Emerging Evidence Lightning Talks

June 27th, 2018
Food Assistance for Nutrition Evidence Summit
Washington D.C.
Please cite this presentation as:

Milk protein and micronutrients added to a school meal improves cognition in Ghanaian children

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Washington D.C.
Dani Van Liefde, Mark Manary, MD
Benefits of school feeding:

- Increase school attendance, enrollment and alleviates short-term hunger
- Cow’s milk in school meal: stimulates weight gain, linear growth, improves nutrition status – mixed results
  - Effects on cognition?

Ghana: Government school feeding program since 2005

- 1 nutritious meal/day; Covers 38% of school population.
- Costs $0.25/child/day and ~35 million USD/year
- Multisector approach engaging 7 government ministries

In Reality -

- Food is served about 1/3 of the time at participating schools
- No regulation on the foods served – mostly boiled cereal, maize or rice

What we know

1 in 5 children receive a school meal.
To test the hypothesis that Ghanaian schoolchildren receiving a micronutrient supplement with 8.8g milk protein/d would have superior linear growth and performance on CANTAB cognitive tests when compared to 1 of 3 control groups.

**Study Objective**

**Primary outcomes:** linear growth & cognitive test scores

**Secondary outcome:** body composition
LOCATION: ATEBUBU

PARTICIPANTS

- Evenly M/F
- 6-9 years old (average 7.5)
- Siblings: 4 average
- 57% clean water source
- 51% contained stool disposal
- Only 1 household owned a computer
- Dairy consumption average: 1 day/week average
- Meat consumption average: every 3 days
Intervention Supplements by Arla

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Grams of Powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk8</td>
<td>8.8g</td>
</tr>
<tr>
<td>Milk4</td>
<td>0.2g + 4.4g</td>
</tr>
<tr>
<td>Milk/Rice</td>
<td>0.2g + 4.4g</td>
</tr>
<tr>
<td>Control</td>
<td>0.2g + 1.8g</td>
</tr>
</tbody>
</table>

**Composition of 4 Powder Interventions**

- **Micronutrients**
- **Sugars**
- **Rice Protein**
- **Milk Protein**

- 13 schools, 1400 children
- Randomized into 4 color-coded groups
- Breakfast + supplement each school day for 9 months
- Attendance was taken daily; cooks/assistants ensured full consumption of meal.
Assessments: baseline, 4.5 and 9 months

ANTHROPOMETRICS

Measurements:
- Height
- Weight
- MUAC

CANTAB: 5 tests, 13 scores
1. Motor Screening Task (MOT)
2. Big/Little Circle (BLC)
3. Paired-Associated Learning (PAL)
4. Pattern Recognition Memory (PRM)
5. Intra/Extradimensional Set Shift (IED)

COGNITION

Δ HAZ – 9 months
Δ 13 Scores – 4.5 months

BODY COMPOSITION

RJL Systems Quantum IV Bioelectric Impedance Analyzer
- Fat Mass (FM)
- Fat Free Mass (FFM)
- Lean Dry Mass (LDM)
- Total Body Water (TBW)

Δ FFMI – 9 months
Results

**BASELINE:** No differences between the 4 supplement groups

1. **COGNITION:** CANTAB – PRM and IED Tests

   - **0g Milk vs. 4g Milk vs. 8g Milk**
     - PRM 1/2 tests; IED 3/3 tests
   - **8g Milk vs. 8g Milk/Rice**

2. **ANTHRO:** HAZ
   - No differences found

3. **BODY COMP:** FFMI
   - Significant differences found

![Graphs showing results for height-for-age, z-score, and fat free mass index for different supplement groups.](image)
CONCLUSIONS

Ghanaian school children consuming 8.8g milk protein + micronutrients in a school meal demonstrated...

• Improvement in executive cognitive function at 4.5 months
• No effect on linear growth after 9 months

All groups consuming milk protein led to the accretion of more fat free mass than the control after 9 months.

