AIRBEL CENTER

DESIGNING & TESTING SOLUTIONS IN CRISES

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

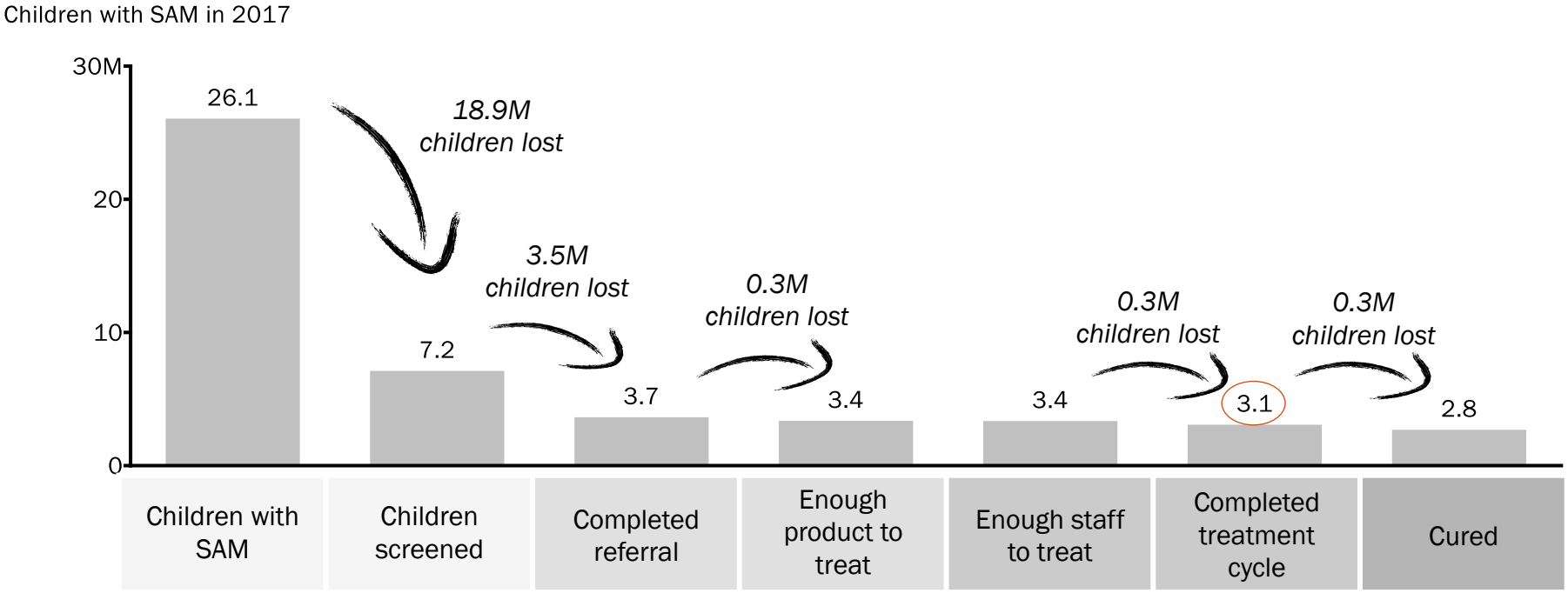
CURRENT STATE OF PLAY

What is the current state of SAM treatment?

There is a pathway a child follows to get from screening and diagnostic to recovery …

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

(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

(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

(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

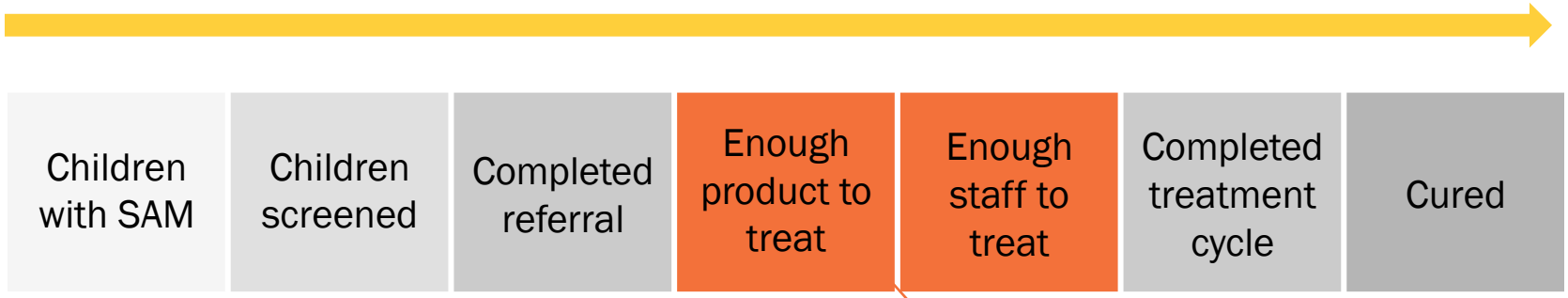
- National/subnational stock out
  - Poor stock management
  - Poor communication between agencies
  - Manufacturer delays in delivery

(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



(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

(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

(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

Intervention	What is it?	What obstacles does it address?
Family MUAC	Introduces MUAC tape screening to parents and encourages them to take an active role in screening their children for acute malnutrition	Reach and coverage of screening by putting a MUAC tape inside the home

NWL has helped us identify 6 innovations that alleviate most of these barriers

Intervention	What is it?	What obstacles does it address?
iCCM + Nutrition	Community case management that integrates screening by community health workers (CHW) with provision of treatment for uncomplicated cases of acute malnutrition	Completed referral to services and completed treatment cycle since CHW facilitate both actions

NWL has helped us identify 6 innovations that alleviate most of these barriers

Intervention	What is it?	What obstacles does it address?
MUAC-only programming	Introduces a single screening protocol (MUAC tape) to all levels of the health system	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

NWL has helped us identify 6 innovations that alleviate most of these barriers

Intervention	What is it?	What obstacles does it address?
COMPaS	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	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

NWL has helped us identify 6 innovations that alleviate most of these barriers

Intervention	What is it?	What obstacles does it address?
MANGO	A treatment protocol that reduces the dosage for treatment	Lower doses increase the availability of the product

NWL has helped us identify 6 innovations that alleviate most of these barriers

Intervention	What is it?	What obstacles does it address?
Local Production of RUTF	Production of RUTF closer to the point of care (in-country, in most cases)	By introducing new suppliers and shortening the supply chain, more product should be available.

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

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

Family MUAC acts on the first section of the treatment cascade

… 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 …

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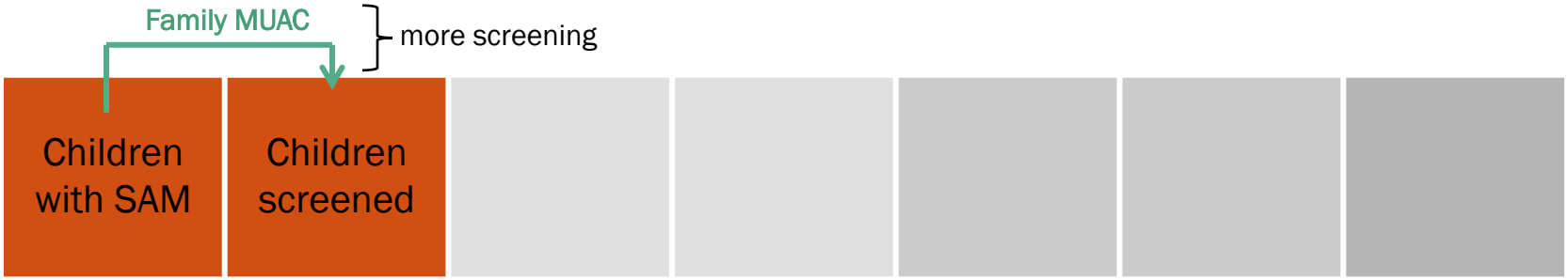
BARRIERS TO SCALE-UP FACED:

(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



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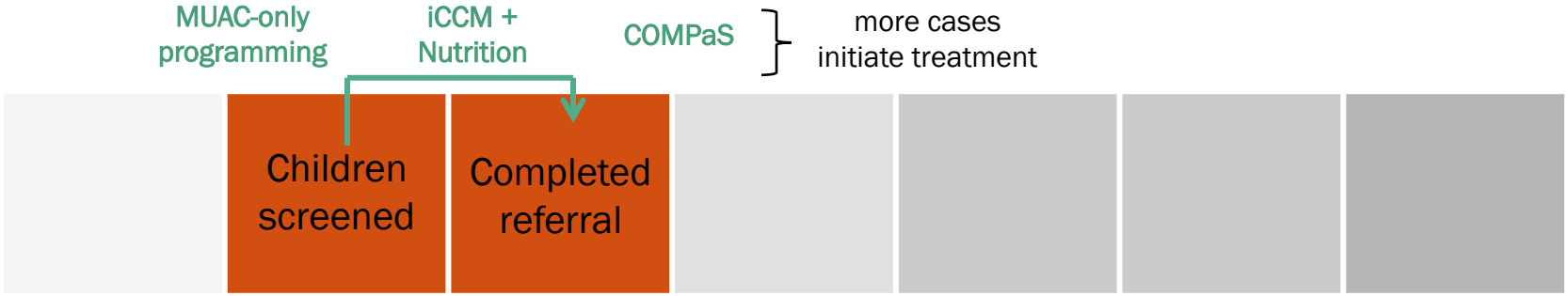
OPPORTUNITY AREAS:

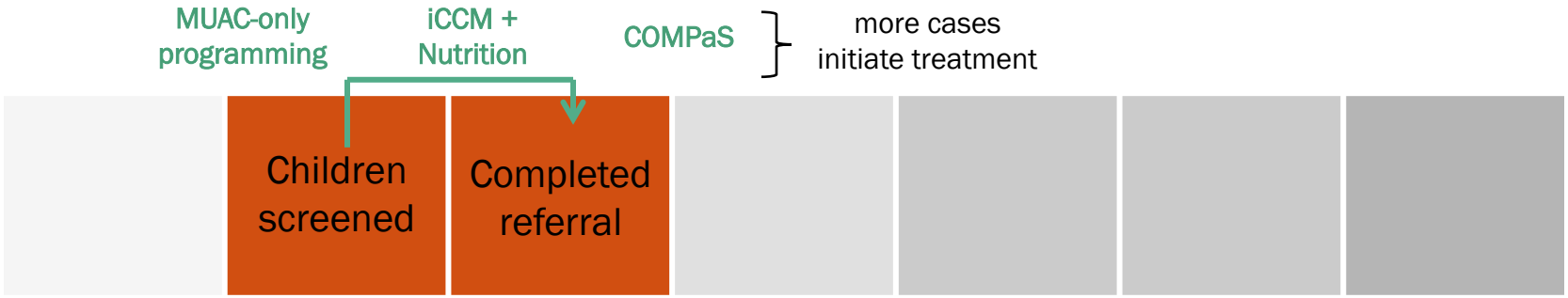
(1) Alignment on protocols
- Standardize training documents in MOHs to focus on MUAC-only

