HUMANITARIAN EVIDENCE PROGRAMME

Relationships between recovery and relapse, and default and repeated episodes of default in the management of acute malnutrition in children in humanitarian emergencies:

A systematic review protocol

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Picture
Mother and her baby boy at their home in Azel, Niger in March 2015. The Azel Treatment Centre is a small community health centre, largely dealing with malnutrition cases. Abbie Trayler-Smith/Oxfam.

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ACRONYMS

CASP	Critical Appraisal Skills Programme
CDC	Centre for Disease Control
CENTRAL	Cochrane Centre Registers for Clinical Trials
CINAHL	Cumulative Index to Nursing and Allied Health
CSB	Corn-soy blend
CRD	Centre for Reviews and Dissemination
CMAM	Community-based management of acute malnutrition
DFID	Department for International Development
ENN	Emergency Nutrition Network
ELRHA	Enhanced Learning and Research for Humanitarian Assistance
EMBASE	Excerpta Medica Database
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organisation
HPG	Humanitarian Policy Group
INGOs	International non-governmental organisations
IMEMR	Index Medicus for Eastern Mediterranean Region
IMSEAR	Index Medicus for South-East Asian Region
LILACS	Latin America Caribbean Health Sciences Literature
MAM	Moderate acute malnutrition
MSF	Medicine Sans Frontiers
MUAC	Mid-Upper Arm Circumference
ODI	Overseas Development Institute
NCHS	National Center for Health Statistics
SAM	Severe acute malnutrition
SC	Supper Cereal
RCT	Randomised controlled trials
RUTF	Ready-to-use therapeutic foods

RUF	Ready-to-use foods
RUSF	Ready-to-use supplementary foods
R4D	Research for Development
TSF	Target supplementary feeding
USA	United States of America
UK	United Kingdom
UNHCR	United Nations High Commissioner for Refugees
UNSCN	United Nations Standing Committee on Nutrition
USAID	United States Agency for International Development
UNICEF	United Nations Children's Fund
WHO	World Health Organization

1. BACKGROUND

The World Health Organization (WHO) defines malnutrition in children as 'a state in which the physical function of a child from birth to five years is impaired due to either overnutrition or undernutrition' whereby 'the latter is the result of poor or insufficient nourishment, poor absorption, or poor biological use of nutrients consumed' (WHO, 2006, p24). Malnutrition is the single greatest threat to child survival, and is measured by three main indicators: underweight, stunting and wasting. Underweight is an indicator for recent weight loss or the combined effect of wasting and stunting. Stunting is an indicator of long-term or chronic malnutrition, while wasting indicates acute deficiency in nutrient intake or disease (UNICEF, 2009). Of these three, wasting poses the greatest risk to mortality in children under five (Black et al., 2008, 2013). The condition is associated with a lack of body fat and wasting of skeletal muscles. Malnutrition is preventable and treatable, and there are appropriate guidelines developed by the WHO and other bodies for managing acute malnutrition in humanitarian emergencies to prevent the risk of mortality (UNICEF, 2009, 2013).

This review is funded through the Humanitarian Evidence Programme, a UK Aid-funded partnership between Oxfam and Feinstein International Center (FIC) at the Friedman School of Nutrition at Tufts University. We plan to conduct a systematic review of evidence to understand what works in the management of acute malnutrition in emergency relief settings. The review primarily will focus on reviewing evidence from published and unpublished/grey literature to understand the relationship between recovery and relapse, and default rates and/or repeated episodes of default, following the management of acute malnutrition in children aged under five-years-old in humanitarian emergencies.

The review forms part of the Humanitarian Evidence Programme, which aims to synthesize evidence in the humanitarian sector and communicate the findings to stakeholders, with the ultimate goal of improving humanitarian policy and practice.

1.1 THE GLOBAL BURDEN OF ACUTE MALNUTRITION

Acute malnutrition in children has been described as a global human disaster, affecting one in three children under five years old in developing countries (WHO, UNICEF, 2013). The condition remains a major public health concern because it is associated with more than half of the eight million deaths in children under five worldwide (WHO, 2013). Estimates suggest that around eight percent of the world's under-fives had MAM, and three per cent had SAM in 2013 (UNICEF, WHO, World Bank, 2012). In absolute terms, this translates to some 51 million and 17 million children respectively suffering MAM and SAM. Around two-thirds of these children live in South-East Asia and in sub-Saharan African countries (UNICEF, WHO and World Bank, 2012).

A rise in the number of acute malnutrition cases can be seen in the immediate aftermath of an emergency, such as when a natural disaster occurs and causes destruction to food sources and food distribution systems (Bagchi et al., 2004). A destruction of the food distribution system increases food insecurity by reducing the accessibility of roads needed to transport foods from one location to another (Moazzem et al., 2009). The disaster may also cause disruption to food crops, and this could have an adverse impact on the food security of the affected population. Food insecurity leads to inadequate dietary and nutrient intake, and the consequence of this is an increase of acute malnutrition rates. Moreover, in emergencies children become vulnerable to infectious diseases such as diarrhoeal diseases, which are a risk factor for malnutrition (Brundtland, 2000). These issues are well captured in the UNICEF conceptual framework published in 1998, on the causes of child malnutrition (UNICEF, 1998).

If not treated, acute malnutrition may permanently impair the growth and development of infants and young children under five years old. Early studies have shown that children's resistance to infections is lowered when they suffer from acute malnutrition (e.g. Golden, 2000). The risk of mortality associated with acute malnutrition is directly related to the severity of the condition. Estimates suggest that children suffering from MAM are associated with mortality rates of between 30 and 115 per 1000 children per year (Collins and Andre, 2010). The risk is higher for children suffering from SAM. A recent meta-analysis conducted by McDonald and colleagues (2013) showed that children who suffer from SAM are up to 11.6 times more likely to die, compared with their well-nourished counterparts. Earlier publication by Andre and Collins (2010) suggested that the mortality risk for children diagnosed with SAM is between 73 and 187 per 1000 children every year. In the Lancet series on Maternal and Child Nutrition, it was estimated that globally around two million children die each year as a result of SAM (Black et al., 2013).

1.2 DEFINING MALNUTRITION

Acute malnutrition in children includes severe wasting, also known as severe acute malnutrition (SAM) and wasting, also known as moderate acute malnutrition (MAM).

1.2.1 Severe acute malnutrition: definition and classification

> *SAM has been classified in the literature using different classification criteria. Programmes implemented before 2006 to manage SAM used the National Center for Health Statistics (NCHS) reference standard, published in 1977, to classify children with SAM. The NCHS classifies infants and children under five years of age as having SAM where their weight-for-height/length is less than -3 standard deviations (SD) also known as z scores, or 70 percent below the median reference standard, and/or in the presence of bilateral oedema, or a mid-upper arm circumference (MUAC) of less than 115mm in children aged between six and 60 months (NCHS, 1997).*

It is important to note that the NCHS standard has been criticised for its shortcomings. It relied on data drawn on bottle-fed babies in the USA, and therefore is not comparable to breastfed babies and children born in developing countries (De Onis et al., 1996). To address this, the World Health Organization (WHO) in 2006 published new child growth standards, which replaced the NCHS reference standards (WHO, 2009; de Onis et al., 2006). The new standards also use the weight-for-height/length <-3SD criterion to identify infants and young children as having SAM. However, unlike the NCHS the new standard is based on data drawn from breastfed babies and appropriately fed children from different ethnic backgrounds in developing countries (de Onis et al., 2006). Reports have indicated that the WHO growth reference classifies between two and four times as many children than the NCHS reference (de Onis et al., 2006; Seal and Kerac, 2007).

