Will we treat 6M kids a year for SAM by 2020?

A projection of the potential impact of innovations in treatment of malnutrition
CIFF has asked the Airbel Center:

How can we partner with the No Wasted Lives coalition to innovate and improve SAM treatment to achieve our goals of 50% cost reduction and doubling treatment?
We set out to answer:

How do promising innovations in SAM treatment cohere into a vision for scale up in treatment?

Is this set on innovations on track for delivering transformative impact?

What are the aligned priorities the nutrition community can agree on to accelerate progress on treatment?
What is our process for projecting likely impact?

What do we need to know?

**Current state of play**
Knowledge of the current state of SAM treatment and cost
[Published assessments, interviews with experts]

**Innovation set**
Selection of the 5-6 innovative interventions with the most promise for increasing coverage and/or decreasing cost
[Interviews with experts, interviews with intervention owners, consultation with NWL]

**Plan for integration**
Point of view on how these innovations interact
[interviews with experts, informed guesses]

**Moving toward impact**
Understand how common barriers affect scaleup of these innovations
[Published costing studies, health system capacity assessments, analogous interventions, hunches from experience]

**Plan for action**
Research and expert opinion on the barriers to scale these innovations face
[interviews with experts, informed guesses]

---

What are we delivering?

A vision in which these promising interventions reach full potential

A mathematical model projecting the impact of these interventions taken together

Buy-in from the nutrition community on next steps
CURRENT STATE OF PLAY

What is the current state of SAM treatment?
There is a pathway a child follows to get from screening and diagnostic to recovery ...

| Children with SAM | Children screened | Completed referral | Enough product to treat | Enough staff to treat | Completed treatment cycle | Cured |
Today we treat ~3M children a year at a cost of about $150 per child
At each stage, we lose a certain number of children ...
... with certain obstacles impeding a child’s progress from stage to stage

<table>
<thead>
<tr>
<th>Children with SAM</th>
<th>Children screened</th>
<th>Completed referral</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Completed treatment cycle</th>
<th>Cured</th>
</tr>
</thead>
</table>

(1) Insufficient community mobilization activities
- Lack of awareness about the program and the disease remain the main barrier to access

(2) Insufficient screening
- CHWs are already overburdened
- Limited pool of qualified candidates to recruit from

(3) Gaps in geographic reach
- Existing screeners are not located where there is the most need
- Terrain and weather inhibit coverage in remote areas
... with certain obstacles impeding a child’s progress from stage to stage

- **Children with SAM**
- **Children screened**
- **Completed referral**
- **Enough product to treat**
- **Enough staff to treat**
- **Completed treatment cycle**
- **Cured**

1. **Practical barriers to access**
   - Distance to clinic too far, including cost of transport
   - Opportunity costs
   - Costs for additional treatment
   - Psychological insecurity

2. **Cultural barriers to access**
   - Lack of independence to decide to visit clinic
   - Alternative health practitioners preferred
   - Lack of trust in clinic staff
   - Stigma

3. **Quality of services**
   - Previous experience with poor quality of services is a disincentive: waiting times, staff attitude etc.
   - Previous rejection

4. **Additional referral may be required**
   - Interface with other programs: clients may be referred to another location

5. **Conflicting screening tools**
   - Clients may be turned away if clinic weight-for-height measures are in conflict with MUAC measurement
… with certain obstacles impeding a child’s progress from stage to stage

<table>
<thead>
<tr>
<th>Children with SAM</th>
<th>Children screened</th>
<th>Completed referral</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Completed treatment cycle</th>
<th>Cured</th>
</tr>
</thead>
</table>

(1) Access to medical stores or other stock of RUTF is inhibited
- Poor stock management
- Inefficiencies in requisition process
- Delivery issues during rainy season/limited transport

(2) Stock outs
- National/subnational stock out
  - Poor stock management
  - Poor communication between agencies
  - Manufacturer delays in delivery

(3) Dependence on external suppliers
- Strict UNICEF standards create disincentive to local production
- Governments sensitive to UNICEF requirements

(4) Different protocols and treatment for moderate acute malnutrition (MAM) and severe acute malnutrition (SAM) require separate products
... with certain obstacles impeding a child’s progress from stage to stage

<table>
<thead>
<tr>
<th>Children with SAM</th>
<th>Children screened</th>
<th>Completed referral</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Completed treatment cycle</th>
<th>Cured</th>
</tr>
</thead>
</table>

(1) Clinic workers may have too few staff for the demand
• Poor attendance by staff
  • Poor compensation
  • Competing responsibilities