(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



… and connect closely with who performs screening



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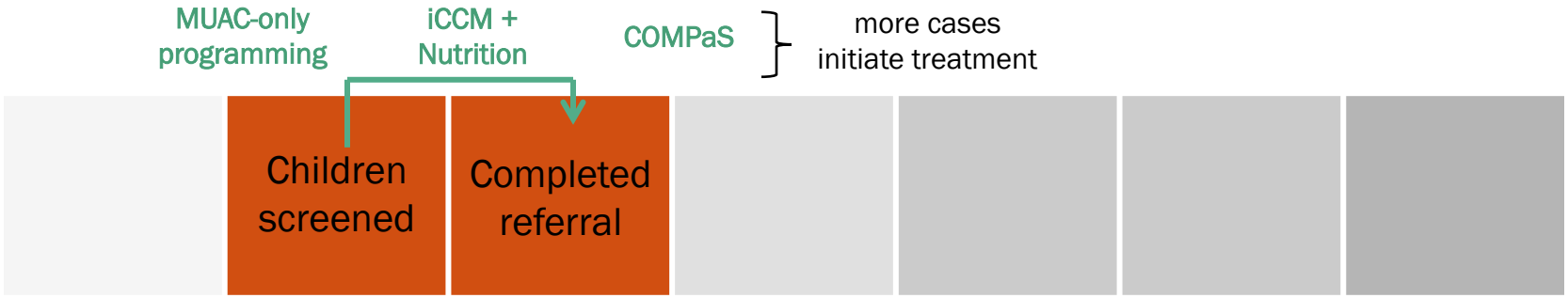

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BARRIERS TO SCALE-UP FACED:

(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)

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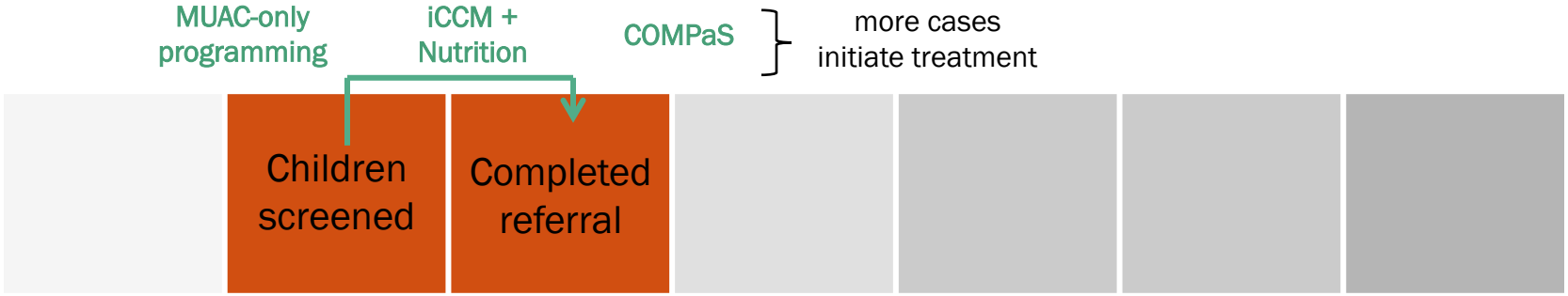

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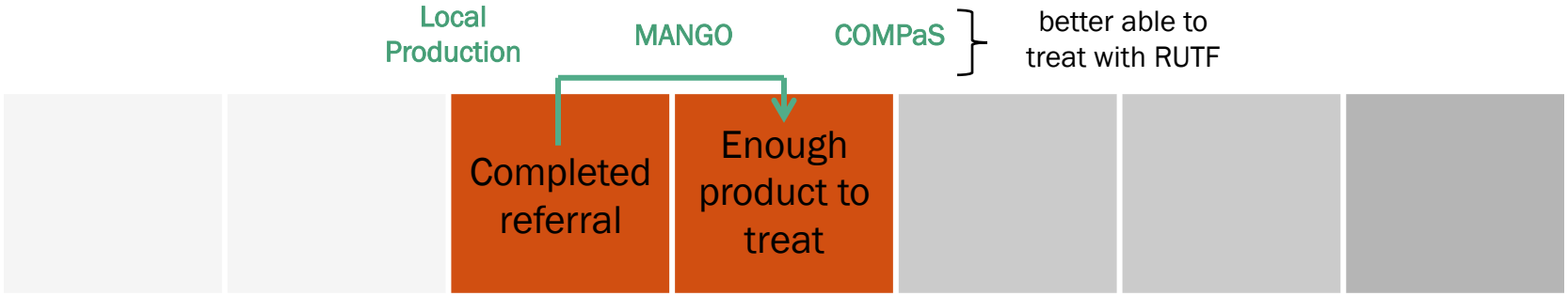
OPPORTUNITY AREAS:

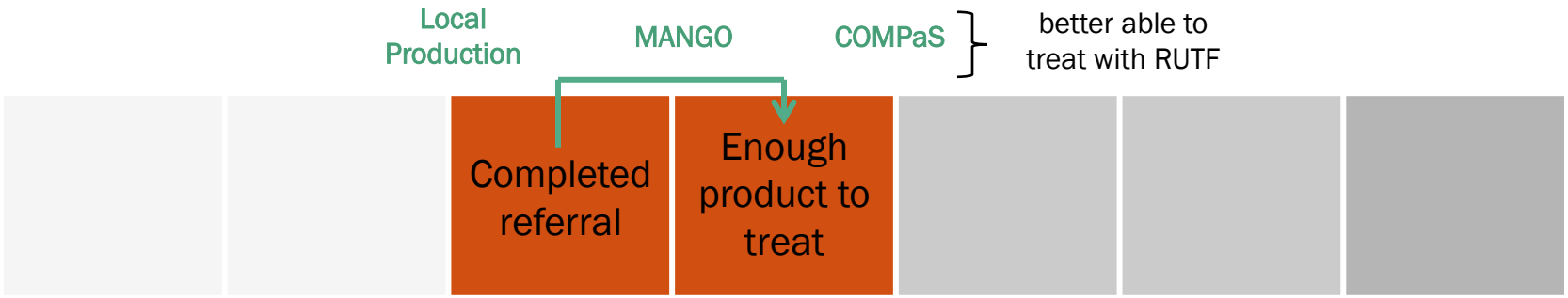
(1) New supply chain paradigm
- Engage private sector to identify more efficient methods of tracking and delivery of RUTF /MUAC tapes

(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



… and connect closely with community-led treatment

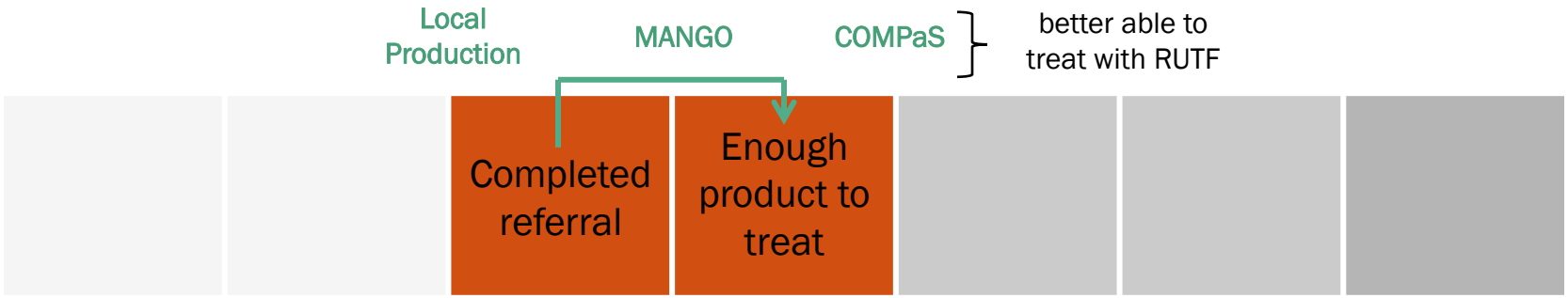


INTERACTS WITH:

(1) iCCM + Nutrition

- CHWs will need to be trained on new dosage requirement

Given these interactions, we identified barriers to scaleup …



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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

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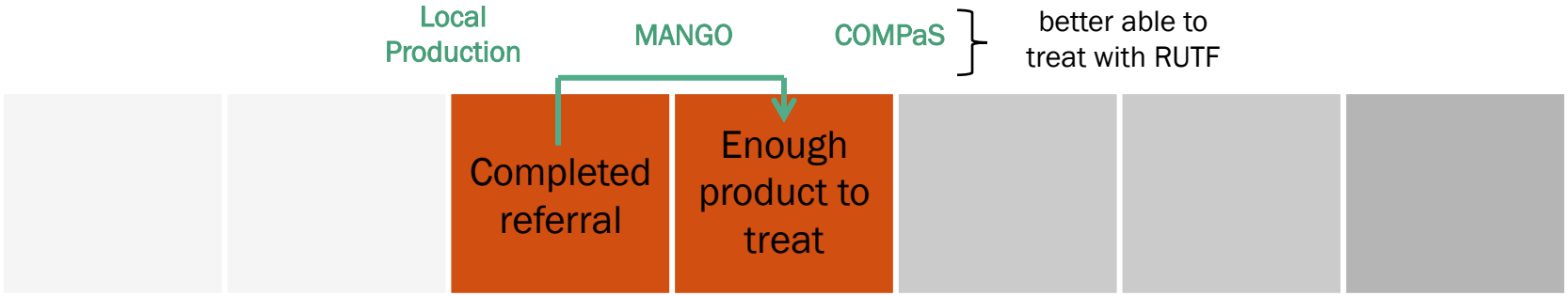

