# Costing Methods for a Cluster-Randomized Cost-Effectiveness Trial Comparing the Performance of Four Supplementary Foods in Treating Sierra Leonean Children with Moderate Acute Malnutrition (MAM)

Ye Shen[1], Stacy Griswold[1], Devika J. Suri[1], Stephen A. Vosti[2], and Beatrice L. Rogers[1]

[1] Tufts University, Boston, MA USA [2] University of California-Davis, Davis, CA USA

## Background & Objective

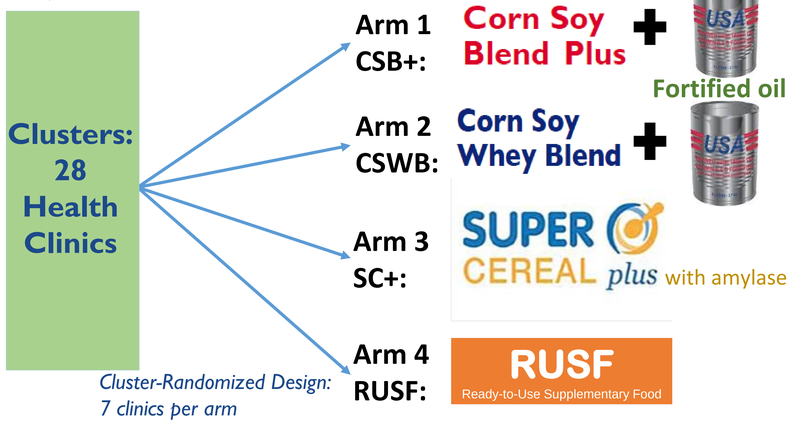
- Policy makers need cost-effectiveness measures to support better decision-making in nutrition policy and programming. Therefore, proper planning and implementation of cost data collection and cost-effectiveness analysis is needed.
- As part of the **Food Aid Quality Review (FAQR) Project** at **Tufts Friedman School of Nutrition Science and Policy**, a comprehensive cost-effectiveness research protocol was designed for a cluster-randomized field trial in Pujehun District, Sierra Leone. The study objective is to evaluate and compare the cost-effectiveness of four isocaloric supplementary foods in treating MAM.
- The objective of this communication is to strengthen and to make more consistent cost-effectiveness research methods undertaken alongside field-based nutrition trials

## Study Design

Pujehun District, Sierra Leone

**Children 6-59mo diagnosed with MAM**

*Bi-weekly Food Ration & Anthropometric measurements until recovery or reaching 12 wks*



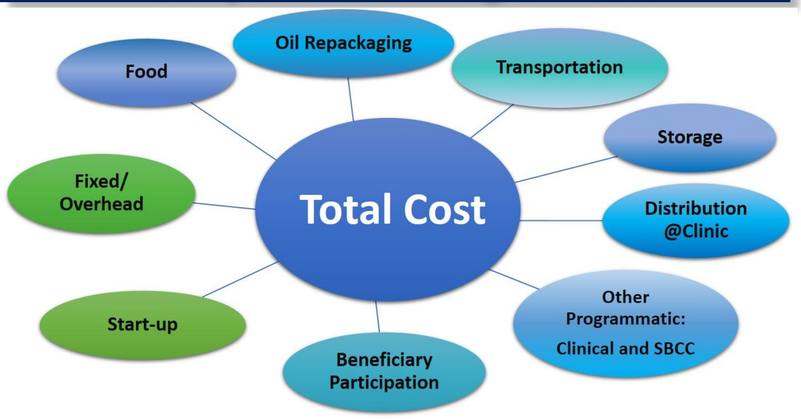

*Cluster-Randomized Design: 7 clinics per arm*

- Additional data collection (such as in-depth interviews, in-home observations, focus group) takes place at household, community, clinic and other levels.

## Effectiveness Outcomes

- Primary outcome: Recovered, or not (0/1), from MAM defined as MUAC ≥ 12.5 cm within the 12-week treatment period
- One example of the secondary outcomes: Recovered, or not(0/1), from MAM defined as MUAC ≥ 12.5 cm sustained at 1 month follow-up

## Components of Program Cost




*Activity-Based-Costing-Ingredients(ABC-I) approach*

- In-depth Interview
- Accounting records
- Direct observation with time-use tracking

## Three Lenses to Evaluate Cost

- **Program Costs**
  - Costs actually incurred as part of this trial (excluding research costs)
- **Adjusted Program Costs**
  - Costs adjusted for what an NGO seeking to replicate the supplementary feeding program using one food would do in the same setting
- **Policy Experiments**
  - Costs associated with moving from site-specific programs to broader implementation contexts

## Summary Measures of Cost

- Total cost per study arm for the entire duration of the study
- Cost per child treated per study arm
- Total cost per study arm per year

## Linking Cost with Effectiveness

- Incremental Cost-Effectiveness Ratio (ICER) across all four arms: the study arm with the worst effectiveness outcome (Reference Arm) compared to each of the remaining three arms

a) Primary Cost-Effectiveness Measure

ICER calculation for One Arm compared to Reference Arm:

***Cost per Case of MAM Recovered***

$$= \frac{Program\ Cost\ per\ child_{One\ Arm} - Program\ Cost\ per\ child_{Reference}}{\frac{\#\ cases\ of\ MAM\ recovered_{One\ Arm}}{\#\ Children_{One\ Arm}} - \frac{\#\ cases\ of\ MAM\ recovered_{Reference}}{\#Children_{Reference}}}$$

b) Cost-Effectiveness Measures for selected secondary effectiveness outcomes e.g. Cost per Sustained Case of MAM Recovered (at 1 month follow up)

c) Cost per Disability-Adjusted-Life-Year (DALY) Averted

- Sensitivity Analyses to Calculate Ranges of Cost-Effectiveness Estimates
  - Parameters with the greatest impact to cost
  - Parameters that change with three lenses
  - Parameters with substantial scientific uncertainty

## Conclusions

- Proper design of cost data collection and cost-effectiveness analyses for nutrition research studies requires careful considerations of all components of program and beneficiary costs, and the specific effectiveness outcomes to be used

**Well-designed cost-effectiveness studies in the international nutrition research community** → **More useful information for decision-making** → **Better designed and managed nutrition programs and policies**

## Acknowledgements

This work is made possible by the generous support of the American people through the Office of Food for Peace (FFP) of the Bureau for Democracy, Conflict and Humanitarian Assistance, under terms of Cooperative Agreement No. AID-OAA-C-16-00020, managed by Tufts University. The contents are the responsibility of Tufts University and its partners in the Food Aid Quality Review (FAQR) and do not necessarily reflect the views of the U.S. Agency for International Development (USAID) or the U.S. government. The Sierra Leone Ministry of Health and Sanitation under the leadership of the Nutrition and Food Directorate collaborate with the study's prime implementing partner, Project Peanut Butter, to implement and operate the 28 feeding clinic sites in the Pujehun District of Sierra Leone and with World Food Programme to store and manage the study's four treatment foods. The Community Action for the Welfare of Children, a Sierra Leonean non-governmental organization, partners with Project Peanut Butter to strengthen behavior change communication messaging and community-based referral systems to the 28 feeding clinics. Caritas Bo, an internationally affiliated non-governmental organization, holds primary responsibility for data collection.

Please send any comments/ inquiries to Ye Shen via Ye.Shen@tufts.edu

For more about the Food Aid Quality Review (FAQR) Project, visit www.foodaidquality.org