Dissemination of Results:
Feasibility and Acceptability Study of
Preparing Corn Soy Blend with Fortified
Vegetable Oil in Malawi

Save the Children, 2000 L Street NW
Washington, DC
May 28, 2015
Food Aid Quality Review (FAQR) Background

- Tufts University Research supported by USAID
- FAQR Phase I: Assessing the quality of Title II food aid products in meeting the nutritional needs of beneficiaries
  - April 2009 – September 2011
  - *Delivering Improved Nutrition: Recommendations for Changes to U.S. Food Aid Products and Programs*
- FAQR Phase II: Implement recommendations
  - October 2011 – Present
  - Target Ratio: 30 g FVO to 100 g CSB (approx. 2 ¼ US tablespoons FVO to 3/4 US cups CSB)
  - Multiple field studies
  - Stakeholder consultations
Development and testing of new or modified nutritionally enhanced food aid commodities

Products

Programs

Process

Uses of food aid products to meet nutritional goals in the context of Title II development programs: Four field studies

Safety, quality assurance in the supply chain, harmonization of food aid processes and specifications among donor agencies, and coordination among agencies within USG
Programs: FAQR Field Studies

Prevention of MAM: Comparison of supplementary foods (Burkina Faso)

Feasibility: Will caregivers prepare CSB with adequate FVO? (Malawi)

Treatment of MAM: Comparison of supplementary foods (Sierra Leone – suspended)

Treatment of MAM: Comparison of supplementary foods (TBD)
Study Objectives

**Objective 1: Effectiveness and Feasibility**
Evaluate the effect of 1) additional fortified vegetable oil (FVO) ration and SBCC, and 2) additional FVO ration and SBCC *plus* providing repackaged CSB in 2 kg packets with printed preparation instructions with regard to:
- The ratio of FVO to CSB in porridge prepared by caretakers
- Sharing and selling of ration
- Targeting of porridge to beneficiary child within the household

**Objective 2: Cost-Effectiveness**
Compare cost per beneficiary and cost per beneficiary meeting the target FVO:CSB ratio among the study groups

**Objective 3: Determinants of Effectiveness**
Evaluate components of the intervention that are associated with caretakers successfully meeting the target porridge ratio
Description of the Supplementary Feeding Program

- Children 6 months – 5 years assessed by MUAC through community screening
- Children with MAM were enrolled in supplementary feeding
- Each eligible child received supplementary food ration monthly for four months
- Beneficiary mother/caretakers (BMCs) collect ration monthly at food distribution points (FDPs)
- At FDP, BMCs receive their ration as well as health talks and food demonstrations
Study Setting: Southern Malawi
Collaborators

• Catholic Relief Services, Project Concern International, Africare, Save the Children
• University of Malawi – Centre for Social Research
• Pakachere Institute for Health and Development Communication
Three Study Phases

Baseline:
- Standard programming: monthly ration = 1 L FVO and 8 kg CSB

Phase I: one intervention group; one control group
- Intervention group received 2.6 L FVO and 8 kg CSB monthly
- Additional SBCC emphasized increased FVO:CSB ratio
- Health workers and lead mothers received additional training

Phase II: two intervention groups; one control group
- Intervention Group 1: received 2.6 L FVO and 8 kg CSB with additional SBCC;
- Intervention Group 2: same intervention as Intervention Group 1 plus repackaged CSB in 2 kg packets with printed food preparation messaging
Repeat Cross-Sectional Design, Multi-Stage Cluster Sampling (by FDP)

Baseline: Jul - Oct ‘13

Phase I: Nov ‘13 - Feb ‘14

Phase II: Mar - Jul ‘14

**Intervention**
- 12 FDPs
- Group 1: FVO + messaging
- Group 2: Add new packaging [6 FDPs, n=196]

**Control Group**
- 4 FDPs

Baseline data collection

Phase I data collection

Phase II data collection

Baseline:
- Jul-Oct ‘13

Phase I:
- Nov ‘13 - Feb ‘14

Phase II:
- Mar - Jul ‘14

**Sampling** (by FDP)
- Standard programming [4 FDPs, n=196]
PHALA LA SOYA NDI MAFUTA NDI MANKHWALA A MWANA WANU WONYENTCHERA. PHALALI LIKUYENERA KUPHIKIDWA MOTSATIRA MILINGO IYI:

UFA - GAWO LIMODZI LA MAGAWO ATATU A KAPU YA CHICHERE

MAFUTA - MASIPUNI ACHITSULO AAKULU 6

Food Aid Quality Review
Distribution of Repackaged FVO
Community Health Workers and Distribution Site
SBCC Messages on Repackaged CSB (Intervention Group 2 only)
## Repackaged CSB Packets (Intervention Group 2 only)