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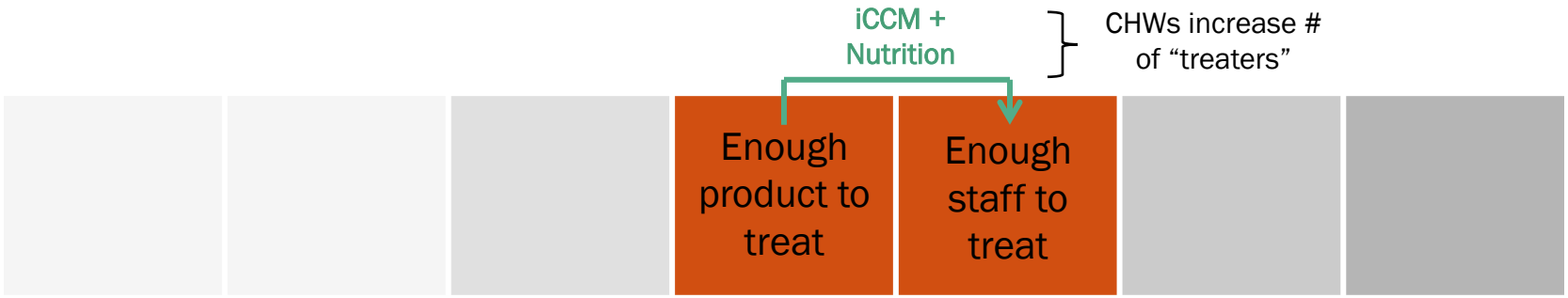
OPPORTUNITY AREAS:

(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:

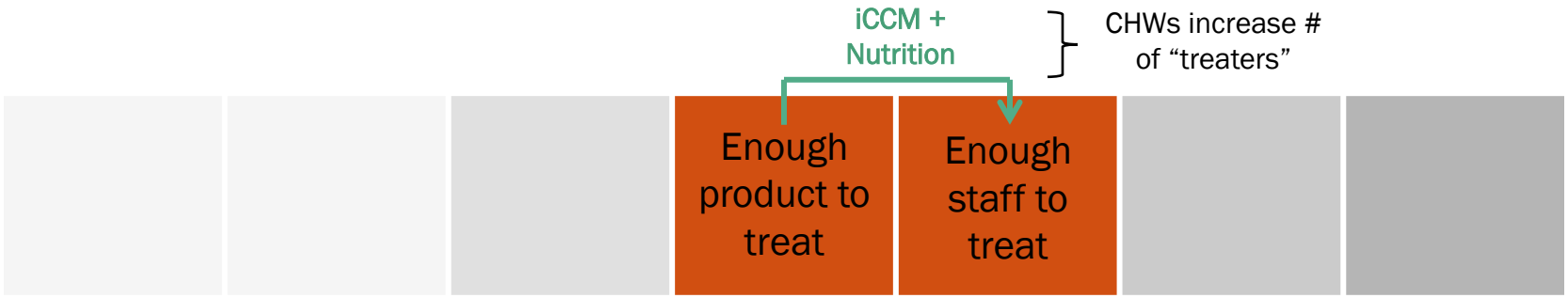
(1) Next generation of health workers

- 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

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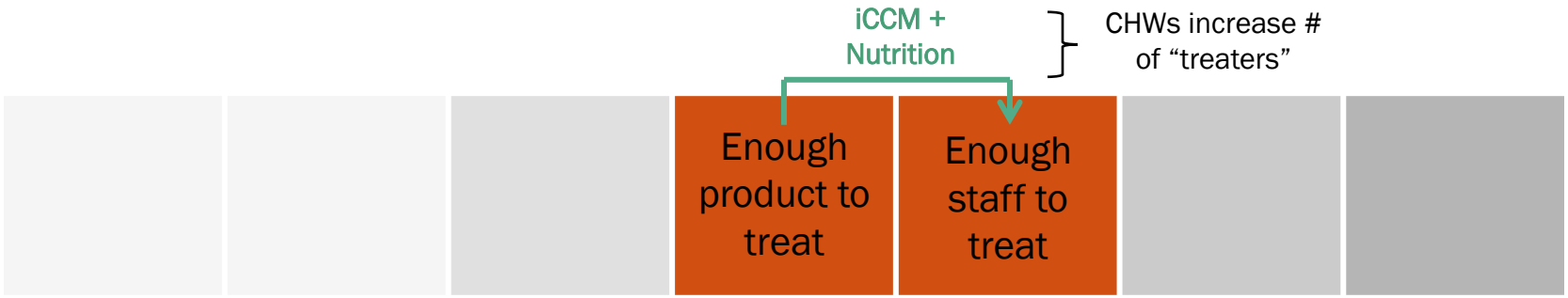

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BARRIERS TO SCALE-UP FACED:

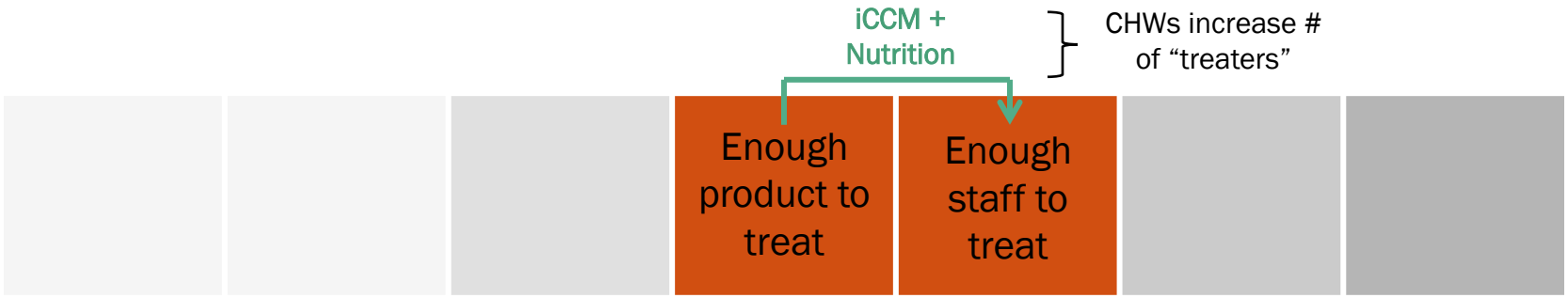
(1) Product

- 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

… and identified opportunities for the nutrition community to address these barriers



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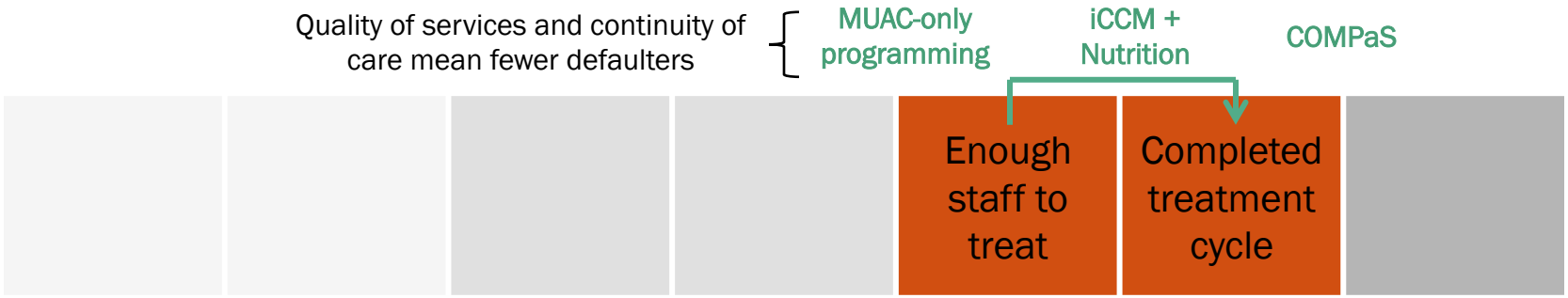
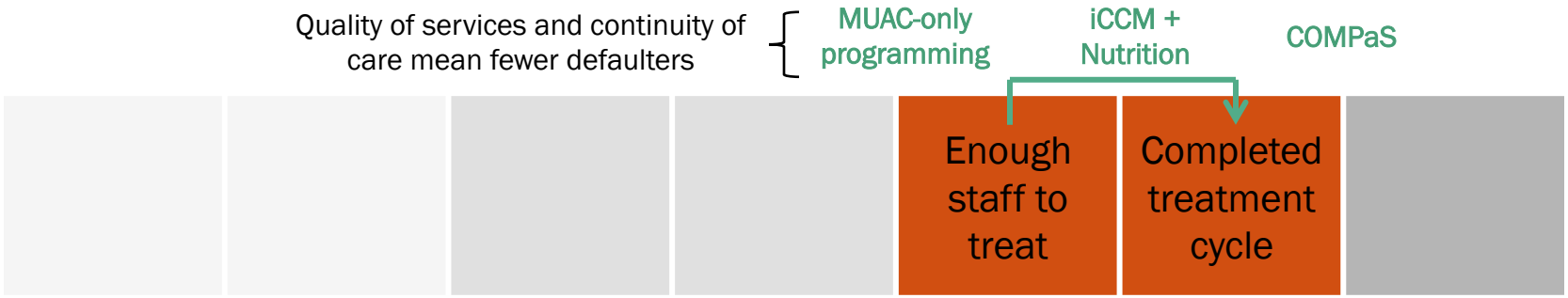
Once treatment has begun, 3 innovations help keep attrition low



… and connect closely with family-led screening



INTERACTS WITH:

(1) Family MUAC

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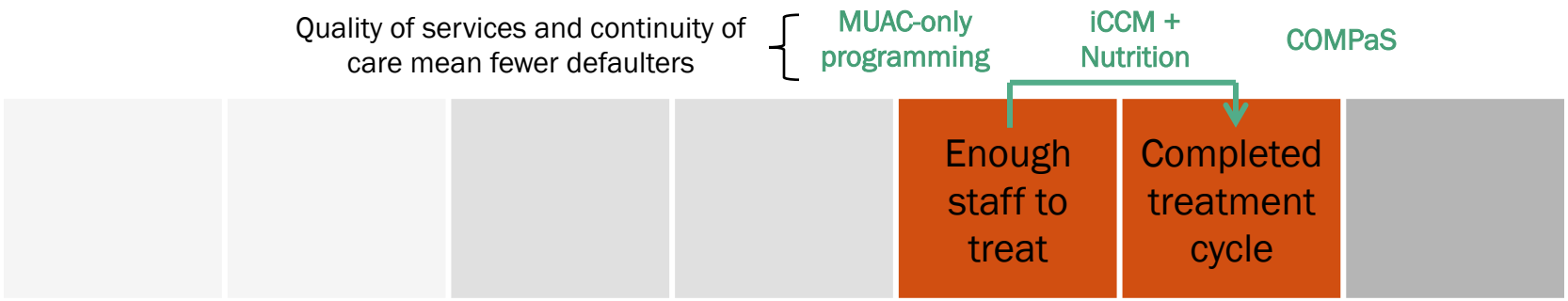
Given these interactions, we identified barriers to scaleup …



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- 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

