

# Simplified protocol to treat severe and moderate acute malnutrition in Yemen

---

*Kerina Tull*

*University of Leeds Nuffield Centre for International Health and Development*

*15 May 2018*

## Question

*Please update the HEART Helpdesk report "Nutrition interventions in developing and fragile contexts, with a focus on community interventions and Yemen" to include specific evidence related to the use of a simplified protocol to treat SAM/MAM:*

- *Focus on under five year olds and pregnant/breastfeeding women (PLW).*
- *List the pros/ cons that the simplified protocols bring when compared to traditional SAM and MAM programmes, including cost-effectiveness.*

## Contents

1. Overview
2. Introduction to acute malnutrition, SAM and MAM
3. Community-based management of acute malnutrition (CMAM) in Yemen: programme evaluations
4. Pros and cons of the simplified protocol
5. Cost-effectiveness of the simplified protocol
6. Best practices for maintaining protocol delivery to communities with constrained access
7. References

---

*The K4D helpdesk service provides brief summaries of current research, evidence, and lessons learned. Helpdesk reports are not rigorous or systematic reviews; they are intended to provide an introduction to the most important evidence related to a research question. They draw on a rapid desk-based review of published literature and consultation with subject specialists.*

*Helpdesk reports are commissioned by the UK Department for International Development and other Government departments, but the views and opinions expressed do not necessarily reflect those of DFID, the UK Government, K4D or any other contributing organisation. For further information, please contact [helpdesk@k4d.info](mailto:helpdesk@k4d.info).*

# 1. Overview

This rapid review is an update of the HEART<sup>1</sup> Helpdesk Report on nutrition interventions in developing and fragile contexts (Bolton, 2014), and focuses on simplified (i.e. separate) protocols used to treat severe and moderate acute malnutrition (SAM and MAM, respectively) in Yemen. The evidence found evaluates these protocols when used in community-based programmes for children aged under 5 years, as well as for pregnant and lactating women (PLW) with a child under 6 months, who have acute malnutrition.

Information sources used for this review were taken from a combination of peer reviewed publications, case studies, and self-reported agency evaluations on SAM and MAM programmes. Information available was more for nutrition programmes treating under 5s alone (6-59 months) or under 5s and PLWs, than PLW alone. Although children under 6 months are generally included in national protocols, stronger evidence-based guidance is needed (USAID, 2016).

There were gaps, however, in the amount of current programme data available in Yemen - especially for Supplementary Feeding Programmes (SFPs) for areas heavily hit by military confrontations (such as the northern province of Dhamar, and Al Mahrah on the Saudi border). Stunting and wasting due to malnutrition is not included in the emergency response (ENN, 2015). An expert consulted for this review revealed that acute malnutrition is still not part of health interventions for some non-government organisations (NGOs) today. This is a major issue, as nationally representative data are needed to guide the development of nutrition interventions and public health programmes, such as dietary diversification, micronutrient fortification and supplementation. Data from South Sudan was therefore included to highlight conflict-related programme adaptations.

Key points from the review include:

- Currently, standard SAM/MAM programmes use two separate programmes (Outpatient Therapeutic Programmes [OTP] for SAM, and SFPs for MAM), with two different nutritional treatments (e.g. weekly ready-to-use therapeutic food (RUTF) Plump'nut for SAM, and take-home rations of Plumpy'sup ready-to-use supplementary food [RUSF] every two weeks for MAM) in community-based management of acute malnutrition (CMAM) programmes.
- The existing treatment protocol of CMAM is endorsed by the United Nations World Food Programme (WFP) in emergency contexts. It is an attractive strategy from a cost-effectiveness perspective (Lenters et al., 2016). Unfortunately, the treatment of malnutrition - beyond identification and referral - is not currently part of community-based model (Tesfai, & Bailey, 2017). Therefore, there is limited evidence on its effectiveness and a lack of understanding of the barriers to adoption in crisis-affected contexts (Bailey et al., 2016).
- Given the high global burden of MAM (an estimated 33 million children) (UNICEF et al., 2012) and the fact that the prevention and treatment of MAM reduces the incidence and severity of SAM, it is important for CMAM programmes to consider incorporating MAM

---

<sup>1</sup> The High-Quality Technical Assistance for Results (formerly Health and Education Advice and Resource Team) or HEART Helpdesk is a rapid response research service based at the Institute of Development Studies, University of Sussex, which synthesises relevant evidence to address specific policy questions.

management and prevention either as part of the CMAM programme itself or through links with complementary programmes.

- SAM programmes are mainly prioritised over MAM programmes by aid agencies and governments (Bailey et al, 2018). However, factors related to poor accessibility, poor satisfaction with staff and system, and factors related to treatment and acceptability of OTP services were significantly associated with a high (55%) default rate in a SAM programme in Sana'a, the largest city in Yemen (Al Amad et al., 2017). This shows that expansion of OTP services and further training OTPs staff on SAM treatment protocols are highly recommended.
- Due to the cost effectiveness of SAM programmes, the non-government organisation NGO Action Against Hunger has committed to improving partnerships with academia, think tanks, and scientific bodies to share technical expertise and for research processes (AHH, 2016:44). However, no specific goals for Yemeni partnerships were noted.
- A combined protocol (CompAS) trialled in three countries (including Yemen) to treat acute malnutrition allows one RUTF/RUSF product for treatment, instead of two, which would be more cost-effective. However, there is limited evidence on its effectiveness, especially in crisis-affected areas (Bailey et al., 2018).

'Lessons learned' from using simplified community-based protocols include:

- Coverage of health services must encompass the full targeted population in the most malnutrition-affected areas, especially the west coast of the country, for intervention and for the age group these services are directed to (Al-Mudhwahi, 2015).
- WFP plan to provide an integrated programme of nutrition as part of a therapeutic measure in Yemen to treat MAM using limited resources (WFP, 2017). However, a further step is needed to create a multi-sector, community-based programme that provides both nutrition specific and nutrition-sensitive interventions to unify provision of SAM and MAM services, since both occur together in Yemeni regions.
- Local NGOs are of great importance (ENN, 2015). UNICEF and the Ta'izz city-based NGO Soul for Development piloted the 'Triple A' approach (Assess, Analyse, Action) in an integrated SAM and MAM community engagement programme. This included training of 770 female community health volunteers (CHVs) to screen for SAM/MAM using mid upper arm circumference (MUAC) and deliver health and nutrition messages. Community engagement was the key to its success, resulting in 2,563 children treated for SAM, and a significant reduction in the number of SAM and MAM children referred to the OTPs (Sallam et al., 2017). As the CHV role is voluntary, costs are low.
- The International Rescue Committee (IRC) feasibility study of low-literate community health workers (CHWs) treating uncomplicated SAM used simple tools and a simplified protocol in Northern Bahr el Ghazal State, South Sudan (Kozuki et al., 2017). This suggests that such a programme can be integrated into an integrated Community Case Management (iCCM) protocol for further success.
- World Vision South Sudan's nutrition team worked with the UNICEF Nutrition Cluster to adapt its nutrition programming to address the malnutrition needs of children and affected communities in constrained areas (i.e. due to civil war) (Laker & Toose, 2015). Development and implementation of a Rapid Response Mechanism (RRM) resulted in better practice of intervention delivery.