Supplements cost $0.06
Testing Novel Supplementary Food Formulation in Young Children in Rural Villages in Low-Income Country:

Results of RCT in children aged 15 months – 7 years in Guinea-Bissau

Susan B. Roberts, PhD
Director, Energy Metabolism Laboratory
Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University
Professor of Nutrition, Tufts University
Professor of Psychiatry & Scientific Staff Member in Pediatrics, Tufts Medical School
New Supplement Design

• **Emphasizes polyphenol-rich ingredients** both for potential cognitive effects (neurogenesis, myelination, inflammation) and as source of micronutrients: cocoa, fish oil

• Adds micronutrients as needed to get **all micronutrients as close to daily requirements as possible** (e.g. 100% RDA iron)

• Protein 22% calories

• **Blended preparation approach**: prepared in the village from local ingredients plus imported mix of ingredients not available locally
2017 Efficacy Trial

• Based on published pilot that showed significant cognitive benefit (Roberts et al. https://doi.org/10.3945/cdn.117.000885)

• Conducted powered RCT with 3 supplements

• Hypothesis: new supplement will improve cognitive function (primary outcome) as well as body composition, anemia and brain blood flow relative to traditional breakfast in children <4 years who eat most of provided supplement (defined >75%)

• Also compared SuperCereal+ to the traditional breakfast
Protocol

• Randomized controlled trial of 3 supplements 5 d/week for ≈6 months in 10 villages (n=1092 children 15 months to ≈7 years w/ >300 <4 years)
  • Randomization families within villages
  • New-Sup, SuperCereal+ porridge, Control (traditional rice breakfast)

• Outcomes measured at baseline (before supplementation) and 6 months
  • Primary: executive function (working memory) measured by local adaptation of classic Spin-the-Pot test
  • Secondary: growth, hemoglobin, supplement adherence, safety, brain blood flow

• High supplement consumption in all groups (83% New-Sup, 81% SC+, 83% Control, P=0.52)
Consort diagram: overall and 75% supplement adherence cohorts

Enrolled
n=1092 participants
(n=877 participants)

Attended baseline visit
n=1041 participants
(n=863 participants)

Randomization

New Supplement
n=357 participants
(n=296 participants)

SuperCereal+
n=341 participants
(n=281 participants)

Control
n=343 participants
(n=286 participants)

Attended follow-up visit

Children under 4 years old

New-Sup
n=138
(n=113)

SC+
n=121
(n=99)

Control
n=121
(n=104)

Children 4 years and older

New-Sup
n=185
(n=176)

SC+
n=174
(n=168)

Control
n=187
(n=175)

Sample sizes for cohort with 75% adherence to supplementation are displayed in bold.
# Descriptive Statistics

**Children < 4 years with ≥75% adherence**

<table>
<thead>
<tr>
<th></th>
<th>New-Sup</th>
<th>SC+</th>
<th>Control</th>
<th>P</th>
<th>BL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>3.0 ± 0.7</td>
<td>2.9 ± 0.7</td>
<td>2.9 ± 0.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N (M/F)</strong></td>
<td>120 (63/57)</td>
<td>107 (56/51)</td>
<td>108 (66/42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adherence (%)</strong></td>
<td>90 ± 6</td>
<td>92 ± 5</td>
<td>93 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight-for-Age Z</strong></td>
<td>-1.29 ± 0.9</td>
<td>-1.22 ± 1.0</td>
<td>-1.33 ± 1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Height-for-age Z</strong></td>
<td>-1.74 ± 1.2</td>
<td>-1.67 ± 1.4</td>
<td>-1.80 ± 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BMI for age Z</strong></td>
<td>-0.26 ± 1.0</td>
<td>-0.20 ± 1.0</td>
<td>-0.26 ± 1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hemoglobin (g/dL)</strong></td>
<td>10.3 ± 1.3</td>
<td>9.8 ± 1.4</td>
<td>10.0 ± 1.5</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>% sev/mod anemia</td>
<td>0+32</td>
<td>5+36</td>
<td>1+33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lean arm tissue</td>
<td>1.8 ± 1.3</td>
<td>1.9 ± 1.4</td>
<td>1.9 ± 1.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significance level: *
Summary:
Multiple benefits for brain and body

• Need to publish results in peer-reviewed journal before public dissemination

• Results in the analysis so far:
  • High rates of consumption – children liked new supplement
  • Beneficial effects on executive function in predefined primary outcome and predefined analyses
    • Related - increase brain blood flow
  • Beneficial effects on anemia (>SC+ or traditional)
  • (Preferentially builds muscle with much less fat deposition c/w SuperCereal+)
Opportunities

• Identify most active constituents in this multi-component supplement?