(2) Limited number of staff trained to treat MAM and/or SAM
• Different treatment protocols mean different training is needed
• Not enough training on malnutrition in health staff curricula
... with certain obstacles impeding a child’s progress from stage to stage

<table>
<thead>
<tr>
<th>Children with SAM</th>
<th>Children screened</th>
<th>Completed referral</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Completed treatment cycle</th>
<th>Cured</th>
</tr>
</thead>
</table>

1. Disincentive to return to clinic for additional doses of treatment
   - Poor quality of care
   - Barriers to initial access persist
   - Outward improvement in child’s health

2. Low fidelity to recommended dosage
   - Treatment is shared with other children in the household, reducing the dosage for the afflicted child
   - RUTF is sold externally

3. Population movement

4. Lack of follow-up for defaulters
... with certain obstacles impeding a child’s progress from stage to stage

<table>
<thead>
<tr>
<th>Children with SAM</th>
<th>Children screened</th>
<th>Completed referral</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Completed treatment cycle</th>
<th>Cured</th>
</tr>
</thead>
</table>

(1) Child does not respond to treatment
- Child too wasted to recover
- Complications from other illness inhibits effect of SAM treatment

(2) Incorrect admission and discharge criteria
- Especially when protocol changes

(3) Poor program monitoring
- Transfers are not recorded or followed up
INNOVATION SET

Which promising interventions address these obstacles?
NWL has helped us identify 6 innovations that alleviate most of these barriers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>What is it?</th>
<th>What obstacles does it address?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family MUAC</td>
<td>Introduces MUAC tape screening to parents and encourages them to take an active role in screening their children for acute malnutrition</td>
<td>Reach and coverage of screening by putting a MUAC tape inside the home</td>
</tr>
</tbody>
</table>
NWL has helped us identify 6 innovations that alleviate most of these barriers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>What is it?</th>
<th>What obstacles does it address?</th>
</tr>
</thead>
<tbody>
<tr>
<td>iCCM + Nutrition</td>
<td>Community case management that integrates screening by community health workers (CHW) with provision of treatment for uncomplicated cases of acute malnutrition</td>
<td>Completed referral to services and completed treatment cycle since CHW facilitate both actions</td>
</tr>
</tbody>
</table>
NWL has helped us identify 6 innovations that alleviate most of these barriers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>What is it?</th>
<th>What obstacles does it address?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUAC-only programming</td>
<td>Introduces a single screening protocol (MUAC tape) to all levels of the health system</td>
<td>Reduction in chances that conflicting screening procedures turns clients away and the potential for streamlining client intake with the simple MUAC tape could improve quality of service, which could improve completed referrals and completion of treatment cycle</td>
</tr>
</tbody>
</table>
NWL has helped us identify 6 innovations that alleviate most of these barriers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>What is it?</th>
<th>What obstacles does it address?</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPaS</td>
<td>A treatment protocol that addresses acute malnutrition on a continuum, rather than as separate MAM and SAM cases. The protocol also calls for a reduction in the dose of treatment based on the client’s rate of recovery</td>
<td>Lower doses increases the availability of the product. A single point of care for children affected by acute malnutrition affects quality of care and could also improve completed referrals and completed treatment cycle</td>
</tr>
</tbody>
</table>
NWL has helped us identify 6 innovations that alleviate most of these barriers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>What is it?</th>
<th>What obstacles does it address?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGO</td>
<td>A treatment protocol that reduces the dosage for treatment</td>
<td>Lower doses increase the availability of the product</td>
</tr>
</tbody>
</table>
NWL has helped us identify 6 innovations that alleviate most of these barriers

<table>
<thead>
<tr>
<th>Intervention</th>
<th>What is it?</th>
<th>What obstacles does it address?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Production of RUTF</td>
<td>Production of RUTF closer to the point of care (in-country, in most cases)</td>
<td>By introducing new suppliers and shortening the supply chain, more product should be available.</td>
</tr>
</tbody>
</table>
PLAN FOR INTEGRATION

How do these innovations interact?
We wanted to know 2 things

[Plan for integration] How do these 6 innovations interact, and how can we knock down barriers to full scale?

[Moving toward impact] In view of these barriers, are we on track to reach our goal of treating 6M children by 2020?
What happens when these innovations come online together?

[Plan for integration]
To understand how these innovations come together, we will map out how they interact, as well as the barriers that may hold them back.
How can we model their effects?

