



CMAM Forum

Collaborating to improve the management of acute malnutrition worldwide

Preventing Moderate Acute Malnutrition (MAM) Through Nutrition-Specific Interventions

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Abbreviations

ACF	Action Contre la Faim / Action Against Hunger
AFATVRH	Age appropriate Frequency, Amount, Texture (thickness), Variety, Responsive Feeding, Hygiene
BCC	Behaviour Change Communication
BSF	Blanket Supplementary Feeding
BSFP	Blanket Supplementary Feeding Programmes
CDGP	Child Development Grants Programme
CSB	Corn Soy Blend
CSB+, CSB++	Corn Soy Blend Plus, a.k.a. Supercereal and Supercereal Plus
CMAM	Community-based Management of Acute Malnutrition
ENA	Essential Nutrition Actions
ENN	Emergency Nutrition Network
FAO	Food and Agriculture Organisation
FAQR	Food Aid Quality Review
FBFs	Fortified Blended Foods
GAM	Global Acute Malnutrition
GFD	General Food Distribution
GMP	Growth Monitoring and Promotion
IDPs	Internally Displaced Persons
IFPRI	International Food Policy Research Institute
IYCF	Infant and Young Child Feeding
IYCF-E	Infant and Young Child Feeding in Emergencies
LBW	Low Birth Weight
LNS	Lipid-based Nutrient Supplements

MAM	Moderate Acute Malnutrition
MAMI	Management of Acute Malnutrition in Infants
MSF	Médecins Sans Frontières
MMN	Multiple Micronutrients
MNP	Micronutrient Powders
MUAC	Mid-Upper Arm Circumference
NGO	Non-Governmental Organization
PLW	Pregnant and Lactating Women
PM2A	Prevention of Malnutrition in Infants Under 2 Years
RUF	Ready-to-Use Food
RUSF	Ready-to-Use Supplementary Food
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SBCC	Social Behaviour Change Communication
SC	Save the Children
SFPs	Supplementary Feeding Programmes
SGA	Small for Gestational Age
TSFP	Targeted Supplementary Feeding Programme
UNICEF	United Nations Children's Fund
UNU	United Nations University
USAID	United States Agency for International Development
USCDC	United States Centre for Disease Control
WASH	Water, Sanitation and Hygiene
WFH	Weight-for-Height
WFP	World Food Programme
WHO	World Health Organization
WSB	Wheat Soy Blend

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Introduction

This Technical Brief is one of three briefs on moderate acute malnutrition (MAM) commissioned by the CMAM Forum. This brief reviews current practice and evidence on nutrition-specific preventive approaches to MAM, providing practical guidance for implementers and programme managers, and highlighting gaps in evidence and guidance.

Methodology

This Technical Brief is based on the list of nutrition-specific interventions outlined in the latest Lancet series,¹ which re-evaluated the challenges of maternal and child undernutrition, examined the growing overweight and obesity epidemic, and defined nutrition-specific and nutrition-sensitive interventions. This brief used a methodical search for existing evidence on whether the nutrition-specific interventions from the Lancet Series are used (and effective) for the prevention of MAM. This research also highlighted other interventions not included in the Lancet Series. Existing evidence was drawn from:

- Published articles and reviews: Searches were carried out using Google Scholar, PubMed as well as general internet searches to access unlisted publications (e.g. Emergency Nutrition Network (ENN) Field Exchange). Other sources of information included the websites of the following organisations: CMAM Forum, ENN, Epicentre, International Food Policy Research Institute (IFPRI) and the World Health Organisation's (WHO) International Clinical Trials Registry Platform.
- Policy and practice documents from major implementers of nutrition-specific preventive MAM approaches (World Food Programme (WFP), United Nation's Children's Fund (UNICEF), non-governmental organisations (NGOs)) were used to gather information on current practices and on how programmatic decisions are made.
- Programme reports (and other grey literature) were accessed through contacts at implementing agencies. These documents provided more information on current practices, experiences and lessons learned. In addition, this information was complemented with conversations/discussions with key people within these organisations.

Nutrition-Specific Interventions

The nutrition-specific interventions included in the search are those modelled by the Lancet Series.¹ The management of MAM and severe acute malnutrition (SAM), both modelled nutrition-specific interventions, were not included given the focus of this brief on prevention interventions. The management of MAM is covered by the CMAM Forum Technical Brief, *Management of Moderate Acute Malnutrition (MAM): Current Knowledge and Practice*. **Table 1** outlines the interventions included in the search.

Table 1: Lancet Series Interventions (modelled) that were included in the search for evidence on MAM prevention

Pregnancy	Infants and children
Folic Acid Supplementation	Exclusive Breastfeeding Promotion
Multiple Micronutrient Supplementation (including iron-folate)	Complementary feeding
Calcium Supplementation	Vitamin A Supplementation
Balanced Energy-Protein Supplementation	Preventive Zinc Supplementation

Source: Bhutta et al, 2013.

Other nutrition-specific interventions that have either been evaluated or used in the past for the prevention of MAM that were not modelled in the Lancet Series, were also considered:

- Iron supplementation
- Measles vaccination
- Cash transfers
- Deworming
- Nutrition Counselling and Nutrition Education
- Growth monitoring and promotion (GMP)
- Support groups
- Maternal education and mental health
- Behaviour change communication (also known as Social Behaviour Change Communication)

The following sections outline the evidence, gaps and challenges associated with each of these interventions, as well as potential areas of further research, areas where more evidence is needed and ways forward. The interventions are ordered according to the amount of evidence that was found to support them.

Lancet Series Nutrition-Specific Interventions for Preventing MAM

1 Balanced Energy-Protein Supplementation

The Lancet Series reviewed balanced energy-protein supplementation for pregnant women. It found that balanced energy protein supplementation increased birth weight by 73 g and reduced the risk of babies being small for their gestational age (SGA) by 34%, with more pronounced effects in malnourished women.² Furthermore, recent evidence³ shows that low birth weight (LBW), SGA and preterm births are associated with an average two-fold increased risk in the development of wasting in children 12-59 months of age. Thus, interventions in pregnancy that prevent LBW, SGA and preterm births are likely to have an impact on reducing MAM. This includes – in addition to balanced energy-protein supplementation – multiple micronutrient supplementation.

This section looks primarily at the evidence of providing food supplements to prevent MAM, the remaining gaps and challenges, ongoing studies and their potential to fill some of these gaps. Practical guidance that could be used for programme implementation is provided in Section 11 (Monitoring and Evaluation). Multiple micronutrient supplementation and its effect on reducing SGA and LBW is discussed in Section 6.

1.1 Specialised Food Products

One of the interventions to prevent MAM is the provision of specialised food products to supplement the diet of vulnerable populations, usually children under 5 years of age and pregnant and lactating women (PLW). There are a variety of products available and different strategies to deliver them. However, not many of the products and strategies have been evaluated in the context of MAM prevention. The strategies to prevent MAM using specialised food products are based on Supplementary Feeding Programmes (SFPs) which have an origin in treatment, rather than prevention. Thus, evidence of their effectiveness in preventing moderate malnutrition is not very strong. A review in 2008⁴ evaluated the impact of SFPs on treating moderate malnutrition and found a degree of success; however, there was little evidence of the impact of these programmes on reducing the prevalence of MAM and in preventing SAM. The review did not evaluate SFPs in the context of their impact on preventing MAM. However, it suggested that to increase impact, some alternative

approaches such as expanded general rations, cash transfers and the seasonal blanket distribution of specialised foods should be considered and evaluated. Ongoing studies are currently evaluating some of these alternative approaches.

There have been advances in developing specialised food products for the prevention of MAM. This technical brief covers information on: a) Lipid-based nutrient supplements (LNS),ⁱ mainly ready-to-use supplementary foods (RUSFs), including those used as complementary foods, and only covers ready-to-use therapeutic foods (RUTFs) – where these have been used to prevent MAM, and b) Fortified Blended Foods (FBFs).ⁱⁱ The types of products and their specific uses have been summarised elsewhere.^{5,6} The summary sheet included in MAM Task Force Decision Tool for Emergencies has been included in this brief as Annex 1.⁷ This summary sheet also includes information on products used to treat severe and moderate acute malnutrition, chronic malnutrition and micronutrient deficiencies. The CMAM Forum Technical Brief, *Management of Moderate Acute Malnutrition (MAM): Current Knowledge and Practice* provides more information on the specific products used to treat MAM.

The MAM Task Force Decision Tool for Emergencies provides guidance on when MAM prevention (and treatment) programmes should be implemented, considering levels of Global Acute Malnutrition (GAM) and risk, as summarised in **Table 2**.⁷ The Tool then provides some guidance on the types of prevention programmes that could be considered, such as blanket supplementary feeding programmes (Section 1.2), infant/young child feeding (IYCF) and nutrition education (Section 2), and cash transfers or vouchers (Section 3).

Table 2: MAM programme recommendations according to GAM and risk levels

GAM level	Risk level ⁱⁱⁱ	MAM programme recommendation
>15%	High, Medium, Low	PREVENTION AND TREATMENT
8-15%	High, Medium	PREVENTION AND TREATMENT
<8%	High	PREVENTION

Source: MAM Decision Making Tool for Emergencies, 2012

Sections 1.2 (Blanket supplementary feeding (BSFP)) and 1.3 (Provision of specialised food products through health or social services services) present the evidence regarding different delivery strategies and types of products that have been evaluated for their effectiveness in preventing MAM. The ideal

i Lipid-based Nutrient Supplements (LNS), also known as Ready to Use Supplementary Foods (RUSF) are energy-dense, nutrient-enriched pastes made of milk powder, peanuts, oil and sugar, whose composition is based on therapeutic products, such as F-100 and Plumpy'nut®, but with higher level of vitamin and mineral fortification. RUSF is designed to be consumed in small amounts (47 g or 3 tablespoons/day) as a supplement to the daily diet. They are used to prevent acute and chronic malnutrition (ACF, 2011).

ii Fortified-blended foods usually refer to corn-soy-blend (CSB) widely used by WFP, USAID, and others in feeding programmes. It contains a combination of blended flour and vegetable protein (e.g. corn-soy blend or wheat-soy blend), oil and a vitamin and mineral mixture. Sometimes extra ingredients such as sugar and milk powder are added. Before consumption the ingredients are combined into a 'pre-mix', which can be made into porridge. Due to its high levels of nutrient inhibitors from phytates and high levels of defaulting associated with programs using it, two improved products have been developed: CSB+ which has a different micronutrient profile and is suitable for older children, pregnant and lactating women; CSB++ which has an improved micronutrient profile (particularly for type II nutrients), addition of animal source protein by addition of 8% milk powder, dehulling of soya (less fibre), higher fat content and tighter microbiological specifications; CSB++ is suitable for children (both younger and older). Other fortified blended foods include soya fortified sorghum grits, soya fortified maize meal, soya fortified bulgur wheat and soya fortified wheat flour⁶.

iii Risk levels are defined by measures of increased morbidity, decreased food security, significant population displacement and population density.

combination of delivery and product to maximise effectiveness of reducing wasting at the lowest cost is discussed in Section 1.4.