<table>
<thead>
<tr>
<th>2 kg CSB Packet</th>
<th>8 kg bag holding four 2 kg packets</th>
<th>24 kg master bag holding three 8 kg bags</th>
</tr>
</thead>
</table>

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Food Aid Quality Review
Study Methods: Data Collection

Quantitative:
- Interviews (BMCs, Lead Mothers, CHWs, PVO Staff)

Laboratory analysis of porridge samples

Observations
- (HH behavior; food handling/distribution; markets)

Qualitative:
- Focus group discussions (BMCs, Lead Mothers)

Data Collection
Study Methods: Analyses by Objective

- **Objective 1: Effectiveness and Feasibility**
  - Description of household characteristics
  - Adjusted and unadjusted comparison of outcomes across study arms
  - Prevalence of sharing

- **Objective 2: Cost-Effectiveness**
  - Cost per beneficiary (4 months of ration delivered)
  - Cost per BMC preparing porridge at the target ratio

- **Objective 3: Determinants of Effectiveness**
  - Description of potential determinants
  - SBCC scores
Study Methods: Definition of Outcomes

Preparation of porridge

- Mean FVO : CSB ratio*
- Percent of BMCs reaching/exceeding target ratio*
  30g FVO : 100g CSB, recommended by FAQR
- Percent of BMCs reaching/exceeding comparison ratio*
  13g FVO : 100g CSB, derived from WHO recommendations¹

*Ratios determined by lab samples

Results: Descriptive Characteristics

- Study groups were **similar** with respect to:
  - Age (BMC & beneficiary child)
  - Household size
  - SES indicators (number of possessions & HFIAS)
  - Level of education of BMCs
  - Time since last ration collection at FDP

- Study groups significantly **differed** with respect to:
  - Number of children under 5 years
  - Previous enrollment in a supplementary feeding program
  - Number of distributions received since enrollment
Results
Objective 1: Effectiveness and Feasibility
Results: Mean FVO to CSB Ratios across Study Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean FVO to CSB Ratio in Porridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention group 1</td>
<td>28:100</td>
</tr>
<tr>
<td>Intervention group 2</td>
<td>25:100</td>
</tr>
<tr>
<td>Control group</td>
<td>12:100</td>
</tr>
</tbody>
</table>

Results:

- Mean FVO to CSB ratios across study groups.
- Intervention group 1: 28:100
- Intervention group 2: 25:100
- Control group: 12:100

p < .001
Results: Percent BMCs Meeting/Exceeding Specified Ratios

<table>
<thead>
<tr>
<th>Group</th>
<th>Porridge Ratio (\geq 30) FVO:100g CSB (Target)</th>
<th>Porridge Ratio (\geq 13) FVO:100g CSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention group 1</td>
<td>82%</td>
<td>37%</td>
</tr>
<tr>
<td>Intervention group 2</td>
<td>79%</td>
<td>30%</td>
</tr>
<tr>
<td>Control group</td>
<td>5%</td>
<td>38%</td>
</tr>
</tbody>
</table>

\(p < .001\)

**Porridge ratio >= 30g FVO:100g CSB (Target)**

**Porridge ratio >= 13g FVO:100g CSB**
Results: Mean FVO to CSB Ratio in Prepared Porridge

Linear regression model shows the two intervention groups had significantly higher FVO:CSB ratios than the control group

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Unadjusted</th>
<th>Adjusted†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>95% CI</td>
</tr>
<tr>
<td>Control group</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Intervention Group 1</td>
<td>0.18</td>
<td>(0.06, 0.31)</td>
</tr>
<tr>
<td>Intervention Group 2</td>
<td>0.14</td>
<td>(0.02, 0.27)</td>
</tr>
</tbody>
</table>

Adjusted for:
- Number of household members
- Age of child beneficiaries
- Age of BMCs
- BMC education level
- Child enrolled in other SFP
- Household food insecurity
- Number of possessions
- Distance from household to FDP
- Number of distributions received
- Random effect: FDP
### Results: BMCs Reaching Target Ratio (30:100)

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Unadjusted</th>
<th>Adjusted†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio</td>
<td>95% CI</td>
</tr>
<tr>
<td>Control group</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Intervention Group 1</td>
<td>26.8</td>
<td>(3.9, 185.9)</td>
</tr>
<tr>
<td>Intervention Group 2</td>
<td>15.4</td>
<td>(2.3, 104.8)</td>
</tr>
</tbody>
</table>