[Moving toward impact]
After analyzing the barriers, we will model the impact of 3 scenarios:

1. A base case, in light of the barriers faced
2. One extreme “demand-side” scenario, in which knocking down some barriers increases treatment-seeking / coverage
3. One extreme “supply-side” scenario, in which knocking down some barriers makes delivering treatment less costly
To create a vision of how these innovations come together, we need to understand how they interact at each stage, and the barriers they face.

<table>
<thead>
<tr>
<th>Children with SAM</th>
<th>Children screened</th>
<th>Completed referral</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Completed treatment cycle</th>
<th>Cured</th>
</tr>
</thead>
</table>
Family MUAC acts on the first section of the treatment cascade

Children with SAM
Children screened
... and interacts with other programming focused on community-level screening methods

INTERACTS WITH:

(1) MUAC-Only Programming
• Caregivers screening children via MUAC may be confused by different screening criteria, e.g. WFH, at clinics

(2) iCCM + Nutrition
• Caregivers will interface more frequently with CHWs who treat the cases they refer
Given these interactions, we identified barriers to scaleup ...

INTERACTS WITH:

(1) MUAC-Only Programming
- Caregivers screening children via MUAC may be confused by different screening criteria, e.g. WFH, at clinics

(2) iCCM + Nutrition
- Caregivers will interface more frequently with CHWs who treat the cases they refer

BARRIERS TO SCALE-UP FACED:

(1) Protocols
- If MUAC-only programming is not adopted, caregivers may perceive treatment as lower quality, and churn

(2) Staff
- Without sufficient CHWs, or clinicians to treat an increased caseload, the effect of Family MUAC will be smaller
... and identified opportunities for the nutrition community to address these barriers

INTERACTS WITH:

(1) MUAC-Only Programming
- Caregivers screening children via MUAC may be confused by different screening criteria, e.g. WFH, at clinics

(2) iCCM + Nutrition
- Caregivers will interface more frequently with CHWs who treat the cases they refer

BARRIERS TO SCALE-UP FACED:

(1) Protocols
- If MUAC-only programming is not adopted, caregivers may perceive treatment as lower quality, and churn

(2) Staff
- Without sufficient CHWs, or clinicians to treat an increased caseload, the effect of Family MUAC will be smaller

OPPORTUNITY AREAS:

(1) Alignment on protocols
- Standardize training documents in MOHs to focus on MUAC-only

(2) Fund proof of concept
- MUAC-only has not been operationalized sufficiently; fund pilots that combine Family MUAC with a test of MUAC-only programs
3 innovations focus on getting more children to complete referral, and seek treatment

- MUAC-only programming
- iCCM + Nutrition
- COMPaS

Children screened → Completed referral → more cases initiate treatment
... and connect closely with who performs screening

INTERACTS WITH:

(1) Family MUAC
- Caregivers who buy into the process by doing screening themselves may be more likely to seek treatment
Given these interactions, we identified barriers to scaleup ...

**INTERACTS WITH:**

(1) Family MUAC  
- Caregivers who buy into the process by doing screening themselves may be more likely to seek treatment

**BARRIERS TO SCALE-UP FACED:**

(1) Institutional Resistance  
- Reluctance to change whole paradigms, such as moving to MUAC-only or collapsing SAM and MAM

(2) Staff  
- CHWs may be overwhelmed by adding nutrition to their existing responsibilities  
- Increased treatment-seeking requires more staff to treat, either at the clinic or communities

(3) Product  
- RUTF requirements rise, particularly for COMPaS  
- Supply of RUTF at community level (last mile)
... and identified opportunities for the nutrition community to address these barriers

INTERACTS WITH:
(1) Family MUAC
- Caregivers who buy into the process by doing screening themselves may be more likely to seek treatment

BARRIERS TO SCALE-UP FACED:
(1) Institutional Resistance
- Reluctance to change whole paradigms, such as moving to MUAC-only or collapsing SAM and MAM
(2) Staff
- CHWs may be overwhelmed by adding nutrition to their existing responsibilities
- Increased treatment-seeking requires more staff to treat, either at the clinic or communities
(3) Product
- RUTF requirements rise, particularly for COMPaS
- Supply of RUTF at community level (last mile)

OPPORTUNITY AREAS:
(1) New supply chain paradigm
- Engage private sector to identify more efficient methods of tracking and delivery of RUTF /MUAC tapes
(2) Fund proof of concept
- Run early trials combining family casefinding, treatment at community level, and combined protocol, to begin to shift sectoral mindset
3 innovations focus on RUTF dosage and availability

<table>
<thead>
<tr>
<th>Local Production</th>
<th>MANGO</th>
<th>COMPaS</th>
<th>better able to treat with RUTF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed referral</td>
<td>Enough product to treat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
... and connect closely with community-led treatment

INTERACTS WITH:

(1) iCCM + Nutrition
• CHWs will need to be trained on new dosage requirement
Given these interactions, we identified barriers to scaleup...