1.2 Blanket Supplementary Feeding (BSF)

Blanket supplementary feeding programmes (BSFP) provide a supplementary food ration to all individuals in a vulnerable pre-defined population; usually children aged 6-23 months (or all children aged 6-59 months and pregnant and lactating women (PLW)).

BSFPs aim to prevent a deterioration of the nutritional status of a group of individuals where under-nutrition rates are high and when a greater impact can be achieved by targeting the entire population as opposed to only undernourished children. These programmes are provided for a defined time period and in a defined geographical area to achieve high coverage and do not include follow-up of individuals. In practice, they are most commonly implemented in emergencies that affect food availability or where the prevalence of acute malnutrition and micronutrient deficiencies were already high prior to the emergency, or in stable situations when wasting increases in a seasonal, predictable manner, although they have also been used when access to programmes to treat MAM and SAM is low.⁸ It is important to also consider other factors before implementing BSFPs including the staff capacity to screen, monitor and refer cases using anthropometric criteria, available resources, types of products and access to the disaster-affected population.⁹ **Box 1** defines other types of feeding programmes, sometimes confused with BSFPs.

Box 1– Blanket Feeding Programmes (BFP) and Targeted Supplementary Feeding Programmes (TSFPs)

- Blanket feeding programmes (BFP) target the whole family, usually providing rations to families with children under 5 years of age. They provide a complement in case of lack of food due to either insufficient food accessibility or an incomplete food distribution. The decision to initiate a BFP is not necessarily linked to malnutrition rates. These programmes are often used while a general food distribution (GDP) is set up.
- Targeted supplementary feeding programmes (TSFPs), aim to treat moderately malnourished individuals as identified through anthropometric screening. TSFPs have more of a programmatic cycle and beneficiaries are enrolled, discharged and followed up by programme staff on the basis of their individual nutritional status.

Source: Andert et al, 2013.

BSFPs can include the distribution of diverse food commodities, addressed at different age groups with different distribution schedules. They can also provide opportunities for community mobilisation, screening and referral for the management of SAM and MAM, as well as the addition of child survival interventions such as deworming, vitamin A supplementation, and immunisation and/or measles vaccination campaigns.⁹ There are instances, where BSFPs are used at the outset of an acute emergency to cover shortfalls in the general food distribution (GFD). However, this means that the relatively high cost food being distributed is shared and used as a family ration. In these instances, the proposed outcome of a BSFP will not be achieved without the establishment of an adequate GFD (if required).

BSFPs are costly in relation to GFD, given that there is a higher input of time, personnel and effort to target, follow-up and provide additional services (e.g. vaccinations, vitamin A, etc.) and ultimately distribute a much smaller quantity of food. Save the Children (SC) UK⁹ estimated that the cost per metric tonne of food distributed through a BSFP can be up to 7 times higher than a GFD.

BSFPs are not intended to provide sustainable long-term solutions for preventing acute malnutrition, although there are examples of their seasonal implementation in Darfur, with a repetitive, if not long-term component to them¹⁰ or some areas in Niger and Ethiopia, where BSFP is supported by the government's national nutrition strategy and where there is no viable exit strategy determined as yet. Even though BSFPs have been implemented for some time in different contexts, the evidence of their impact on population malnutrition rates is scarce. An evaluation of a BSFP in Kenya,¹¹ providing corn soy blend plus (CSB+) and oil, found an increase in mean weight-for-height z-scores of participating children. However, given the number of other humanitarian interventions in the area and the fact that a substantial proportion of children developed acute malnutrition while participating in the BSFP, the results cannot be attributed directly to the programme. In Sudan, WFP found that adding a community engagement and sensitisation component to provide information on appropriate feeding practices boosted the efficiency of their BSFP programme, providing CSB+. However, the challenge lies in taking this component to scale.¹² In Niger, a BSFP with RUSF had the same effect of flattening a seasonal rise in admissions to therapeutic feeding compared with than individualised treatment of 60,000 moderately wasted children.¹³ Another study in Niger compared the incidence of wasting, stunting and mortality between children aged 6-23 months participating and not participating in distributions of RUSF and found that the short-term distribution of RUSF improved the nutritional status of children at risk for malnutrition and lowered mortality rates.¹⁴ In Darfur, Talley et al¹⁰ also compared children receiving RUSF and those receiving an improved dry ration and found an improvement in weight-for-height z-scores in those receiving RUSF. These studies suggest that BSFPs in combination with RUSFs (but not necessarily CSB) could have an important role in preventing MAM, in areas where food insecurity is one of the principal underlying causes.

One study in Niger, compared the effect of preventative supplementation using RUSF vs. RUTF and found the RUSF strategy was associated with a 46% and 59% reduction in wasting and severe wasting respectively, but only in villages where a previous supplementary feeding programme had been implemented, performing better than RUTF. In contrast, in villages where no previous intervention had been implemented, there was no difference in the incidence of wasting according to type of supplementation.¹⁵ RUTF is designed to treat severe acute malnutrition and there is some evidence such as this study that it can be effective at preventing and treating MAM, however this is not recommended due to its high cost and the fact that it provides confusing messages to communities, where RUTF needs to be considered as life-saving medicine/therapy intended only for the child with SAM.⁵

The ENN has finalised a study in Chad,^{iv} to assess the effectiveness of a BSFP in preventing an increase in acute malnutrition in children 6–23 months of age during the hunger season (2012). Target children received 200g/day of CSB++ (see Annex 1), lactating mothers received 220g/day of CSB++ and severely food insecure households received a family ration. Nutritional surveys were carried out at the beginning and end of the hunger season to establish the prevalence of acute malnutrition and measure mortality rates. In addition, a cohort of children was followed during the hunger season to measure the effectiveness of the BSFP in preventing the deterioration of nutritional status. Results from the surveys showed that the BSFP in combination with the other interventions carried out in the area (general food ration, cash for work and unconditional cash transfers, water, sanitation and hygiene (WASH) promotion programme and a government food price control programme) were able to prevent the typical 5% increase in acute malnutrition during the hunger season. It also had a significant impact on reducing mortality rates (2.17 per 10000 child-days in August 2011 vs. 0.12 per 10000 child-days in June 2012). However, results from the cohort of children showed that 34.6% of

^{iv} <http://www.enonline.net/fex/47/fromtheeditor>

previously well-nourished children went on to develop acute malnutrition during the follow-up period despite the package of interventions. Given that the objective of BSFPs is to prevent the occurrence of acute malnutrition, this finding should be interpreted as an indication of limited effect. The possible reasons for this may be that the food package was insufficient to mitigate household food insecurity and the fact that the BSFP supply chain was interrupted leading to two consecutive months of missed distributions. This highlights the implementation difficulties faced by these programmes.

Two other studies that evaluated the addition of LNS to general food distributions (GFD) found very little effect on the prevention of acute malnutrition, although there were some effects on increasing haemoglobin rates and reducing diarrhoea and fever episodes.^{16,17}

In addition to the difficulty of attributing any effects directly to the BSFPs (as highlighted in the United States Centre for Disease Control (USCDC)-Kenya and ENN-Chad studies mentioned above), two studies have explored some other programmatic and methodological challenges surrounding BSFPs. Recommendations include: a) entry to the programmes should be based on height, not age; b) resources for specialist training and supervision must be allocated, and c) simple and inexpensive methods must be used to minimise child substitution (a different child presenting for a subsequent visit) such as individual cohort cards, unique IDs and photographs.^{11,18} However, more evidence is required, and there are some questions that still need to be explored, for example the optimal timing of implementing BSF, whether it should be a LNS or a FBF -based ration, and how long children should be supplemented to achieve the greatest nutritional impact.¹⁰ A summary of practical guidance on BSFPs is presented in Section 11 (Monitoring and Evaluation).

1.3 Provision of Specialised Food Products through Health or Social Services

Two studies have looked at the effect of providing supplementary food through national health systems in Malawi and Uganda.¹⁹⁻²¹ The study in Uganda provided CSB to all children 6–23 months of age and the study in Malawi compared the effect of CSB vs. LNS on children classified as underweight. Both studies found there to be no effect of CSB reducing MAM. However, the studies in Malawi found a modest increase in weight among moderately underweight children who received LNS.

Ruel and colleagues²² used a cluster-randomised trial to evaluate an age-based preventive model for under-nutrition, delivering a package of food assistance, and maternal and child health and nutrition interventions. The trial took place in Haiti and the package was delivered through health services provided by World Vision. It found that this ‘preventive model’ (targeting ALL children 6–23 months of age) was more effective at reducing childhood undernutrition, including wasting, stunting and underweight than the traditional, recuperative model based on targeting underweight children. Ongoing follow-up trials in Burundi^v and Guatemala^{vi} aim to assess the impact and cost effectiveness of the package of interventions on child nutritional status, the optimal composition and size of food rations, and the optimal timing and duration of the intervention.

More recently, a mid-term review of the SHOUHARDO II Multi-Year Assistance Programme implemented by CARE in Bangladesh found a large reduction in MAM from 15.6% to 9% in children under 5 years of age, and from 18.2% to 11.7% in children under 2 years, over a period of approximately 3 years. This is considered a significant achievement of SHOUHARDO II thus far.²³ The SHOUHARDO II programme is one of the world’s largest non-emergency food security

^v www.clinicaltrials.gov/ct2/show/NCT01072279

^{vi} www.clinicaltrials.gov/ct2/show/NCT01072279

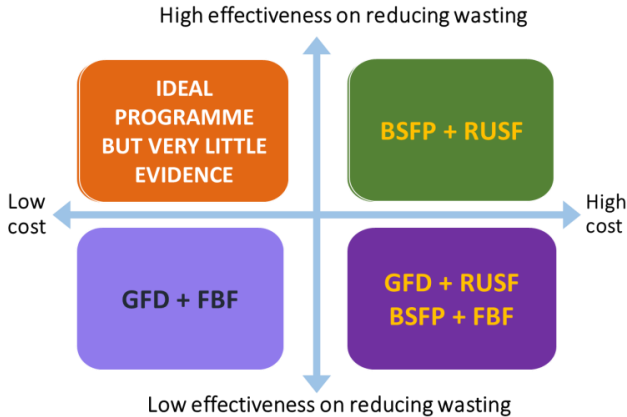
programmes. It aims to reach 370,000 poor and extremely poor households in 11 of the poorest and most marginalised districts in Bangladesh. The SHOUHARDO II programme also introduced a trial of the Prevention of Malnutrition in Children under 2 Approach – (PM2A), based on the model implemented in Haiti and described above, which targets all children 6-23 months of age – and compared it to a more targeted approach of improving maternal and child health and nutrition, under which food rations are only provided to pregnant women, mothers and children in the poor or extremely poor households. The comparison of nutrition outcomes under these approaches should provide insight into their relative costs and benefits in the context of Bangladesh. Preliminary results show a greater impact of the targeted approach, rather than the PM2A, but final analyses will only be possible at the end of the project in 2015.²³

DiGirolamo et al²⁴ argue that combining interventions may be more efficient than separate interventions, particularly when these are targeted at the same population and could make use of the same facilities, procurement/transport links and client contacts. Their paper focuses on the integration of early child development and nutrition interventions, also discussed in the context of MAM prevention in the CMAM Technical Brief Preventing MAM through Nutrition-Sensitive Interventions; however the principle could be applicable to integrating feeding programmes into health and other social services. Integration of feeding programmes into these services would increase their sustainability by embedding them within ongoing activities, making them more routine and transferring responsibility to local implementers, all this assuming that the providers of these services (e.g. national governments, NGOs) can assume the cost of the food and the running of the programmes.