Logistic regression shows the two intervention groups had significantly higher odds of reaching the target ratio compared to the control group

†Adjusted for:
- Number of household members
- Age of child beneficiaries
- Age of BMCs
- BMC education level
- Child enrolled in other SFP
- Household food insecurity
- Number of possessions
- Distance from household to FDP
- Number of distributions received
- Random effect: FDP
Results: sharing of FVO and CSB

- Only beneficiary child consumes the porridge:
  - Intervention group 1: 53%
  - Intervention group 2: 55%
  - Control: 30%

- Use FVO for porridge only:
  - Intervention group 1: 86%
  - Intervention group 2: 84%
  - Control: 71%

- Use CSB for porridge only:
  - Intervention group 1: 99%
  - Intervention group 2: 99%
  - Control: 99%

*P* < 0.001
Results: Quotes from FGDs with BMCs

“If there are leftovers, we give to other children in the household” - Intervention Group 1

“If there are other children from other households they also eat” - Intervention Group 1

“Every time at the FDP, we are clearly instructed not to give out or sell the ration, so anyone who heard the instructions and has sense would not sell or share the ration” – Intervention Group 2

“I also use the oil for the child’s relish” – Control Group

“When I cook the porridge I know that I am supposed to give the sick child only but I also have another child who is young... so I found myself giving both my children the porridge” – Control Group
FGD with BMCs
Results
Objective 2: Cost-Effectiveness
Results: Cost Components

Commodities
• FVO
• CSB

Transport
• To Malawi
• Within Malawi
• Warehouse

Distribution
• PVO, FDP staff
• Beneficiary time

Intervention only:
• Pre-implementation: formative research, SBCC testing, training
• Repackaging of FVO and CSB
• Ongoing training of health workers

1. Cost per beneficiary (4 mos ration delivered)
2. Cost per BMC preparing porridge at target ratio (CE)
Results: Cost per Beneficiary Child (4 months of ration)*

Intervention Group 1: $143
- CSB
- Oil
- To country transport
- In country transport
- Warehousing
- Personnel Costs
- Distribution costs
- Intervention related costs
- Beneficiary Costs
- Pre-implementation investments

Intervention Group 2: $158

Control Group: $83

*For PCI FDPs only, as representative of PVO costs
Results: “Dog, Tail and Flea” Costs

• Majority of costs are commodities and transport to country (“dog”)
  • After pre-implementation investments, main costs of intervention are increased FVO ration and ongoing SBCC

• Costs of in-country transport, warehousing, and distribution had less impact on program cost or CE (“tail and fleas”) between groups
Results: Cost-Effectiveness

- **Intervention Group 1** was the most cost-effective
- Lowest cost per BMC preparing porridge at target ratio

*For PCI FDPs only, as representative of PVO costs*
Results
Objective 3: Determinants of Effectiveness
### Results: SBCC Scores (intervention groups combined)

<table>
<thead>
<tr>
<th></th>
<th>BMCs (n=388)</th>
<th>Lead Mothers (n=135)</th>
<th>CHWs (n=104)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredients to use in porridge</td>
<td>100%</td>
<td>94%</td>
<td>96%</td>
</tr>
<tr>
<td>How often to feed the child</td>
<td>97%</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Who should eat the porridge</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>How long to boil the porridge</td>
<td>95%</td>
<td>93%</td>
<td>99%</td>
</tr>
<tr>
<td>How to store the CSB</td>
<td>88%</td>
<td>93%</td>
<td>99%</td>
</tr>
<tr>
<td>How to store the FVO</td>
<td>86%</td>
<td>93%</td>
<td>99%</td>
</tr>
<tr>
<td><strong>Overall mean score (out of 6), mean (SD)</strong></td>
<td><strong>5.66 (0.78)</strong></td>
<td><strong>5.71 (0.78)</strong></td>
<td><strong>5.79 (0.8)</strong></td>
</tr>
</tbody>
</table>
Results: Mean SBCC Score by Study Group

P<0.001 for all three comparisons across study groups
Results: Bivariate Analyses of Determinants among Intervention Groups Combined