**INTERACTS WITH:**

1. **iCCM + Nutrition**
   - CHWs will need to be trained on new dosage requirement

**BARRIERS TO SCALE-UP FACED:**

1. **Protocols**
   - Aligning on RUTF dosages may be mired by bureaucracy
   - Strict RUTF formula requirements hinder new, local producers

2. **Staff**
   - Reduced dosages require retraining at all levels

3. **Product**
   - Treating Acute Malnutrition with a single product will put pressure on existing producers and supply channels

Local Production → MANGO → COMPaS → better able to treat with RUTF

Completed referral → Enough product to treat
... and identified opportunities for the nutrition community to address these barriers

INTERACTS WITH:
(1) iCCM + Nutrition
  • CHWs will need to be trained on new dosage requirement

BARRIERS TO SCALE-UP FACED:
(1) Protocols
  • Aligning on RUTF dosages may be mired by bureaucracy
  • Strict RUTF formula requirements hinder new, local producers

(2) Staff
  • Reduced dosages require retraining at all levels

(3) Product
  • Treating Acute Malnutrition with a single product will put pressure on existing producers and supply channels

OPPORTUNITY AREAS:
(1) New accreditation paradigm
  • Allow a third party to accredit RUTF formulas, allowing for new producers
  • Create a favorable tax environment

(2) New supply chain paradigm
  • Engage private sector to rethink delivery and storage of RUTF
  • Expansion of RUTF producers into the production of other ready-to-use foods
  • Consistent forecasting from buyers
iCCM + Nutrition increases the ability to treat cases

OPPORTUNITY AREAS:

(1) Next generation of health workers
• Invest in making nutrition-focused roles – clinicians, CHWs, researchers, etc. – more attractive, potentially through new incentive structures
• Push for greater focus on nutrition in curricula in schools

(2) Mapping capacity
• Fund research to understand the contexts that will be constrained by human resources in the future
• Improve benefits for CHWs (better access to health career, more participation in health centers, more supervision etc)
... and connect closely with Local Production of RUTF

INTERACTS WITH:

(1) Local Production
• Insofar as local supply chains are simpler or more efficient, CHWs who treat may see fewer stockouts or greater ease of storage under increased local production

---

够治疗的产品
够治疗的人员

iCCM + Nutrition

CHWs increase # of “treaters”
Given these interactions, we identified barriers to scaleup ... 

**BARRIERS TO SCALE-UP FACED:**

1. **Product**
   - Creating a decentralized regime of RUTF distribution for mobile CHWs, as opposed to transporting all product to the health center, will require new coordination

2. **Institutional Resistance**
   - Skepticism that CHWs can successfully treat, especially on top of existing work burden

**INTERACTS WITH:**

1. **Local Production**
   - Insofar as local supply chains are simpler or more efficient, CHWs who treat may see fewer stockouts or greater ease of storage under increased local production

**Diagram Notes:**
- iCCM + Nutrition
- CHWs increase # of “treaters”
- Enough product to treat
- Enough staff to treat
... and identified opportunities for the nutrition community to address these barriers

INTERACTS WITH:

(1) Local Production
• Insofar as local supply chains are simpler or more efficient, CHWs who treat may see fewer stockouts or greater ease of storage under increased local production

BARRIERS TO SCALE-UP FACED:

(1) Product
• Creating a decentralized regime of RUTF distribution for mobile CHWs, as opposed to transporting all product to the health center, will require new coordination

(2) Institutional Resistance
• Skepticism that CHWs can successfully treat, especially on top of existing work burden

OPPORTUNITY AREAS:

(1) Next generation of health workers
• Invest in making nutrition-focused roles – clinicians, CHWs, researchers, etc. – more attractive
• Push for greater focus on nutrition in curricula in schools

(2) Mapping capacity
• Fund research to identify resource-constrained contexts
• Improve benefits for CHWs
Once treatment has begun, 3 innovations help keep attrition low

- MUAC-only programming
- iCCM + Nutrition
- COMPaS

Quality of services and continuity of care mean fewer defaulters

- Enough staff to treat
- Completed treatment cycle
... and connect closely with family-led screening

Quality of services and continuity of care mean fewer defaulters

<table>
<thead>
<tr>
<th>MUAC-only programming</th>
<th>iCCM + Nutrition</th>
<th>COMPaS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enough staff to treat</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Completed treatment cycle</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INTERACTS WITH:**

1. **Family MUAC**
   - Caregivers who are bought in to the beginning of the treatment process may be less likely to stop treatment
Given these interactions, we identified barriers to scaleup...