A recent economic evaluation revealed that few studies have assessed the cost-effectiveness of nutrition interventions, particularly treatment of MAM and changes in acute malnutrition protocols (Lelijveld et al., 2018:2). The cost per MAM child treated is not widely published, perhaps due to the current lack of recommended protocols. Treatment for SAM is estimated to cost between USD100 and USD203 per child treated.

As this query was concerned with mothers and lactating women, evidence used in this review is not 'gender blind'. In terms of gender dynamics, studies show that money given to women is more likely to provide positive nutritional and health benefits for their children than money given to men (King & Lomborg, 2008:1). Results from the 2012-2013 Yemen National Social Protection Monitoring Survey show that boys (15%) are slightly more affected by malnutrition than girls (11%) (IPC/UNICEF, 2014:116). However, no other evidence was found for the effect of gender on nutrition programme protocols. Treatment for SAM is estimated to cost between USD26 and USD53 per disability-adjusted life year (DALY) averted. However, the effect of disability on the simplified protocol was not a focus for this review.

## 2. Introduction to acute malnutrition, SAM and MAM

### Definitions

Acute malnutrition in children aged under five years (hereby referred to as *under 5s*) is internationally defined by being too thin for a given height<sup>2</sup> and/or having a left arm circumference less than a given threshold (i.e. measuring how fat or thin the mid upper arm circumference [MUAC] is), and/or having swollen feet (known as bilateral pitting or malnutrition oedema<sup>3</sup>). Acute malnutrition can result in death if left untreated (Save the Children, 2017a).

Pregnant women who receive inadequate nutrition experience greater maternal morbidity (i.e. are more likely to be ill whilst pregnant), and have a higher risk of poor pregnancy outcomes such as premature birth or miscarriage. Production of milk and the act of breastfeeding require more energy from the body. Therefore, nursing (lactating) mothers need to be well nourished.

Currently, both children<sup>4</sup> and pregnant and lactating women (PLW) with a child under 6 months of age can receive treatment for acute malnutrition through different treatment programmes.

---

<sup>2</sup> Severe acute malnutrition (SAM): weight-for-height ratio z-score (WHZ) of <-3 (also termed "severe wasting") or MUAC < 115 mm, or the presence of bilateral pitting oedema, or both. Moderate acute malnutrition (MAM): WHZ between -2 and -3 ("moderate to severe wasting") or mid-upper arm circumference (MUAC) of 115-125 mm (WHO definitions).

<sup>3</sup> The optimal setting for managing children with SAM who have mild to moderate oedema remains unclear; these children may be treated in outpatient settings or referred to inpatient facilities, depending on the protocol of particular programs. No RCTs have compared inpatient treatment to community-based treatment for this group (Lenters et al., 2016).

<sup>4</sup> The management of acute malnutrition in infants under 6 months, a highly vulnerable group with an increased risk of mortality, is generally included in national protocols, though stronger evidence-based guidance is needed (USAID, 2016). Currently there are no agreed upon nor reliable tools for screening for SAM in infants at community level (MUAC for SAM/MAM has not yet been recommended for this group) (UNICEF, 2015:119).

## Treatment programmes

In humanitarian settings (as well as in many other non-emergency but fragile contexts where malnutrition is common), current international and national recommendations involve treating SAM and MAM in separate programmes, using separate (simplified) protocols and separate products, managed by two large but separate United Nations agencies (Bailey et al., 2018:2). Results from the 2012-2013 Yemen National Social Protection Monitoring Survey show that boys (15%) are slightly more affected by malnutrition than girls (11%) (IPC/UNICEF, 2014:116). However, treatment programmes are for children of both genders.

Acute malnutrition is currently divided into severe (SAM) and moderate (MAM) based on level of wasting (Lelijveld et al., 2018). SAM is the most extreme and visible form of malnutrition: children with SAM have very low weight for their height and severe muscle wasting. Uncomplicated SAM cases refer to children with no medical complications and with an appetite.<sup>5</sup> These children are treated at home with weekly or biweekly visits at a nearby health facility (UNICEF, 2013). 24-hour care is provided in hospital units known as Therapeutic Feeding Centres or Stabilisation Centres (TFCs/SCs) for 2 to 3 weeks. Once stabilised, they are referred to the Outpatient Therapeutic Programme (OTP) clinic to continue the SAM treatment course and a take-home ration of ready-to-use therapeutic supplementary food (RUSF) known as Plumpy'nut<sup>6</sup> once per week (World Bank, 2017:10; Save the Children, 2017a). Oversight and technical guidance is usually from the United Nations International Children's Fund (UNICEF).

Cases of uncomplicated MAM are treated with either a RUSF or fortified corn soy blend ++ (CSB++<sup>7</sup>) through a (targeted) Supplementary Feeding Programme (SFP), with oversight and technical guidance from the UN World Food Programme (WFP). Children receive a take-home ration of RUSF known as Plumpy'sup food every two weeks.

For malnourished PLW, treatment is mainly via SFP at the community level, for a minimum of 2 months and a maximum of 4 months per beneficiary. If a fixed site, such as a hospital or clinic, is not feasible, mobile SFP support can be provided on rotational basis, offering fortnightly visits to the catchment population. The mobile team approach is particularly viable for covering scattered pockets of populations, and in the post-disaster situations which disrupt public health systems.