1.4 Gaps & Challenges

Graph 1 summarises the evidence presented in previous sections. Ideally, any programme that has the objective of preventing MAM would be effective at reducing wasting levels at a low cost. However, the evidence reviewed has not shown a programme that provides this combination. The programmes that have shown a small impact on reducing wasting, are assumed to have had a higher cost due to the specialised food products provided and the associated delivery system. The evidence presented here indicates that using a RUSF in combination with a BSFP is the most effective at preventing MAM. However, costs can be a significant limiting factor in the implementation of these programmes at scale and on a sustainable basis. For example, a full course of treatment for severe acute malnutrition costs

Graph 1: Summary of Existing Evidence (to 2013) Regarding the Effectiveness and Cost of Interventions to Reduce MAM



Source: Jimenez & Stone-Jimenez, 2014

would be fair to infer that funding for the treatment and prevention of MAM would be more difficult to secure in an ongoing manner, if so required. As described in Section 1.5 there are new products and delivery strategies being developed and evaluated in different contexts, which should influence programming and practice in the short to medium term.

1.5 Ongoing Studies

Ongoing studies are expected to answer some of the questions presented above. For example, Médecins Sans Frontières (MSF) has conducted two randomised controlled trials, in Uganda^{vii} and Nigeria^{viii} to determine whether providing nutritional supplementation to children with an infection (malaria, pneumonia or diarrhoea) will prevent acute malnutrition and reduce morbidity. The nutritional supplements were provided for 14 days and included a RUTF or multiple-micronutrient powders (MNP). The primary aim was to measure the effectiveness of supplementation with RUTF concurrently with treatment for diarrhoea, malaria or pneumonia in reducing incidence of acute malnutrition. The studies will also provide information on: a) the effectiveness of supplementation with a MNP concurrently with treatment for infection in reducing the incidence of malnutrition, and b) the effectiveness of supplementation with RUTF or MNP on reduction of frequency of diarrhoea, malaria or pneumonia.

Another study in Bangladesh^{ix} is testing the impact of three specially formulated complementary food supplements vs. Plumpy'Doz®, a previously tested, commercially available complementary food supplement, vs. a control group that receives no complementary food supplement, on child growth and nutritional status. This cluster-randomised trial recruited children 6 to 18 months of age. The three foods being tested are an enhanced wheat-soy blend (WSB++) developed by WFP, and locally developed chickpea-based and a rice-based complementary food supplements. It is expected that the impact of the three foods will be equivalent/non-inferior to that of Plumpy'Doz®. The primary outcomes are change in height-for-age and weight-for-length z-scores and the prevalence of stunting and wasting at 18 months of age. Other outcomes include morbidity, body composition, developmental milestones, cognitive and motor function.

Tufts University is currently collaborating with ACDI/VOCA and Save the Children in Burkina Faso to assess the effectiveness, cost, and cost-effectiveness of various CSB products, based on recommendations from the Food Aid Quality Review (FAQR) carried out in October 2011.²⁶ The FAQR recommended improvements in the formulation of FBFs used in Title II programming by including a dairy ingredient, improving the micronutrient premix and preparing CSB consistently with fortified vegetable oil in the recommended ratio of 30g oil to 100g CSB. The products included in the study are:

- Corn Soy Blend 14 (CSB14), with whey protein concentrate and enhanced micronutrient profile, prepared with fortified vegetable oil
- Ready-to Use Supplementary Food (RUSF), a generic Lipid-Based Nutrient Supplement (LNS) product aligned with WHO recommendations for treatment and prevention of moderate acute malnutrition
- Supercereal Plus (CSB++), the FBF used by WFP, which has an enhanced nutrient profile, dairy ingredient (non-fat dry milk), and oil already embedded into the CSB
- Supercereal (CSB+) prepared with fortified vegetable oil

^{vii} www.clinicaltrials.gov/ct2/show/NCT01497236

^{viii} www.clinicaltrials.gov/ct2/show/NCT01154803

^{ix} <http://clinicaltrials.gov/show/NCT00944281>

The effectiveness of the products will be compared using a prospective cluster-randomised effectiveness trial and will be based on the preventive model: distribution of the food supplement to at-risk children 6-23 months. All study arms will deliver the same services to children and their household. The total number of children is approximately 6,000 (1,500 per arm). The study will follow children from 6 months of age (when distribution of food supplement intended for children's consumption is initiated) up to 24 months and then at 6 months and 12 months after completion to assess their growth and health status. This study will allow the following comparisons: a) CSB with oil added before distribution (Supercereal plus [CSB++]) vs. with oil to be added after distribution (Supercereal [CSB+], and CSB14); and b) Cereal/soy-based food assistance product vs. RUSF. Results should provide information on the type of food product that is more cost-effective at preventing MAM and should influence USAID's Title II food assistance programming.

2 Infant and Young Child Feeding (IYCF)

Infant and young child feeding (IYCF) includes 6 months of exclusive breastfeeding, and continued breastfeeding with complementary feeding from 6 months onwards. Children from 0-11 months are classified as infants and those from 11-23 months are classified as young children.²⁷ Sections 2.1 and 2.2 present the existing evidence of the effectiveness of exclusive breastfeeding and complementary feeding as health and nutrition interventions, highlighting where this evidence is specific to MAM prevention.

2.1 Exclusive Breastfeeding

Exclusive breastfeeding takes place when an infant receives only breast milk without any additional food or drink, not even water. Exclusive breastfeeding is recommended for the first 6 months of an infant's life. In the 2008 Lancet series, it was estimated that 10% of the disease burden among children less than 5 years of age is attributable to suboptimal breastfeeding practices, especially non-exclusive breastfeeding in the first 6 months of life.²⁸ More recent evidence shows that infants (0-5 months) and young children (6-23 months) who are not breastfed have a 10 fold and 2 fold increased risk of dying from diarrhoea, respectively, compared to those who are breastfed²⁹. There is also evidence that breastfed infants suffer from less respiratory illnesses.^{30,31}

However, the reality is that levels of exclusive breastfeeding tend to be lower than desired. Evidence demonstrates that mothers and other caregivers require active support for establishing and sustaining appropriate breastfeeding practices. A recent review³² concluded that counselling or educational interventions increased exclusive breastfeeding by 43% at day 1, by 30% until 1 month, and by 90% from 1-5 months. The review included interventions with breastfeeding education and/or additional support given to mothers through counsellors (doctors, nurses, midwives, lactation consultants or peer counsellors) in individual or group sessions.

Exclusive breastfeeding is considered a cornerstone of any malnutrition prevention strategy given the evidence of preventing infant illness and mortality; although it should be noted that there is little empirical evidence of its direct impact on MAM prevention.

2.2 Complementary Feeding

Children under 2 years of age have higher nutrient needs to support growth and development but typically consume relatively small amounts of food. For this reason, complementary foods need to be far more nutrient-dense and micronutrient-rich. However, infants are typically fed watery porridges that are low in many of the key nutrients, such as iron and zinc. It is difficult to meet iron and zinc requirements with non-fortified nutrient-rich foods (such as meat, poultry, and fish) because low-income households can rarely afford these foods. Dietary (and nutrient) adequacy can be improved by

promoting the increased intake of local, nutrient-dense, diverse, quality foods including underutilised indigenous foods as complementary foods, as well as improving access to specialised food products for infants and young children. However, any efforts to provide and/or market these products should be integrated with educational messages on infant and young child feeding (including breastfeeding and complementary feeding).³³

The importance of the complementary feeding period on the development of undernutrition is well documented. Victora and colleagues,³⁴ demonstrated that weight-for-length z-scores falter between 4 and 20 months, with a peak at approximately 10 months of age. However, most of the recent evidence focuses on the importance of complementary feeding on growth and the prevention of stunting^{35,36} rather than wasting. Even some of the evaluations of specialised food products used to prevent MAM (LNS and CSB) measure stunting as their primary outcome.³⁷ Nevertheless, Imdad and colleagues³⁸ showed that provision of appropriate complementary food, with or without nutritional education, and maternal nutritional counselling lead to significant increases in weight, 0.25kg and 0.30kg respectively, in children 6-23 months of age.

Chaparro and Dewey,³⁹ analysed the typical general food distribution (GFD) ration provided in emergency settings – based on cereals, pulse, an FBF such as CSB, oil, salt and sugar – and found that it did not meet the nutritional needs of infants and young children and pregnant and lactating women. The hypothetical intake from a ration of food aid commodities in addition to breast milk for children 6-23 months of age provided less than 75% of the recommended daily intake for several micronutrients, including calcium, iron, and zinc, B vitamins such as riboflavin, B6 and B12, and fat-soluble vitamins such as D, E and K. It also generally contained lower than recommended levels of fat and essential fatty acids. They set out to design a LNS that would meet the nutritional needs of children under 2 years and PLW. They proposed a LNS formulation, with one ‘dose’ (20 g) provided to infants and young children and two ‘doses’ (40 g/day) to pregnant and lactating women. The addition of LNS to the GFD ration, even after eliminating the FBF (e.g. CSB), increased the cost by 34 – 52% (food only). As discussed in Section 1.4 above, the cost of providing LNS or other specialised food products during the complementary feeding period can make these programmes less likely to be implemented at scale in a sustainable manner.