As well as the weight-for-height criteria recommended by these two growth standards, the WHO and United Nations Children's Fund (UNICEF) also recommend the use of MUAC for classifying SAM in children aged six- to 60 months (WHO; UNICEF, 2009; 2013). Using this tool, a MUAC cut-off of less than 115mm is recommended for diagnosing SAM, as data suggests that children with this MUAC cut-off have a greatly elevated risk of death compared to those who are above (WHO, UNICEF, 2009). This cut-off point has replaced an earlier recommendation by a WHO expert panel to use a MUAC cut-off of less 110mm for recruiting children into therapeutic programmes designed to manage SAM (WHO, UNICEF, 2006, 2007). The higher cut-off adjustment now enables the identification of children below the 115mm mark to be prioritised and treated appropriately to avoid the risk of mortality (Black et al., 2008). Data generated by humanitarian non-governmental organisations (e.g. Valid 2006) show that the MUAC is a better predictor of SAM. Community health workers with little or no training can also easily use this method to diagnose SAM. Furthermore it requires no charts unlike the weight–for-height method (Picot et al., 2012). The WHO does not recommend the use of MUAC to diagnose SAM in infants/babies aged below six months. Rather the same weight-for-height/length threshold with or without the presence of clinical oedema is recommended (WHO, 2006).

Forms of SAM

There are three recognized forms of SAM: kwashiorkor, marasmus and marasmus-kwashiorkor. Kwashiorkor, most commonly observed in young children over two-years-old is characterized by the presence of bilateral pitting oedema of nutritional origin (Brewster et al., 1997; Golden, 1997 & 1996). The condition is diagnosed regardless of whether the MUAC is less than 115mm or children have weight-for-height/length of less than 3SD since the build-up of fluid in tissue can result in a higher weight and swelling of the limbs. Marasmus, on the other hand, is more often seen in children aged under two (Waterlow, 1984, 1976, 1972), and is characterized by severe body wasting or massive loss of body fat, muscle and subcutaneous tissue. Kwashiorkor can sometimes be overlaid onto marasmus, and in that case the condition is called marasmus-kwashiorkor (Golden, 1996 & 1997). A summary of diagnostic criteria used for screening children with SAM is presented in Table 1 below.

Table 1: Summary of diagnostic criteria for SAM in children aged 6 to 60 months old

Indicator	Measure	Cut-off
Severe wasting (2)	Weight-for-height (1)	< -3SD
Severe wasting (2)	MUAC	<115mm
Bilateral oedema (3)	Clinical sign	

1 Based on WHO standards (www.who.int/chilgrowth/standards) , 2, 3 independent indicators of SAM require urgent action (adapted from WHO 2006 child growth reference standard).

Several other classification systems existed prior to the NCHS and WHO growth standards, which used different anthropometric measures and clinical characteristics to identify SAM in children. These include the Wellcome classifications of kwashiorkor, defined as 60-80 percent expected body weight plus oedema, and marasmus-kwashiorkor, defined as less than 60 percent expected body weight with oedema (Waterlow, 1972; Dugdale, 1971) and the Gomez classification of marasmus as a percentage expected weight-for-age of less than 60% (Stuart and Stevenson, 1959; Gomez et al., 1956).

Managing SAM

In 1999, the WHO published a protocol that provides step-by-step guidelines on how SAM should be managed (WHO, 1999). The guidelines recommend three distinct phases of treatment: initial stabilisation, nutrition rehabilitation and follow-up phases. In the initial stabilisation phase, life-threatening conditions such as hyperglycaemia, hypothermia, dehydration and other severe co-morbidities are identified and treated alongside nutritional management using the F-75 feeding formula to improve the nutritional status of affected children. Treatment in this phase is typically delivered in an inpatient hospital setting or at specialised nutrition rehabilitation centres, usually attached to a hospital's paediatric ward.

In the second phase of treatment, the child receives a more nutrient-dense therapeutic diet (F-100) in order to promote weight gain. Other care plans are implemented to stimulate the child's emotional development alongside any physical improvements. Caregivers also receive training on the causes of malnutrition and the management of common ailments, such as diarrhoea and malaria, to help them prevent relapses and avoid a recurrence of malnutrition. The last phase of hospital-level management takes place after the children have been discharged and reintegrated with their families. During this phase, health workers conduct regular follow-up visits to the homes of treated children to support and counsel their caregivers with the aim of preventing relapse.

The evidence gathered thus far indicates that the 1999 guidelines used to manage SAM have resulted in improved nutritional status and led to significant reductions in mortality rates (Andre et al., 1999; Collins, 2004). However, the model has some shortcomings that are worth highlighting. It is a biomedical model of care, and does not take into account the wider social aspects of malnutrition (Andre, 2001; Collins, 2001). Collins and Yate (2010) argue that the majority of children suffering from SAM do not have medical complications, and thus

can be rehabilitated at home with nutrient-dense foods. Some studies have found a lack of competence among health workers, leading to poor quality management of children with SAM in hospital settings (Puoane et al., 2001; Collins, 2007, 2004). Other issues identified include low coverage rates due to the high cost of care, longer durations of hospital stay to achieve recovery and the increased risk of cross-infections when children are admitted to hospitals with poor hygiene standards (Collins and Saddler, 2002; Collins 2001, 2004).

Alternative approaches

To improve the quality of care and treatment coverage, in 2000 international non-governmental organisations (INGOS) developed and piloted a new acute malnutrition management model – known as the community-based management of acute malnutrition (CMAM) model. Different terminologies have been used previously to describe the CMAM model, including community therapeutic care (CTC); integrated management of acute malnutrition (IMAM), community-based therapeutic care (CBTC) and ambulatory care for the treatment of acute malnutrition. In this document, CMAM will be used to refer to all of the different terms formerly used to describe the community-based management of acute malnutrition model. The CMAM model allows for children who are diagnosed with SAM, and who have no medical complications to be treated at outpatient centres (WHO, UNICEF, WFP, SCN, 2007). CMAM programmes use a new solid-based ready-to-use therapeutic food (RUTF) unlike the water-based F-75 or F-100 that is recommended for use in hospital-based care for children with acute malnutrition (WHO, 1999). The new RUTFs have the same nutrient content as for F-75 or F-100 and are made from a combination of groundnut or peanut butter, dried skimmed powdered milk, sugar and vegetable oil, enriched with vitamins and minerals (Nutriset, 2000). RUTF has a low water content, and therefore carries less risk of bacterial contamination (Collins, 2001; André, 1997).