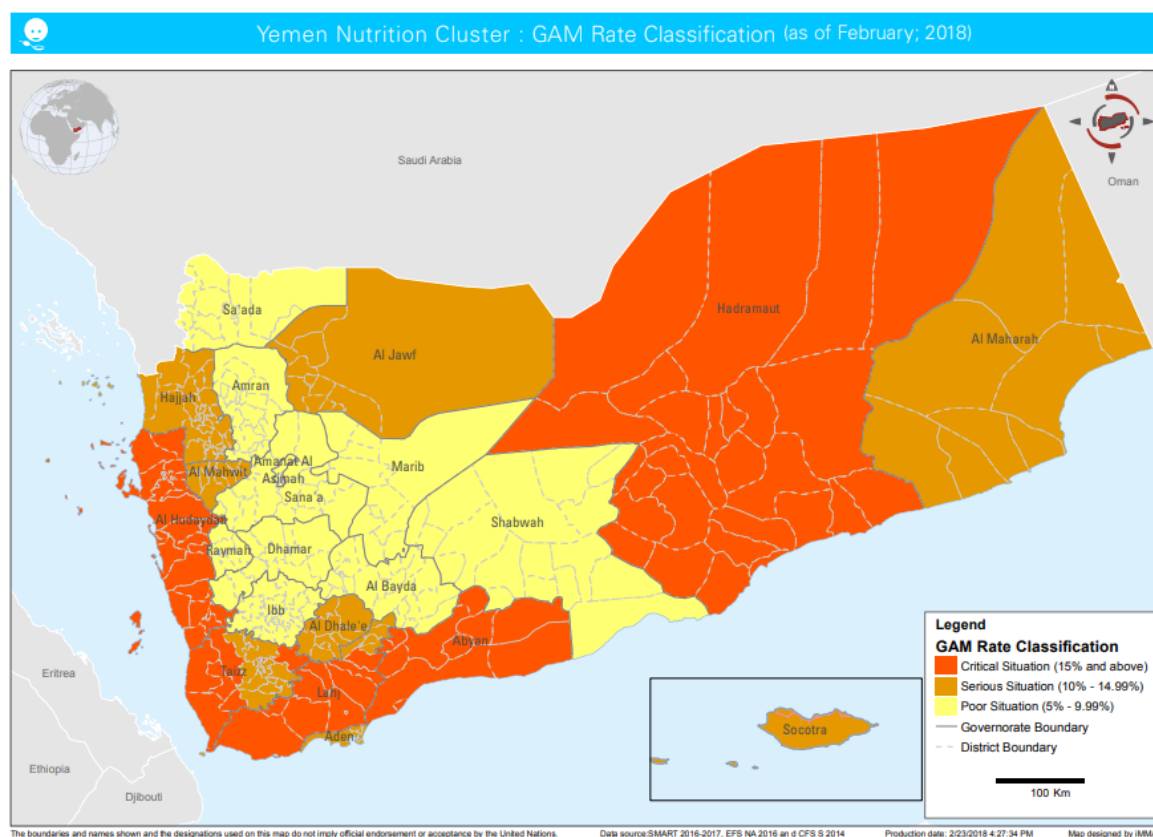
---

<sup>5</sup> Complicated SAM cases, which represent approximately 10–20% of all children with SAM, refer to children without an appetite and/or with medical complications such as a high fever, severe dehydration, and lower respiratory infection. The children are stabilised in 24-hour inpatient care facilities before referral to continue treatment at decentralised outpatient care facilities.

<sup>6</sup> A peanut-based paste used in the emergency treatment of malnourished children.

<sup>7</sup> Now called Supercereal Plus, fortified with skimmed milk powder, sugar and oil (de Pee & Bloem, 2009).

## Malnutrition status in Yemen



Source: UNICEF Yemen Nutrition Cluster (2018).

Even before the latest conflict in 2015, Yemen had one of the highest rates of malnutrition in the world (WFP, 2016). Currently, some 1.8 million Yemeni under 5s are malnourished - of whom 500,000 children have SAM (WHO EMRO, 2018). This is a decrease from the 2017 recorded figures of 2.2 million and 462,000 SAM children, respectively (Save the Children, 2017b). However, the latest Demographic Health Survey (of 12,348 children) notes a stunting<sup>8</sup> rate of 46.5%, with a significant difference of 17% in rates between urban and rural areas (Sharaf & Rashad, 2016; SUN, 2017; WFP Yemen et al., 2017:14). This malnutrition-related stunting is irreversible (WFP, 2016). In areas like Al Hudaydah governorate (also known as Hodeidah, the 4<sup>th</sup> largest city, bordering the Red Sea), Global Acute Malnutrition (GAM)<sup>9</sup> rates among under 5s as high as 31% have been recorded - more than double the 15% emergency threshold used to guide humanitarian intervention (ENN, 2015). In fact, according to the Emergency Food Security and Nutrition Assessment (EFSNA) for Yemen, wasting (acute) levels surpassed the emergency threshold of 15 in four out of 19 governorates; and stunting was found to be “critical” or “serious”

<sup>8</sup> Stunting (i.e. too short for their age, or weight-for-age score) is an indicator of chronic malnutrition, the result of prolonged food deprivation and/or disease or illness- compared to wasting is an indicator of acute undernutrition, the result of more recent food deprivation or illness.

<sup>9</sup> GAM is comprised of the proportion of children 6-59 months in the population classified with MAM (-79-70% GAM range), SAM (<70-% GAM), and/or malnutrition oedema. Often used in protracted refugee situations.



in all except two governorates assessed (WFP Yemen et al., 2017:4). Additionally, one million under 5s are at risk of acute malnutrition - in Hodeida alone, more than 100,000 under 5s are at risk of SAM (Zeyad, 2016; Eshaq et al., 2017).

The nutrition situation for Yemeni women of reproductive age (15 to 49 years) is equally serious: 25% are underweight and more than four-fifths are anaemic, which can lead to maternal death and disabling morbidities (WFP, 2017). Maternal malnutrition is also a risk factor for low-birth weight babies, which is especially high in rural settlements (Muftah, 2016). Reports show that 1.1 million PLW have been suffering from acute malnutrition since escalation of the ongoing conflict in mid-March 2015 (Save the Children, 2017b); as a result, many pregnant women are currently suffering miscarriages (Columbus, 2017). With the country's healthcare system on the brink of collapse, midwives state that simple complications in pregnancy are often life-threatening (Columbus, 2017).

The number of children and PLW that require urgent humanitarian nutrition services to treat or prevent malnutrition has increased 148% since late 2014 (Save the Children, 2017c). Therefore, there is an urgent need for specific malnutrition programmes for under 5s and PLW. However, not all programmes have been evaluated for their efficiency.

### **3. Community-based management of acute malnutrition (CMAM) in Yemen: programme evaluations**

CMAM is a critical tool for addressing emergency levels of GAM in a conflict-affected context (Laker & Toose, 2015). The CMAM approach is described elsewhere (see Bolton, 2014). By offering case management at decentralised sites and incorporating community activities, the approach increases coverage, access, and effectiveness of treatment for acute malnutrition in vulnerable groups (USAID, 2016:1). The strategy promotes establishing linkages with complementary programmes, strengthening professional and institutional capacity to implement CMAM services, and supporting the enabling policy environment as well as direct service delivery. The CMAM approach is also the launching point for scaling-up access to treatment of malnutrition during humanitarian emergencies. It is an attractive strategy from a cost-effectiveness perspective, as most children are treated on an outpatient basis, reducing opportunity costs to caregivers (Lenters et al., 2016). As mothers administer RUTFs to their children, this means less time away from income-generating activities and responsibilities as caregiver to additional children.

The existing treatment protocol of CMAM programmes is endorsed by the WFP in emergency contexts. However, there is limited evidence on its effectiveness and a lack of understanding of the barriers to adoption in crisis-affected contexts (Bailey et al., 2016).

#### **SAM management vs MAM management**

Implementation of the various components of CMAM can vary across geographic areas and implementers, but all CMAM programmes include the outpatient management of SAM without medical complications, and are designed with a community component. Some CMAM programmes include MAM management, while others do not. This is partly a reflection of the absence of normative global guidance for MAM management (Lelijveld et al., 2018), compared to SAM management for which normative guidance is readily available. Resources may also be more constrained for managing MAM, which has a lower risk of death compared to SAM and,

therefore, may be deemed a lower priority. Given the high global burden of MAM (an estimated 33 million children) (UNICEF et al., 2012) and the fact that the prevention and treatment of MAM reduce the incidence and severity of SAM, it is important for CMAM programmes to consider incorporating MAM management and prevention either as part of the CMAM programme itself or through links with complementary programmes.