Nevertheless, studies that have evaluated the use of LNS products during the complementary feeding period to promote weight gain have shown mixed results. A study in Malawi found that a RUSF spread was associated with higher weight gain in infants 6–11 months of age compared to a regular fortified food⁴⁰ but in the Democratic Republic of Congo, there was no significant difference in the prevalence of stunting and underweight in infants receiving either RUSF or CSB. It should be noted though that median duration of exclusive breastfeeding in this population was only two and a half months.⁴¹ Furthermore, a systematic review of the effectiveness of home fortification of complementary foods demonstrated that the provision of micronutrients with a vehicle that also provides additional energy could have an effect on growth, but no effect was seen on weight-for-length.⁴² It should be noted, that the results of all studies outlined above need to be considered in light of differing degrees of food/nutrient insecurity in each of the settings. The level of impact of the provision of any food/nutrient based product will depend on the degree of food/nutrient insecurity affecting the target population.

All the same, a study in four countries (Guatemala, Zambia, Democratic Republic of Congo and Pakistan) found that meat consumption during the complementary feeding period was associated with less wasting and stunting.⁴³ Thus, the evidence points to the importance of the complementary feeding

period in preventing under-nutrition and promoting weight gain, although its effect on preventing MAM specifically is not as well documented.

The importance of maintaining breastfeeding during the complementary feeding period is supported by data demonstrating that breast milk can provide about half the energy intake of infants 6-11 months of age and about one-third for young children 12-23 months of age.⁴⁴ It should be noted that estimates of total energy requirements have been reduced (from FAO/WHO/UNU 1985 requirements to the current FAO/WHO/UNU 2004) changing the proportion of energy supplied by breast milk at 6-11 months to 60% and at 12-23 months of age to nearly 40%. There has been concern that the provision of LNS to prevent and/or treat moderate malnutrition may displace breast milk consumption, particularly in infants (6-11 months of age). A displacement of breast milk was shown in a small study in Bangladesh when a high energy density complementary diet was provided to young children aged 9-17 months of age.⁴⁵ However, two more recent studies in the Democratic Republic of Congo and Malawi compared the consumption of LNS with CSB in infants and found that the type of complementary food used did not have an effect on breast milk intake.^{46,47}

A systematic review of the efficacy and effectiveness of complementary feeding interventions, highlighted that the most effective interventions included: a) well-designed nutrition education and counselling, b) optimal use of locally available foods, c) provision of fortified foods, and d) use of micronutrient supplements.⁴⁸ The marketing and labeling of all complementary feeding products needs to be in conformity with the *International Code of Marketing of Breast-milk Substitutes* and subsequent relevant World Health Assembly resolutions to ensure that all marketing and labeling of these products are controlled and that recommended breastfeeding practices and the use of energy dense and high nutrient local, culturally appropriate foods are protected.⁴⁹

2.3 Nutrition Counselling and Nutrition Education

The evidence presented above describes the importance of both nutrition counselling and education to achieve positive nutrition outcomes from targeted exclusive breastfeeding and complementary feeding interventions. In addition, the role of counselling and nutrition education in the management of MAM is included in the CMAM Forum Technical Brief, *Management of Moderate Acute Malnutrition (MAM): Current Knowledge and Practice*.

Nutrition counselling consists of an individual session with a mother/caregiver to discuss a particular issue or problem.²⁷ A *3-Step Nutrition Counselling* session is a process in which the counsellor:

- **Assesses** the infant and young child's situation using their health card, and asking about their illness history and dietary intake, and caregiver practices such as responsive feeding, and hygiene
- **Analyses** and prioritises any difficulties, and
- **Acts** with the mother or caregiver deciding on an action in response to the difficulty.²⁷

An assessment tool from *The Community Infant and Young Child Feeding (IYCF) Counselling Package* helps counsellors to structure and thus remember the information they must obtain by observing and engaging in conversation with the mother or caregiver. Once the required information has been obtained, counsellors learn to reflect on what they have learned about the child and mother/caregiver. If there are more than two difficulties or situations, the counsellor prioritises the issues, selecting one or two to discuss during the action step. The counsellor selects a small amount of relevant information to discuss with the mother/caregiver to determine if together they can identify one or two small doable actions (SDAs) that they could try for a limited period of time. Once these SDAs are agreed upon, the counsellor arranges to meet with the mother/caregiver at a scheduled time and location (follow-up visit) to determine if this is working well, or whether they need to explore another possible action to help move in the direction of the recommended practice(s).²⁷ Nutrition

counselling has been provided to mothers with children that have MAM to improve the use of household foods to meet the nutrient needs of the children.⁵⁰

Nutrition education on the other hand is less personal and is usually conducted in a group session. It has been defined as any combination of educational strategies designed to facilitate voluntary adoption of improved food choices and other food and nutrition-related practices and behaviours conducive to health and well-being. Nutrition education is delivered through multiple platforms and involves activities at the individual, community, and policy levels.⁵¹

The evidence-base related to the effectiveness of nutrition counselling for improving nutritional impact is mainly associated with increasing breastfeeding rates.^{52,53,54} Nutrition education has been associated with significant and sustained increase in the frequency of complementary feeding in Bangladesh,^{55,56} and improved nutritional outcomes (children who progressed from being moderately malnourished to normal or mildly malnourished), particularly in those that also received a food supplement. These studies however do not include much practical guidance on the most effective forms of delivering nutrition education. Beyond research settings, where the content, delivery and outcomes are closely measured and controlled, it is hard to quantify and evaluate effectively the results from nutrition education programmes. Ashworth and Ferguson⁵⁰ evaluated the dietary advice through counselling given by a number of international agencies for the management of moderate acute malnutrition. They found a greater emphasis on providing food supplements for rehabilitation than on utilising household/family foods, although intervention studies for wasted children suggest that counselling caregivers about household/family foods can achieve weight gain. Overall, they concluded that provision of dietary advice through counselling can be effective in managing malnutrition, but it is often weak or absent and should be strengthened. More attention is needed on formulating the messages and improving counselling skills.

The latest recommendations regarding counselling messages on complementary feeding focus on ‘AFATVRH’ – or ‘Age appropriate, Frequency, Amount, Thickness/texture, and Variety of local-affordable-feasible-seasonal foods, Responsive feeding and Hygiene.’ Counselling skills refer to the *3-step Nutrition Counselling* described above (assess, analyse and act)²⁷ and also include listening and learning skills, building confidence and giving support skills.⁵⁷

2.4 Gaps & Challenges

A major challenge is ensuring the quality implementation of nutrition counselling and education interventions that have proven crucial to maintaining high levels of exclusive breastfeeding and recommended complementary feeding practices. A further challenge in the area of IYCF is how to engage with the food industry to improve infant and young child feeding practices.⁵⁸ It is no longer a question of whether public–private partnerships should happen, but rather the development and enforcement of clear and agreed upon regulatory frameworks to define appropriate composition and marketing practices.⁵⁹

The integration of recommended IYCF practices within CMAM protocols⁶⁰ aims to ensure that health workers in CMAM programmes can explain to mothers and caregivers the importance of IYCF practices including exclusive breastfeeding and the risks of not doing so, as well as the recommended practices of complementary feeding from 6-23 months of age. Health workers can also be trained to conduct counselling to identify, prevent and resolve common breastfeeding and complementary feeding difficulties and to facilitate practical group nutrition education sessions and support groups focused on IYCF. These health workers support mothers/caregivers to prevent malnutrition as well as rehabilitate. Although strong CMAM programmes will incorporate and inherently address IYCF, there is still work required to ensure that its integration is firmly embedded within CMAM protocols.

A major challenge of IYCF programmes in both facility-based and community settings (through outreach or other community based activities) include, a) the roll-out of a generic package of interventions without an identification of the underlying causes of malnutrition, as outlined in step 2 of the 3-step nutrition counselling guideline, which means that key causes of malnutrition are not analysed and prioritised; b) methods of delivering IYCF information can vary from an un-engaging didactic form, to engaging informational sessions, to practical, participatory sessions. The different methods of engagement will likely play a significant role in outcomes observed.

The Management of Acute Malnutrition in Infants (MAMI) project⁶¹ set out to establish the burden of acute malnutrition in infants under 6 months of age, identify what guidelines, policies and strategies currently stipulate case management, determine practice in the field and make recommendations for future practice and research. The MAMI project found a significant lack of evidence-based guidelines for the management of acute malnutrition in infants under 6 months of age and highlighted that this risked the presumption that care for older children can safely be extended to infants under 6 months of age and/or perpetuates the assumption that infants under 6 months of age are all well-nourished. Practical difficulties include the frequent lack of adequately trained staff to provide the requisite level of support (theoretical and practical) to mothers who are not exclusively breastfeeding.

3 Cash Transfers

Cash transfers and other social protection safety net programmes have been used, among other objectives to try and improve health and nutrition status. Cash transfers, whether conditional or unconditional can help deliver nutrition specific interventions such as food supplements through a food ration, or cash and food combinations. More details on cash transfers can be found in the CMAM Forum Technical Brief, *Preventing Moderate Acute Malnutrition (MAM) through Nutrition-Sensitive Interventions*.

A recent study in Brazil showed, that under-5 mortality rate, decreased as coverage of the Government's social protection cash transfer programme (*Bolsa Familia*) increased.⁶² However, the systematic review of evidence for the Lancet series carried out by Bassani and colleagues,⁶³ which evaluated the effect of financial social protection incentive programmes on increasing coverage of breastfeeding, immunisation, diarrhoea management, healthcare use, and other preventive strategies, concluded that the quality of evidence available was low and thus could not provide any conclusive evidence of nutritional impact. Nevertheless, food transfers, cash transfers and food vouchers have often performed better than food aid at improving measures of dietary diversity, however, this is not universal as households might use the cash transfer to increase staple food consumption.⁶⁴

A review⁶⁵ of the effect of cash transfers on nutritional outcomes in emergency and transition settings concluded that cash could have positive effects on nutritional outcomes in certain circumstances, particularly where these transfers can improve access to goods and services, or where care practices and health status are limited by economic constraints. However, where access is not the only constraint, complementary programmes are essential, and cash transfers might not be an appropriate response to improve nutritional outcomes.