Early clinical trials (Diop et al., 2003; Manary et al., 2004; Ndekha et al., 2005; Collins et al., 2006), controlled comparative studies (Gaboulaud et al., 2005; Cilberto et al., 2005; Sandige et al., 2004) and a large body of evidence generated by INGOs (e.g. Valid International, Concern Worldwide) following the pilot implementation of CMAM programmes in emergency situations have demonstrated that the CMAM approach can achieve successful outcomes. The recovery rates reported in most studies have exceeded the Sphere project's minimum standards for therapeutic effectiveness (Sphere, 2000, 2011). Similarly, mortality rates reported were lower than five percent and significantly better than the stipulated Sphere minimum standard. Based on this evidence, the WHO, UNICEF, United Nations Standing Committee on Nutrition (UNSCN) and the World Food Programme endorsed the CMAM model in 2007 as a strategy for managing SAM in community-based settings in humanitarian emergencies (WHO, UNCEF, WFP, UNSCN, 2007). However, intervention studies and published programme reports have found high rates of default and relapse (Kerac et al., 2009; Cilberto et al., 2006; Ndekha et al., 2004; Valid, 2006).

Discharging children from SAM therapeutic programmes

Table 2 below summarizes the latest WHO recommendation for discharging under five-year-olds from acute malnutrition management programmes (WHO, 2013).

Table 2: Criteria for discharging children from SAM treatment

Children with SAM should only be discharged from treatment when they meet the following criteria:

- A weight-for-height/length of > -2SD/z scores and no oedema for at least two weeks, or
- MUAC of > 115 and no oedema for at least two weeks
- The anthropometric indicator that is used to confirm severe acute malnutrition should be used to assess whether a child has reached nutritional recovery

Children admitted with only bilateral pitting oedema should be discharged from treatment on whichever anthropometric indicator, MUAC or weight-for-height/length is routinely used in programmes

The percentage of weight gain should not be used as a discharge criteria for those receiving treatment for SAM

1.2.2 Moderate acute malnutrition: Definition and classification

Similar to SAM, various criteria have been used to define and classify MAM. The NCHS recommendation was to define children aged under five with MAM if their weight-for-height was less than 80 percent, or a weight-for-height between -3 and -2SD or z scores without oedema. In a consensus statement issued recently by the WHO (2010) similar weight-for-height between -3 and -2SD/z score without oedema has been recommended. However the WHO, also added MUAC to use cut-off from 115mm to < 125mm without oedema.

Additional criteria, according to the WHO recommendation, are to consider children who are discharged from outpatient treatment programmes (i.e. those with weight-for-height of -2SD or MUAC < 115mm, with no oedema) using the outpatient therapeutic programmes guidelines. The statement indicated that children identified using these criteria are likely to respond to appropriate treatment.

Managing MAM

The development of acute malnutrition occurs rapidly and is observed more frequently in emergency situations, especially if children are already experiencing mild to moderate malnutrition in a pre-disaster setting (Picot et al., 2012). The increase in the prevalence of malnutrition is compounded by infections such as diarrhoeal diseases, malaria, pneumonia and HIV (Brundtland, 2004). The link between malnutrition and infections has been well documented. Estimates suggest that 16 percent of pneumonia, diarrhoea and malaria morbidity in children under five years old is attributable to severe wasting (Collins, 2007). The nutritional status of infants and young children can also be impaired by HIV infection (Rollins, 2009; Fergusson and Tomkins, 2009). Severely malnourished children diagnosed with HIV infection are significantly more likely to die compared with children with no HIV infection (Fergusson and Tomkins, 2009). For these reasons, acute malnutrition in infants and children needs to be seriously prioritized and managed to prevent loss of life.

MAM treatment options

For children diagnosed with MAM, different programme approaches need to be used to manage their condition. UNICEF (2014) classifies these interventions or programme approaches into three levels:

1. Target supplementary feeding (TSF), provided to manage MAM in individual children identified through anthropometric screening. Treatment is usually carried out in outpatient/community settings and includes the provision of specialized nutritious foods such as fortified blended flour (e.g. Super cereal (SC), SC plus or corn-soy blend (CSB) and /or oil-based ready-to-use supplemental foods (RUSF) e.g. Plumpy'Doz.)
2. Blanket supplementary feeding provided to children to prevent MAM from progressing to SAM. This type of intervention involves blanket distribution of dry food rations to the parents of children under five years old.
3. Depending on the context or situation, the purpose of some blanket supplementary feeding interventions is for the prevention and treatment of MAM. This could include during protracted conflicts or severe famine situations where it may be difficult to prioritise children for targeted supplementary feeding.

As this review focuses only on the management and treatment of acute malnutrition, we will not be considering studies aimed at preventing SAM. The MAM taskforce decision making tool (summarized in Table 3) provides guidance on when MAM preventions and treatment programmes should be implemented.

Table 3: Guidance on when MAM preventions and treatment programmes should be implemented

GAM level	Risk level	MAM programme recommendation
>15%	High, medium, low	Prevention and treatment
8-15%	High, medium	Prevention and Treatment
<8%	High	Preventions

Source: MAM decision making tool for emergencies, 2012

Children are discharged from MAM programmes if they attain a

- Weight-for-height/length > -2SD/z scores. Children admitted using weight-for-height z scores can also be discharged using eight to 10 percentage weight gain.
- MUAC ≥125mm for two consecutive visits

1.3 RATIONALE FOR THE REVIEW

Previous systematic reviews seeking to investigate the effectiveness of interventions to manage acute malnutrition in children under five have been limited to exploring the effect of the therapeutic diet used (e.g. Schooness et al., 2013). There have only been a few reviews conducted more recently that have started to investigate the wider impacts of treatment for acute malnutrition (e.g. Lenters, et al., 2013; Picot et al., 2012; Alcoba et al., 2013). Lenters and colleagues (2013) compared the effectiveness of the WHO inpatient protocol for managing SAM with the CMAM approach. However, their review was limited to studying recovery/cure and mortality rates, and the rate of weight and MUAC gains as primary outcomes. On the other hand, Alcoba et al. (2013) assessed the appropriateness and efficacy of routine first-line antibiotics provided during outpatient care for children with uncomplicated SAM. These reviews did not include relapse or defaulting, although the findings are useful in broadening our understanding of the impact of interventions used to manage MAM and SAM. More research is needed to address the important knowledge gaps around relapse, and to study the relationship between relapse and recovery. Further research is also needed to uncover the rates of children defaulting from acute malnutrition management programmes, and to study the relationship between defaults, relapse or repeated episodes of acute malnutrition.

In essence, we need evidence to understand whether effective treatment of SAM and MAM reduces the risk of relapse in affected children, and whether children who default during the course of treatment have an increased risk of relapse. To the best of our knowledge no systematic review of the evidence has yet been carried out to explore these relationships. Our review will attempt to address this knowledge gap.

In addition, as noted earlier, default and relapse rates in humanitarian emergency settings have been high. By gathering data from existing sources, we can try to understand and explain why this occurs. We hypothesized that higher default rates, and potential relapse, would be recorded in programmes where the quality of the delivery is perceived by beneficiaries as poor. Poor quality could be the result of inadequate resources to deliver treatment, including human resources (e.g. staff that have the technical knowledge and skills to manage acute malnutrition in children). Poor staffing could also affect regular monitoring and counselling of carers about malnutrition and the benefit of the treatment programme. These factors are likely to impact largely on children's attendance to, and completion of, the programme. Also, the existence and quality of community mobilisation and sensitization activities to educate community members on the programme. Rates of malnutrition before the programme implementation could also impact on children's attendance, and hence default rates. Furthermore, an important assumption regarding relapse is that if there are adequate follow-up home visits after discharge from treatment, relapse or its episodes could

be minimal and vice-versa. This review aims to identify relevant data from the literature in order to test these hypotheses.

