Reviewer's report

Title: Fat-free mass prediction equations for bioelectric impedance analysis compared to dual energy X-ray absorptiometry in obese adolescents: a validation study

Version: 1 Date: 15 July 2015

Reviewer: Tom Hazell

Reviewer's report:

General Comments to Author:
This is an interesting study examining if there is a predictive equation for FFM based on BIA that is as accurate as DXA. Considering DXA is considered accurate but not always practical, and BIA is considered practical but not accurate, this is an important question. However, there are several issues that need to be addressed before publication can be warranted.

Specific Comments:

Abstract
- No mention of methodological controls on subjects, such as all body comp measured fasted?
- No mention of how many equations were considered?
- Overall, the abstract needs to be revised to focus on the purpose of the study

Keywords
- fat-free mass, bioelectric impedance analysis, DXA are all in the title so should not be keywords
- what about body composition, accuracy?

Introduction
Ln 68 – Are hospitals the only settings to use DXA? Perhaps this can be reworded to special settings not just hospitals

Ln 72 – capitals necessary on “Bioelectrical Impedance Analyses”?

Lns 72-83 – This paragraph needs to be revised to better address that while BIA is practical, it may not be accurate and that the predictive equations used with BIA could be important in this accuracy

Methods
Ln 88 – What does VU stand for if it is an acronym?

Ln 92 – Basically a repeat of Ln 91 but with blood pressure omitted?
Lns 93-94 – Inclusion criteria includes overweight subjects? This does not agree with Lns 171-172. What is the obesity criteria defined by Cole et al? The reference is warranted but the criteria should be detailed here as it is key to the study.

Ln 96 – Should ‘retardation’ not be replaced with developmentally delayed or something more appropriate?

Ln 96 – What are the physical limitations or at least some generalization to inform the reader.

Ln 104 – No mention of subjects being fasted yet. No other controls over study visit?

Ln 108 – BMIsds should be detailed here.

Ln 123 – Here fasting state is mentioned but no details are provided.

Ln 127 – That subjects were measured supine should be earlier on in the description of the BIA procedure.

Results
Ln 172 – Why overweight subjects not included? Overweight was an inclusion criteria as I have mentioned above?

Ln 174 – Remove the mean age from the brackets as it is in Table 1. Further, should F & M not be girls and boys?

Lns 179-182 – Put the n=# in brackets for clarity.

Lns 184-187 – Could Table 2 not be broken down to equations on children only, adolescents only, obese adolescents, and then adults?

Ln 188 – Why brackets and +/- for FFM by DXA?

Lns 188-194 – This calculations should be detailed in the methods so the reader knows exactly how these were performed.

Lns 204-206 – This information is not in the methods? It is not described that the subjects were measured at six months after baseline. It is only indicated that all measures took place on the same day in the fasted state.

Discussion
Ln 215 – That the FFM equations are for BIA should be acknowledged.

Ln 217-218 – What “much larger increase in FFM”? Do the authors mean a larger difference in FFM between boys and girls?

Ln 222-223 – Why use 5% if 2.5% is more appropriate? These lines do not support the use of 5%? Further, if there is a rationale for 5%, then perhaps the authors could demonstrate how poor the accuracy would be if it were 2.5%. If
~60-65% is bad with 5% error, how poor would it be for 2.5%?

Ln 232 – Age is more important to have here rather than gender?

Ln 234 – “quite right” is incorrect here. And doesn't the fact that the Deurenburg equation predicted FFM correctly contrast to what was written above?

Ln 236 – device not apparatus?

Lns 247-252 – Should the fact that DXA is still the gold standard not be mentioned here? While the authors are correct that there could be error in the DXA measure, it is still the best measure we have for body composition.

Lns 253-254 – Is one sentence and 2 lines a paragraph? Could this not be combined with the following paragraph? A reference is required here as well.

Ln 257 – “nowadays” is slang. This sentence should be reworded.

References
The journal abbreviations are in improper format for #3, 5, 8, 10, 11, 14, 15, 19, 21, 24, 28, 30, 31, 32, and 33.

Figure 1
Should these panels not be labeled in some way (a, b, c)?

Why not bar graphs for boys and girls so that the order of equations can be the same?

Table 1
Capitals on girls and boys?

The 2 in kg/m2 should be superscript.

Brackets needed around sd for boys.

Table 2
The idea of this table is very good. However, the product needs some revision. There is much overlap between columns 2 – 7. If the information in column 2 was decreased to not overlap with columns 3-7 then all could be shortened to allow more room for column 8 on the equations. Perhaps, the N and gender breakdown could be removed and added to the other columns. While this table illustrates important information, it is not effective in its current state.

Table 3
All values that are “.0” should be “0.0”.

**Level of interest:** An article whose findings are important to those with closely related research interests
Quality of written English: Needs some language corrections before being published

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.