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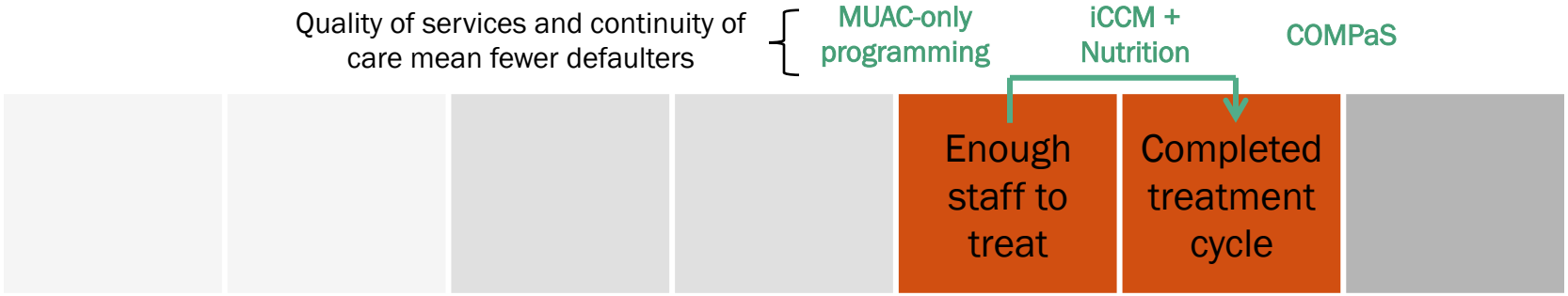

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OPPORTUNITY AREAS:

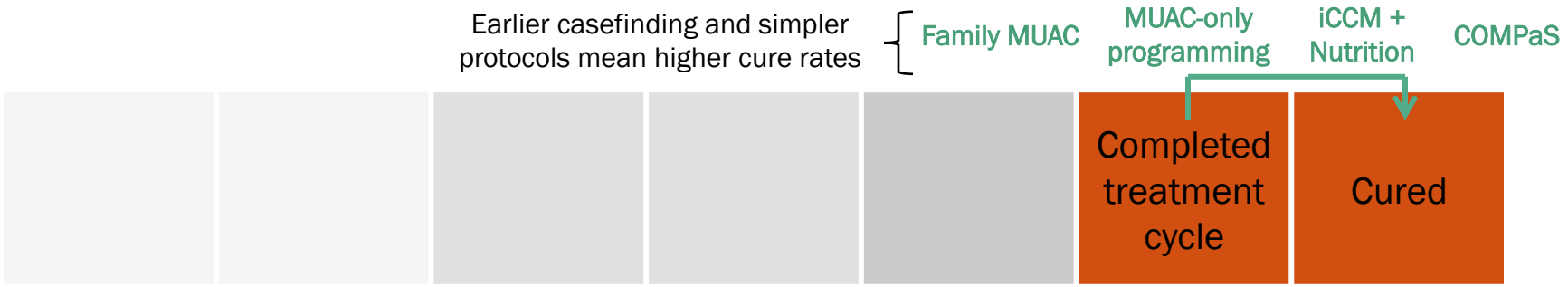
(1) Convene "leading lights" of nutrition

- Allow champions of newer paradigms to make their case in front of UNICEF, WHO, and other top stakeholders

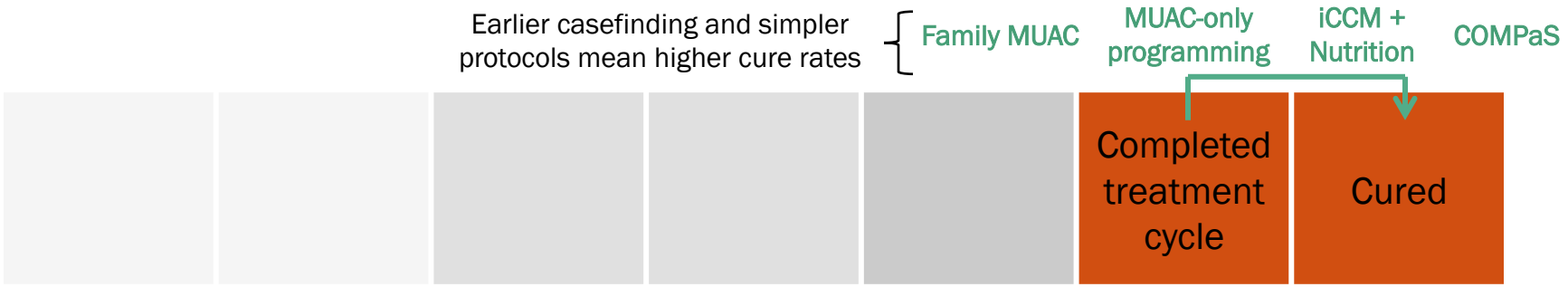
(2) Fund proof of concept

- Prove effectiveness of combining family casefinding, treatment at community level, and combined protocol, to begin to shift sectoral mindset

4 innovations improve quality of services, meaning more children are cured



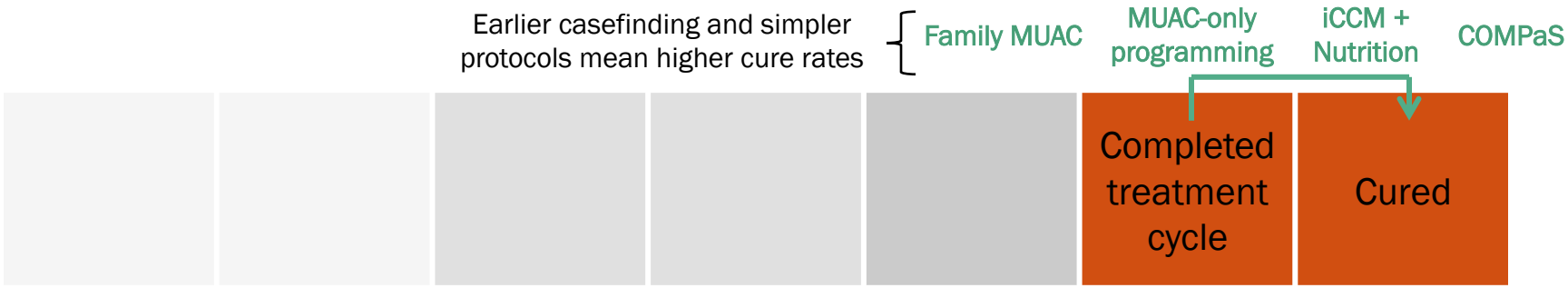
These innovations do not explicitly interact with either Local Production or MANGO's reduced dosage



INTERACTS WITH:

N/A

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



INTERACTS WITH:

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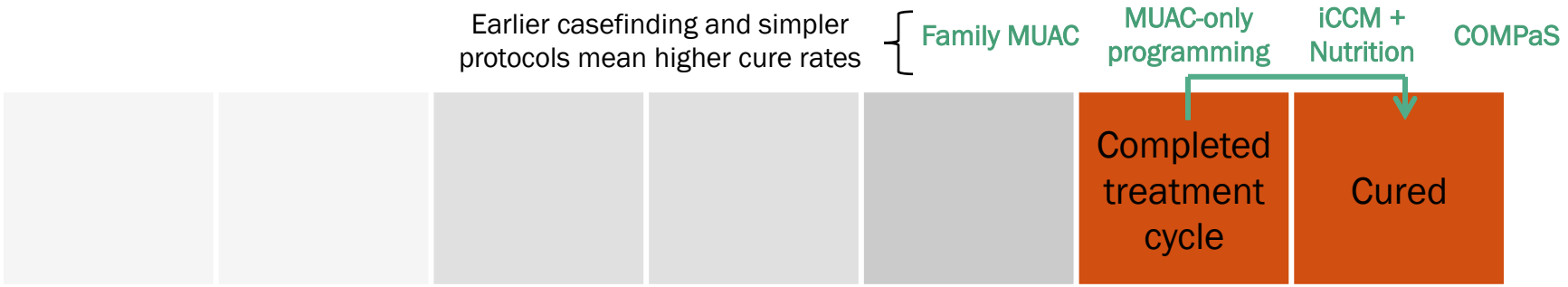
BARRIERS TO SCALE-UP FACED:

(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

… and identified opportunities for the nutrition community to address these barriers



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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

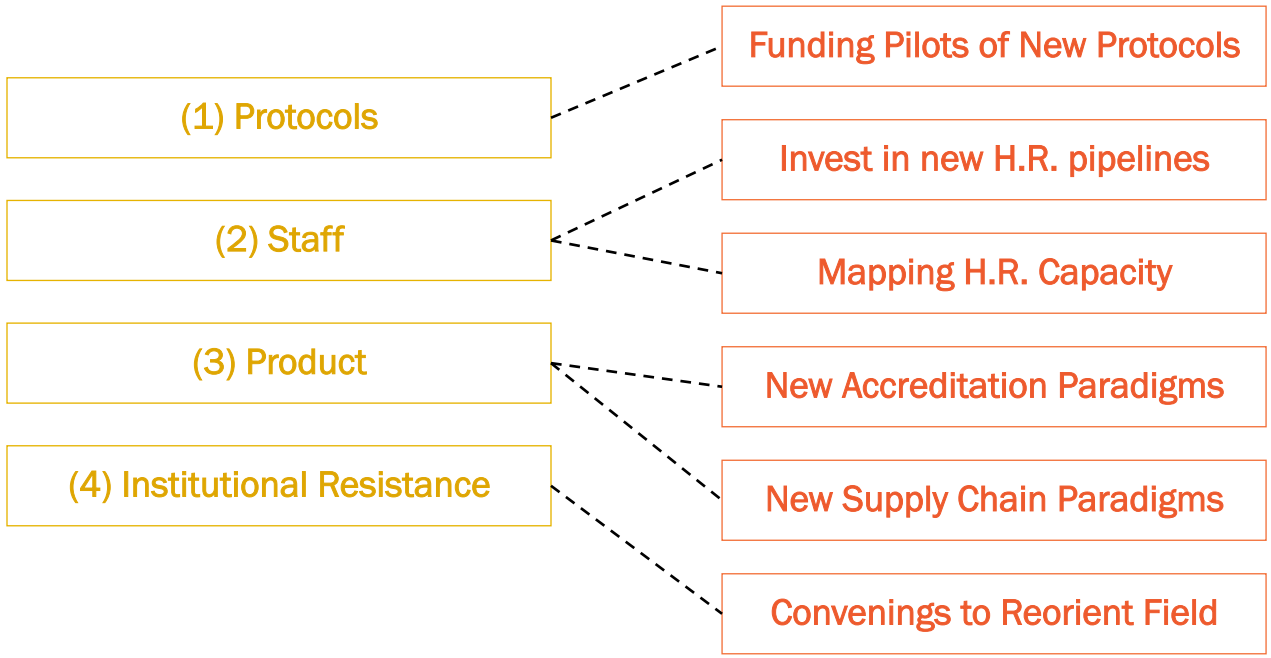
(3) Product

- 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



MOVING TOWARD IMPACT

Are we on track?