A few recently-published studies (Guerrero and Gallapher, 2013, Collins and Saddler, 2002) have identified other factors as being responsible for the higher default rates recorded in acute malnutrition management programmes. These include the accessibility of treatment/programmes including geographical accessibility (e.g. distance), and traditional beliefs regarding the causes and management of malnutrition.

The majority of data that can help us to explain the reasons for increased default rates and its relationship with relapse following the management of acute malnutrition is to be found in the grey literature or unpublished reports. Our review will attempt to identify these literature sources and collate this data to explain the high default rates. The findings of the review are expected to contribute to the growing literature on the effectiveness of interventions used to treat acute malnutrition, with the ultimate aim of better informing programme and policy decisions.

1.4 AIM OF THE REVIEW

The review will investigate the relationship

- between recovery/cure and relapse, and
- between relapse and default and/or return defaults/episodes of default

in the management of acute malnutrition in children under five in humanitarian emergencies.

The review will also explore the contexts in which acute malnutrition management programmes were implemented, in order to identify and describe how context influences relapse and default and/or return default/episodes.

Specific objectives

The review aims to investigate:

- The effect of treatment on mortality risk among children suffering from SAM and/or MAM
- The relationship between recovery and relapse; and between relapse and default or return default/episodes of default
- Reasons for default and relapse or return defaults/episodes of default

2. REVIEW METHODS

2.1 STUDY DESIGN

The review will systematically identify a range of literature to investigate the relationship between recovery/cure rates, relapse and default or episodes of default in the management of SAM or MAM in children under five in the humanitarian emergency context. It aims to identify and describe factors that influence defaults and relapse. The review will feature published literature, quantitative and qualitative studies, as well as grey literature (i.e. reports not published in traditional academic journals). It is appropriate to adopt mixed methods and combine a quantitative and qualitative approach because our aim is not only to understand the relationship between therapeutic outcomes, but also to explore what factors influence these outcomes. The review finds that CMAM programmes delivered in humanitarian emergency contexts are complex, and therefore the impact of these interventions can only be understood by collating and synthesizing evidence from multiple studies (and different study designs) as well as programme reports.

2.2 INCLUSION AND EXCLUSION CRITERIA

We will feature various types of literature, including qualitative, quantitative and mixed methods studies, reported in academic journals and the grey literature. Previous systematic reviews will be included if their question closely corresponds to this review. Where there is not a direct match, these reviews will be used as a source for identifying other potentially relevant studies to be included in our review. The inclusion criteria are described below.

2.2.1 Population and condition

- The review will include studies if they targeted infants and children under five years old, and cover the management of MAM and/or SAM.
- Because of the different definitions and classification criteria that have been used to identify children with acute malnutrition (see section 1.2) we will consider only studies that have used ‘standard and accepted’ definition (Picot et al., 2012). That is, definitions for MAM and SAM used by the authors should be based on the NCHS child growth standard if studies were published before or during 2006 and the WHO child growth standards if studies were published after 2006.
- We will not include studies that focused on the management of acute malnutrition in pregnant women or lactating mothers.

2.2.2 Intervention and treatment

The interventions considered for this review are those for the treatment of SAM or MAM delivered in humanitarian emergencies. These humanitarian emergencies are defined as major incidents that threaten human life and public health (WHO, 2010). These include protracted conflicts, flooding, earthquakes and other natural disasters, and nutrition emergencies when prevalence rates of malnutrition has reached a crisis level (>=15%) according to the WHO crisis classification using global acute malnutrition (WHO, 2003). The latter in particular may include government-led interventions designed to manage acute malnutrition in such a crisis situation. We will evaluate and include studies that are based on interventions implemented during emergencies situations.

- Interventions provided to manage/treat SAM in humanitarian emergencies described above should include inpatient care using therapeutic milks such as F-75 or F-100, and potentially RUTF, and outpatient care using RUTFs. Some commercially available RUTFs include *Plumpy'Nut* manufactured by Nutriset, and *ZeePaste* manufactured by GC Rieber Compact for the treatment of SAM.
- Interventions provided to manage/treat MAM in humanitarian emergencies described above should include those that used fortified blended flour e.g. super cereal, super cereal plus, CSB and/or oil-based RUSF (e.g. Plumpy'Doz).

Studies that are based on blanket supplementary feeding provided to children to prevent MAM from progressing to SAM will not be considered. However, where studies state that the aim of the supplementary feeding programme was to manage rather than prevent MAM they will be included in the review.

2.2.3 Outcomes

Studies will be included if they reported on the following acute malnutrition management outcomes.

Table 4: The inclusion of studies based on acute malnutrition management outcomes

Outcome of interest	Definition
Recovery rate	As defined by authors based on standard criteria
Default rate	The proportion of children who were absent from treatment for two consecutive sessions
Treatment effect on mortality risks	
Absence and or repeated absence	Proportion of children who were absent from treatment/number of absence recorded
Return default rate/repeated default episodes	The proportion of children who re-enrolled into treatment after defaulting /number of times they re-enrolled
Relapse rate/repeated relapse episodes	The proportion of children who re-enrolled after they recovery and discharged
Weight gain or time to recover	(Discharge – admission weights/admission weight) length of stay between admission and discharge

The above outcomes do not have to be the main primary outcomes of the included studies and can be either primary or secondary outcomes. We anticipate that different treatment programmes will have different follow-up periods, therefore outcome measures recorded after any length of follow up will be considered.

2.2.4 Study types

Quantitative study design

Randomised controlled-trials (RCTs), quasi-randomised trials and non-randomised observational studies including retrospective and prospective cohort controlled and uncontrolled, before- and after- and controlled comparative studies will be assessed and included in the review.

Qualitative studies

Also included are qualitative studies that use semi-structured interviews, focus groups and participant observation methods, or a combination of these techniques, to explore how nutritional management of MAM or SAM services were delivered in humanitarian contexts and the factors associated with default and relapses. Qualitative information reported in mixed methods studies that are relevant to the review to explain relapse and default outcomes will also be considered.

2.3 SEARCH STRATEGY

2.3.1 Mapping the literature

The team will undertake a scoping literature search to map out the literature that is available on outcomes of nutritional management of MAM and SAM in humanitarian emergencies, with a special focus on studies that addressed recovery/cure, default/dropout and relapse rates. The scoping search for peer review literature or published studies will be conducted via Medline using appropriate key terms summarised in Table 5. We also plan to conduct additional scoping searches via Google Scholar for relevant items by title e.g. 'management of acute malnutrition in children in emergencies'. This technique allows for the identification of cited and related articles. The results of the scoping searches will:

- Enable us to understand the full scope of literature currently available to address the review question
- Make us aware of potential opportunities and difficulties that might arise during the review process
- Help us identify appropriate parameters for the review, as well as refine our search strategy

Table 5: Terms used to perform scoping search for peer-reviewed literature in MEDLINE (lower case indicates free-text terms, initial capitalisation indicates a Medical Subject Heading (MeSH)

Population	Setting
malnourish$	humanitarian$
undernourish$	conflict$
malnutrition	famine$
undernutrition	disaster$
kwashiorkor	natural disaster$
oedema	emergency$
marasmus	complex emergency
acute malnutrition	protracted emergency
severe acute malnutrition	Relief Work/
Malnutrition/	Disaster Planning/
exp Protein-Energy Malnutrition/	starvation/ (heading for famine)

Population	Setting
child$	Developing countr$
baby	sub-saharan africa
babies	south-east asia
infant$	latin america$
child, preschool/	
infant/	
child nutrition disorders/	

2.3.2 Published and unpublished literature

Based on the initial results from the scoping searches, we will revise our search strategy and use it to perform final searches to identify published and unpublished studies to be included in the review. Additional keywords will be added, and search statements reflecting other facets of the research question will be considered for the main search strategy. Once a final search strategy is agreed, it will be run in the following specialized bibliographic and electronic databases to identify peer-reviewed journal articles. Detailed searches will also be performed in Google Scholar, and other identified relevant websites for grey unpublished literature using the search terms defined below.