The following are two evaluations of recent community-based malnutrition programmes with simplified protocols in Yemen for SAM and MAM:

## **Outpatient Therapeutic Programme treatment of SAM**

One study evaluated treatment attendance vs default rate (i.e. rate absent for 2 consecutive visits), among children with SAM who were admitted to the 11 OTP in primary health centres of Sana'a, the largest city in Yemen (Al Amad et al., 2017).

Key results: Of the 339 SAM children treated, 186 (55%) children were discharged as defaulters, 141 (42%) were cured, and 12 (3%) were transferred to other treatment sites. Many factors related to poor accessibility, poor satisfaction with staff and system, and treatment and acceptability of OTP services factors were significantly associated with treatment default. Having difficulty to attend OTP every week (odds ratio 8.4), unavailability of medication during follow-up visits (OR 5.0), not liking eating Plumpy'Nut (OR 5.8), and not gaining weight since the start of treatment (OR 9.3) were the strongest predictors of treatment default.

Lessons learned and recommendations: Due to the high default rate among SAM children in Sana'a city, expansion of OTP services, and further training OTPs staff on SAM treatment protocols are highly recommended. However, it should be noted that due to short follow-ups of interventions, it may be difficult to record true recovery times (Lenters et al., 2016). Furthermore, most SAM and MAM trials rely on passive recruitment: caregivers bring affected children to a health facility, where they may be recruited into a trial. Thus, study results may not be generalisable and can result in selection bias if the characteristics of caregivers who seek help differ systematically from those who do not bring their children for treatment.

## **Supplementary Feeding Programme treatment of MAM**

The WFP reported findings of its treatment of MAM in Yemen under its Emergency Operation 201068 (WFP, 2017). This included a targeted SFP with activities for prevention of acute and chronic malnutrition, as well as a blanket supplementary feeding programme (BSFP) for all children and PLW regardless of nutritional status. The SFP RUSF Plumpy'Sup provided 535 kcal per day for an average of 90 days. PLW received a monthly 6kg take-home ration of a fortified blended flour, SuperCereal, from the beginning of the second trimester through to six months of breastfeeding to prevent under nutrition and micronutrient deficiencies, as well as to support healthy maternal and neonatal outcomes.

Key results: The cumulative 2017 total for the targeted SFP was 94,788 children aged 6-59 months and 59,917 acutely malnourished PLW. This was through 561 health facilities and 99 mobile clinics in 13 governorates. 82% of MAM children were discharged as cured, 17% defaulted, and less than 1% died; while 97% of PLW admitted in March were discharged as cured, 2% defaulted and no deaths were recorded.



However, for the BSFP 43,041 children aged 6-59 months were provided with RUSF (regardless of MUAC indicator), including only 142 out of the planned 20,945 children aged 6 to 23 months (0.68%) (WFP, 2017). Although no cure rates are presented, it is clear that this blanket programme was not as successful as was expected.

Lesson learned and recommendations: To avert a looming nutrition catastrophe due to the low BSFP results, WFP, in collaboration with its key partners - UNICEF, WHO and Nutrition Cluster partners - will provide an integrated package of nutrition and food assistance with complementary activities. These will use limited resources focusing on areas at the highest risk to meet the immediate needs of the most vulnerable, responding to the needs of each Yemeni family as a whole (WFP, 2017).

WHO currently supports 47 TFCs/SCs, with 3 more planned in 2018, to cope with the rising needs for malnutrition treatment services (WHO EMRO, 2018). Section 6 describes how UNICEF uses a simplified protocol for their work.

## 4. Pros and cons of the simplified protocol

### Simplified vs Combined (unified) protocol

In 2016, the International Rescue Committee (IRC) and its partners - NGO Action Against Hunger (AAH) and the London School of Hygiene and Tropical Medicine - completed the first phase of a global research initiative that challenges some of the assumptions preventing progress in treating malnutrition using separate (simplified) protocols (Bailey et al., 2016; Tesfai & Bailey, 2017). A protocol that eliminates the binary distinction between SAM and MAM, and instead offers a unified and simplified protocol for treating both was developed (named ComPAS, Combined Protocol for Acute Malnutrition Study).

Secondary analysis of data from children recovering from SAM in OTP and from MAM in a targeted SFP programmes in Chad, Kenya and Yemen highlighted the following pros and cons of the simplified protocol (Bailey et al., 2016):

#### *Pros of simplified protocol:*

- SAM children can be treated, even with logistical or financial constraints, e.g. funding available for one RUTF, and limited staff only.
- Ideally, severe cases eventually 'graduate' to moderate status.

#### *Cons of the simplified protocol:*

- It is logistically complicated to implement, requiring the procurement of two different nutritional products and the set-up of two separate programmes (including staff and training needs in the OTPs), in coordination with two separate (usually UN) agencies.
- It is consequently expensive (Tesfai & Bailey, 2017).
- This binary system often results in the prioritisation of SAM over MAM, which therefore decreases the availability of treatment.
- Many aid agencies and governments offer treatment only for SAM due to the challenges associated with procuring two products and coordinating two programmes. This results in

a situation where treatment may not be available to children with MAM until they deteriorate to SAM when resources are limited (Save the Children, 2017a; Bailey et al., 2018:2).

Table 1 below shows the differences between a simplified and a combined protocol:

**Table 1** Nutritional protocol for the control and intervention trial arms

	Standard protocol (control)	Combined protocol (intervention)
Admission criteria	<ul style="list-style-type: none"> <li>• OTP</li> <li>• WHZ &lt; -3</li> <li>and/or</li> <li>• MUAC &lt; 115 mm</li> <li>and/or</li> <li>• Bilateral pitting oedema (+/++)</li> <li>and</li> <li>• Clinically uncomplicated<sup>a</sup></li> </ul> SFP <ul style="list-style-type: none"> <li>• Discharged from OTP</li> <li>and/or</li> <li>• WHZ &lt; -2 to &gt; -3</li> <li>and/or</li> <li>• MUAC 115 to &lt; 125 mm</li> <li>and</li> <li>• Clinically uncomplicated<sup>a</sup></li> </ul>	<ul style="list-style-type: none"> <li>• MUAC &lt; 125 mm</li> <li>and/or</li> <li>• Bilateral pitting oedema (+/++)</li> <li>and</li> <li>• Clinically uncomplicated<sup>a</sup></li> </ul>
Treatment frequency	OTP Weekly SFP 14 days	MUAC < 115 mm and/or oedema (+/++)  MUAC 115 to < 125 mm
Treatment transition criteria	<ul style="list-style-type: none"> <li>• Child meets OTP 'cured' definition as described below</li> </ul>	<ul style="list-style-type: none"> <li>• Two consecutive MUAC measurements at or above 115 mm</li> <li>and</li> <li>• No oedema</li> </ul>
Dosage	OTP RUTF 200 kcal/kg/day SFP RUSF 500 kcal/day (1 sachet/day)	MUAC < 115 mm and/or oedema (+/++) RUTF 1000 kcal/day (2 sachets/day) MUAC 115 to < 125 mm RUTF 500 kcal/day (1 sachet/day)
Cured	OTP <ul style="list-style-type: none"> <li>• Child maintains MUAC ≥ 115 mm for 2 consecutive visits<sup>b</sup></li> <li>and/or</li> <li>• WHZ &gt; -3 for 2 consecutive visits<sup>b</sup></li> <li>and</li> <li>• No oedema for 2 consecutive visits</li> </ul> SFP Child maintains WHZ > -2 and/or MUAC ≥ 125 mm for a period of 2 consecutive visits <sup>b</sup>	≥ 125 mm for 2 consecutive measurements and no oedema

