



Comparison between calculated and direct measurements of CD4 percentage for immunological monitoring of antiretroviral therapy in children

Kihembo M, Ntege NP, Munderi P, Muhangi M, Levin J, Hughes P, Tweyongyere R

MRC / UVRI Uganda Research Unit on AIDS





BACKGROUND



- 2.1 million Children are estimated to be living with HIV/AIDS; majority in sub-Saharan Africa
- CD4 levels are required for ART initiation and immunologic monitoring
- In children CD4% is applied
- Limited facilities to perform direct CD4% measurement
- The alternative approach is to compute the CD4 percentage





OBJECTIVE



- To compare calculated and direct measurements of CD4 percentage in assessing pediatric eligibility for ART and immune monitoring





METHODS



- CD4% was determined for 99 children enrolled in ARROW trial at MRC by two approaches:
 - Direct CD4% using the single platform assay by BD Facscalibur as a gold standard.
 - CD4% computed from absolute lymphocytes obtained by Beckman Coulter and CD4 count obtained by BD Facscount flowcytometer.

$$\text{CD4\%} = \frac{\text{Absolute CD4 count}}{\text{Absolute lymphocytes}} \times 100$$





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Coulter ACT5 Diff CP



BD Facscount





ANALYSIS



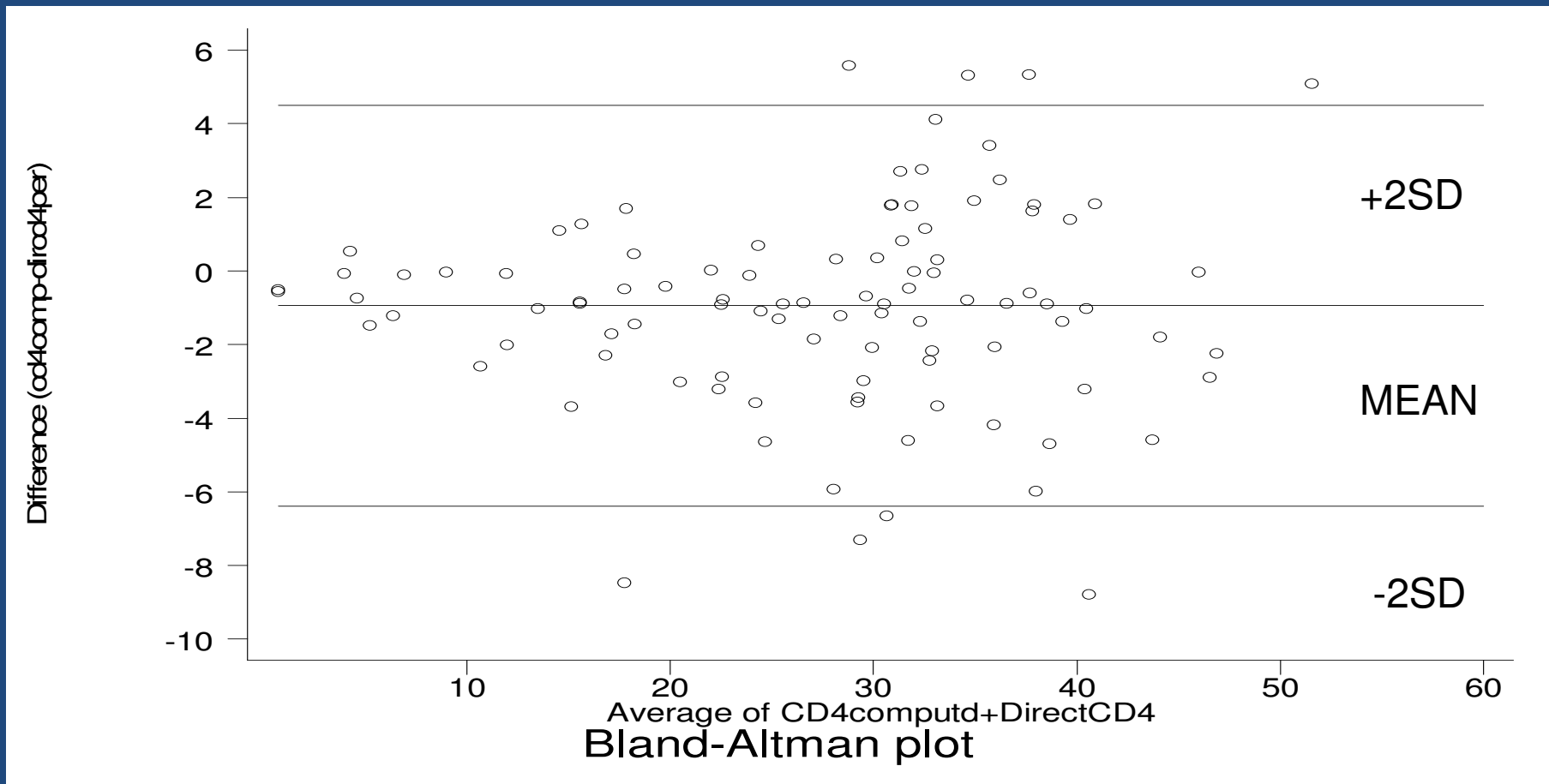
- The two techniques were compared using:
 - Bland -Altman statistical methods
 - Lin's concordance correlation coefficient (R_c)
- Using the Facscalibur as the gold standard the sensitivity and specificity of the computation method was determined