2.3.3 Bibliography and database search

A comprehensive literature search, using a revised search strategy with agreed appropriate search terms will be conducted in specialised electronic databases including Medline (listed below). The databases were purposively selected, as they are known to ‘house’ most of the child health and nutrition journals in this area. They include:

- Medline (via PubMed) (1980 onwards)
- Medline in-process (via PubMed)
- EMBASE (1980 onwards)
- CINAHL (1950 onwards)
- Science Citation Index
- CAB abstracts Ovid – Nutrition Abstract Review
- Regional literature databases such as African Index Medicus, Index Medicus for the Eastern Mediterranean Region (IMEMR), Latin American Caribbean Health Sciences Literature (LILACS), and Index Medicus for the South-East Asian Region (IMSEAR)
- The Cochrane Library – Cochrane Reviews, Cochrane Other Reviews
- Cochrane Central Registers for Clinical Trials (CENTRAL)
- ZETOC, BIOSIS, PAIS International, Bioline

We will use cluster searching techniques (Booth et al., 2013) to enable the retrieval of ‘sibling’ studies (those closely associated with previously identified randomized controlled trials and observational studies) to broaden the collective understanding of the context in which these studies were conducted.

2.3.4 Websites and Google Scholar searches for non-peer review and grey literature

Grey literature, including programme reports, conference proceedings, technical reports, field exchanges that are published by humanitarian development organisations (NGOs), as well as government ministries of health will be searched using the Google Scholar and relevant websites listed below. We will use a combination of the following search terms to conduct the search in Google Scholar:

- Children under five
- Acute malnutrition
- Nutritional management
- Humanitarian emergencies
- Ready-to-use therapeutic foods
- Therapeutic care
- Developing countries
- Sub-Saharan Africa
- South and Latin America

We have prioritized the following international and national websites to search for grey literature, in addition to the Google Scholar, because the yield of published reports from these sites is potentially higher

- DFID R4D
- Overseas Development Institute (ODI), including the Humanitarian Policy Group (HPG) and Humanitarian Practice Network
- Emergency Nutrition Network (ENN)
- International Initiative for Impact Evaluation (3ie)
- EvidenceAid
- Feinstein International Center and Friedman School of Nutrition Science and Policy, Tufts University
- Enhancing Learning and Research for Humanitarian Assistance (ELRHA)
- International Association of Professionals in Humanitarian Assistance and Protection (PHAP)
- The Network on Humanitarian Action
- The World Bank
- WHO Global Health Library and the Food and Nutrition Bulletin
- UNICEF
- World Food Programme
- The CMAM Forum
- Coverage Monitoring Network
- Nutritional Causal Analysis
- Global Alliance for Improved Nutrition
- Harvard Humanitarian Initiative (HHI)
- Humanitarian Social Network
- European Commission Humanitarian Aid and Civil Protection department
- USAID
- Reliefweb
- Oxfam Policy & Practice website
- OpenGrey
- UNHCR Policy Development and Evaluation Service
- ELDIS
- Valid International
- Helen Keller International
- Concern Worldwide
- Save the Children
- Action Against Hunger
- Médecins Sans Frontières (MSF)
- Free from Hunger
- International Medical Corps
- Centre for Reviews and Disseminations (CRD)
- Health technology assessment database

2.3.5 Supplementary searches

In addition to all of the above searches, we will consult the reference lists of the included studies, in order to identify potentially relevant studies not captured by the electronic database and/or websites and Google searches. We will systematically scan the PLoS open access resource and Food and Nutrition Bulletin as the most appropriate operationalization of 'hand searching'. A citation follow-up search will be carried out to find additional relevant and related papers.

2.3.6 Contacts with individuals and organisations

We have identified key individual authors and organizations to be contacted for any unpublished data and/or reports or rejected or ongoing manuscripts (see list in Appendix 1). They include: UNICEF, Save the Children (UK & US), Action Against Hunger, Centre for Disease Control (CDC), Concern Worldwide, Food and Nutrition Technical Assistance (FANTA). USAID, DFID, Food and Agricultural Organisation (FAO), GOAL Global, International Committee of the Red Cross, and International Medical Corps.

2.4 SEARCH LIMITATIONS

We will limit our searches to studies published between 1980 and 2015. No language restrictions will be applied but searches will be conducted in English. We will attempt to translate any paper we identify that is not written in English, using expertise within the review team. For example, Michelle Holdsworth (MH) and Robert Akparibo (RA) speak and read French. Where the review team is unable to translate a paper, we will discuss the issue with Oxfam and the Feinstein International Center to identify additional translation expertise. EndNote Reference manager will be used to organise and manage the papers.

2.5 SCREENING STUDIES

Two independent reviewers will undertake a two-stage selection process as follows:

1. Title and abstract stage screening

Using a predefined selection checklist (see Appendix 1), two independent reviewers will screen all titles and abstracts of peer-reviewed, non-peer-reviewed papers and grey reports identified by the search to ascertain their relevance or appropriateness for inclusion in the review.

2. Screening of full text

Potentially qualified papers identified based on titles screened will be subjected to full text screening to further ascertain their eligibility. The two independent reviewers, one subject specialist and one emergency management expert will apply a predefined checklist (see Appendix 2) to conduct the screening. The relevance of each paper will be coded onto an Excel spreadsheet. To minimize inter-observer variability in the screening and coding process, several measures would be instituted. For instance, before any coding is started, RA will provide an orientation tutorial on the management of MAM and SAM in humanitarian context. The training will draw on the UNICEF online training material for nutrition management in emergencies.

A third reviewer will be brought in to address any unresolved issues or disagreements that may arise between the two independent reviewers. If the issues are still unresolved we will hold a meeting involving all members of the review team to resolve them. For papers retrieved through contacts with individual authors, we will aim to clarify any uncertainty with these authors directly.

2.6 DATA EXTRACTION

Two reviewers will independently code and extract data from the included studies onto an Excel spreadsheet for analysis. A third reviewer will check the data extraction. The two reviewers will use the pre-defined data extraction form attached in Appendix 3. Where there are two or more papers published that describe the same study, these will be combined and analysed as one study, and the data extracted will be treated as such. We aim to contact the authors of papers that qualify for inclusion in the review during the extraction phase if there is a lack of clarity, missing or incomplete data, to ask for clarification or more information where necessary.

2.6.1 Quantitative data

We will extract the following specific details from quantitative papers: country and year of study, population, study design and methods, intervention details (including treatment received by intervention and controlled groups, if any, and duration of follow up), and outcomes of significance to the review (numerical results from studies). See details in data extraction template in Appendix 3.