<sup>a</sup>Clinically uncomplicated: passes the appetite test, no Integrated Management of Childhood Illness (IMCI) danger signs [11]/no serious medical complications  
<sup>b</sup>Dependent on which criteria the child was admitted on

Source: Bailey et al., 2018:4

## 5. Cost-effectiveness of the simplified protocol

In Yemen, there is a willingness by Nutrition Cluster partners to scale-up SFPs, however, it is not feasible with WFP's engagement, as donors do not fund NGOs to procure supplies for the SFPs (due to the perception that they are funding the cost of supplies through the WFP that should be able to distribute them throughout the country). Funding gaps have resulted in areas with limited or no nutrition services (through Health Facilities, mobile teams or temporary HFs) (ENN, 2015:11). Even if funding for supplies becomes available to the partners, bureaucratic impediments and the cost of deliveries would increase cost of treatment (UNICEF Yemen Nutrition Cluster, 2017:2).

It is suggested that international donors and humanitarian actors should recognise the integrated Community Case Management (iCCM) programme as a potentially high-impact humanitarian response. Flexible funding from donors would allow for development of more evidence on iCCM approaches and improvements that can both sustain and enhance programming in acute crisis (Kozuki et al., 2017:4). However, further investigation is necessary to understand the most effective and efficient supervisory and supply chain mechanisms to deliver this treatment model at scale and quantify its impact on access and coverage (see Section 6).

Funding shortages and the logistical difficulties of coordinating two programmes mean that treatment is often only available for SAM when using the simplified protocol (Tesfai & Bailey, 2017). However, the published literature on the cost-effectiveness of SAM is limited (Lenters et al., 2016). Few studies have assessed the cost-effectiveness of nutrition interventions, particularly with regard to treatment of MAM and changes in acute malnutrition protocols (Lenters et al., 2016; Lelijveld et al., 2018:2).

The cost per MAM child treated is not widely published, perhaps due to the current lack of recommended protocols. Treatment for SAM is estimated to cost between USD26 and USD53 per disability-adjusted life year (DALY) averted, and between USD100 and USD203 per child treated. It has also been estimated that costs can be as high as USD500 per child treated by NGOs in fragile or emergency contexts (Lelijveld et al., 2018:2).

In contexts where the treatment of both SAM and MAM are available, the parallel systems may be resulting in an inefficient use of resources. In addition, current dosage of RUTF for treatment of SAM is based on the weight of the child, requiring multiple calculations by health workers and, in some cases, children are provided with a higher dose and for a longer period of time than required (Lelijveld et al., 2018:2).

Programmes to reduce SAM are a cost-effective investment, and it is recommended that they should be given high priority by national governments (Lenters et al., 2016). The Copenhagen Consensus Center Food Security and Nutrition Perspective Paper estimated the benefit:cost ratio for nutrition investments in 17 countries, including Yemen (Horton & Hoddinott, 2014). The authors suggest that the benefit:cost ratio of nutrition investments is “very attractive”: for example, increasing time in the workforce justifies interventions to prevent stunting. In terms of gender dynamics, previous studies show that money given to women is more likely to provide positive nutritional and health benefits for their children than money given to men (King & Lomborg, 2008:1). Therefore, to build evidence on cost-effectiveness, cost data should routinely be collected (USAID, 2014:33). The USAID Multi-Sectoral Nutrition Strategy 2014-2025 recommends that broader-based economic growth will be needed for a quick return to pre-crisis food and nutrition security levels in Yemen.

## **6. Best practices for maintaining protocol delivery to communities with constrained access**

Yemen's ongoing conflict has decimated its accommodation, schools, health care facilities and other infrastructure. It has also destroyed health facilities, putting more than 22 million people in need of humanitarian assistance (ENN, 2015; Ryan, 2018). One expert contacted for this review stated that because of this *“protocols of feeding may be less an issue than the logistics of getting supplies to where they are needed and would be dependent on the goodwill/agreement of the*

*various local, national and international factions. This would be particularly relevant for any community project delivery or maintenance as infrastructure is now incredibly poor.”*

Responses to conflict are often underfunded, government capacity and resources stretched or unavailable, and transport and health infrastructure poor and inconsistent. Under these conditions, responding agencies face significant barriers in reaching the most vulnerable, in maintaining humanitarian access long enough to complete treatment for malnutrition, and in sustaining the programme and its benefits.

## **Using community health workers**

Across the world, three leading causes of child death - diarrhoea, malaria, and pneumonia - can be treated by local health workers in their homes. Unfortunately, the treatment of malnutrition - beyond identification and referral - is not currently part of a community-based model (Tesfai, & Bailey, 2017). In South Sudan - and most countries where the burden of acute malnutrition is highest - treatment is limited to health facilities because it has been assumed that only a literate health worker can provide treatment. However, recently IRC conducted a feasibility study of low-literate community health workers (CHWs) treating SAM using simplified tools and a simplified protocol in Northern Bahr el Ghazal State, South Sudan (Kozuki et al., 2017). This was to determine whether treatment for uncomplicated SAM can be integrated into the iCCM protocol, with the use of job aids and tools that have been adapted for use by low-literate CHWs. These CHWs were able to follow the simplified SAM treatment protocol with high accuracy using simplified tools. IRC suspect an improvement in access through earlier identification and timely treatment as compared to the health facility, based on the percentage of children admitted in the more severe MUAC zone and 84% of children claiming not to have received nutrition treatment recently.

## **Using local NGOs and integrated community protocols**

Integrated programmes are not just a social welfare programme, but a therapeutic measure to address malnutrition using nutrition specific measures. An evaluation on the efficiency of outreach services from 2006-2014 in Yemen's intervention coverage indicators of health-related millennium development goals (such as immunisation, integrated management of childhood illnesses, reproductive health (family planning), and disease control including non-communicable diseases) found that they have shown good progress (Al-Mudhwahi, 2015). However, nutrition sensitive awareness campaigns related to family planning, female education, and qat<sup>10</sup> consumption are also needed as malnutrition is still highly prevalent among under 5s in the country (Breisinger & Ecker, 2014).

Coverage indicators of the outreach approach in Yemen, which started in 2006, indicate a strong role of the integrated services in reaching under 5s of the most vulnerable communities with basic health services including preventive and curative ones (Al-Mudhwahi, 2015). These activities also respond to the financial risk protection challenges with enhancing efficiency in the provision of health services. Considering that nutrition is part of the package of integrated outreach services, inter-related measures of universal coverage in Yemen should be addressed together with setting the impact indicators for essential health services coverage targeting the

---

<sup>10</sup> Also known as khat: a natural amphetamine-like stimulant chewed in order to cause excitement, loss of appetite, and/or euphoria.

neediest populations. Coverage of health services encompasses the full targeted population in the most malnutrition-affected areas, especially the west coast of the country, for intervention and for the age group these services are directed to (Al-Mudhwahi, 2015; UNICEF Yemen Nutrition Cluster, 2018).