With these barriers in mind, we modeled out our 3 different scenarios

SCENARIO	DESCRIPTION	WHAT'S INCLUDED
1 **Base case**	Slow but realistic uptake of all 6 interventions to 2020	Local Production; Family MUAC; MANGO; iCCM; COMPaS; MUAC Only
2 **"Demand-side" scenario**	Fast, 5-year rollout of interventions focused on treatment-seeking and coverage	Family MUAC; COMPaS*; MUAC Only
3 **"Supply-side" scenario**	Fast, 5-year rollout of interventions focused on product and cost	Local Production; iCCM; MANGO; COMPaS*

(*) 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

B [Coverage] We are still refining our assumptions, and strive for transparency about the available data

	Children screened/referred	Seek treatment	Enough product to treat	Enough staff to treat	Continues treatment program	Cured
Local production	No effect assumed	No effect assumed	– Medium increase – **Confidence**: Medium – **Sources:** 4 Interviews and 2 documents	No effect assumed	No effect assumed	No effect assumed
MANGO	No effect assumed	No effect assumed	– Medium increase – **Confidence**: Medium – **Sources:** 1 Interview and 2 documents	No effect assumed	No effect assumed	No effect assumed
COMPaS	No effect assumed	– Small increase – **Confidence**: High – **Sources:** Several papers	– Medium increase (assumed = Mango) – **Confidence**: Medium – **Sources:** 1 Interview and 2 documents	No effect assumed	– Small increase – **Confidence**: Medium – **Sources:**, 1 paper, Coverage assessments, interview	– Small increase – **Confidence**: Small – **Sources:** Several Documents, interviews and online discussions
iCCM Nutrition	No effect assumed	– Medium increase – **Confidence**: Medium – **Sources:** 3 experts, 2 unpublished studies (Mali and Pakistan)	No effect assumed	No effect assumed	– Small increase – **Confidence**: Medium – **Sources:** Same as above	– Small increase – **Confidence**: Low – **Sources:** Same as above
MUAC-only	No effect assumed	– Medium increase – **Confidence**: Low – **Sources:** 2 experts, 1 paper	No effect assumed	No effect assumed	– Minimal increase – **Confidence**: Low – **Sources:** 1 paper, 1 expert	– Minimal increase – **Confidence**: Low – **Sources:** 1 paper, 2 expert
Family MUAC	– Large increase – **Confidence**: Medium - High – **Sources:** 3 Interviews 2 papers	No effect assumed	No effect assumed	No effect assumed	No effect assumed	– Minimal increase – **Confidence**: Low – **Sources:** 1 interview 1 document

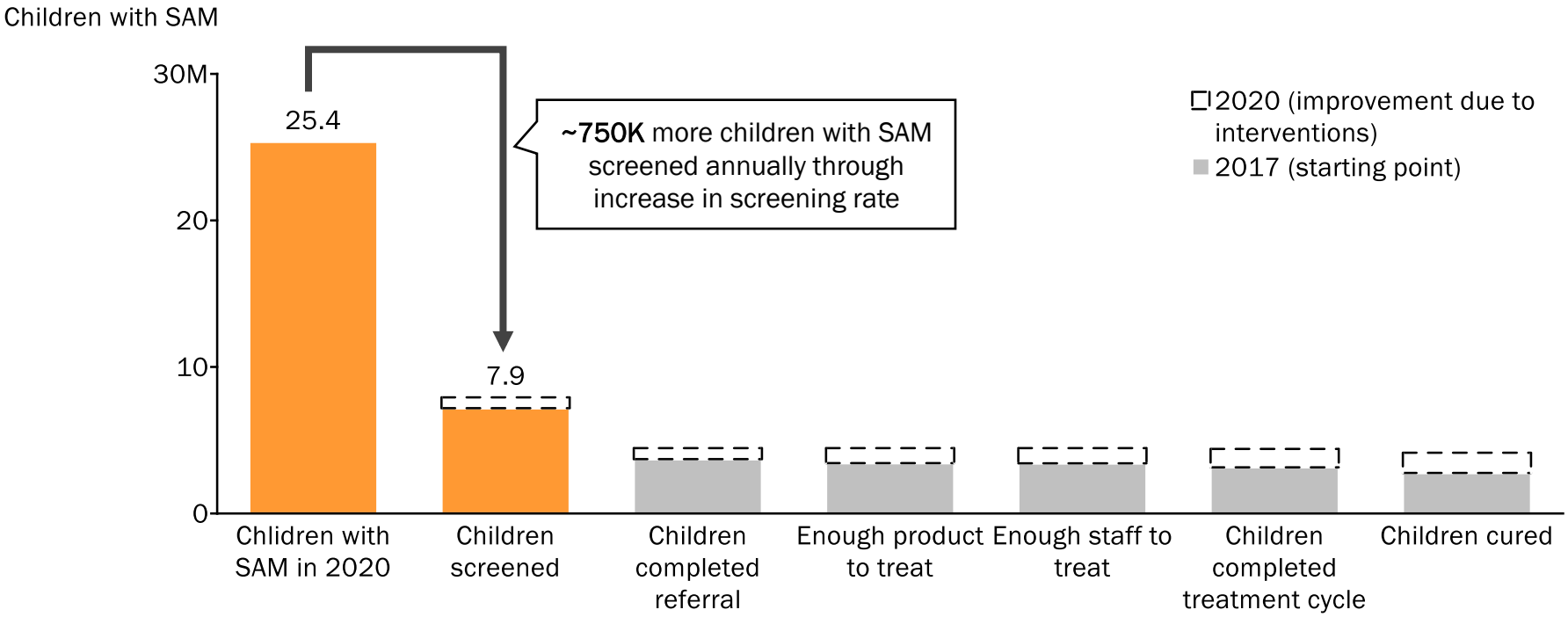
[Cost] We are still refining our assumptions, and strive for transparency about the available data

	Supply of RUTF, MUAC, other products	Cost to **train** health workers	**Salaries** for management, supervision, and workers	**Logistics**, office space, utilities, transport
Local production	- Medium/low savings - **Confidence:** Low - **Sources:** 4 papers 1 interview	No effect assumed	No effect assumed	No effect assumed
MANGO	- Medium savings - **Confidence:** Medium - **Sources:** 1 interview 1 document	No effect assumed	No effect assumed	No effect assumed
COMPaS	- Medium cost increase - **Confidence:** Low - **Sources:** Several papers	- Large cost increase - **Confidence:** Low - **Sources:** several papers	No effect assumed	- Low savings - **Confidence:** Low - **Sources:** several papers
iCCM Nutrition	No effect assumed	- Medium cost increase - **Confidence:** Low - **Sources:** 3 papers	- Medium cost increase - **Confidence:** Low - **Sources:** 1 paper	- Low savings - **Confidence:** Medium - **Sources:** 2 papers, 1 interview
MUAC-only	- Medium cost increase - **Confidence:** Low - **Sources:** 1 paper, 1 interview	- Large cost increase - **Confidence:** Low - **Sources:** 1 paper, 1 interview	- Large cost increase - **Confidence:** Low - **Sources:** 1 paper	- Low savings - **Confidence:** Low - **Sources:** 1 paper,
Family MUAC	No effect assumed	- Medium cost increase - **Confidence:** Low - **Sources:** 1 paper	- Medium cost increase - **Confidence:** Low - **Sources:** 1 paper	- Low savings - **Confidence:** Medium - **Sources:** 1 paper

B: Coverage

Base case

Screening rates are improved by ramping up Family MUAC



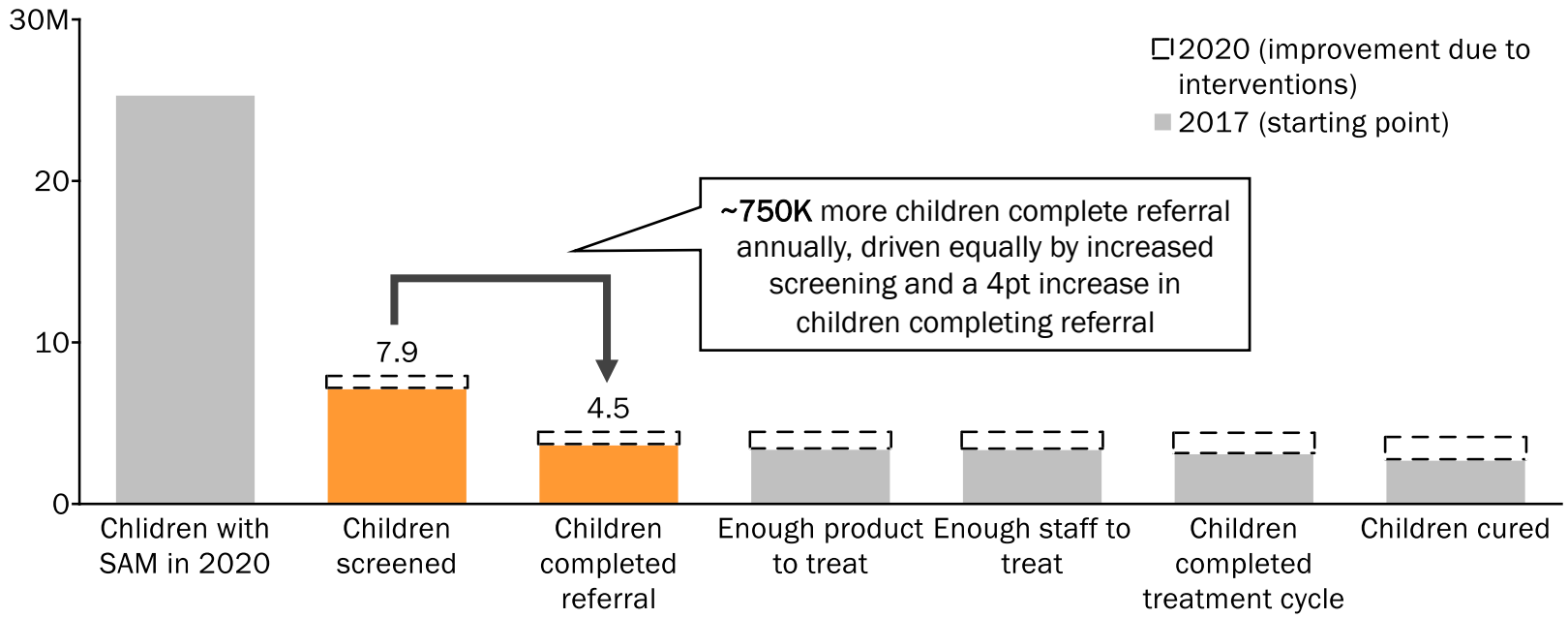
Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively

B: Coverage

Base case

Referral completion will see improvements driven by COMPaS, iCCM, and MUAC-Only

Children with SAM

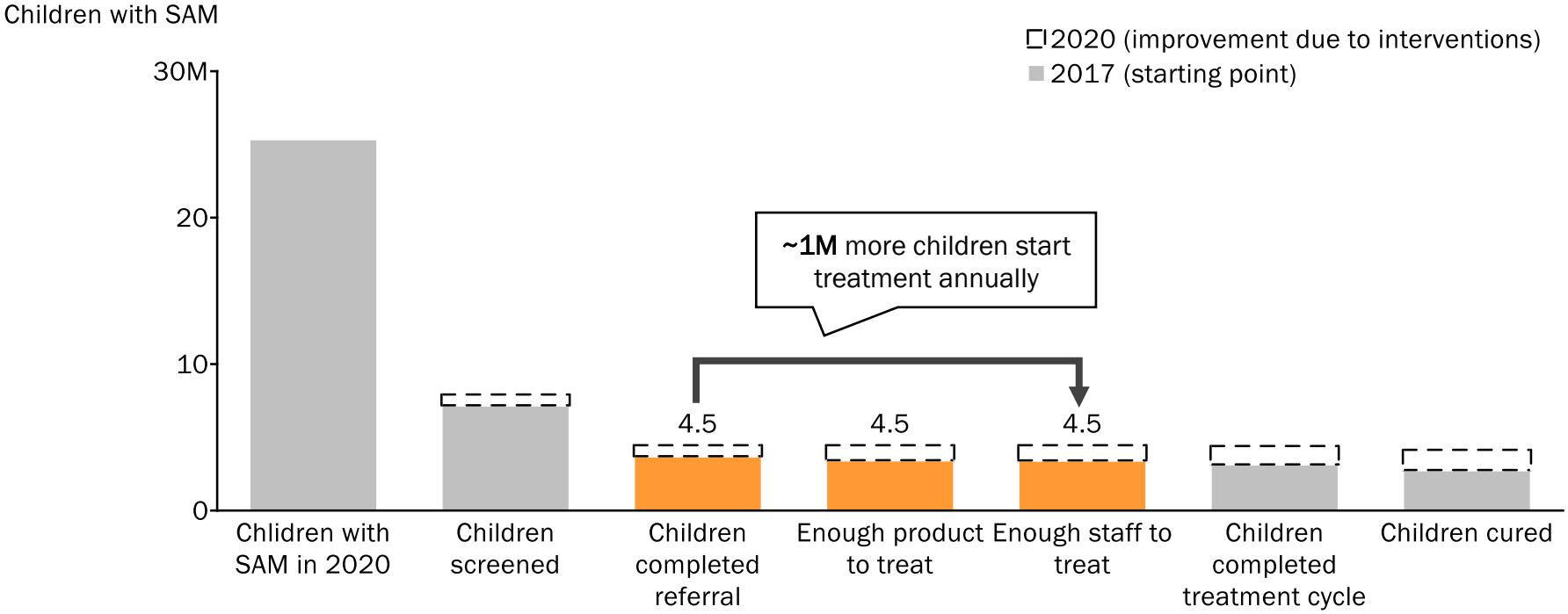


Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively

B: Coverage

Base case

While Local Production and MANGO will provide enough RUTF to treat more children, clinic staff could become a bottleneck

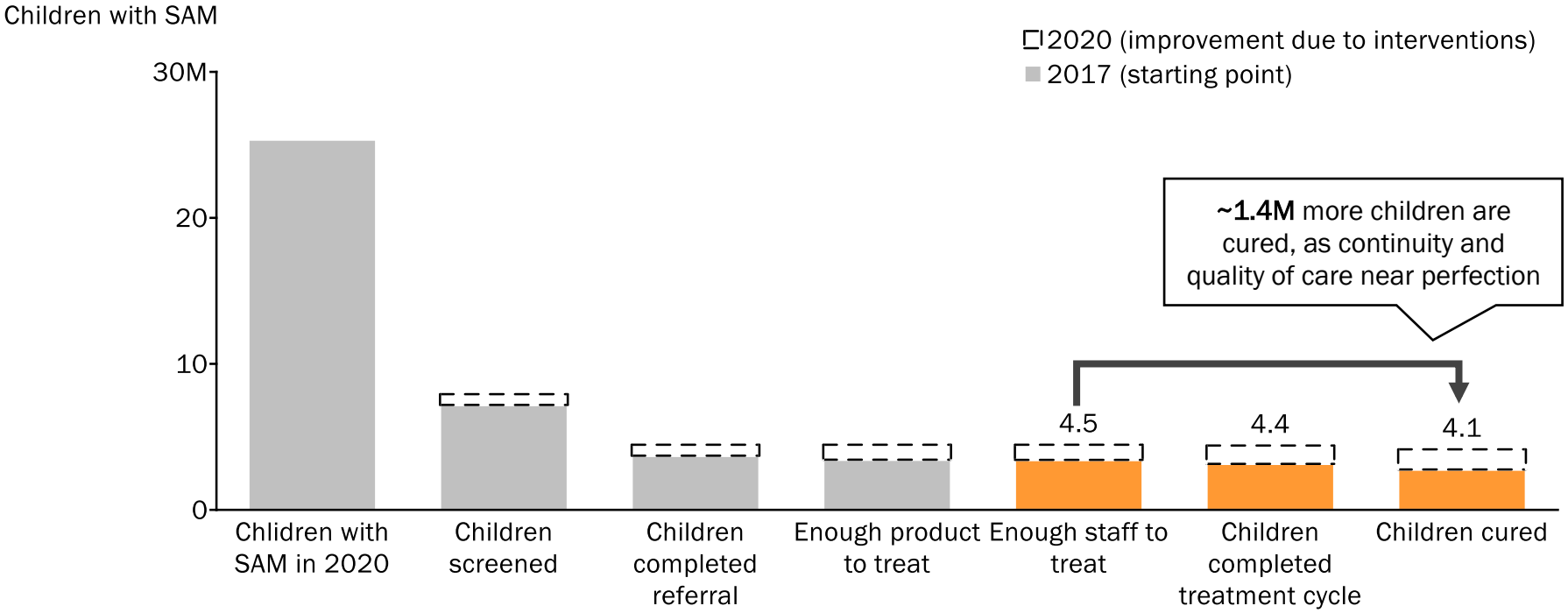


Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively

B: Coverage

Base case

Continuity and quality of care are improved by a small amount via COMPaS, iCCM, MUAC-Only, and Family MUAC

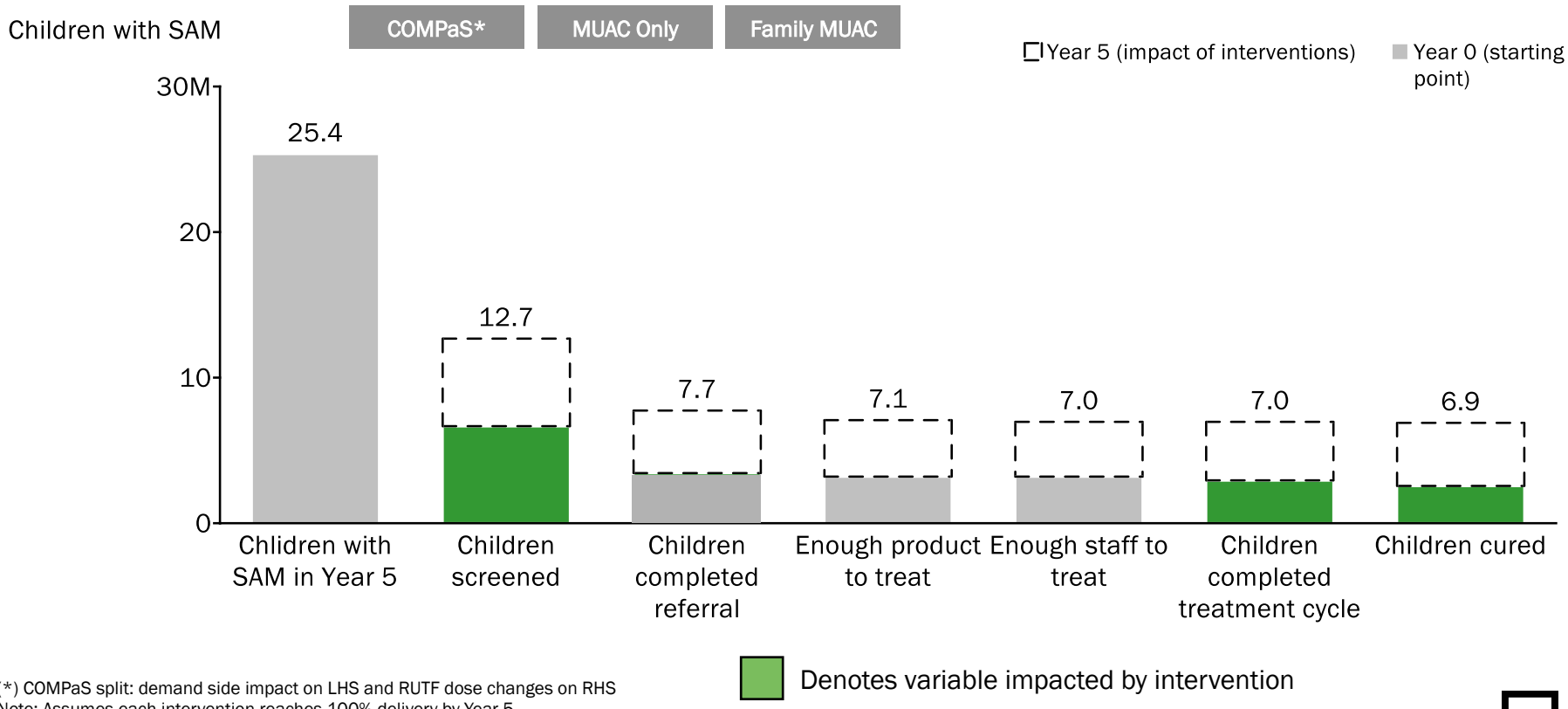


Note: Assumes Local Production, Family MUAC, iCCM Nutrition scale linearly starting in 2018, 2016, and 2018 respectively; assumes MANGO, COMPaS, and MUAC Only scale exponentially starting in 2019, 2019, and 2018 respectively

