



Addressing Childhood Malnutrition: Can We Measure Body Composition?

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The Challenge: Differences Between Treatments Will Be *Small*

- Example: malnourished infant weighing 5.0 kg on admission
- Gains 15% weight in 8 weeks = 750 grams
- Diet A causes weight gain 30% fat, 70% lean
 $\Delta \text{lean } 525 \text{ g} = 9.3 \text{ g/d}$
- Diet B causes weight gain 40% fat, 60% lean
 $\Delta \text{lean } 450 \text{ g} = 8.0 \text{ g/d}$

How can we measure body composition?

- Gold standard imaging
 - DXA
- 2-compartment models eg air displacement plethysmograph, body water



Little bias, but expensive, requires electricity, need to be motionless for scanning



- **2-C methods only as good as their assumptions!**
- **ADP relies on fixed density of fat and lean tissue**
- **TBW relies on fixed hydration**



How can we measure body composition?

- Gold standard imaging
– DXA
- 2-compartment models eg
air displacement
plethysmograph, body
water
- **Simple derivative
methods e.g.
bioelectrical
impedance**



Simple field technique

**Poor accuracy (relative to
ADP (± 200 g lean tissue))**

**May be suitable for x-
sectional, not for changes
over time**



What Else Is There?

- Basic techniques – MUAC, skinfolds
- Functional tests (e.g. strength)
- Coming next – creatine dilution?
- Isotope dilution techniques...

**Clark et al. J Appl Physiol
2014;116:1605**



Sensitive to field errors and differences across assessors

Potential to combine methods to estimate muscle (Jaswant & Nitish 2014)