2.6.2 Qualitative data

We will extract the following specific details from qualitative studies: country and year of study, population, design and methods, intervention details and main outcomes of significance to the review (see Appendix 4). Qualitative outcomes will typically be those labelled as ‘results’ or ‘findings’ in the study reports. Key concepts, quotes and information relevant to the review question and addressing qualitative components of the review question (i.e. acceptability, attitudes or implementation and context), or provide explanation to the quantitative findings will be extracted. Data from providers, recipients and those directing humanitarian efforts will be included.

2.6.3 Data extraction from programme reports

Specific details to be extracted from programme reports are: country and year of publication, title of the report, type, and focus of the report and outcomes related to the review (coverage, recovery, default and relapse rates; repeated absence and episodes of defaults/ relapse, as well as reason for these outcomes).

2.7 DATA ANALYSIS

2.7.1 Quantitative data analysis

If possible, for example where there is homogeneity of studies of sufficient quality and robustness, a meta-analysis of the statistical data to combine the findings from the different peer review studies will be conducted. However, because of the nature of acute malnutrition (MAM and SAM), heterogeneity of the clinical manifestations of these conditions (e.g. Marasmus, and oedematous malnutrition/Kwashiorkor) and the criteria used to define these, as well as the different treatment approaches and therapeutic foods use to treat these conditions, we anticipate that the studies will be highly heterogeneous. If this is the case, a meta-analysis will not be performed.

We will ascertain the viability of carrying out a meta-analysis by first assessing the degree of heterogeneity of the quantitative studies. Although this analysis will be done purposefully to decide on whether or not to conduct a meta-analysis, it is also useful to assess the level of potential effect of different biases (selection bias, confounding and performance biases) that may impact on the quality of the quantitative findings**.** If appropriate, the degree of heterogeneity will be quantified or rated using the I^2 test (Higgins, 2002). Where necessary,

we may perform a funnel plot to identify potential outliers that may reflect potential publication or reporting bias.

When a meta-analysis is not possible

If a meta-analysis is not possible due to the heterogeneity of the data, we will opt instead to summarise the data and report the outcomes descriptively using tables and a narrative approach. This will be appropriate as the focus of this review is to understand the relationship between key programme outcomes following the management of MAM and SAM in humanitarian emergencies, i.e. recovery/cure, relapse and default rates, and repeated absence and episodes of default and relapse. A tabular narrative description of the data can adequately capture this.

2.7.2 Qualitative data analysis

The textual data extracted from papers will be directly entered using NVivo qualitative analysis software. Two reviewers will then independently code the text according to similarities, meaning and content. Themes will be generated using the codes and thematic categories created from the codes. Where textual categorization is not possible the data will be presented descriptively.

2.8. DEALING WITH MISSING DATA

We will attempt to describe the completeness of the data extracted for each quantitative study, including the primary outcomes documented by individual studies. In particular, we will explore whether missing data were reported in each study. We will also examine whether any missing data were related to outcomes, and whether these were uniform across groups. We will look at the types of data excluded in the final analysis of each study, as well as identify the reasons for these exclusions.

2.9 EVALUATING THE QUALITY OF INCLUDED STUDIES

Two independent reviewers from the review team will each use the CASP quality assessment checklist to evaluate and grade the quality of the included studies. We anticipate that the included studies will differ in their methodological designs. The CASP quality assessment tool (available at www.casp-uk.net) has separate checklists for assessing a range of quantitative study designs, as well as qualitative and systematic review studies. CASP is also a well-recognized tool and, we believe, an appropriate instrument to use in our quality assessment of studies.

The two independent reviewers will also assess the risks of bias of each included study. They will use the Cochrane Collaboration's handbook for the assessment of risks of bias for systematic review of randomized controlled studies (Higgins, 2011). Similarly, another validated tool will be applied to assess for the risk of bias for non-randomized controlled studies (Kim et al., 2013). We will particularly assess each study for adequate sequence generation, allocation of concealment, blinding, incomplete outcome data, selection bias, performance bias, as well as other source of biases. We will then grade the risks of potential bias as low, high or unclear risk of bias. For cluster randomized controlled studies we will perform an additional risk of bias assessment to examine for bias in recruitment, baseline imbalances and loss of clusters. Any disagreement will be discussed with an independent fourth reviewer, Andrew Booth (AB).

3. CONTRIBUTION OF MEMBERS OF THE REVIEW TEAM

All members of the review team (Robert Akparibo (RA), Andrew Lee (AL), Andrew Booth (AB), Janet Harris (JH), Helen Wood (HW), Lindsay Blank (LB) and Michelle Holdsworth (MH)), and the members of the expert panel (Seth Adu-Afarwuah (SAA), Mark Manary (MM) and Tanya Khara (TK)) will contribute to the review based on their areas of expertise. The search strategy was designed by RA, a child/emergency nutrition specialist, AL, an emergency/disaster management specialist and HW, an information specialist. HW will test the initial strategy by conducting a scoping search in selected electronic databases. HW, RA and AL will revise and refine the search strategy upon completion of the initial scoping. HW and RA will conduct the final search in all the selected electronic databases. RA, AL and LB, a systematic review expert, will screen the papers for inclusion in the review. The three reviewers will also conduct data extraction and quality assessment of included studies. Nutrition specialist MH will validate the extraction by cross checking a sample. JH, an evidence synthesis expert and AL, an expert systematic reviewer and advisor on evidence synthesis, will provide expertise in qualitative data synthesis and analysis. RA and the members of the expert panel will contact relevant organizations identified for further grey literature or unpublished reports. The panel members will review and advise on the final content of the review report, as well as assist in dissemination of the findings. All members of the expert panel are specialists in nutrition in emergency management.

4. CONFLICTS OF INTEREST

We declare no competing interests.

5. TIMELINE

The submission deadline for the final review report is 31 July 2016.

6. ACKNOWLEDGMENTS

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7. REFERENCES

Alcoba, G., Kerac, M., Breysse, S., Salpeteur, C., Galetto-Lacour, A., Briend, A., Gervaix, A.(2013). *Do Children with Uncomplicated Severe Acute Malnutrition Need Antibiotics? A Systematic Review and Meta-Analysis.* PLoS ONE, 8(1), e53184. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0053184

Bank U-W-TW: Levels and Trends in Child Malnutrition: UNICEF-WHO-The World Bank Joint Child Malnutrition Estimates. Washington D.C; 2012. WHO, UNICEF & WorldBank. (2012) Joint Child Malnutrition Estimates. Levels and trends in child malnutrition. http://www.who.int/nutgrowthdb/jme_unicef_who_wb.pdf.