• Scaling:
  Use of new supplement in Guinea-Bissau and other low income countries with low baseline nutrition to improve treatment of anemia, muscle loss and cognition?

• Long-term supplementation:
  Combine with educational enrichment to demonstrate accelerated learning?
RESEARCH ON FOOD ASSISTANCE FOR NUTRITIONAL IMPACT

FAQR Evidence for Action, Washington DC

June 2018
Introduction

Consortium partners:
- Action Against Hunger
- Concern Worldwide (CWW)
- Emergency Nutrition Network (ENN)
- University College London (UCL)

Funding:
- UK aid from the UK Government
- Humanitarian aid from the European Commission

Duration: March 2014 – May 2017
REFANI Research Questions

PRIMARY QUESTION
Can Cash Based Interventions (CBI) protect nutritional status in children (aged 6-59 months) in a range of crisis contexts?
REFANI Country Studies

Pakistan

Niger

Somalia

DADU, SINDH PROVINCE

AFGOYE CORRIDOR

TAHOUA DISTRICT
## Study Interventions

<table>
<thead>
<tr>
<th>Study Country and Arm</th>
<th>Type of Cash or voucher transfer</th>
<th>Amount of transfer per month</th>
<th>Duration and dates of distribution programme</th>
<th>Total amount of transfer $US</th>
<th>Target recipient or cash or voucher transfer</th>
<th>Complementary interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Niger</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>Seasonal unconditional cash transfer</td>
<td>CFA 32,500, $US 58</td>
<td>4 months, Jun-Sep 2015</td>
<td>233</td>
<td>Mothers</td>
<td>4 months supplementary feeding</td>
</tr>
<tr>
<td>Modified Cash</td>
<td>Earlier and longer seasonal unconditional cash transfer</td>
<td>CFA 21,666, $US 39</td>
<td>6 months, Apr-Sep 2015</td>
<td>233</td>
<td>Mothers</td>
<td>4 months supplementary feeding</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pakistan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>Unconditional cash transfer</td>
<td>PKR 1,500, $US 15</td>
<td>6 months, Jul-Dec 2015</td>
<td>88</td>
<td>Mothers</td>
<td>WINS</td>
</tr>
<tr>
<td>Double Cash</td>
<td>Unconditional cash transfer</td>
<td>PKR 3,000, $US 29</td>
<td>6 months, Jul-Dec 2015</td>
<td>175</td>
<td>Mothers</td>
<td>WINS</td>
</tr>
<tr>
<td>Fresh Food Voucher</td>
<td>Voucher transfer</td>
<td>PKR 1,500, $US 15</td>
<td>6 months, Jul-Dec 2015</td>
<td>88</td>
<td>Mothers</td>
<td>WINS</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Somalia</strong></td>
<td>Unconditional cash transfer, NFI kits, free piped drinking water</td>
<td>$US 84</td>
<td>5 months, May-Oct 2016</td>
<td>420.00</td>
<td>Mothers</td>
<td>Free drinking water, non-food item kit</td>
</tr>
</tbody>
</table>

1. NFI: Non-Food Item
## Household Results

<table>
<thead>
<tr>
<th>Study Country &amp; Arm</th>
<th>Household Total Expenditure (US$/30 days)</th>
<th>Household Food Expenditure (US$/30 days)</th>
<th>Household Dietary Diversity Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline mean ± SD</td>
<td>Intervention effect after 6 months (95% CI)</td>
<td>Baseline mean ± SD</td>
</tr>
<tr>
<td><strong>Niger</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>42.04 ± 26.14</td>
<td>-2.31 (-8.11, 3.48) P&gt;0.05</td>
<td>32.12 (28.42, 35.66)</td>
</tr>
<tr>
<td>Modified Cash</td>
<td>42.93 ± 28.38</td>
<td></td>
<td>34.05 (31.97, 35.97)</td>
</tr>
<tr>
<td>Control</td>
<td>77.3 ± 36.1</td>
<td></td>
<td>53.0 (18.3, 70.8)</td>
</tr>
<tr>
<td>Standard Cash</td>
<td>70.8 ± 33.6</td>
<td>10.0 (5.4, 14.5) P&lt;0.001</td>
<td>38.9 (17.2, 61.3)</td>
</tr>
<tr>
<td><strong>Pakistan</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Cash</td>
<td>79.0 ± 32.9</td>
<td>4.5 (-0.1, 9.1) P=0.06</td>
<td>48.2 (16.5, 68.2)</td>
</tr>
<tr>
<td>Fresh Food Voucher</td>
<td>73.8 ± 37.3</td>
<td>3.1 (-1.4, 7.7) P=0.18</td>
<td>50.6 (18.2, 69.2)</td>
</tr>
<tr>
<td>Control</td>
<td>75.7 ± 37.3</td>
<td></td>
<td>49.0 ± 25.2</td>
</tr>
<tr>
<td>Intervention</td>
<td>92.1 ± 49.1</td>
<td>29.6 (3.5, 55.7) P=0.028</td>
<td>68.8 ± 35.1</td>
</tr>
</tbody>
</table>