**INTERACTS WITH:**

(1) Family MUAC
- Caregivers who are bought in to the beginning of the treatment process may be less likely to stop treatment

**BARRIERS TO SCALE-UP Faced:**

(1) Protocols
- Discharge criteria and whether progress is tracked via MUAC or weight-for-height will require new protocols

(2) Institutional Resistance
- Many of these innovations, though on their way to proving impact, have been met with skepticism from the field, meaning adoption will not necessarily follow from positive results

Quality of services and continuity of care mean fewer defaulters

- MUAC-only programming
- iCCM + Nutrition
- COMPaS

- Enough staff to treat
- Completed treatment cycle
... and identified opportunities for the nutrition community to address these barriers

**INTERACTS WITH:**

1. **Family MUAC**
   - Caregivers who are bought in to the beginning of the treatment process may be less likely to stop treatment

**BARRIERS TO SCALE-UP FACED:**

1. **Protocols**
   - Discharge criteria and whether progress is tracked via MUAC or weight-for-height will require new protocols

2. **Institutional Resistance**
   - Many of these innovations, though on their way to proving impact, have been met with skepticism from the field, meaning adoption will not necessarily follow from positive results

**OPPORTUNITY AREAS:**

1. **Convene “leading lights” of nutrition**
   - Allow champions of newer paradigms to make their case in front of UNICEF, WHO, and other top stakeholders

2. **Fund proof of concept**
   - Prove effectiveness of combining family casefinding, treatment at community level, and combined protocol, to begin to shift sectoral mindset

Quality of services and continuity of care mean fewer defaulters

- MUAC-only programming
- iCCM + Nutrition
- COMPaS

Enough staff to treat
Completed treatment cycle

**MUAC-ONLY PROGRAMMING**

- Caregivers who are bought in to the beginning of the treatment process may be less likely to stop treatment

**iCCM + NUTRITION**

- Effective combination of family casefinding, treatment at community level, and combined protocol

**COMPaS**

- Continuity of care and quality of services mean fewer defaulters
4 innovations improve quality of services, meaning more children are cured

Earlier casefinding and simpler protocols mean higher cure rates

- Family MUAC
- MUAC-only programming
- iCCM + Nutrition
- COMPaS

Completed treatment cycle

Cured
These innovations do not explicitly interact with either Local Production or MANGO’s reduced dosage.

Earlier casefinding and simpler protocols mean higher cure rates

INTERACTS WITH:

N/A
However, taken together, these 4 will still face common barriers to scale

INTERACTS WITH:
N/A

BARRIERS TO SCALE-UP FACED:

(1) Protocols
• Aligning on MUAC-programming – for caregivers as well as in the clinic – will be key to ensuring cases are found earlier and thus that cure rates are higher
• Simplify protocols to facilitate integration, adoption and supervision at all levels of the health system

Earlier casefinding and simpler protocols mean higher cure rates

Family MUAC
MUAC-only programming
iCCM + Nutrition
COMPaS
Completed treatment cycle
Cured
... and identified opportunities for the nutrition community to address these barriers

INTERACTS WITH: N/A

BARRIERS TO SCALE-UP FACED:

(1) Protocols
- Aligning on MUAC-programming – for caregivers as well as in the clinic – will be key to ensuring cases are found earlier and thus that cure rates are higher
- Simplify protocols to facilitate integration, adoption and supervision at all levels of the health system

OPPORTUNITY AREAS:

(1) Fund proof of concept
- Focus new research on the relationship between early admission – especially due to the combined protocol – affects cure rates
- Build experiences and document examples in different contexts
We identified 4 barriers that crosscut the interventions

(1) Protocols
- Complexity of current protocols limits adoption of newer paradigms, such as local production
- Re-writing rigid protocols takes too long; by point of adoption, some are obsolete

(2) Staff
- Enough CHWs must exist to treat increased caseload
- CHWs and caregivers must be adequately trained in new protocols
  - Incentives and current caseloads may make community-led treatment more difficult

(3) Product
- Complex and opaque supply chains make having enough product a bottleneck
  - Regional offices are often not aware of how to acquire, e.g., more MUAC tapes
  - RUTF accreditation may be too strict
- Little competition means RUTF costs still high