Black, RE., Victora, CG., Walker, SP., Bhutta, ZA., de Onis, M., Ezzati, M., Grantham-McGregor, S.,, Katz, J., Martorell, R.,, Uauy, R.; Maternal and Child Nutrition Study Group. (2013). *Maternal and Child Undernutrition and Overweight in Low-Income and Middle-Income Countries. Lancet,* 382(9890), 427–51. http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(13)60937-X.pdf

Black, RE, Allen, LH, Bhutta, ZA, Caulfield, LE, de Onis, M, Ezzati, M, Mathers, C, Rivera, J.(2008). *Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences. Lancet*, 371(9608), 243–260. http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(07)61690-0/abstract

Booth, A., Harris, J., Croot, E., Springett, J., Campbell, F., Wilkins, E. (2013). Towards a Methodology for Cluster Searching to Provide Conceptual and Contextual 'Richness' for systematic Reviews Of Complex Interventions: Case Study (Cluster). BMC medical research methodology, 13(1), 118. http://bmcmedresmethodol.biomedcentral.com/articles/10.1186/1471-2288-13-118

Brewster, D., Manary, M., Graham, S. (1997). Case Management of Kwashiorkor: An Intervention Project at Seven Nutrition Rehabilitation Centres in Malawi. European Journal of Clinical Nutrition, 51, 139–47.

Briend, A. (2001). Highly Nutrient-Dense Spread: A New Approach to Delivering Multiple Micronutrients to High-Risk Groups. British Journal of Nutrition, 85(suppl 2), S175–9. http://dx.doi.org/10.1049/BJN2000311

Briend, A., Brewster, D., Manary, M., Graham, S. (1997). Case Management of Kwashiorkor: An Intervention Project at Seven Nutrition Rehabilitation Centres in Malawi. European Journal of Clinical Nutrition, 51, 139–147.

Briend, A., Lacsala, R., Prudhon, C., Mounier, B., Grallety, Y., and Golden, MHN. (1999) *Ready-To-Use Therapeutic Food for Treatment of Marasmus. Lancet,* 353(9166), 1767–68. http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(99)01078-8/abstract

Briend, A. (1997), Treatment of Severe Acute Malnutrition with a Therapeutic Spread. Field Exchange, 2 , 14.

Brundtland, GH. (2000) Nutrition and Infection: Malnutrition and Mortality in Public Health, 58(2), S1–S4.

Cilberto, MA., Manary, MJ., Ndekha, MJ., Briend, A., Ashorn, P. (2006) Home-Based Therapy for Oedematous Malnutrition with Ready-To-Use Therapeutic Foods. Acta Paediatrica 95(8), 1012–5.

Ciliberto M.A., Sandige H., Ndekha M.J., Ashorn P., Briend A., Cilberto H.M. & Manary M.J. (2005) Comparison of home-based therapy with ready-to-use therapeutic food with standard

therapy in the treatment of malnourished Malawian children: a controlled, clinical effectiveness trial. *American Journal of Clinical Nutrition* 81, 864–870.

Collins, S., Dent, N., Binns, P., Bahwere, P., Sadler, K., Hallam, A. (2006). *Management of Severe Acute Malnutrition in Children. Lancet,* 368(9551), 1992–2000.

Collins, S. (2007). Treating Severe Acute Malnutrition Seriously. ArchDis Dis Child., 92(5), 453–61.

Collins, S. (2001). *Changing the way we address Severe Malnutrition during Famine. Lancet,* 358(9280), 498–501. http://dx.doi.org/10.1016/S0140-6736(01)05630-6

Collins, S., Sadler, K., Dent, N., Khara, T., Guerro, S., Myatt, M., Saboya, M., Walsh, S. (2006). *Key Issues in the Success of Community-Based Management of Severe Malnutrition*. *Food and Nutrition Bulletin,* 27 (3 suppl), S49–82.

Collins, S., Nicky, D., Binns, P., Bahwere, P., Saddler, K., Hallam, A. (2006). *Management of Severe Acute Malnutrition in Children. Lancet,* 368(9551), 1992–2000. http://dx.doi.org/10.1016/S0140-6736(06)69443-9

Collins, S., Briend, A. (2010). Editorial: Therapeutic Nutrition for Children with Severe Acute Malnutrition: Summary of African Experience. Indian Paediatrics (47).

Collins, S. (2004) Community-based Therapeutic Care. A new Paradigm for Selective Feeding in Nutritional Crisis. Humanitarian Practice Network Paper Number 48..

Collins, S., Sadler, K. (2002). *Outpatient Care for Severely Malnourished Children in Emergency Relief Programmes. A retrospective Cohort Study. Lancet,* 360(9348), 1824–30. http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(02)11770-3/abstract

de Onis, M., Yip, R. (1996). The WHO Growth Chart: Historical Considerations and Current Scientific Issues. Bibliotheca Nutritio et Dieta, 53, 74–89. http://www.who.int/childgrowth/publications/deonis_yip_1996/en/

de Onis, M., Onyango, AW., Borghi, E., Garza, C., Yang, H., WHO Multicenter Growth Reference Study Group. (2006). Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO International Growth Reference: Implications for Child Health Programmes. Public Health Nutrition, 9(7), 942–47. Diop, EHI., Dossou, NI., Ndour, MM., Briend, A., Wade, S. (2003). Comparison of the Efficacy of a Solid Ready-To-Use Food and a Liquid, Milk-Based Diet for the Rehabilitation of Severely Malnourished Children: A Randomized Trial. American Journal of Clinical Nutrition, 78(2), 302–307. http://ajcn.nutrition.org/content/78/2/302/F1.expansion.html

Dugdale, AE. (1971). An Age-Independent Anthropometric Index of Nutritional Status. American Journal of Clinical Nutrition, 24(2), 174–6. http://intl-ajcn.nutrition.org/content/24/2/174.abstract

Fergusson, P., Tomkins, A. (2009). HIV Prevalence and Mortality among Children Undergoing Treatment for Severe Acute Malnutrition in Sub-Saharan Africa: A Systematic Review and Meta- analysis. Transactions of the Royal Society of Tropical Medicine and Hygiene, 103(6), 541–8. http://trstmh.oxfordjournals.org/content/103/6/541.short

Golden, MHN. (1996) Severe Malnutrition. in: DJ Weatherall, JGG Ledington, DA Warrell (Eds.) The Oxford textbook of medicine. 3rd edn. Oxford University Press, Oxford; 1996: 1278–1296..

Golden, MHN. (1997). *Protein-Energy Interaction in the Management of Severe Malnutrition. Clinical Nutrition*, 16(suppl 1), 19–23. http://www.clinicalnutritionjournal.com/article/S0261-5614(97)80045-3/pdf

Gomez, F., Galvan, RR., Frenk, S., Munoz, JC., Chavez, R., Vazquez, J. (1956). *Mortality in Second and Third Degree Malnutrition. Journal of Tropical Pediatrics*, 2(2), 77–83.

Guerrero, S., Myatt, M., and Collins, S. (2009). Determinants of Coverage in Community-Based Therapeutic Care Programmes: Towards a Joint Quantitative and Qualitative Analysis. London: Blackwell.

