SWB UNICEF Anthropometric Standardization

Summary

Accuracy, Precision and Possible Fraud

In UNICEF nutrition survey trainings, we train data collectors on anthropometric measures, then practice and test all individuals for their capacity to measure height, weight and middle upper arm circumference (MUAC) with an acceptable accuracy and precision. Each trainee is responsible to measure 10 children twice.  All tools are standardized so there is no risk of measurement bias from the instruments.   If they fail, we have to retrain until they pass or they are not hired. Our problem is that when there is poor supervision of the process and there is cheating. The sharpest trainees copy some but not all of the measures from the first round to the second round.  As there are 20 measures of height, weight and MUAC for each child, we can calculate the accuracy and precision of each measure for each trainee.  We have several databases of these training exercises from the region. We would like to determine the statistical probability of cheating in the results for each trainee.   For example, what is the probability of one trainee recording twice a MUAC 1 cm away from the median measure of the group or the master trainer in the exercise?  What is the probability that trainee A and trainee B record the same measure of MUAC when that measure is 0.5 cm from the median measure?

Objectives

* How can we detect possible fraud in anthropometric standardization data?
* How to define cheating?
  + Exact copying of measurements Inter and intra trainees.
  + Intentionally entering data that does not correspond measurements made by the trainee to achieve an acceptable level accuracy and precision
* Definition of improved methodologies for conducting and analysing the anthropometric standardization

Notes on the data:

* Normally the data are collected by 20 trainees by measuring 10 children twice over a 4 hour period
* Data are not always available from all 10 children twice
* When a supervisor was used as the reference for comparison (gold standard), they are identified in the position column as supervisor and their id number if one was used. Supervisors are not always used as the gold standard.
* Weight data are almost always the most accurate and precise as the measures are made with a digital scale accurate to 100g
* MUAC data are the most difficult to analyse. Trainees without extensive field experience tend to pull the MUAC band too tight when measuring children. We do not yet have a MUAC measuring tool with a standard tension for making survey measurements. The UNICEF supply division has identified a MUAC tape with standard tension for measuring women, but currently a smaller MUAC tap for measuring children has not been identified.