A meta-analysis of the relationship between cash transfer programmes and height-for-age demonstrated a positive but not statistically significant effect. In addition, it demonstrated that conditional programmes statistically accomplish the same as unconditional but that conditions not

related to health or education strongly inhibit child growth. Girls benefitted more than boys and areas with higher levels of disadvantage benefitted more.⁶⁶

The effectiveness of combining cash transfers with a food supplement was evaluated with a study in Niger that compared the effect of different combinations of food supplements, family food rations and cash transfers on the incidence of global acute malnutrition (GAM). The comparative groups included three groups receiving monthly distributions of food supplements plus cash, one group receiving a food supplement plus a family food ration, two groups receiving two different types of food supplements, and one group receiving cash only. Results showed that in a region where there is a high prevalence of acute malnutrition and stunting and where markets are functional, prevention of global acute malnutrition in infants aged 6-23 months of age was more effective if a food supplement for young infants is distributed, together with a direct transfer of cash for the households, compared with distributions of food supplements or cash only. Neither the type of food supplement (enriched flour or RUSF) nor its caloric value (800 kcal/day, 500kcal/day or 250 kcal/day) appeared to have an influence on the efficiency of preventing acute malnutrition, stunting or death in young children, either in the short or long-term (15 months).⁶⁷

3.1 Gaps & Challenges

There is a need for more evidence on the nutritional impact and cost-effectiveness of different cash transfer interventions in contexts with persistently high rates of MAM and where more traditional interventions, like general food rations and supplementary feeding programmes, have fallen short in reducing malnutrition rates⁶⁵. Some of this research is ongoing, for example the MAM'Out^x trial carried out by ACF in Burkina Faso aims to evaluate the effect of a seasonal and multi-annual cash transfer programme to prevent acute malnutrition in children under 24 months of age. The cash transfers are unconditional and targeted at poor households with children less than 1 year of age at the time of inclusion. The cash is distributed to mothers. The study is a two-arm cluster randomised intervention trial, with one arm receiving the intervention and one acting as control. The main outcomes will be the cumulative incidence of acute malnutrition (or wasting) and cost-effectiveness. The ENN is also carrying out a trial in Niger^{xi}, to provide evidence on the effectiveness of unconditional cash transfers to prevent seasonal weight loss and acute malnutrition in an emergency context, to understand how the cash works in order to determine whether future programmes in a similar setting will also be effective, and to examine the cost efficiency of the intervention. Beyond research, ACF and Save the Children launched the Child Development Grants' Programme (CDGP) in Nigeria. This 5-year programme aims to provide evidence of a scalable cash transfer programme that can bring cost-effective immediate and long-term food security and nutrition benefits to 60,000 pregnant women and women with children under 2 years of age in two northern states. It should be noted however, that the outcome indicators do not include a reduction in wasting levels.

Ryckembusch et al⁶⁸ argue that markets are a crucial factor to consider. In contexts where markets are weak (e.g., due to structural constraints or temporary disruptions in the food supply chain), food transfers are more likely to be an appropriate response. Indeed, in those situations vouchers and cash transfers increase the risk of supply failures and can generate or exacerbate inflation. Furthermore, when markets are stronger, the use of cash transfers and vouchers may be more cost efficient than food. Their paper proposes a method, called the Omega Value that allows policy-makers who design a programme with nutrition objectives to compare direct food transfers and commodity-based food vouchers in terms of both efficiency and cost-effectiveness. Building upon this model and with further

^x <http://clinicaltrials.gov/show/NCT01866124>

^{xi} <http://www.enonline.net/ourwork/research/cashtransfer>

evidence of the nutritional impact of cash transfers, guidelines of when and how these transfer programmes can be implemented could be developed.

4 Preventive Zinc Supplementation

Evidence demonstrates that preventive zinc supplementation can reduce the incidence of diarrhoea by 13% and pneumonia by 19%, with an 18% reduction in all-cause mortality in children aged 12-59 months of age.⁶⁹ It also has a significant positive effect on linear growth⁷⁰ and weight gain⁷¹. Thus, preventive zinc supplementation programmes are recommended to reduce the incidence of diarrhoea, pneumonia, and possibly other infections. Preventive zinc supplementation reduces mortality among children 12 months of age or older, increases growth velocity and thereby reduces their risk of nutritional stunting and underweight.⁷¹

Diarrhoea and pneumonia, both very prevalent among vulnerable young children are exacerbated by acute malnutrition, increasing the risk of death⁷² and delaying recovery,⁷³ thus zinc supplementation could have an indirect role in preventing MAM. The CMAM Forum Technical Brief, *Preventing MAM through Nutrition-Sensitive Interventions*, covers diarrhoea prevention, WASH and its links to MAM prevention in more detail.

4.1 Gaps and Challenges

More studies are still required to improve the programmatic use of zinc, further evaluations of the zinc salts used, the dose, the frequency and duration of supplementation, and its acceptability.⁷⁴ A recent randomised controlled trial in Burkina Faso^{xii} aimed to determine optimal amount of zinc to include in a LNS. Young healthy children (n=3200 infants) were randomly assigned to receive LNS with different amounts of zinc and a placebo or zinc supplement from 9 up to 18 months of age. The families received the respective supplement at weekly intervals and the participants underwent a morbidity evaluation weekly, anthropometric evaluation at 9, 12, 15 and 18 months and laboratory analyses at enrolment and at 18 months of age. Growth outcomes were analysed during the two-year follow up at 24, 30, 36 and 42 months of age. Preliminary results show that the prevalence of MAM (when defined using mid-upper arm circumference – MUAC) was significantly lower in the groups that received LNS plus zinc supplement at 18 months (7.1% vs 11.1%), but did not differ by amount of zinc received. When MAM was defined using weight-for-height z-scores, the difference in MAM prevalence between zinc groups (7.8%) and placebo (10.5%) was marginally different and less significant.⁷⁵

The evidence does not necessarily show that preventive zinc supplementation has a direct effect on preventing MAM. However, it remains very important to reduce the incidence of diarrhoea and pneumonia, making it an important intervention in preventing morbidity and mortality in vulnerable children and in turn preventing MAM. The MSF studies highlighted in Section 1.5 should shed some light on the interaction between these morbidities and MAM. Programmatically, preventive zinc supplementation is becoming more mainstreamed. For example, UNICEF has worked with its suppliers to repackage oral rehydration salts (ORS) and zinc supplements so that they are provided in one package with an illustrative leaflet to explain how they are used.

^{xii} <http://clinicaltrials.gov/show/NCT00944281>

5 Recommended Health Interventions

There is a group of health interventions that can directly or indirectly have an effect on the prevention of MAM. These are usually part of national guidelines and should be promoted/included where possible.

5.1 Vitamin A Supplementation (6-59 months of age)

Vitamin A supplementation has not been found to have an effect on annual weight gain or linear growth⁷⁶. However, evidence demonstrates that vitamin A supplementation in children aged 6-59 months of age reduces all-cause mortality by 25% and diarrhoea specific mortality by 30%.⁷⁷ Thus, in many countries providing vitamin A supplements to children 6-59 months of age is a 'routine' national protocol linked to immunisation campaigns. Data from 2011 demonstrates that coverage of vitamin A supplementation with the recommended 2 doses per year in least developed countries was 82%^{xiii}. It is worth highlighting that WHO recommendations regarding vitamin A supplementation during the first 6 weeks post-partum changed in 2011. It is no longer recommended except in areas where there is a severe public health problem related to vitamin A deficiency (i.e. prevalence of night blindness of 5% or higher).⁷⁸

5.2 Deworming with Anthelmintic Drugs

WHO currently recommends periodic deworming of all children over 12 months living in endemic areas^{xiv}. To reduce the worm burden, WHO recommends periodic drug treatment (deworming) of all children living in endemic areas. There is some evidence that deworming can significantly reduce wasting in children under 30 months of age,⁷⁹ although more recent reviews have been either inconclusive⁸⁰ or have found limited evidence of the effect of massive deworming on weight gain.⁸¹

5.3 Measles Vaccination

Measles is one of the major causes of child deaths in humanitarian emergencies and further contributes to mortality by exacerbating undernutrition and vitamin A deficiency.⁸² There is very little evidence of a direct link between measles and acute malnutrition, except for the study by Salama and colleagues,⁸³ which found that measles alone or in combination with wasting accounted for 35 (22%) of 159 deaths among children younger than 5 years and for 12 (16.7%) of 72 deaths among children 5 to 14 years of age during a famine in Ethiopia.

5.4 Gaps & Challenges

As summarised above, there is very little evidence of a direct effect of vitamin A supplementation, deworming and measles vaccination on preventing MAM. However, they have an indirect role due to their effectiveness in reducing mortality and morbidity. Programmes that aim to prevent MAM should include or be linked with services that provide these interventions, for example the Essential Nutrition Actions (ENA) Framework (Box 2). BSFP guidelines highlight that these programmes provide opportunities or entry points for the provision of these interventions.⁹ MAM prevention programmes provided through the health services should also be able to provide access to these preventive interventions, where they are offered.

^{xiii} http://www.childinfo.org/vitamina_coverage.php

^{xiv} <http://www.who.int/elena/titles/deworming/en/>

Box 2: Essential Nutrition Actions (ENA) Framework⁸⁴

Although not specifically related to MAM prevention, it is worth highlighting that the Essential Nutrition Actions (ENA) framework provides recommendations that reflect proven actions that need to be taken to scale within the health sector to improve maternal, and child health and nutrition.⁶⁶ It manages the advocacy, planning and delivery of an integrated package of preventive nutrition actions addressing women's nutrition during pregnancy and lactation, optimal IYCF (breastfeeding and complementary feeding), nutritional care of sick and malnourished children (including zinc, vitamin A and ready to use therapeutic foods), and the control of anaemia, vitamin A and iodine deficiencies. Using multiple contact points, ENA targets health services and BCC or social behaviour change communication support (SBCC) to women and young children during the first 1,000 days of life - from pregnancy through the first two years of life. Given the evidence-base of these actions to improve overall nutrition and reduce mortality and the fact that the framework advocates for multiple-contacts with women and children, it is usually considered as a basis for nutrition programming.

Source: WHO, 2013.

6 Multiple Micronutrient Supplementation (MMN)

The existing evidence on multiple micronutrient (MMN) supplementation, demonstrates that on its own it has little effect on preventing MAM or increasing weight. However, there is evidence of a significant benefit of MMN supplementation during pregnancy on reducing SGA births. It has also been demonstrated that MMN supplementation does not significantly increase the risk of neonatal mortality in populations where skilled birth care is available and majority of births take place in facilities.⁸⁵ Other studies have found some improvement in length⁸⁶ and length and weight.⁸⁷ Although the efficacy of MMN varies across studies, there is evidence that outcomes are better when 2 or more micronutrients are provided together.⁸⁷

6.1 Home Food Fortification or Multiple Micronutrient Powders (MNP)

Home food fortification or multiple micronutrient powders, are a blend of micronutrients that can be added to solid or semi-solid food to treat iron deficiency among young children and other vulnerable groups. In addition to iron, the micronutrient powders contain recommended daily intakes of other micronutrients.^{xv} The content and types of micronutrients included in the powders can be modified according to the needs of the targeted populations.⁸⁸

A Cochrane review of the use of micronutrient powders showed that it is an effective intervention to reduce anaemia and iron deficiency in children 6-23 months of age. However, the benefits of this intervention as a child survival strategy or its impact on developmental outcomes are unclear. Further studies on morbidity outcomes and effects on malaria are required. Although no major problems of acceptability were found, adherence is variable and more work is required to address it.⁸⁹

6.2 Gaps and Challenges

MMN can prevent micronutrient deficiencies and there is evidence that it is effective particularly at preventing anaemia. In terms of gaps, further evidence of the links between micronutrient deficiencies during pregnancy and the risk of undernutrition, including MAM in children is necessary. This intervention has been included in this part of the technical brief due to the evidence of the impact of

^{xv} Currently two formulations are used, one formulation containing 5 nutrients (Iron – 12.5 mg, Zinc – 5 mg, folic acid 160 µg, Vitamin A – 300 µg and 30 mg) and the other 15 (Vitamins A- 400 µg, C- 30 mg, D- 5 µg, E- 5 mg, B1- 0.5 mg, B2- 0.5 mg, niacin- 6 mg, B6-0.5 mg, B12- 0.9 µg, folic acid- 150 µg, and minerals: iron – 10 mg, zinc- 4.1 mg, copper- 0.56 mg, iodine- 90 µg, selenium-17 µg).