B: Coverage

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

Demand-side scenario

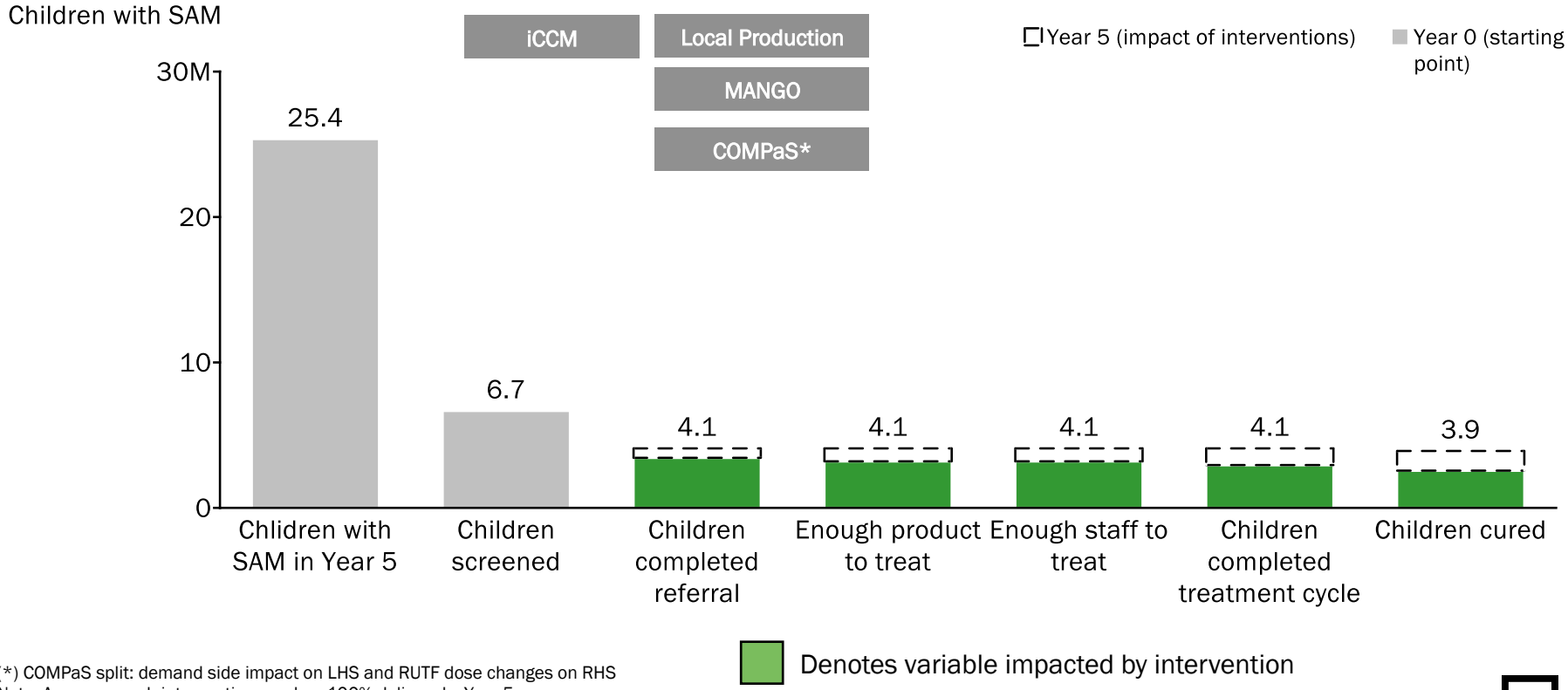


(*) COMPaS split: demand side impact on LHS and RUTF dose changes on RHS
Note: Assumes each intervention reaches 100% delivery by Year 5

B: Coverage

Improvements to supply-side are substantive, but pale in comparison to loss during casefinding

Supply-side scenario



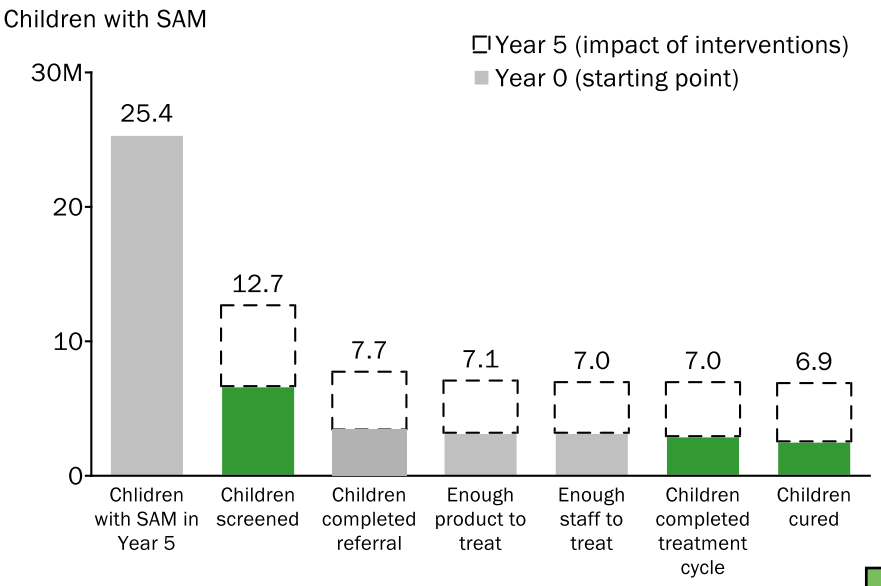
(*) COMPaS split: demand side impact on LHS and RUTF dose changes on RHS
Note: Assumes each intervention reaches 100% delivery by Year 5

B: Coverage

Demand-side interventions inspire confidence that, with big investments, 6M can be treated

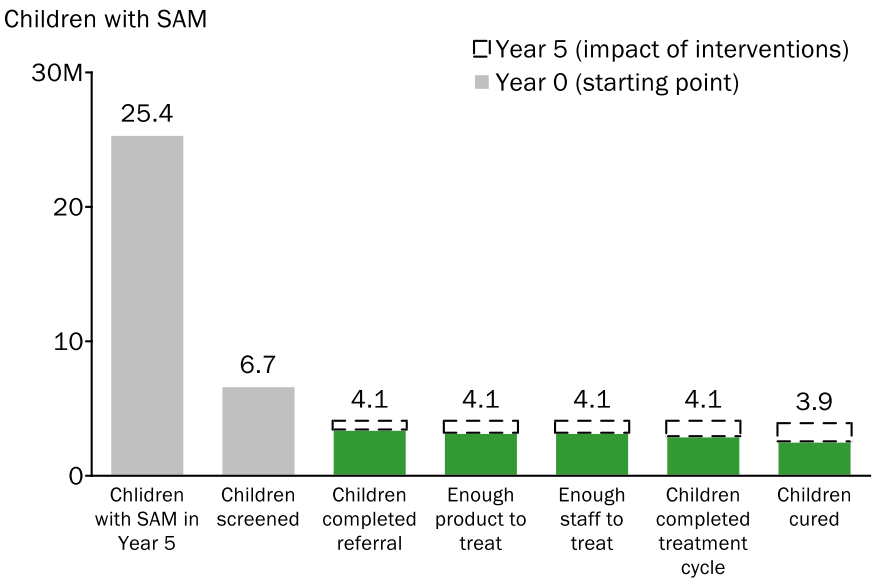
ONLY "DEMAND-SIDE" INTERVENTIONS

COMPaS* | MUAC Only | Family MUAC



ONLY "SUPPLY-SIDE" INTERVENTIONS

iCCM | Local Production | MANGO | COMPaS*



Denotes variable impacted by intervention

(*) COMPaS split: demand side impact on LHS and RUTF dose changes on RHS
Note: Assumes each intervention reaches 100% delivery by Year 5

C: Cost

Currently, costs are concentrated in supply and personnel …

	Supply of RUTF, MUAC, other products	Cost to **train** health workers	**Salaries** for management, supervision, and workers	**Logistics**, office space, utilities, transport
Current cost to treat (~$168)	~30% of costs (~$45-50)	~20% of costs (~$30-35)	~40% of costs (~$65-70)	~10% of costs (~$15-20)

C: Cost

Some interventions, like MANGO, introduce cost-efficiency on the supply side; cost to treat could go down to ~$155 per child after scaleup …

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

Dosage reduction

C: Cost

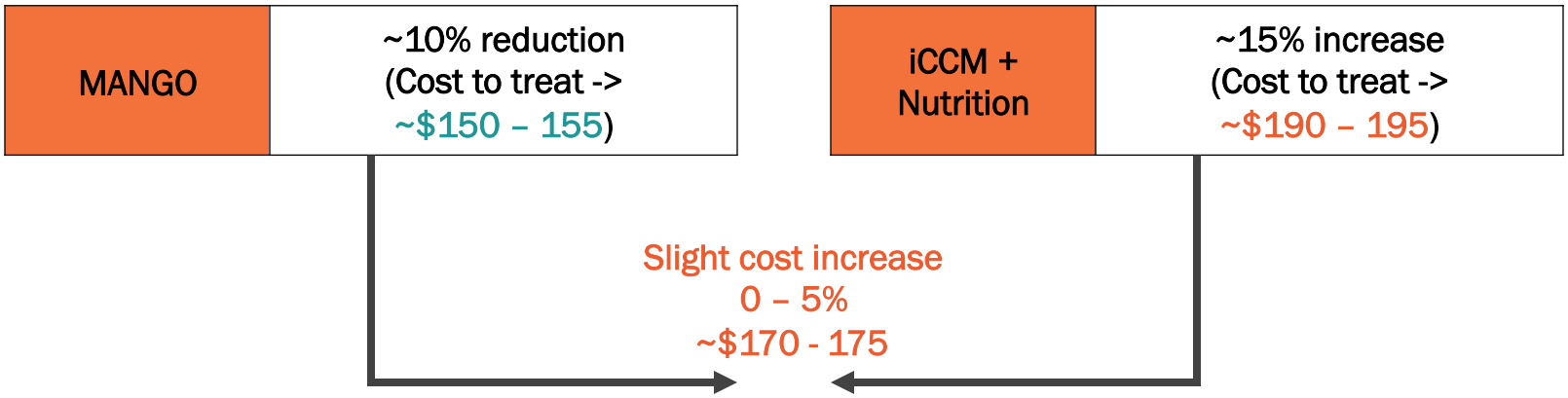
Other interventions, like iCCM + Nutrition, incur new costs in training and personnel; cost to treat could rise to ~$190 per child