1 The Household Food Insecurity Access Scale (HFIAS) was also measured in Niger and this showed a significant improvement in household food security in households receiving the modified CTP during the initial 2 months of the transfer when the standard cash arm was not receiving cash (P<0.001 & P=0.0019).

2 NM = not measured
# Diet Diversity in Children

<table>
<thead>
<tr>
<th>Country</th>
<th>Individual Dietary Diversity Score</th>
<th>Recent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Baseline</strong></td>
<td><strong>6-month Intervention effect (95% CI)</strong></td>
</tr>
<tr>
<td>Niger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>2.3 ± 1.3</td>
<td>-0.03 (-0.59, 0.52)</td>
</tr>
<tr>
<td>Modified Cash</td>
<td>2.5 ± 1.3</td>
<td>P=0.904</td>
</tr>
<tr>
<td>Control</td>
<td>7.5 ± 2.0</td>
<td>0.59 (0.39, 0.79)</td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td><strong>P&lt;0.001</strong></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>7.0 ± 1.9</td>
<td>0.73 (0.33, 0.93)</td>
</tr>
<tr>
<td>Double Cash</td>
<td>7.1 ± 2.0</td>
<td><strong>P&lt;0.001</strong></td>
</tr>
<tr>
<td>Fresh Food Voucher</td>
<td>7.2 ± 1.9</td>
<td>0.43 (0.23, 0.63)</td>
</tr>
<tr>
<td>Somalia</td>
<td></td>
<td><strong>P=0.001</strong></td>
</tr>
<tr>
<td>Intervention</td>
<td>2.95 ± 1.03</td>
<td>0.57 (0.04, 1.10)</td>
</tr>
</tbody>
</table>

1. Intervention effects are shown as the change in the mean or proportion (difference in difference).
2. A 2-week recall period was used in Pakistan and a 4-week recall period was used in Niger and Somalia.
Primary Outcomes: Children

Study Country & Arm

- Standard Cash
- Modified Cash
- Control
- Standard Cash
- Pakistan
- Double Cash
- Fresh Food Voucher
- Control
- Somalia
- Intervention
## Secondary Outcomes: Children

<table>
<thead>
<tr>
<th>Country</th>
<th>Stunting (HAZ &lt; -2)</th>
<th>6-month intervention effect</th>
<th>12-month intervention effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@ Baseline prevalence</td>
<td>OR (95% CI)</td>
<td>P-value</td>
</tr>
<tr>
<td>Niger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>36.6% (33.0, 40.3)</td>
<td>OR 1.33 (0.97, 1.84)</td>
<td>P=0.078</td>
</tr>
<tr>
<td>Modified Cash</td>
<td>34.8% (30.6, 39.3)</td>
<td>NM</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>51.7% (48.2-55.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Cash</td>
<td>50.9% (47.6-54.2)</td>
<td>OR 0.36 (0.22, 0.59)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Cash</td>
<td>46.5% (43.0-49.9)</td>
<td>OR 0.39 (0.24, 0.64)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Fresh Food Voucher</td>
<td>54.9% (51.5-58.3)</td>
<td>OR 0.41 (0.25, 0.67)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Somalia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>45.4% (36.4, 54.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention¹</td>
<td>55.5% (44.6, 65.9)</td>
<td>-0.16% (-7.61, 7.29)</td>
<td>P=0.9</td>
</tr>
</tbody>
</table>
Conclusions and Recommendations

• The combined findings indicate that cash and voucher transfers are only effective at reducing acute malnutrition in some contexts and the effect size may be small.