MMN supplementation on reducing SGA births.³ As suggested in Section 5.4, programmes that aim to prevent MAM should include or be linked with services that provide access to this intervention.

Lancet Series Nutrition-Specific Interventions with NO evidence of an effect on preventing MAM

The exercise of methodically reviewing evidence of the effectiveness of the nutrition-specific interventions modelled in the Lancet Series,¹ showed that iron supplementation, folic acid supplementation and calcium supplementation have no effect on increasing weight and/or preventing MAM.

Daily iron supplementation or iron/folate combined can reduce anaemia in pregnant women at term by 73%,⁹⁰ folic acid supplementation has proven effectiveness on reducing stillbirths due to neural tube defects by 41%,⁹¹ and calcium supplementation is associated with a reduction in risk of gestational hypertension, pre-eclampsia neonatal mortality and pre-term birth.⁹² The common thread through the evidence associated with these interventions is that they are associated with healthier pregnancies and improved birth outcomes, which have an effect on the development of MAM in children. It may not be necessary to identify more direct evidence of their effect on preventing MAM but consideration of their potential indirect links are important for programmes that aim to prevent MAM as well as address undernutrition more generally.

Other Nutrition-Specific Interventions

7 Growth Monitoring and Promotion (GMP)

Growth monitoring and promotion (GMP) is a prevention activity that uses growth monitoring—measuring and interpreting an infant or child’s growth, to facilitate communication and interaction with the caregiver and to generate adequate action to promote child growth through: a) increased caregiver’s awareness about child growth, b) improved caring practices, and c) increased demand for other services.⁹³

GMP was promoted heavily in the 1980s and in its practice it came to be viewed as an intervention in itself rather than as an entry point for future interventions.⁹⁴ Two reviews of the effectiveness of GMP were carried out in 2007 and 2008. The first concluded that programmes at scale can achieve high coverage and good frequency of participation and that some large-scale programmes have achieved intermediate outcomes from growth monitoring such as improved practices, improved use of services and earlier care-seeking, as well as better growth outcomes, and reductions in undernutrition.⁹⁵ The second concluded that growth monitoring can provide an entry point to preventive and curative health care and was an integral part of programmes that were associated with significant reductions in malnutrition and mortality. However the review showed no unequivocal evidence that growth monitoring was beneficial *per se*.⁹⁶

GMP alone is not a programme or comprehensive intervention to address undernutrition and cannot be viewed as a competitor to effective interventions to address undernutrition generally. However, GMP may serve as a possible platform for delivery of other nutrition interventions. The decision to build community-based programmes using a GMP platform should be based on consideration of benefits, feasibility of quality implementation, as well as capacity of human resources.⁹⁴

8 Support Groups

Support groups are self-help groups that allow members to share similar situations, experiences, stories, express their ideas and feelings, explore options and try out/test new behaviours, and discuss ways to overcome or resolve a problem or situation.⁹⁷ Results of community-based support groups include social and emotional support, concrete information and assistance, self-confidence, satisfaction, recognition by self and others, and determination and skills to exert control over their lives.⁹⁸ Most of the support groups used in the context of addressing undernutrition, refer to peer support groups or mother-to-mother support groups.⁹⁹

Although there is no evidence on support groups preventing MAM, there is evidence that they have reduced neonatal mortality in India,¹⁰⁰ Bangladesh¹⁰¹ and Malawi¹⁰² and increased levels of exclusive breastfeeding in Guatemala.¹⁰³ In Mozambique, the Care Group Model^{xvi,104} focused on interventions for preventing and treating childhood diarrhoea, and promoting good nutrition. Results demonstrated a reduction in childhood undernutrition that was 4 times that for Mozambique nationwide. The project achieved these results at a cost of US\$0.55 per capita.¹⁰⁵

9 Maternal Education and Mental Health

An increase in maternal education levels is associated with an improvement in stunting.^{106,107} One study that explored the impact of maternal education on child nutrition in Malawi, Tanzania and Zimbabwe, found that in all three countries the prevalence of wasting appears to decrease as maternal education increases, although this was only statistically significant in Tanzania and Zimbabwe.¹⁰⁸

Improving maternal mental health, for example by reducing maternal depression, may be one of the most important interventions in situations of severe food shortages for both the mother and child.¹⁰⁹ It has also been found to be as strong predictor of child mental health as one or two traumatic events in a child's lifetime.¹¹⁰ There is evidence that maternal mental health is an important determinant of suboptimal caregiving and health seeking behaviours¹¹¹ as well as early childhood underweight and stunting.¹¹² Although there is less evidence relating it specifically to the prevention of MAM, a cross sectional study in Brazil found that common maternal mental disorders doubled the risk of moderate or severe malnutrition in children.¹¹³ Furthermore, in Pakistan, infants of prenatally depressed mothers had significant higher risk of being underweight, stunted and had more diarrheal episodes. Chronic depression carries a greater risk for poor outcomes than episodic depression. Thus, early treatment of prenatal and postnatal depression could benefit not only the mother's mental health but also the infant's physical health and development.¹¹⁴ Some work has been done to consider mental health of mothers (and children) within feeding centres,¹¹⁵ as well as the need for psychosocial stimulation in severe food shortage situations.¹⁰⁹ Nevertheless, a recent exercise to identify research priorities in mental health in humanitarian settings did not identify maternal mental health and its possible link to child health and nutrition as one of the top 10 priorities.¹¹⁶

10 Behaviour Change Communication (BCC)/Social Behaviour Change Communication (SBCC)

Behaviour change communication (BCC) for health is a consultative process, based on research that uses communication to promote and facilitate behaviour change, and in the case of social behaviour change communication (SBCC), including the necessary social change to improve health outcomes.

^{xvi} This model works through a network of community volunteers. Each staff health promoter trains and supports as many as eight care groups. About 10-15 volunteers comprise each care group, which meets twice a month. Then, every volunteer is responsible for re-teaching lessons learned in the care group to 10-15 households.

BCC should be driven by epidemiological evidence and client/community perspectives and needs. It is guided by a comprehensive theory that focuses on individual level change, whereas SBCC incorporates change at broader environmental and structural levels.^{xvii} BCC is an evidence- and research-based process of using communication to promote behaviors that lead to improvements in health outcomes. BCC intends to foster necessary actions in the home, community, health facility or society that improve health outcomes by promoting healthy lifestyles or preventing and limiting the impact of health problems using an appropriate mix of interpersonal, group and mass-media channels. Maintaining social marketing focus, effective communication strategies rely on formative research with beneficiaries to understand the context, the issue from their perspective, and factors that influence improved practices.

Evidence of the effect of BCC on preventing undernutrition or MAM specifically is limited. However, it is difficult to identify where the limits of BCC lie in relation to some of the counselling and nutrition education interventions described in Section 2.3. Recent evidence shows that maternal knowledge after a behaviour change communication intervention was dependent not only on community health workers' knowledge but also on their knowledge-sharing skills.¹¹⁷

The Positive Deviance/Hearth model, an example of BCC, is a home-based and neighbourhood-based approach to address malnutrition. It has three goals: a) rehabilitate malnourished children, b) enable families to sustain the rehabilitation of these children at home on their own, and c) prevent malnutrition among the community's other children, current and future. It identifies affordable, acceptable, effective and sustainable practices that are already used by members of the community. By learning what their neighbours are doing to prevent malnutrition, families are empowered to adopt better practices even with very limited access to health services¹¹⁸. As an approach, it targets moderately and severely malnourished children and it is stated as a requirement, that in order to implement a positive deviance programme, the community or communities should have at least 30% moderately to severely malnourished children.

11 Monitoring and Evaluation of Nutrition-Specific Interventions for MAM Prevention

Monitoring and evaluation of interventions provides information on whether the goals of an intervention have been met and what effect the intervention has had, if any. This section provides a broad overview of some of the indicators and experiences of monitoring and evaluating BSFPs, IYCF programmes, cash transfer programmes and broader multi-sectoral programmes.

11.1 BSF Programmes

There is currently limited guidance on how to monitor and evaluate BSFPs. SC UK⁹ gathered information on the current recommended practices, and highlighted that it can be done at three levels:

- **Post distribution Monitoring** – to assess the immediate outcomes of the distribution, indicating the percentage of ration actually received by the beneficiaries compared to the planned ration, and to provide information on timeliness of distribution and number of beneficiaries in the BSFP.
- **Progress Monitoring** – including quantitative and qualitative indicators, to assess the delivery of appropriate commodities and services to all the right beneficiaries at the right time. Data collected includes: a) delivery of commodities: how much quantity of what commodity, b) delivery of services: types of services (e.g. vaccination, education, etc.), c) beneficiaries: numbers served vs. numbers targeted, coverage and utilisation of the ration, d) timing of the distributions in relation

^{xvii} <http://manoffgroup.com/documents/DefiningSBCC.pdf>

to planned schedule, e) programme perception and beneficiary retention rates, and f) utilisation of services and commodities: attendance, household behaviour (i.e. food utilisation as measured by post-distribution monitoring at household level).

- **Impact Evaluation** – this is complex and presents some methodological challenges such as estimating changes in rates at the population level and attributing those changes to the specific intervention. Given its complexity there are not many such evaluations. One example is the USCDC¹¹ evaluation carried out in Kenya and described in Section 1.2.

Based on the evidence discussed in the previous sections and the ongoing studies and evaluations, a summary of lessons learned and some practical guidance for BSFPs is presented in **Table 3**. BSFPs generally happen in the context of a general food distribution, so ensuring coordination with these distributions is necessary to increase efficiency and facilitate delivery to beneficiaries. In the context of sudden onset emergencies, a temporary BSFP can be implemented quickly – before SAM/MAM treatment is available to help prevent the deterioration of nutritional status.