(4) Institutional Resistance
- Innovations that use new paradigms, such as a combined protocol, may brush up against conservatism even once shown to be effective
- NGOs lack incentive to give up power to, say, community-led case-finding
We also have a preliminary understanding of opportunity areas for the nutrition community, which our model can help inform

- (1) Protocols
- (2) Staff
- (3) Product
- (4) Institutional Resistance

- Funding Pilots of New Protocols
- Invest in new H.R. pipelines
- Mapping H.R. Capacity
- New Accreditation Paradigms
- New Supply Chain Paradigms
- Convenings to Reorient Field
MOVING TOWARD IMPACT

Are we on track?
With these barriers in mind, we modeled out our 3 different scenarios

<table>
<thead>
<tr>
<th>SCENARIO</th>
<th>DESCRIPTION</th>
<th>WHAT’S INCLUDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Base case</td>
<td>Slow but realistic uptake of all 6 interventions to 2020</td>
<td>Local Production</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MANGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COMPaS</td>
</tr>
<tr>
<td>2 “Demand-side”</td>
<td>Fast, 5-year rollout of interventions focused on treatment-seeking and coverage</td>
<td>COMPaS*</td>
</tr>
<tr>
<td>scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 “Supply-side”</td>
<td>Fast, 5-year rollout of interventions focused on product and cost</td>
<td>Local Production</td>
</tr>
<tr>
<td>scenario</td>
<td></td>
<td>MANGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COMPaS*</td>
</tr>
</tbody>
</table>

(*) COMPaS split by demand-side and supply-side impact
... making projections that take into account a few key dynamics, making our assumptions clear where there is little data, i.e.:

A. How quickly an innovation can scale up, year to year

B. How much each innovation improves the percentage of children who progress onto the phase of our treatment cascade

C. How much each innovation improves the cost to treat

D. How real-world factors affect interactions among the innovations
**Coverage** We are still refining our assumptions, and strive for transparency about the available data.

<table>
<thead>
<tr>
<th>Children screened/referred</th>
<th>Seek treatment</th>
<th>Enough product to treat</th>
<th>Enough staff to treat</th>
<th>Continues treatment program</th>
<th>Cured</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local production</strong></td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>- Medium increase</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Confidence: Medium</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Sources: 4 Interviews and 2 documents</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MANGO</strong></td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>- Medium increase</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Confidence: Medium</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Sources: 1 Interview and 2 documents</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COMPaS</strong></td>
<td>No effect assumed</td>
<td>- Small increase</td>
<td>- Medium increase</td>
<td>No effect assumed</td>
<td>- Small increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Confidence: High</td>
<td>- Confidence: Medium</td>
<td></td>
<td>- Confidence: Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sources: Several papers</td>
<td>- Sources: Medium</td>
<td></td>
<td>- Sources: Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Sources: 1 Interview and 2 documents</td>
<td></td>
<td>- Sources: Several</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Documents, interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>and online discussions</td>
</tr>
<tr>
<td><strong>ICCM Nutrition</strong></td>
<td>No effect assumed</td>
<td>- Medium increase</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>- Small increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Confidence: Medium</td>
<td></td>
<td></td>
<td>- Confidence: Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sources: 3 experts, 2 unpublished studies (Mali and Pakistan)</td>
<td>- Sources: Same as above</td>
<td></td>
<td>- Sources: Same as above</td>
</tr>
<tr>
<td><strong>MUAC-only</strong></td>
<td>No effect assumed</td>
<td>- Medium increase</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>- Minimal increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Confidence: Low</td>
<td></td>
<td></td>
<td>- Confidence: Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sources: 2 experts, 1 paper</td>
<td>- Sources: 1 paper, 1 expert</td>
<td></td>
<td>- Sources: 1 paper, 2 expert</td>
</tr>
<tr>
<td><strong>Family MUAC</strong></td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sources:** 4 Interviews and 2 documents, 1 Interview, 2 documents, Several papers, 1 paper, Coverage assessments, interview, 1 interview 1 document
**Cost**

We are still refining our assumptions, and strive for transparency about the available data.