The aid of local NGOs have been used successfully to deliver nutrition-related activities in Yemen, especially in Hodeidah and Hajjah, since evacuation of international NGOs in 2015 (ENN, 2015:7). An example of such is shown below:

### **MUAC and community ‘triple A’ approach- Ta’izz, Yemen**

One example of an integrated community programme is the partnership between UNICEF and a local Yemeni NGO, Soul for Development. This was set-up to implement a pilot project for a two-year, integrated, community-based programme in three out of 23 districts in the southwest city of Ta’izz (208 villages with a combined population of 312,634) from March 2015 to February 2017. The project used the ‘triple A’ approach, which enables communities to Assess and Analyse the causes of their health and nutrition-related problems and identify and agree ‘doable Actions’ at the family and community levels to improve health and nutrition status (Sallam et al., 2017).

Key findings: The entry point to community engagement was the formation of 193 village development committees (VDCs). These were groups of 8-10 influential people in the community, including school principals, traditional leaders, sheikhs (tribal leaders) and religious leaders such as imams. A further 15 sub-district development committees were also formed. These committees, together with the respective District Health Office, were involved in the selection of 770 female community health volunteers (CHVs), who were trained to provide health and nutrition services in 50% of the villages. The main roles of the CHVs were to screen children for acute malnutrition and refer them for treatment, as well as to provide micronutrient powders to children under two years old, iron and folate to pregnant women, and deworming tablets to under 5s. The CHV role is voluntary, although transport costs are covered. CHVs were later trained on growth monitoring and promotion for children under two years of age.

Approximately 90% of children under two years old were screened for SAM and MAM using MUAC on a monthly basis during the pilot period, indicating caregivers’ understanding of the significance of the practice. This resulted in 2,563 children being treated for SAM. There was a significant reduction in the reported numbers of SAM and MAM children referred (by the CHVs) from some villages to the OTPs (a total of 13 out of the 68 model villages recorded zero cases of SAM (MUAC <115mm) by the end of the project period). Bottle-feeding almost disappeared in some villages, as more mothers initiated early breastfeeding. Maternal/caregiver knowledge on nutritious food (including exclusive breastfeeding and complementary feeding) increased by 50-60%. There was also an increase among participating communities in utilising local foods for preparing nutritious meals.

Lessons learned: Although community engagement development was key to its success, the main challenges involved communication and coordination issues, especially with health offices at governorate and district levels; selection of suitable CHVs (this was resolved through a CHV selection-verification system); and long waiting times for CHV trainings (only partially resolved). Moreover, the outbreak of conflict in the country created significant insecurity for team members, commodities and vehicles; Soul for Development had to relocate outside Ta’izz City due to heavy military confrontations. The local NGOs often have to deal with multiple and conflicting

authorities (the Ministry of Health on the one hand, and the de facto authorities on the other), with both parties imposing contradicting instructions and demands (Sallam et al., 2017).

To help with this, a review workshop was organised with NGO partners working in community-based programmes, including Soul for Development, to inform scaling-up plans, improve CHV selection, building capacity for health supervisors and mobile health teams, unifying planning and coordination, and an emphasis on education and support to adopt the production of local food-based meals and recipes. The scaling-up plan included revision of the basic training package for CHVs to incorporate growth monitoring, and for endorsement of the community structures (VDCs) to be part of the community-based programme's formal structure. While the scaling-up plan was being rolled out nationwide, UNICEF continued its partnership with SOUL for Development and increased the number of targeted districts to ten, while partnerships with other NGOs reached an additional 15 districts in 2017; however a further step is needed to create a multi-sector, community-based programme that provides both nutrition specific and nutrition-sensitive interventions in order to unify provision of SAM and MAM services, since both occur together in Yemeni regions.

## Adapting existing nutrition protocols

A case study by Laker & Toose (2015) investigated how World Vision South Sudan's nutrition team worked with the UNICEF Nutrition Cluster to adapt its nutrition programming to overcome the contextual challenges and address the malnutrition needs of children and affected communities. Key observations and learnings from World Vision's implementation of CMAM and the multi-sectoral Rapid Response Mechanism (RRM)<sup>11</sup> to support existing nutrition programmes include:

- Improving reporting of gaps in financial resources and/or target areas (ENN, 2015);
- securing alternative RUTF supplies from international offices as gifts-in-kind, creating a successful buffer to protect programming;
- investing in a network of community nutrition volunteers and secured alternative sites, such as places of worship for CMAM activities in areas without a functioning health facility, and
- building community capacity through volunteers who actively participate in case-finding, referrals, and following-up to build sustainability of the programme.

As it may be difficult to achieve the minimal 2 months of contact required for CMAM treatment in hard to reach areas, the CMAM project model was adapted in the following ways:

- providing two or more rations, rather than one week's supply, when fighting is predicted, to deal with supply issues;
- training community volunteers to monitor the children receiving treatment and help ensure that children receive additional rations if access is impossible, and
- positioning supplies during the dry season where health facilities are being used before roads become flooded and inaccessible.

---

<sup>11</sup> The multi-sector RRM uses mobile teams of experts to meet the critical needs of displaced populations in hard to-reach areas of the most affected states provided beneficial complementarity surge capacity for existing CMAM programmes.



Key findings: In the Bol and Otego districts of Fashoda, the RRM greatly increased the coverage of existing CMAM programmes through mass MUAC screening, and referral of identified children to the existing OTPs for follow-up. The RRM was also quick to take over the OTP sites when a partner was phasing out; for instance, when Médecins Sans Frontières pulled out of Fashoda. In Koch, the RRM made an impact on the hard-to-reach districts of Nobor and Gany, where the existing partner could not reach.

However, there were challenges with the RRM model (Laker & Toose, 2015:10-11), which include underestimated logistical challenges around accessing hard-to-reach locations, (especially changing and population movements in the raining season); constructing semi-permanent OTP sites was not possible due to difficulties finding skilled contractors and transporting materials to the hard-to-reach locations and insecurity. Also, better early integration with the mobile food aid team could have allowed implementation of certain CMAM components.

Lessons learned and recommendations:

- Development and dissemination to all partners of a terms of reference (ToR) for the RRM prior to implementation and popularising it among partners would have resulted in more success.
- More flexibility to enable partners to implement the RRM, allowing it to happen where there are no field-level agreements or partnership corporate agreements in place.
- Further integration of food-aid mobile teams and nutrition RRM teams would enable partners to implement the full continuum of CMAM, including interventions to prevent malnutrition.
- The logistics cluster must prioritise its support; hard-to-reach locations present major logistical bottlenecks which partners cannot always overcome alone. Outsourcing services during peak seasons can result in more effective responses in future.
- Inter-cluster collaboration is needed to jointly develop an RRM roster to regulate activities. This will enable better coordination among the partners' various rapid response teams.
- Mapping of capacity gaps among partners prior to RRM design would help identify specific areas of intervention, avoiding conflict and duplication of activities.