RESULTS

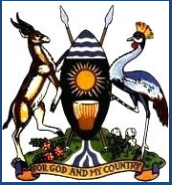
BLAND - ALTMAN PLOT



95% limits of agreement were between -6.28 to 4.4 (width interval = 10.7)

This suggests acceptable agreement between the methods

RESULTS

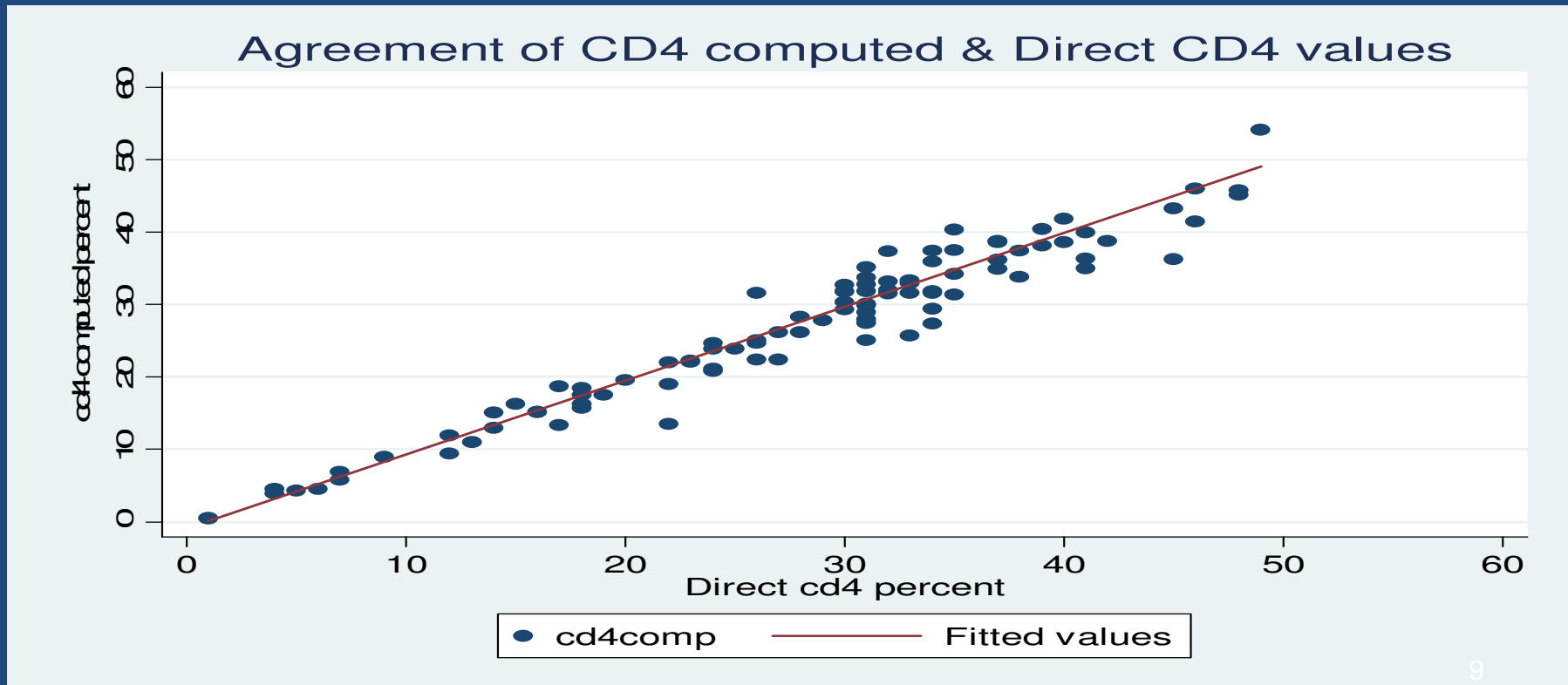


Lin's concordance correlation coefficient (R_c)



There was a strong agreement between computed CD4% and direct CD4% values of 0.97.

Excellent agreement is defined as $R_c > 0.90$





RESULTS



- The computed method had
 - sensitivity of 100%
 - specificity of 97.3%





CONCLUSIONS



- Computing CD4 percentage could be a reliable alternative method for pediatric immunologic monitoring in centers that can afford low cost CD4 count testing facilities without access to automated analysers.
- The high sensitivity and specificity tests mean that many children who need to be started on ART cannot be missed.





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