Table 3: Programmatic Lessons from BSFPs

Recommendation	
Admission Criteria	Entry into programmes should be based on height, not age.
Capacity	Human and financial capacity must be available to provide coordination, specialist training and supportive supervision.
Avoid Child Substitution	Simple methods to avoid this include: individual cohort cards, unique IDs and photographs.
Ration Sharing	Increasing the premix ration to account for sharing with family members and ensure that the targeted individual receives an adequate amount.
Food Quality, Delivery and Storage	No expired or contaminated food should be distributed. This puts the beneficiaries' health at risk and would have a negative impact on the relationship with the community. Appropriate communication devices to facilitate delivery and distribution as well as contact with the food provider and the community.
Targeting Beneficiaries	To begin with, there should be a target-setting exercise based on available population-based statistics and accurate registration of beneficiaries; any under or over estimation should be addressed as soon as possible. Once the programme is operating, beneficiary estimates for the following month can be based on the figures from the previous month plus any major expected change (influx of refugees/internally displaced persons (IDPs), relocation, etc.).
Accessibility	Accessibility needs to be addressed on a case-by-case basis in the planning stage, and alternative distribution points or times should be considered where necessary

Source: Hall et al, 2011; USCDC, 2012; Andert et al, 2013

11.2 IYCF Programmes

Monitoring and evaluation of IYCF programmes should consist of periodic collection of the following eight core indicators:¹¹⁹

- Early initiation of breastfeeding,
- Exclusive breastfeeding under 6 months,
- Continued breastfeeding at 1 year,
- Introduction of solid, semi-solid or soft foods,
- Minimum dietary diversity,
- Minimum meal frequency,
- Minimum acceptable diet, and
- Consumption of iron-rich or iron-fortified foods

Since it may not always be feasible to report on all core indicators, the following four indicators are recommended in order of priority, based on evidence of their positive association with child survival and/or nutrient intakes: a) for infants 0-5 months of age: exclusive breastfeeding under 6 months and early initiation of breastfeeding, and b) for children 6–23 months of age: minimum acceptable diet and consumption of iron-rich or iron-fortified foods.¹¹⁹

11.3 Cash transfer programmes

Recent evidence from the monitoring of a cash and voucher transfer programme in Somalia,¹²⁰ showed that the monitoring system helped identify and address implementation problems in a timely manner. For example, the need to increase the number of distribution points to reduce beneficiary travel time, improve the service at distribution points to reduce beneficiary waiting time, increasing the value of the vouchers, and changing the value of cash distributed based on market price information. It also provided evidence of changes in the beneficiary households as a result of the interventions.

A number of impact evaluations of cash transfer and social protection programmes are being carried out.¹²¹ They all include an element of randomisation to allow for the comparison between groups receiving the cash transfer or voucher against those that do not receive the intervention. The Zambia Child Grant Programme,¹²² was evaluated for impact using a randomised controlled trial design. The programme implemented by the Zambian Government since 2010, targets households with children under 5 years of age in selected districts and provides each household with 60 kwacha (ZMW), or roughly U.S. \$12 a month, regardless of household size. Payments are made every other month, and there are no conditions to receive the money. Results showed an increase in: a) the number of households eating more than two meals per day, b) the proportion of children 6-23 months of age receiving minimum acceptable diet, and c) weight-for-height z-scores. It also showed a significant reduction in diarrhoea morbidity. Results from ongoing impact evaluations should inform programming options and provide further insight into the best ways of monitoring and evaluating these interventions.

11.4 Multi-sectoral Programmes

WFP's Evaluation Office is planning to conduct impact evaluations of their MAM-related programming activities, including treatment and prevention.¹²³ The impact evaluations would focus on programme effectiveness considering the contribution of WFP's MAM interventions within wider programming contexts. In order to plan these impact evaluations and determine their feasibility, WFP commissioned an evaluability assessment.¹²⁴ This assessment found that WFP MAM programmes are very diverse but have in common that they emphasise countries with emergencies or with on-going food and nutrition insecurity and they all use some form of food supplements. The programmes are carried out in: a) emergencies, b) post-emergency situations, c) longer-term prevention activities—using blanket feeding interventions, and through d) nationally integrated prevention programmes. In addition, most have other interventions and activities going on concurrently, usually under the responsibility of governments and partners. The report concluded that impact evaluations could be feasibly done in post-emergency situations and longer-term prevention programmes, and recommended that this be done in 4-5 countries. It highlighted that in the short-to-medium term, MAM prevention programmes would likely be subsumed into stunting prevention programmes and thus, the focus of these impact evaluations should be on MAM treatment programme activities. The prevention activities, with appropriate outcomes specific to MAM, should be evaluated as part of the larger multi-sectoral interventions that include women's education, improved antenatal care, adolescent health and nutrition, and conditional cash transfers. Two recently launched WFP

programmes aimed at reducing stunting in Malawi and Mozambique^{xviii} would be used as examples of how to carry out these multi-sectoral evaluations. Furthermore, in order to carry out the impact evaluations, data collection, both in coverage and quality, would need to be strengthened, and in the countries with impact evaluations, serious investment of both funds and effort would be needed.

The mid-term review of the SHOUHARDO II programme (mentioned above in Section 1.3) is an example of an evaluation of a multi-pronged food security programme.²³ The methodology used quantitative and qualitative data to measure the outputs, outcomes and impact of the programme. It also considered other elements such as targeting, the contribution of specific activities towards programme objectives, the efficiency with which programme resources were being used, and the potential sustainability of programme activities. The quantitative component ensured the validity of findings and comparability with baseline measures by utilising the same household survey instrument and sampling frame. Whereas, the qualitative research was carried out via interviews and focus group discussions with SHOUHARDO II staff, government stakeholders, implementing partners and programme beneficiaries. The findings and analysis of the review were intended to inform and improve implementation of SHOUHARDO II for the remaining duration of the programme (to 2015). The evaluation's mixture of qualitative and quantitative methodologies could be useful for other contexts.

More stable situations, such as the one described with the SHOUHARDO II programme and the planned evaluations of the WFP programmes in Malawi and Mozambique, provide indications of the type of multi-sectoral programme that could be implemented and how it can be evaluated to measure whether it has had an effect on preventing and treating MAM, as well as other nutrition indicators. Given the broad base of these programmes, it is necessary to ensure that MAM outcomes are included in monitoring and evaluation plans. Nevertheless, evaluations of these multi-sectoral programmes refer to large and relatively well-funded programmes that can afford this level of evaluation and may not provide a lot of practical guidance for smaller programmes.

Conclusions and Way Forward

In April 2013, UNICEF estimated that 52 million children under 5 years of age were wasted.¹²⁵ Interventions to address and prevent this level of acute malnutrition are necessary. This brief methodically looked for existing evidence on whether the interventions modelled in the Lancet Series are used (and effective) in preventing MAM and how the evidence feeds into programmatic decisions. This exercise has highlighted just how limited rigorous evidence is and how many gaps exist. Furthermore, it is also important for implementing partners, governments, funders and other stakeholders to evaluate the cost of different types of interventions or packages of interventions in relation to their potential efficacy in preventing MAM and reflect on the plausibility of replicability, scale-up and sustainability in terms of being able to meet needs, both short and longer-term.

Robust evidence of an intervention that prevents MAM at a population level is still lacking. Although providing a food supplement, usually in the form of a specialised food product, has demonstrated limited effectiveness in preventing MAM in some contexts – the combination of product (LNS, FBF, etc.), delivery strategy (BSFP, health/social service) and context (emergencies vs. more stable situations) can vary significantly so finding consistent results has not been straightforward, as summarised in Sections 1.2 and 1.3. One of the difficulties of procuring evidence of impact is not only the issue of being able to associate any impact directly with the intervention as highlighted in the USCDC study in Kenya,¹¹ but the importance of other underlying determinants of malnutrition such as

^{xviii} <http://www.wfp.org/news/news-release/launch-innovative-project-prevent-stunting-among-children>

agriculture, food security, WASH, social protection programmes and the availability of health services, all of which are discussed further in the CMAM Forum Technical Brief, *Preventing Moderate Acute Malnutrition (MAM) through Nutrition-Sensitive Interventions*.

In the short-term, BSFPs remain the current recommended practice to prevent MAM in emergencies that impact on food availability, or in stable situations when wasting increases in a seasonal, predictable manner as is known to be associated with food insecurity. However, some process evaluations of how they could work better to increase their impact would be useful, given that there are some contexts where they are the main programmatic intervention to prevent MAM. The number of new products being evaluated should provide information on their effectiveness in preventing MAM but answers on how they should be delivered, how much is required and for how long may not be generalisable from current ongoing studies.

The number of interventions taking place at the same time in most contexts makes it difficult to separate any specific effect of a food-based intervention or other interventions in preventing MAM. Programmes that have included a number of interventions (e.g. PM2A in Haiti and SHOUHADO II in Bangladesh) have demonstrated an effect in reducing and preventing MAM. Furthermore, current guidelines for BSFP recommend adding health interventions such as Vitamin A supplementation, deworming and immunisations where possible.⁹ This would indicate that a single food or non-food intervention would be unlikely to have a significant impact on reducing or preventing MAM.

Separating out the impact of interventions aiming to prevent undernutrition and those that specifically target acute malnutrition might not be possible. Nevertheless, it is important to keep in mind that there are some populations (East, West and Central Africa, and Southern Asia), as well as particular situations (e.g. seasonality and emergencies that affect food access and availability), that are particularly vulnerable to acute malnutrition. Programmes aiming to prevent undernutrition in these populations therefore need to include specific interventions (e.g. high quality food supplement) to address acute malnutrition, as well as work synergistically with other nutrition sensitive activities to tackle the underlying causes and reduce future vulnerability.

In non-emergency contexts, there is evidence from Haiti and Bangladesh that a food ration had an effect on reducing levels of wasting, but both of these programmes included a number of complementary interventions so separating the effect of the food provided is not possible. Furthermore, in these non-emergency contexts it is more realistic to consider MAM prevention in the context of broader multi-sectoral programmes, as there is unlikely to be a programme that focuses solely on MAM prevention. Nevertheless, this raises some concern that interventions with evidence of impact on preventing MAM, such as the provision of a specialised food product, may not be included within these broader programmes, leaving populations vulnerable to MAM without the required prevention inputs.

Further research is required on the relative cost-effectiveness of MAM prevention interventions and targeting techniques that are most effective for MAM prevention. There are also outstanding programmatic questions such as the role of food aid in the prevention of MAM and issues with locally produced food vs. imported food, as well as the minimum quantity of RUSF that is required to prevent MAM. Furthermore, there are also outstanding questions regarding the physiological energy needs to prevent MAM in children 6-23 months of age and PLW (current evidence on energy needs for treatment is included in the CMAM Forum Technical Brief, *Management of Moderate Acute Malnutrition (MAM): Current Knowledge and Practice*, as well as how MAM prevention could have an effect on child growth outcomes.