	Supply of RUTF, MUAC, other products	Cost to **train** health workers	**Salaries** for management, supervision, and workers	**Logistics**, office space, utilities, transport
New cost to treat (~$190 - 195)	~30% of costs (~$45-50)	iCCM + Nutrition ~15% overall increase		~10% of costs (~$15-20)

Increase in training and personnel costs

C: Cost

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



C: Cost

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

		ESTIMATED EFFECT ON COST	RATIONALE
NWL Pillar	Base case	Slight increase (0 – 5%)	• Increase in training / personnel cost slightly outweighs RUTF cost savings
NWL Pillar	"Demand-side" scenario	Medium increase (15 – 25%)	• Increase in cost of training / personnel to implement utilization programs
NWL Pillar	"Supply-side" scenario	Slight increase (0 – 5%)	• Increase in training / personnel cost from iCCM slightly outweighs RUTF cost savings
NWL Pillar	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
NWL Pillar	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

	(1) Protocols Too complex, too rigid	(2) Staff Enough CHWs, nurses, factory workers	(3) Product Supply chains, acquisitions murky	(4) Institutional resistance No data yet, or resistance to new ideas
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

1. Steve Collins. Postscript: Local purchase of ingredients for RUTF in developing countries? | ENN [Internet]. [cited 2017 Apr 18]. Available from: http://www.ennonline.net/fex/38/postscript
2. Segrè J, Liu G, Komrska J. Local versus offshore production of ready-to-use therapeutic foods and small quantity lipid-based nutrient supplements. Matern Child Nutr. 2016 Jan 1;n/a-n/a.
3. Jeanette Bailey. Model Treatment interview. 2017.
4. Paul Murphy. Model Treatment interview. 2017.
5. Cecile Salpeteur. Model Treatment interview. 2017.
6. Kerstin Hanson. Model Treatment interview. 2017.
7. James PT, Van den Briel N, Rozet A, Israël A-D, Fenn B, Navarro-Colorado C. Low–dose RUTF protocol and improved service delivery lead to good programme outcomes in the treatment of uncomplicated SAM: a programme report from Myanmar. Matern Child Nutr. 2015 Oct;11(4):859–69.
8. Cecile SALPETEUR. MODELLING AN ALTERNATIVE NUTRITION PROTOCOL GENERALIZABLE TO OUTPATIENT (MANGO). 2015.
9. Blanárová L, Rogers E, Magen C, Woodhead S. Taking Severe Acute Malnutrition Treatment Back to the Community: Practical Experiences from Nutrition Coverage Surveys. Front Public Health [Internet]. 2016 Sep 13 [cited 2017 Apr 18];4. Available from: http://journal.frontiersin.org/Article/10.3389/fpubh.2016.00198/abstract
10. Puett C, Guerrero S. Barriers to access for severe acute malnutrition treatment services in Pakistan and Ethiopia: a comparative qualitative analysis. Public Health Nutr. 2015 Jul;18(10):1873–82.
11. Rogers E, Myatt M, Woodhead S, Guerrero S, Alvarez JL. Coverage of Community-Based Management of Severe Acute Malnutrition Programmes in Twenty-One Countries, 2012-2013. PLOS ONE. 2015 Jun 4;10(6):e0128666.
12. UNICEF. MANAGEMENT OF SEVERE ACUTE MALNUTRITION IN CHILDREN: WORKING TOWARDS RESULTS AT SCALE. 2015.
13. Maust A, Koroma AS, Abla C, Molokwu N, Ryan KN, Singh L, et al. Severe and Moderate Acute Malnutrition Can Be Successfully Managed with an Integrated Protocol in Sierra Leone. J Nutr. 2015 Nov; 145(11):2604–9.
14. anette Bailey, Rachel Chase, Marko Kerac, André Briend, Mark Manary, Charles Opondo, Maureen Gallagher and Anna Kim. Combined protocol for SAM/MAM treatment: The ComPAS study. Field Exch. 2016 Nov;53:44.
15. Burza S, Mahajan R, Marino E, Sunyoto T, Shandilya C, Tabrez M, et al. Community-based management of severe acute malnutrition in India: new evidence from Bihar123. Am J Clin Nutr. 2015 Apr; 101(4):847–59.
16. WFH versus MUAC [Internet]. ENN forum. Available from: http://www.en-net.org/question/1915.aspx
17. Ernest Guevara, Alison Norris, Guerrero S, Mark Myatt. Assessment of Coverage of Community-based Management of Acute Malnutrition. CMAM FORUM Technical Brief; 2012.
18. Guerrero S, Mark Myatt. Why coverage is important: efficacy, effectiveness, coverage, and the impact of CMAM interventions. Field Exch. 2015;7.
19. Jose Luis Alvarez. Improving the Measurement of the Coverage of Programs to Treat Severe Acute Malnutrition [Internet]. Global Nutrition report; 2015. Available from: http://www.globalnutritionreport.org/files/2014/11/gnr14_pn4g_07alvarez.pdf
20. Kerac M, Bunn J, Chagaluka G, Bahwere P, Tomkins A, Collins S, et al. Follow-Up of Post-Discharge Growth and Mortality after Treatment for Severe Acute Malnutrition (FuSAM Study): A Prospective Cohort Study. PLoS ONE [Internet]. 2014 Jun 3 [cited 2017 Apr 18];9(6). Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4043484/
21. Paul Wise. Model Treatment interview.
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.
23. Myatt M, Khara T, Collins S. A Review of Methods to Detect Cases of Severely Malnourished Children in the Community for Their Admission into Community-Based Therapeutic Care Programs. Food Nutr Bull. 2006 Sep 1;27(3_suppl3):S7–23.
24. Mark Myatt. Model Treatment interview. 2017.

25. Kevin Phelan. Model Treatment interview. 2017.
26. Dale NM, Myatt M, Prudhon C, Briend A. Using Mid-Upper Arm Circumference to End Treatment of Severe Acute Malnutrition Leads to Higher Weight Gains in the Most Malnourished Children. PLOS ONE. 2013 Feb 13;8(2):e55404.
27. Kevin Phelan, Candelaria Lanusse, Saskia van der Kam, Pascale Delchevalerie, Nathalie Avril and Kerstin Hanson. Simplifying the response to childhood malnutrition: MSF's experience with MUAC-based (and oedema) programming. Field Exch. 2015 Aug;50:108.
28. Guerrero S. Model Treatment interview. 2017.
29. Blackwell N, Myatt M, Allafort-Duverger T, Balogoun A, Ibrahim A, Briend A. Mothers Understand And Can do it (MUAC): a comparison of mothers and community health workers determining mid-upper arm circumference in 103 children aged from 6 months to 5 years. Arch Public Health Arch Belg Sante Publique. 2015;73(1):26.
30. Alé FGB, Phelan KPQ, Issa H, Defourny I, Le Duc G, Harczi G, et al. Mothers screening for malnutrition by mid-upper arm circumference is non-inferior to community health workers: results from a large-scale pragmatic trial in rural Niger. Arch Public Health Arch Belg Sante Publique. 2016;74(1):38.
31. Les Roberts. Model Treatment interview.
32. Marie Sophie Whitney. IRC scoping interviews. 2017.
33. UNICEF. Ready-to-Use Therapeutic Food: Current Outlook. 2014.
34. Ready-to-Use Therapeutic Food Price Data [Internet]. UNICEF. 2015 [cited 2017 Apr 18]. Available from: https://www.unicef.org/supply/index_59716.html
35. Weber JM, Ryan KN, Tandon R, Mathur M, Girma T, Steiner-Asiedu M, et al. Acceptability of locally produced ready-to-use therapeutic foods in Ethiopia, Ghana, Pakistan and India. Matern Child Nutr. 2017 Apr;13(2).
36. Puett C, Sadler K, Alderman H, Coates J, Fiedler JL, Myatt M. Cost-effectiveness of the community-based management of severe acute malnutrition by community health workers in southern Bangladesh. Health Policy Plan. 2013 Jul;28(4):386–99.
37. Wilford R, Golden K, Walker DG. Cost-effectiveness of community-based management of acute malnutrition in Malawi. Health Policy Plan. 2012 Mar;27(2):127–37.
38. Bachmann MO. Cost effectiveness of community-based therapeutic care for children with severe acute malnutrition in Zambia: decision tree model. Cost Eff Resour Alloc CE. 2009 Jan 15;7:2.
39. Tekeste A, Wondafrash M, Azene G, Deribe K. Cost effectiveness of community-based and in-patient therapeutic feeding programs to treat severe acute malnutrition in Ethiopia. Cost Eff Resour Alloc CE. 2012 Mar 19;10:4.
40. Isanaka S, Menzies NA, Sayyad J, Ayoola M, Grais RF, Doyon S. Cost analysis of the treatment of severe acute malnutrition in West Africa. Matern Child Nutr. 2016 Jan 1;n/a-n/a.
41. Puett C, Salpéteur C, Lacroix E, Houngbé F, Aït-Aïssa M, Israël A-D. Protecting child health and nutrition status with ready-to-use food in addition to food assistance in urban Chad: a cost-effectiveness analysis. Cost Eff Resour Alloc. 2013;11:27.
42. Purwestri RC, Scherbaum V, Inayati DA, Wirawan NN, Suryantan J, Bloem MA, et al. Cost analysis of community-based daily and weekly programs for treatment of moderate and mild wasting among children on Nias Island, Indonesia. Food Nutr Bull. 2012;33(3):207–216.
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.
44. Vaughan K, Kok MC, Witter S, Dieleman M. Costs and cost-effectiveness of community health workers: evidence from a literature review. Hum Resour Health [Internet]. 2015 Sep 1 [cited 2017 Apr 18];
13. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4557864/
45. Nicky Connell. IRC scoping interviews. 2017.
46. McCord GC, Liu A, Singh P. Deployment of community health workers across rural sub-Saharan Africa: financial considerations and operational assumptions. Bull World Health Organ. 2013;91(4):244–253b.
47. Horton S, Shekar M, Ajay M. Scaling Up Nutrition: What Will It Cost? [Internet]. The World Bank; 2009 [cited 2017 Apr 18]. Available from: http://elibrary.worldbank.org/doi/book/10.1596/978-0-8213-8077-2
48. Nikki Dent and Natalie Session. Where are MUAC and oedema only Severe Acute Malnutrition (SAM) treatment services in operation? 2017.
49. ALIMA. Concept note. The MUAC Revolution: A New Role for an Old Tool to Scale-Up and Simplify Malnutrition Treatment. 2017.