• This finding is consistent with the existing literature from development contexts and is unsurprising given the multiple causes of malnutrition and the fact that only some of these risk factors are likely to improve following short term cash or voucher transfers to individuals.

• The Pakistan study found compelling evidence that cash and voucher transfers can increase mean HAZ and reduce stunting, with moderate effect sizes.
Conclusions and Recommendations

• CBI are a useful tool in humanitarian response but they will not usually be adequate, *by themselves*, to achieve humanitarian nutrition and health objectives.

• Important drivers of health and nutrition outcomes, including access to vaccination, WASH infrastructure, and access to curative nutrition and health services, are unlikely to be removed by cash transfers to individual beneficiaries in most contexts, and will continue to require direct, sector-specific interventions.

• Research in difficult humanitarian contexts is important and possible, given donor support and strong partnerships.
Impact of food supplements on fat-free mass, hemoglobin, iron status, and inflammation in children with moderate acute malnutrition: a 2x2x3 factorial randomized trial in Burkina Faso

André BRIEND
University of Copenhagen (Denmark)
University of Tampere (Finland)
andre.briend@gmail.com
Treatfood Project – Burkina Faso

• Objective: to assess the impact on weight gain, body composition (measured with D2O) and Hb status of:
  
  - Corn-soy blend vs. lipid based supplements (LNS)
  - Milk vs. soy as protein source
  - dehulled soy vs. soy isolates

• Settings: ALIMA project, Province du Passoré, Burkina Faso

• Subjects: 6-23 months children with MAM:
  
  - MUAC 115-125mm or WHZ >-3 <-2

Trial registration: ISRCTN42569496

### Study design

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Soy quality</th>
<th>Milk (% of protein)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dehulled</td>
<td>0</td>
</tr>
<tr>
<td>CSB</td>
<td>Isolate</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Dehulled</td>
<td>D</td>
</tr>
<tr>
<td>LNS</td>
<td>Isolate</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>Dehulled</td>
<td>J</td>
</tr>
</tbody>
</table>

All supplements provided 500 kcal; all had the same mineral vitamin premix
Results (1)

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Soy quality</th>
<th>Milk protein (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNS vs CSB</td>
<td>Isolate vs dehulled</td>
<td>20% vs 0%</td>
</tr>
<tr>
<td>FFMI (kg/m²)</td>
<td>0.083 (0.003; 0.163)</td>
<td>0.038 (0.042; 0.118)</td>
</tr>
<tr>
<td>FMI (kg/m²)</td>
<td>0.052 (-0.024; 0.127)</td>
<td>-0.003 (-0.078; 0.073)</td>
</tr>
<tr>
<td>FFM (g)</td>
<td>37 (-10; 84)</td>
<td>24 (-23; 71)</td>
</tr>
<tr>
<td>FM (g)</td>
<td>28 (-12; 67)</td>
<td>1 (-38; 40)</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>75 (32; 119)</td>
<td>36 (-8; 79)</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>0.03 (-0.05; 0.11)</td>
<td>0.02 (-0.07; 0.1)</td>
</tr>
<tr>
<td>Weight-height Z</td>
<td>0.11 (0.04; 0.17)</td>
<td>0.05 (-0.01; 0.11)</td>
</tr>
<tr>
<td>Knee-heel (mm)</td>
<td>0.4 (-0.2; 1)</td>
<td>0 (-0.6; 0.6)</td>
</tr>
<tr>
<td>MUAC (mm)</td>
<td>1 (0.5; 1.6)</td>
<td>0.3 (-0.24; 0.85)</td>
</tr>
<tr>
<td>Triceps (mm)</td>
<td>0.16 (0.06; 0.25)</td>
<td>0.06 (-0.04; 0.16)</td>
</tr>
</tbody>
</table>

- LNS increased fat-free mass accretion relative to CSB
- Soy isolate had no main effect. If beneficial, only in LNS
- Milk only marginally significantly increased FFMI and knee-heel length
Results (2)

- **LNS vs CSB**
  - Hemoglobin: 3 (1; 4) g/L
  - Serum ferritin: 4.3 (6.6; 12.3) µg/L
  - Serum sTfr: -1.0 (-1.4; -0.6) mg/L