Some work has been done to elucidate the aetiology of wasting and stunting and their relationship with each other¹²⁶ as well as the influence of the foetal period in the development of these conditions in young childhood.³ This indicates the importance of considering preventive MAM interventions in the context of a life cycle approach.¹²⁷ More work to clarify these pathways would be useful particularly if prevention programmes start to have a broader base of interventions in more stable situations and start to include nutrition-sensitive interventions too. For example, the ENN has highlighted the importance of the stunting-wasting relationship and has included it as an area of further research in their Strategy for 2013-2015.¹²⁸ In terms of programming, do these pathways have an effect on targeting? Is a stunted AND wasted child less likely to qualify for targeted programmes? These questions are particularly relevant in the context of broader, multi-sectoral interventions.

The populations that require MAM prevention interventions are specific and thus research and programmes should continue to ensure that there is an evidence-base to serve these needs. However, conducting research in some of these contexts has particular challenges, including embedding a rigorous research project within ongoing and operating emergency or development programmes, and working with multiple collaborators and stakeholders with potentially different priorities.

There is significant evidence to support the importance of exclusive breastfeeding for the prevention of MAM given its proven association with the prevention of illness and mortality in infants.²⁸ Evidence also demonstrates the importance of complementary feeding period to prevent weight-for-length faltering,³³ even if its effect on directly preventing MAM is not well-documented. Furthermore, there is strong evidence for the type of interventions – nutrition counselling and nutrition education – required to ensure that IYCF practices including high levels of exclusive breastfeeding and adequate complementary feeding practices (AFATVRH – Age appropriate Frequency, Amount, Texture (thickness), Variety, Responsive Feeding and Hygiene); although more guidance on the most effective forms of delivering nutrition education is required.

Save the Children's guidelines on BSFP⁹ recommend that these programmes should include context appropriate nutrition counselling and education, promotion of safe and optimal IYCF, safe water, sanitation and hygiene measures, as well as messages on appropriate preparation and use of the food supplement being provided. The guidelines highlight the UNICEF *Community Infant and Young Child Feeding (IYCF) Counselling Package* as a comprehensive set of tools/materials that could be adapted to diverse country and situation contexts.

Furthermore, since MAM is present in infants under 6 months of age – in the programmes reviewed by the MAMI study, this demographic accounted for 16% of admissions into selective feeding programmes,⁶⁰ it is important to continue to promote, protect and support optimal IYCF practices including exclusive breastfeeding as a prevention and treatment measure, in addition to providing food supplements to PLW to help prevent MAM in their infants.

For other interventions, preventive zinc supplementation (Section 4), and vitamin A supplementation (Section 5.1), the evidence demonstrates their effectiveness at reducing mortality and morbidity. Their importance in preventing MAM is therefore inferred, but still strong enough to indicate that MAM prevention programmes should include these interventions.

Multiple micronutrient supplementation and supplementation of iron, folic acid and calcium are all nutrition-specific approaches where no evidence was found on their effectiveness of preventing MAM. However, these are all important during pregnancy and given its relationship with the development of

acute malnutrition of children later on in life – the importance of these interventions should not be underestimated in programmes addressing under-nutrition, if not specifically MAM. Other interventions, including growth monitoring programmes, support groups and BCC are considered tools that could be useful in creating opportunities for effective prevention of MAM. Thus, they have been included within the brief, although evidence of their effectiveness in preventing MAM has not been documented.

Cash transfers can replace food transfers in some contexts or be combined with them. Programmatic decisions on the type of ‘transfer’ to implement are not straightforward and will vary according to context. Ongoing research and impact evaluations should provide more information on their impact, alone or in combination with food, on nutrition outcomes. There is some evidence that children with mothers suffering from a mental health problem are at higher risk of malnutrition, including MAM. Although evidence is still limited, this is considered an approach that could have implications for the prevention of under-nutrition in general and MAM in particular.

An important gap that this brief has highlighted is the lack of any empirical evidence on the effectiveness of non-food, nutrition-specific interventions in preventing MAM. Although it might not be necessary for some (e.g. exclusive breastfeeding), it would be useful to know how other interventions such as counselling and BCC compare to those interventions that distribute food (if at all).

Overall, the work carried out to write this brief suggests that the best interventions to prevent MAM would be exclusive breastfeeding for the first 6 months, followed by complementary feeding using recommendations such as AFATVRH, and a supplementary food provided to vulnerable populations either periodically or as part of a more generalised programme. If this is combined with other nutrition-specific interventions such as preventive zinc supplementation during episodes of diarrhoea, vitamin A supplementation according to international guidelines along with treatment for infections and immunisation, and possibly cash transfers to address some other household vulnerabilities, then you would expect the prevention of MAM, even though this combination of interventions is not based on proven pathways and causal links. Nevertheless, MAM prevention is not limited to nutrition-specific interventions. Nutrition-sensitive interventions and the management of MAM, both the subjects of other CMAM Forum Technical Briefs also play a significant role in preventing MAM. The delivery of a package of interventions (including nutrition-specific and -sensitive) to prevent and manage MAM requires joint programming, coordination and engagement with local authorities and stakeholders. Although not necessarily straightforward in every case, this joint programming can be achieved when commitment (and political will) exists. The use of appropriate formative research and the identification of particular causal links will help to improve the cost-efficacy of any package delivered. However monitoring and evaluation to document their activities, coverage, quality and impact still remains a challenge.

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Annex 1: MAM Task Force product sheet

Objective	Treatment of Severe Acute Malnutrition	Treatment of Moderate Acute Malnutrition	Prevention of Malnutrition				Other	
			Acute malnutrition		Micronutrient and chronic malnutrition			
Generic Term	Ready-to-Use Therapeutic Foods (RUTF)	Ready-to-use Supplementary Foods (RUSF) <i>High quantity*</i>	Fortified Blended Foods	Lipid-based Nutrient Supplements (LNS) <i>Medium quantity*</i>	Fortified Blended Food	Lipid-based Nutrient Supplements (LNS) <i>Low quantity*</i>	Vitamin & Mineral Powder	High Energy Biscuit (HEB)
			Supercereal Plus	Wawa Mum	Supercereal Plus			
Purpose	Treatment of uncomplicated severe acute malnutrition with continued breastfeeding	Supplement to treat moderate acute malnutrition with continued breastfeeding	Supplement to treat moderate acute malnutrition with continued breastfeeding	Supplement to the local diet for prevention of acute malnutrition with continued breastfeeding and prevent micronutrient deficiency and stunting	Supplement to the local diet for prevention of acute malnutrition with continued breastfeeding and prevent micronutrient deficiency and stunting	Supplement to the local diet with continued breastfeeding to prevent micronutrient deficiency and stunting	Fortification of home prepared foods, just before consumption, with continued breastfeeding to prevent micronutrient deficiencies	Temporary meal replacement; prevention for acute malnutrition and micronutrient deficiencies for vulnerable groups
Target Group	6-59 months <i>Older children and adults including HIV+</i>	6-59 months <i>Others pregnant and lactating women including HIV+ adults</i>	6-59 months: <i>SuperCereal Plus</i> <i>Others including PLW, HIV+ adults: SuperCereal</i>	6-23 months	6-23 months: <i>SuperCereal Plus</i> <i>PLW: SuperCereal</i>	6-23 months	6-59 months	General population, vulnerable groups

Energy /nutrient per 100g	500 kcal 12.5g protein 32.9g fat	500 kcal 12.5g protein 32.9g fat	840kcal 32gprotein 18g fat	247kcal 5.9gprotein 16g fat	840kcal 32gprotein 18g fat	108kcal 2.5gprotein 7g fat	<u>Daily supplement:</u> <u>RDI:</u> A- 400ug, C- 30ug, D- 5ug, E- 5ug, B1- 0.5, B2- 0.5 ug, niacin- 6ug, B6-0.5ug, B12- 0.9ug, folic acid- 150ug, Iron- 10ug, zinc- 4.1, copper- 0.56, iodine- 90ug, selenium-17ug	1,800 kcal/400g (biscuits) 2,300kcal/500g (BP-5, NRG-5)
Packaging	Sachet = 92g	Sachet = 92g	SuperCereal: 25 kg bag SuperCereal Plus: 1.5kg bag	325 gm pots or sachets of different quantities	SuperCereal: 25 kg bag SuperCereal Plus: 1.5kg bag	Sachet = 20g	Sachet = 1g	400g packs (HEB) 500g packs (NRG-5, BP-5)
	24 months	24 months	12 months	24 months	12 months	18 months	24 months	5 years
Ration/dose	According to weight: 6-59m: 200kcal/kg/day	One sachet/day 92g/day (75kcal/kg /day)	200g/day	47-50g/day	200g/day	20g/day	One sachet/day 1g/day or 5g/day	Adults: 400g/day (HEB),500g/day (NRG-5, BP-5)
Approximate duration of Intervention	6-8 weeks	3 months	3-6 months	3-6 months	3-6 months	Up to 18 months	Up to 59 months	1 week as full diet 1 month for children
Cost/dose/day (USD)	0.36/sachet	0.29/day	Super Cereal: 0.17 / day Super Cereal Plus 0.15/day	0.18/day	Super Cereal: 0.17 / day Super Cereal Plus 0.15/day		0.028/day	2.84/day
Manufacturer	Nutriset (Fr); Vitaset (DR); JB (Mad); Nutivita (Ind), Edesia (US); Diva (SA); Com-compact (N, Ind); Tabatchnick (US); Challenge (US), Insta(Ke); local production	Nutriset (Fr); Edesia (US); Compact (India & Norway); Nutrivita (India); Four local producers in Pakistan	Michiels fabrieken (Bel); CerFar (It); ProRata, Somill, J&C (SA) ; Export Trading, Rab (Mal) ;	Nutriset (Fr); Edesia (US); Compact (India, Norway); Nutrivita (India)	Michiels fabrieken (Bel); CerFar (It); ProRata, Somill, J&C (SA) ; Export Trading, Rab (Mal) ;	Nutriset (Fr); Edesia (US)	Global Health Initiative; DSM; Fortitech; Heinz; Hexagon; Piramal (India); Renata (Bangladesh)	NRG-5/BP-5: MSI (D), Compact (N), Biscuits: Nuova Biscotti (I); Michiels (B); Insta (Ke)

Note: Refer to the decision tool and guidance note in using this product sheet and following the decisions made on what type of products to use

* Quantity is referring to kcals in most cases

** The list of products is not exhaustive as new products and producers exist and are emerging rapidly