<table>
<thead>
<tr>
<th></th>
<th>BMCs who met 30:100 ratio (n=100)</th>
<th>BMCs who did not meet 30:100 ratio (n=198)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC SBCC score</td>
<td>5.48 (1.04)</td>
<td>5.68 (0.69)</td>
<td>0.045</td>
</tr>
<tr>
<td>CHW SBCC score</td>
<td>5.93 (0.12)</td>
<td>5.91 (0.14)</td>
<td>0.261</td>
</tr>
<tr>
<td>Lead Mother SBCC score</td>
<td>5.76 (0.27)</td>
<td>5.63 (0.30)</td>
<td>0.220</td>
</tr>
<tr>
<td>Proportion of health workers that receive training, reported (By FDP)</td>
<td>0.87 (0.11)</td>
<td>0.83 (0.15)</td>
<td>0.031</td>
</tr>
<tr>
<td>Proportion of Lead mothers that receive training, reported (By FDP)</td>
<td>0.67 (0.14)</td>
<td>0.69 (0.18)</td>
<td>0.430</td>
</tr>
<tr>
<td>HH proximity Mean Distance</td>
<td>3.47 (2.44)</td>
<td>3.67 (2.35)</td>
<td>0.499</td>
</tr>
<tr>
<td>Number of household members</td>
<td>5.65 (1.84)</td>
<td>5.21 (1.80)</td>
<td>0.048</td>
</tr>
<tr>
<td>Mean # children under 5</td>
<td>1.36 (0.56)</td>
<td>1.34 (0.60)</td>
<td>0.818</td>
</tr>
</tbody>
</table>
Study Limitations

• This was a combined intervention, therefore, we could not separate the effect of extra FVO from the effect of SBCC.

• The CSB quantity (8 kg/child/month) mandated by the MoH in Malawi are greater than typically provided in SFPs.
  – Implications for sharing
  – Comparability to other programs

• PVOs were selected by CRS based on their agreement to participate.
Main Findings:
Objective 1 Effectiveness and Feasibility

- It is feasible to get BMCs to meet the target ratio of FVO:CSB with FVO distributed separately from CSB.
- The extra FVO ration and SBCC intervention, together, are effective in achieving the target FVO:CSB ratio.
- There is no added impact of providing CSB in 2 kg packets with messaging.
- Reported sharing is lower in the intervention groups.
- There is minimal reported selling of FVO or CSB in any group.
Main Findings: Objective 2 Cost Effectiveness

- Cost of the intervention per beneficiary is lower in the control group
- **Cost-effectiveness** is higher in intervention groups
- Cost-effectiveness is most favorable in Intervention Group 1 (no added impact in Group 2)
  - Effectiveness defined as proportion of BMCs meeting target FVO:CSB ratio
  - But in terms of other outcomes, repackaging may have additional benefits (e.g. hygiene, reduced distribution time, BMC preference)
Main Findings:
Objective 3 Determinants of Effectiveness

- Main determinant of effectiveness was the intervention

- Due to lack of variability in the implementation of the SBCC component, we cannot distinguish the effect of individual intervention components
Policy Implications

• It is possible to achieve high rates of compliance with recommended FVO:CSB ratio in porridge preparation even when FVO and CSB are distributed separately.

• These results highlight the importance of assessing cost-effectiveness, not cost alone, in choosing among alternative programs.
The Way Forward

- Distinguish separate effects of increased FVO vs. intensified SBCC

- Compare cost-effectiveness of the present intervention with that of providing alternative (e.g., lipid-dense) supplements

- Determine the effect of increased FVO:CSB ratio on child growth outcomes
Defining Research Gaps

Numerous ongoing studies aiming to fill research gaps.

Feasibility:
Will caregivers prepare CSB with adequate FVO? (Malawi)

Treatment of MAM:
Comparison of supplementary foods (country TBD)

Treatment of MAM: Comparison of supplementary foods (Sierra Leone – suspended)

Prevention of MAM:
Comparison of supplementary foods (Burkina Faso)
Acknowledgements

• Support provided through USAID, Office of Food for Peace
• Research Partners:
  – Catholic Relief Services, Project Concern International, Africare, Save the Children, University of Malawi Centre for Social Research, Pakachere Institute for Health and Development Communication
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  – Mulanje, Chiradzulu, Machinga and Balaka Communities
  – Enumerators
Thank You

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www.foodaidquality.pbworks.com
www.REFINEnutrition.org
Breakout Session

Themes:

TABLE A. Repackaging rations: logistics, food safety, re-use of materials, etc.

TABLE B. SBCC messaging: formative research, material development, opportunities, barriers, etc.