## 7. References

AAH, Action Against Hunger (2016). *Annual Progress Report 2016*.

[https://www.actionagainsthunger.org.uk/sites/default/files/publications/small\\_apr\\_2016\\_final\\_low\\_resolution\\_1.pdf](https://www.actionagainsthunger.org.uk/sites/default/files/publications/small_apr_2016_final_low_resolution_1.pdf)

Al Amad, M., Al-Eryani, L., Al Serouri A., Khader, Y.S. (2017). Evaluation of outpatient therapeutic programme (OTP) for treatment of severe acute malnutrition in Yemen: a focus on treatment default and its risk factors. *Journal of Evaluation in Clinical Practice*, 23(6), 1361-1366.

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/jep.12798>

Al-Mudhwahi, A.A. (2015). Role of Integrated Outreach Activities in Improving Nutritional Status among Under-Five Children in Yemen. *J Nutr Sci Vitaminol*, 61, S60-S62.

[https://www.jstage.jst.go.jp/article/jnsv/61/Supplement/61\\_S60/\\_pdf/-char/en](https://www.jstage.jst.go.jp/article/jnsv/61/Supplement/61_S60/_pdf/-char/en)

- Bailey, J., Chase, R., Kerac, M., Briend, A., Manary, M., Opondo, C., Gallagher, M., & Kim, A. (2016). Combined protocol for SAM/MAM treatment: The ComPAS study. *Field Exchange*, 53. [https://www.enonline.net/attachments/2544/FEX-53-Web\\_30112016.pdf](https://www.enonline.net/attachments/2544/FEX-53-Web_30112016.pdf)
- Bailey, J., Lelijveld, N., Marron, B., Onyoo, P., Ho, L.S., Manary, M., Briend, A., Opondo, C., & Kerac, M. (2018). Combined Protocol for Acute Malnutrition Study (ComPAS) in rural South Sudan and urban Kenya: study protocol for a randomized controlled trial. *Trials*, 19: 251. <https://trialsjournal.biomedcentral.com/track/pdf/10.1186/s13063-018-2643-2>
- Bolton, L. (2014). *Nutrition interventions in developing and fragile contexts with a focus on community interventions and Yemen*. 12 September 2014. HEART. <http://www.heart-resources.org/wp-content/uploads/2014/10/Yemen-Nutrition.pdf>
- Breisinger, C., & Ecker, O. (2014). Simulating economic growth effects on food and nutrition security in Yemen: A new macro–micro modelling approach. *Economic Modelling*, 43, 100-113.
- Columbus, K. - *Save the Children*, 2017. PREGNANT WOMEN FACING BOMBS AND STARVATION IN YEMEN ARE PAYING A HEAVY PRICE. 11 April 2017. <https://blogs.savethechildren.org.uk/2017/04/pregnant-women-facing-bombs-starvation-yemen-paying-heavy-price/>
- de Pee S., & Bloem, M.W. (2009). Current and potential role of specially formulated foods and food supplements for preventing malnutrition among 6- to 23-month-old children and for treating moderate malnutrition among 6- to 59-month-old children. *Food Nutr Bull*, 30: S434–S463.
- ENN (2015). *Case Study Yemen. Scaling up nutrition services and maintaining service during conflict in Yemen: Lessons from the Hodeidah sub-national Nutrition Cluster*. <http://nutritioncluster.net/wp-content/uploads/sites/4/2016/01/Yemen-Case-Study.pdf>
- Eshaq, A.M., Fothan, A.M., Jensen, E.C., Khan, T.A., & AlAmodi, A.A. (2017). Malnutrition in Yemen: an invisible crisis. *Lancet*, 389 (10064), 31-32. [http://dx.doi.org/10.1016/S0140-6736\(16\)32587-9](http://dx.doi.org/10.1016/S0140-6736(16)32587-9)
- Horton, S., & Hoddinott, J. (2014). *Food Security and Nutrition Perspectives Paper: Benefits and Costs of the Food and Nutrition Targets for the Post-2015 Development Agenda*. Working paper - 18 November 2014. Copenhagen Consensus Center.
- IPC/UNICEF (2014). *Yemen National Social Protection Monitoring Survey (NSPMS): 2012-2013 Final Report*. [http://www.ipc-undp.org/pub/eng/Yemen\\_National\\_Social\\_Protection\\_Monitoring\\_Survey\\_2012\\_2013.pdf](http://www.ipc-undp.org/pub/eng/Yemen_National_Social_Protection_Monitoring_Survey_2012_2013.pdf)
- King, E.M., & Lomborg, B. (2008). *Women and Development*. Copenhagen Consensus Center. [http://www.copenhagenconsensus.com/sites/default/files/wOMEN\\_8.pdf](http://www.copenhagenconsensus.com/sites/default/files/wOMEN_8.pdf)
- Kozuki, N., Ericson, K., Marron, B., Barbera, Y., & Miller, N. (2017). *Integrated Community Case Management in Acute and Protracted Emergencies Case Study for South Sudan May 2017*. IRC and UNICEF. <https://www.rescue.org/sites/default/files/document/1740/ircunicefsouthsudaniccmcasestudyfinal.pdf>
- Laker, M., & Toose, J. (2015). *Nutrition programming in conflict settings: South Sudan case Study*. 15 October 2015. World Vision International. <https://www.wvi.org/disaster-management/publication/nutrition-programming-conflict-settings-south-sudan-case-study>
- Lelijveld, N., Bailey, J., Mayberry, A., Trenouth, L., N'Diaye, D.S., Haghparast-Bidgoli, H., & Puett, C. (2018). The "ComPAS Trial" combined treatment model for acute malnutrition: study protocol for the

economic evaluation. *Trials*, 19, 252. <https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-018-2594-7>

Lenters, L., Wazny, K., & Bhutta, Z.A. (2016). Chapter 11: Management of Severe and Moderate Acute Malnutrition in Children. In *Black RE, Laxminarayan R, Temmerman M, et al., [editors]. "Reproductive, Maternal, Newborn, and Child Health: Disease Control Priorities, Third Edition (Volume 2). Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2016. <https://www.ncbi.nlm.nih.gov/books/NBK361900/>*

Muftah, S. (2016). Maternal under-nutrition and anaemia factors associated with low birth weight babies in Yemen. *Int J Commun Med Public Health*, 3, 2749–56. <https://doi.org/10.18203/2394-6040.ijcmph20163356>

Ryan, K. - *International Rescue Committee* (2018). War in Yemen – Follow a mobile health team treating children in Yemen’s remotest villages. 24 March 2018. <https://www.rescue.org/article/follow-mobile-health-team-treating-children-yemens-remotest-villages>

Sallam, F.A.K., Albably, K., Zvandaziva, C., & Singh K. (2017). Community engagement through local leadership: Increasing access to nutrition services in a conflict setting in Yemen. <https://www.enonline.net/nex/9nutserviceaccessyemen>