<table>
<thead>
<tr>
<th>Supply of RUTF, MUAC, other products</th>
<th>Cost to train health workers</th>
<th>Salaries for management, supervision, and workers</th>
<th>Logistics, office space, utilities, transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local production</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
</tr>
<tr>
<td>MANGO</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
<td>No effect assumed</td>
</tr>
<tr>
<td>COMPaS</td>
<td>Large cost increase</td>
<td>No effect assumed</td>
<td>Low savings</td>
</tr>
<tr>
<td>iCCM Nutrition</td>
<td>Medium cost increase</td>
<td>Medium cost increase</td>
<td>Low savings</td>
</tr>
<tr>
<td>MUAC-only</td>
<td>Large cost increase</td>
<td>Medium cost increase</td>
<td>Low savings</td>
</tr>
<tr>
<td>Family MUAC</td>
<td>Medium cost increase</td>
<td>Medium cost increase</td>
<td>Low savings</td>
</tr>
</tbody>
</table>

**Sources:**
- Low savings
- Medium cost increase
- Medium savings
- Medium/low savings

- 4 papers
- 1 interview
- 1 document
- Several papers
- 1 paper
Screening rates are improved by ramping up Family MUAC

Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively.
Referral completion will see improvements driven by COMPaS, iCCM, and MUAC-Only

Children with SAM

- ~750K more children complete referral annually, driven equally by increased screening and a 4pt increase in children completing referral

Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively
While Local Production and MANGO will provide enough RUTF to treat more children, clinic staff could become a bottleneck.

Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively.
Continuity and quality of care are improved by a small amount via COMPaS, iCCM, MUAC-Only, and Family MUAC.

Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively.

~1.4M more children are cured, as continuity and quality of care near perfection.
Increasing casefinding has a large effect on our ability to get to 6M treated, with biggest lost still in referral completion.

B: Coverage

Demand-side scenario

(*) COMPaS split: demand side impact on LHS and RUTF dose changes on RHS

Note: Assumes each intervention reaches 100% delivery by Year 5
Improvements to supply-side are substantive, but pale in comparison to loss during casefinding

Children with SAM

- Children with SAM in Year 5: 25.4
- Children screened: 6.7
- Children completed referral: 4.1
- Enough product to treat: 4.1
- Enough staff to treat: 4.1
- Children completed treatment cycle: 4.1
- Children cured: 3.9

(*) COMPaS split: demand side impact on LHS and RUTF dose changes on RHS
Note: Assumes each intervention reaches 100% delivery by Year 5
Demand-side interventions inspire confidence that, with big investments, 6M can be treated

ONLY “DEMAND-SIDE” INTERVENTIONS

ONLY “SUPPLY-SIDE” INTERVENTIONS

(*) COMPaS split: demand side impact on LHS and RUTF dose changes on RHS
Note: Assumes each intervention reaches 100% delivery by Year 5
Currently, costs are concentrated in supply and personnel ...

<table>
<thead>
<tr>
<th>Supply of RUTF, MUAC, other products</th>
<th>Cost to train health workers</th>
<th>Salaries for management, supervision, and workers</th>
<th>Logistics, office space, utilities, transport</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current cost to treat (~$168)</strong></td>
<td><del>30% of costs (</del>$45-50)</td>
<td><del>20% of costs (</del>$30-35)</td>
<td><del>10% of costs (</del>$15-20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><del>40% of costs (</del>$65-70)</td>
<td></td>
</tr>
</tbody>
</table>
Some interventions, like MANGO, introduce cost-efficiency on the supply side; cost to treat could go down to ~$155 per child after scaleup ...

<table>
<thead>
<tr>
<th>Supply of RUTF, MUAC, other products</th>
<th>Cost to train health workers</th>
<th>Salaries for management, supervision, and workers</th>
<th>Logistics, office space, utilities, transport</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New cost to treat (~$150 - 155)</strong></td>
<td><del>20% of costs (</del>$30-35)</td>
<td><del>40% of costs (</del>$65-70)</td>
<td><del>10% of costs (</del>$15-20)</td>
</tr>
<tr>
<td>MANGO ~10% overall reduction</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dosage reduction
Other interventions, like iCCM + Nutrition, incur new costs in training and personnel; cost to treat could rise to ~$190 per child

<table>
<thead>
<tr>
<th>Supply of RUTF, MUAC, other products</th>
<th>Cost to train health workers</th>
<th>Salaries for management, supervision, and workers</th>
<th>Logistics, office space, utilities, transport</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New cost to treat</strong> ( ~$190 - 195 )</td>
<td><del>30% of costs (</del>$45-50)</td>
<td><strong>iCCM + Nutrition</strong> ~15% overall increase</td>
<td><del>10% of costs (</del>$15-20)</td>
</tr>
</tbody>
</table>

Increase in training and personnel costs
In most scenarios, where multiple interventions are rolled out, the cost increases from scaling up interventions like iCCM + Nutrition may outweigh savings from interventions like MANGO.