- **Soy quality**
  - No effects

- **Milk content**
  - No effects

- **LNS increased iron status and haemoglobin** relative to CSB
  - Soy isolate had no main effect.
  - Milk had no effect

Note: LNS also had an effect on inflammation markers

Discussion: main effect (1)

Children gained predominantly fat free mass (93.5%), like well nourished children of the same age, even when they received lipid based supplements

Higher-fat free mass index with LNS
Muscle, a major component of fat-free mass protective against chronic diseases by improving insulin sensitivity

Concern re. an increased risk of obesity and chronic diseases with LNS and other food supplements in MAM children not supported by these data
Discussion: main effect (2)

LNS lead to significantly higher weight gain and higher fat free mas index; consistent with previous studies

No clear effect of milk compared to soy:

- No dose effect relationship
- Not consistent with previous studies on SAM children
- Mechanism of the usual effect of milk products unknown:
  - AA profile ?
  - Protein level ?

No effect of soy isolates compared to dehulled soy:
- High nutrient / phytate ratio ? No effect on mineral absorption ?
Discussion (3): Hb, iron and inflammation

LNS led to significantly higher Hb concentration
All markers of iron status suggest improvement

Explanation: better acceptability? Less sharing? Better absorption with a vitamin C effect? Less antinutrients?

Effect of LNS on inflammation markers:
Explanation: increased infection? No evidence; no difference in malaria diagnostic; increased iron and LA intake?
Acknowledgements:

Took part in this study:

And the Burkina Faso team:
93 project staff
~ 300 CHW
Lower cost efficacious RUTF made in developing countries

Steve Collins
Valid Nutrition
Our Mission

Breaking the mould and driving evidence-based change

We exist to make effective affordable and appealing nutrition available to consumers in developing countries - at scale.

To do things differently we must:

• Offer **better and less costly nutritional products**

• **Source and manufacture in developing countries**

• Treat recipients as proactive clients & **focus on “demand” not just “supply”**
Soya, Maize, Sorghum (SMS)- RUTF with Amino Acid

Three arm non-inferiority individually randomized controlled efficacy trial


<table>
<thead>
<tr>
<th></th>
<th>No Milk</th>
<th>9.3% milk</th>
<th>25% milk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ITT analyses = 433 (262/171)</td>
<td>ITT analyses=420 (253/167)</td>
<td>ITT analyses=446 (280/166)</td>
</tr>
<tr>
<td>PP analysis</td>
<td>cure rate=360 (211/149)</td>
<td>cure rate=355 (205/150)</td>
<td>cure rate=380 (229/151)</td>
</tr>
<tr>
<td></td>
<td>Defaulters excluded n=73 (51/22)</td>
<td>Defaulters excluded n=65 (48/17)</td>
<td>Defaulters excluded n=66 (51/15)</td>
</tr>
<tr>
<td></td>
<td>Weight gain &amp; LOS=340 (196/144)</td>
<td>Weight gain &amp; LOS=330 (186/144)</td>
<td>Weight gain &amp; LOS=353 (210/143)</td>
</tr>
<tr>
<td></td>
<td>Not cured excluded n=93 (66/27)</td>
<td>Not cured excluded n=90 (67/23)</td>
<td>Not cured excluded n=93 (70/23)</td>
</tr>
</tbody>
</table>

Numbers in each analysis - Total (< 24 months / >= 24 months)
Recovery rates equivalent to Peanut Milk recipe RUTF

Treatment of anaemia superior to Peanut Milk recipe RUTF

Cost comparison Soya Maize Sorghum RUTF Vs standard milk peanut RUTF

Lower cost recipes using local crops

Source: Valid Nutrition 2017
Other benefits of Soya Maize Sorghum RUTF compared to the standard milk peanut RUTF

- **Easier and safer to manufacture and use**
  - Reduced aflatoxin risk from peanuts
  - Decreased risk of allergic reaction to peanuts amongst users
  - Decreased costs and working capital requirements for manufacture in developing countries
  - No issues with lactose intolerance

- **Decreased carbon footprint and enhanced sustainability**
  - Use of plant origin ingredients grown in developing countries
  - Few food miles for production and use

- 10% lower sugar content
Agricultural diversity & sustainability

Recipes using local crops

Valid’s Model

Economic empowerment

Lower cost more efficacious products

Thank you for listening