TABLE C. Sharing rations: challenges, solutions, sharing within household and in the community

Instructions:

(a) Pick topic and move to corresponding table
(b) pick a facilitator and note taker
(c) quickly brainstorm a few key questions to discuss, then
(d) initiate further discussion
EXTRA SLIDES
Results: Total Program Costs, USD, for Phase II (4 months)*

* For PCI FDPs only, as representative of PVO costs

- Pre-implementation investments
- Intervention costs
- Warehousing, personnel, distribution, beneficiary costs
- To country transport
- Oil
- CSB

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-implementation</th>
<th>Intervention</th>
<th>Warehousing, personnel, distribution, beneficiary</th>
<th>To country transport</th>
<th>Oil</th>
<th>CSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=151)</td>
<td>$14,909</td>
<td>$5,742</td>
<td>$1,754</td>
<td>$10,291</td>
<td>$200</td>
<td>$200</td>
</tr>
<tr>
<td>Group 2 (n=172)</td>
<td>$14,909</td>
<td>$5,742</td>
<td>$1,754</td>
<td>$10,291</td>
<td>$200</td>
<td>$200</td>
</tr>
<tr>
<td>Control (n=179)</td>
<td>$14,909</td>
<td>$5,742</td>
<td>$1,754</td>
<td>$10,291</td>
<td>$200</td>
<td>$200</td>
</tr>
</tbody>
</table>

Results:
- Total Program Costs, USD, for Phase II (4 months)*
- Group 1 (n=151): $21,650
- Group 2 (n=172): $27,171
- Control (n=179): $14,909

For PCI FDPs only, as representative of PVO costs.
Results, Cost-Effectiveness: Sensitivity Analysis

DO NOT USE

- Original CE value
- CE if 20% price increase
- CE if 20% price decrease
- Including BMCs from Africare and Save the Children

<table>
<thead>
<tr>
<th>Intervention Group 1</th>
<th>Intervention Group 2</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-Effectiveness (cost per HH preparing 30:100 porridge ratio)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$384</td>
<td>$527</td>
<td>$1,666</td>
</tr>
<tr>
<td>$408</td>
<td>$557</td>
<td>$1,803</td>
</tr>
<tr>
<td>$360</td>
<td>$497</td>
<td>$1,529</td>
</tr>
<tr>
<td>$285</td>
<td>$372</td>
<td>$1,611</td>
</tr>
</tbody>
</table>

- Modeling a 20% increase and 20% decrease in CSB and FVO price changed CE by only about 6% in intervention and 8% in control
- Modeling an inclusion of BMCs from all 3 PVOs had greater effect on CE
Results, Cost-Effectiveness: Total Program Costs, USD*

* For PCI FDPs only, as representative of PVO costs

Pre-implementation investments
Intervention costs
Warehousing, personnel, distribution, beneficiary costs
To country transport
Oil
CSB

Group 1 (n=151)
$21,650

Group 2 (n=172)
$27,171

Control (n=179)
$14,909

Total Program Costs, USD*:
- $5,000
- $10,000
- $15,000
- $20,000
- $25,000
- $30,000

Food Aid Quality Review
Lessons Learned

• Initial planning and clarity of expectations and priorities/constraints among all research partners
• Frequent coordination and communication with all research partners
Challenges of Conducting Research within an already existing Title II Development Program

- Identification of eligible study subjects was difficult due to inaccuracies in beneficiary list.
- The study overlapped with the end of the WALA program.
- The WALA program shifted from distribution of CSB13 to CSB+ halfway through study implementation.
- Coordination with multiple stakeholders was challenging at times.
Cost-Effectiveness Sensitivity Analysis [KEEP BUT TALK TO STEVE]

Change from original model cost-effectiveness values for different scenarios, by study group

- **Intervention Group 1**
- **Intervention Group 2**
- **Control Group**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Intervention Group 1</th>
<th>Intervention Group 2</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>$23</td>
<td>$28</td>
<td>($9) ($12) ($53)</td>
<td>($10) ($13)</td>
</tr>
<tr>
<td>$30</td>
<td>$34</td>
<td>($80)</td>
<td>($73) ($116)</td>
</tr>
<tr>
<td>$40</td>
<td>$44</td>
<td>($118)</td>
<td>($118) ($152)</td>
</tr>
</tbody>
</table>

- **Commodity loss throughout pipeline (10% in original model)**: 23% 5%
- **Without monetizing BMC time (14,000/month in original model)**: 0 MWK
- **Number of BMCs per group (650 in original model)**: 1,500 10,000
- **Average distance from PVO to FDP (40 km in original model)**: 80 km

Cost per beneficiary household preparing porridge at target ratio:

- **Increases** with additional commodity loss through pipeline, and with increased distance to food distribution point
- **Decreases** with lower commodity losses, without monetizing BMC time, and increased participants (but with diminishing returns)

Food Aid Quality Review