- **MANGO**: ~10% reduction (Cost to treat -> ~$150 – 155)
- **iCCM + Nutrition**: ~15% increase (Cost to treat -> ~$190 – 195)
- Slight cost increase 0 – 5% ~$170 – 175
We have focused on modeling costs for the scaleup of the technical interventions, but cost efficiency can be gained both in certain interventions, as well as through the other 2 pillars of NWL’s strategy.

<table>
<thead>
<tr>
<th>NWL Pillar</th>
<th>ESTIMATED EFFECT ON COST</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base case</strong></td>
<td>Slight increase (0 – 5%)</td>
<td>• Increase in training / personnel cost slightly outweighs RUTF cost savings</td>
</tr>
<tr>
<td><strong>“Demand-side” scenario</strong></td>
<td>Medium increase (15 – 25%)</td>
<td>• Increase in cost of training / personnel to implement utilization programs</td>
</tr>
<tr>
<td><strong>“Supply-side” scenario</strong></td>
<td>Slight increase (0 – 5%)</td>
<td>• Increase in training / personnel cost from iCCM slightly outweighs RUTF cost savings</td>
</tr>
</tbody>
</table>
| **Political advocacy to integrate treatment protocols into existing systems** | Slight decrease | • Integration into existing health systems may mean more personnel qualified to diagnose / treat  
• Use of, e.g., CHWs to treat may reduce costs over time, as costs are shared with existing programs |
| **Increased donor funding and attention to SAM** | Little to no effect | • Increased attention and funding will allow for greater treatment reach, but may not have an affect on cost to treat |
PLAN FOR ACTION

How can the nutrition community move forward?
[Plan for action] Our model and analysis of barriers suggest a couple of points:

1. Increasing casefinding has a large effect on our ability to get to 6M treated, with biggest loss still in referral completion

2. These interventions can have a significant impact on coverage, but costs will remain high unless paired with advocacy for increased funding and more integration into existing systems

3. Some interventions do achieve cost efficiencies and are worth investing in, but more work is needed to understand how integrating them with costlier, casefinding-focused efforts will function in the real world
We’ve aligned with members of the coalition on actions the nutrition community could take forward; this list continues to grow as partners input

<table>
<thead>
<tr>
<th>(1) Protocols</th>
<th>(2) Staff</th>
<th>(3) Product</th>
<th>(4) Institutional resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too complex, too rigid</td>
<td>Enough CHWs, nurses, factory workers</td>
<td>Supply chains, acquisitions murky</td>
<td>No data yet, or resistance to new ideas</td>
</tr>
</tbody>
</table>

**Advocate**
- Encourage UNICEF to loosen RUTF protocols
- Push WHO to simplify protocols
- Lobby MOHs to center nutrition in curricula
- Propose new incentive structures for health workers
- Encourage crosstalk between regional buyers and HQ
- Create favorable tax environment for producers
- Convene “leading lights of nutrition” group to ensure consensus around e.g. MUAC-only and Family MUAC

**Build**
- Create 3rd party RUTF accreditation org.
- Create platform enabling buyers to have consistent and shareable forecasting
- Create online CHW training, or partner with existing technologists using ICT to train
- Reinforce supervision mechanism
- Single open data platform to track RUTF + MUAC availability
- Pilot new supply mechanisms, e.g. private sector involvement, RUTF lockers, etc.
- Introduce open source communication system between champions of the 6 interventions
- Create portal for quick responses from UN agencies

**Fund**
- Fund early trials that couple “demand-side” interventions such as COMPaS, Family MUAC, and iCCM + Nutrition
- Investment in “CHWs of tomorrow,” including new educational tools
- Explore new management models, e.g. cooperatives
- “Netflix prize” for alternative formulations
- Loans for new producers
- Local laboratory testing of product
- Fund “R&D for Nutrition” lab, with champions on paid leave to fulfill their vision
References

12. UNICEF. MANAGEMENT OF SEVERE ACUTE MALNUTRITION IN CHILDREN: WORKING TOWARDS RESULTS AT SCALE. 2015.
22. Alvarez JL. The effectiveness of treatment for Severe Acute Malnutrition (SAM) delivered by Community Health Workers compared to a traditional facility based model. Pending Publ.
33. UNICEF. Ready-to-Use Therapeutic Food: Current Outlook. 2014.
43. Rogers E. Cost-Effectiveness of the Treatment of Uncomplicated Severe Acute Malnutrition by Community Health Workers Compared to Treatment Provided at an Outpatient Facility. Pending Publ.