Save the Children (2017a). *Nutrition and Mortality Assessment Report Emergency WASH & Nutrition for conflict affected people in Yemen – Taiz governorate*. March 2017. [https://reliefweb.int/sites/reliefweb.int/files/resources/Taiz\\_highlands\\_7\\_districts\\_smart\\_survey\\_report\\_march\\_2017.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/Taiz_highlands_7_districts_smart_survey_report_march_2017.pdf)

Save the Children (2017b). *Yemen Humanitarian Response Situation Report*. March 2017. [https://yemen.savethechildren.net/sites/yemen.savethechildren.net/files/library/Ex\\_sitrp\\_March2017.pdf](https://yemen.savethechildren.net/sites/yemen.savethechildren.net/files/library/Ex_sitrp_March2017.pdf)

Save the Children (2017c). *YEMEN: 600 NEW CASES OF STARVING CHILDREN EVERY DAY*. 26 November 2017. <https://yemen.savethechildren.net/news/yemen-600-new-cases-starving-children-every-day>

Sharaf, M.F. & Rashad, A.S. (2016). Regional inequalities in child malnutrition in Egypt, Jordan, and Yemen: a Blinder-Oaxaca decomposition analysis. *Health Economics Review*, 6:23. <https://doi.org/10.1186/s13561-016-0097-3>

SUN – *Scaling Up Nutrition* (2017). Yemen. November 2017. <http://scalingupnutrition.org/sun-countries/yemen/>

Tesfai, C., & Bailey, J. (2017). *Breaking down the barriers to treating malnutrition*. 18 January 2017. IRIN News. <https://www.irinnews.org/opinion/2017/01/18/breaking-down-barriers-treating-malnutrition>

UNICEF (2013). *Global Evaluation of Community Management of Acute Malnutrition (CMAM): Global Synthesis Report*. New York: UNICEF. [http://www.unicef.org/evaldatabase/index\\_69843.html](http://www.unicef.org/evaldatabase/index_69843.html).

UNICEF (2015). *UNICEF Programme Guidance Document Management of Severe Acute Malnutrition in children: Working towards results at scale*. [https://www.unicef.org/eapro/UNICEF\\_program\\_guidance\\_on\\_management\\_of\\_SAM\\_2015.pdf](https://www.unicef.org/eapro/UNICEF_program_guidance_on_management_of_SAM_2015.pdf)

UNICEF Yemen Nutrition Cluster (2017). *Yemen Nutrition Cluster Bulletin*. Oct-Dec 2017. Issue 4. <https://reliefweb.int/sites/reliefweb.int/files/resources/2017-Yemen-Nutrition-Cluster-Bulletin-Issue-4.pdf>

UNICEF, WHO, & The World Bank (2012). *UNICEF-World Bank Joint Child Malnutrition Estimates*. New York: UNICEF; Geneva: WHO; Washington, DC: The World Bank.  
[http://www.who.int/nutgrowthdb/jme\\_unicef\\_who\\_wb.pdf](http://www.who.int/nutgrowthdb/jme_unicef_who_wb.pdf)

USAID (2014). *Multi-Sectoral Nutrition Strategy 2014–2025*. Washington, DC: United States Agency for International Development.  
[https://www.usaid.gov/sites/default/files/documents/1867/USAID\\_Nutrition\\_Strategy\\_5-09\\_508.pdf](https://www.usaid.gov/sites/default/files/documents/1867/USAID_Nutrition_Strategy_5-09_508.pdf)

USAID (2016). *COMMUNITY-BASED MANAGEMENT OF ACUTE MALNUTRITION. MULTI-SECTORAL NUTRITION STRATEGY 2014–2025 Technical Guidance Brief*. 28 January 2016.  
<https://www.usaid.gov/sites/default/files/documents/1864/CMAM-technical-guidance-brief-508-revFeb2017.pdf>

WFP, *World Food Programme* (2016). News: WFP Alarmed At Growing Rates of Hunger And Malnutrition In War-Torn Yemen. 25 October 2016. <https://www.wfp.org/news/news-release/wfp-alarmed-growing-rates-hunger-and-malnutrition-war-torn-yemen>

WFP (2017). World Food Programme Nutrition Activities in Yemen - June 2017. 30 June 2017.  
<https://reliefweb.int/report/yemen/world-food-programme-nutrition-activities-yemen-june-2017>

WFP Yemen, FAO Yemen, & UNICEF Yemen (2017). *Emergency Food Security and Nutrition Assessment (EFSNA) Yemen*. June 2017 – Data collected in December 2016.  
[https://reliefweb.int/sites/reliefweb.int/files/resources/yemen\\_efsna\\_-\\_full\\_report\\_final\\_2016.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/yemen_efsna_-_full_report_final_2016.pdf)

WHO EMRO (2018). *WHO scales up support to mitigate child malnutrition in Yemen*. World Health Organization- Regional Office for the Eastern Mediterranean. <http://www.emro.who.int/yem/yemen-news/who-scales-up-support-to-mitigate-child-malnutrition-in-yemen.html?format=html>

World Bank (2017). *Yemen - Emergency Health and Nutrition Project: additional financing (English)*. Washington, D.C.: World Bank Group.  
<http://documents.worldbank.org/curated/en/700331495418435105/Yemen-Emergency-Health-and-Nutrition-Project-additional-financing>

Zeyad, A. (2016). Yemen's coast struggles with severe malnutrition as conflict drags. 16 September 2016. <http://www.cbsnews.com/news/yemenscoast-struggles-with-severe-malnutrition-asconflict-drags-on/>

## Acknowledgements

We thank the following experts who voluntarily provided suggestions for relevant literature or other advice to the author to support the preparation of this report. The content of the report does not necessarily reflect the opinions of any of the experts consulted.

Basil Aboul-Enein, LSHTM

Khaled Alkhamesy, Sana'a University

Jeanette Bailey, International Rescue Committee

Mary Hall, Derby NHS Foundation Trust

Mohamed Sharif, IFRC Yemen

## Suggested citation

Tull, K. (2018). *Simplified protocol to treat severe and moderate acute malnutrition in Yemen*. K4D Helpdesk Report. Brighton, UK: Institute of Development Studies.

## About this report

*This report is based on five days of desk-based research. The K4D research helpdesk provides rapid syntheses of a selection of recent relevant literature and international expert thinking in response to specific questions relating to international development. For any enquiries, contact [helpdesk@k4d.info](mailto:helpdesk@k4d.info).*

*K4D services are provided by a consortium of leading organisations working in international development, led by the Institute of Development Studies (IDS), with Education Development Trust, Itad, University of Leeds Nuffield Centre for International Health and Development, Liverpool School of Tropical Medicine (LSTM), University of Birmingham International Development Department (IDD) and the University of Manchester Humanitarian and Conflict Response Institute (HCRI).*

*This report was prepared for the UK Government's Department for International Development (DFID) and its partners in support of pro-poor programmes. It is licensed for non-commercial purposes only. K4D cannot be held responsible for errors or any consequences arising from the use of information contained in this report. Any views and opinions expressed do not necessarily reflect those of DFID, K4D or any other contributing organisation. © DFID - Crown copyright 2017.*