Higgins, J., Alman, DG., Gotzsche, PC., Juni, P.,, Moher, D., Oxman, AD., Savovic, J., Schulz, KF., Weeks, L., Sterne, JAC.; Cochrane Methods Group. (2011). *The Cochrane Collaboration's Tool for Assessing Risk of Bias in Randomised Trials. BMJ*,343(5928). http://www.bmj.com/content/343/bmj.d5928.full.pdf+html

Higgins, JPT., Green, S. (editors) (2011). *Cochrane Handbook for Systematic Review of Interventions (2002 & 2008) and updated 2011. The Cochrane Collaboration*. Retrieved 10 February, 2016 from http://handbook.cochrane.org/Kerac, M., Bunin, J., Seal, A., Thindwa, M., Tomkins, A., Sadler, K., Bahwere, P., Collins, S. (2009). *Probiotics and Prebiotics for Severe Acute Malnutrition (PRONUT Study): A Double-Blind Efficacy Randomised Controlled Trial in Malawi. Lancet*, 374(9684), 136–44

Kim, SY., Park, JE., Lee, YJ., Seo, HJ., Sheen, SS., Hahn, S., Jang, BH., Son, HJ. (2013). Testing a Tool for Assessing the Risk of Bias For Nonrandomized Studies Showed Moderate Reliability and Promising Validity. Journal of Clinical Epidemiology, 66(4,408–14. http://dx.doi.org/10.1016/j.jclinepi.2012.09.016

Lenters, LM., Wazny, K., Webb, P., Ahmed, T., Bhutta, ZA. (2013). Treatment of Severe and Moderate Acute Malnutrition in Low- and Middle-Income Settings: A Systematic Review, Meta-Analysis and Delphi Process. BMC Public Health, 13(suppl 3), S23.

McDonald, CM., Olofin, I., Flaxman, S., Fawzi, WW., Spiegelman, D., Caulfield, LE., Black, RE., Ezzati, M., Danaei, G. (2013). The Effect of Multiple Anthropometric Deficits on Child Mortality: Meta-Analysis of Individual Data in 10 Prospective Studies from Developing Countries. American Journal of Clinical Nutrition, 97(4), 896–901. http://ajcn.nutrition.org/content/97/4/896?cited-by=yes&legid=ajcn;97/4/896

NCHS Growth Chart for Children from Birth to 18 Years. *Data from National Health Survey 1977, 11(165).* Retrieved from http://dtic.mil/dtic/tr/fulltext/u2/a433981.pdf

Ndekha, MJ., Manary, M., Ashorn, P., Briend, A. (2005) Home-Based Therapy with Ready-To-Use Therapeutic Food is of Benefit to Malnourished, HIV-Infected Malawian Children. Acta Paediatrica, 94(2),222–25.

Picot, J., Hartwell, D., Harris, P., Mendes, D., Clegg, AJ., Takeda, A. (2012). The Effectiveness of Interventions to Treat Severe Acute Malnutrition in Young Children: A Systematic Review. Health Technology Assessment. 16(19), 1–316.

Prudhon, C., Briend, A. et al. (2006). WHO, UNICEF and SCN Informal Consultation on Community-Based Management of Severe Acute Malnutrition in Children. SCN Nutrition Policy Paper 21, Food and Nutrition Bulletin, 27(3)http://www.who.int/nutrition/publications/severemalnutrition/FNB_0379_5721/en/

Rollins, N. (2009). Guidelines for an Integrated Approach to the Nutritional Care of HIV-Infected Children (6 Months–14 Years). Geneva: World Health Organization. Retrieved 16 February 2016, from http://www.who.int/nutrition/publications/hivaids/9789241597524/en/

Sandige, H., Ndekha, MJ., Briend, A., Ashorn P., Manary MJ. (2004). Home-Based Treatment of Malnourished Malawian Children with Locally Produced or Imported Ready-To-Use Food. Journal of Pediatric Gastroenterology and Nutrition, 39(2), 141–146. http://journals.lww.com/jpgn/Fulltext/2004/08000/Home_Based_Treatment_of_Malnourished_Malawian.3.aspx

Seal, A. and Kerac, M. (2007). Operational Implications of Using the 2006 World Health Organization Growth Standards in Nutrition Programmes: Secondary Data Analysis. BMJ, 334, 733. http://www.bmj.com/content/334/7596/733.full.pdf+html

Schooness, A., Lombard, M., Musekiwa, A., Nel, E., Volmink, J. (2013). Ready-To-Use Therapeutic Food for Home-Based Treatment of Severe Acute Malnutrition in Children from Six Months to Five Years of Age. Cochrane Database of Systematic Reviews. http://www.cochrane.org/CD009000/BEHAV_ready-to-use-therapeutic-food-as-home-based-treatment-for-severely-malnourished-children-between-six-months-and-five-years-old

Sphere Project. (2011). *Humanitarian Charter and Minimum standards in Emergency Response.* Retrieved 16 February, 2016, from https://www.ifrc.org/PageFiles/95530/The-Sphere-Project-Handbook-20111.pdf.

Stuart, HC., Stevenson, SS. (1959). Physical Growth and Development. pp.12–61. in Nelson, WE. (ed.) Textbook of Paediatrics. Philadelphia: Elsevier Saunders.

Thandi, P., Sanders, D., Chopra, M., Ashworth, A., Strasser, S., McCoy, D., Zulu, B., Matinise, N., Mdingazwe, N. (2001). Evaluating the Clinical Management of Severely Malnourished Children – A Study of Two Rural District Hospitals. s South African Medical Journal, 91(2), 137–41.

UNICEF. (2009). *Tracking Progress on Child and Maternal Nutrition: A Survival and Development Priority.* Retrieved 16 February, 2016, from http://www.unicef.org/publications/index_51656.html .

UNICEF. (2013) Improving Child Nutrition. The achievable imperative for global progress. New York, USA: UNICEF. April 2013. http://www.slideshare.net/OutreachUNICEF/improving-child-nutrition-the-achievable-imperative-for-global-progress.

UNICEF. (2014). *Preventing Moderate Acute Malnutrition (MAM) Through Nutrition Specific Intervention. CMAM Forum Technical Brief.* Retrieved 16 February, 2016, from http://www.cmamforum.org/Pool/Resources/Nutrition-specific-MAM-prevention-CMAM-Forum-Technical-Brief-Sept-2014-.pdf.

UNICEF. (1998). *The State of the World's Children 1998.* New York: UNICEF (Online). Retrieved 16 February, 2016, from http://www.unicef.org/sowc98/mainmenu.htm.

Valid International and Concern Worldwide. (2006). *Community-Based Therapeutic Care: A Field Manual.* Retrieved 11 February 2016, from http://www.validinternational.org/docs/CTC Field Manual.pdf

Waterlow, JC. (1976). Classification and Definition of Protein Energy Malnutrition in Beaton, GH. and Bengoa, HM. (eds.) Nutrition in Preventive Medicine. Monograph Series No. 62. Geneva: WHO.

Waterlow, JC. (1984). Kwashiorkor Revisited. The Pathogenesis of Oedema in Kwashiorkor and its Significance. Transactions of the Royal Society of Tropical Medicine and Hygiene, 78, 438–41.

Waterlow, JC. (1972). Classification and Definition of Protein-Calorie Malnutrition. BMJ, 3, 566–69.

WHO, UNICEF, WFP & UNSCN. (2007). Joint Statement on Community Based-Management of Severe Acute Malnutrition. Retrieved 16 February, 2016, http://www.who.int/nutrition/topics/statement_commbased_malnutrition/en/

WHO. (2006)– *Working together for health.* Geneva: WHO. Available at: http://www.who.int/whr/2006/whr06_en.pdf.

WHO. (1999). *Management of severe malnutrition: a manual for physicians and other health workers.* Geneva: WHO. Retrieved 16 February, 2016, from http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S1020-49891999000700020

WHO and UNICEF. (2009). *WHO Child Growth Standards and the Identification of Severe Acute Malnutrition in Infants and Children: A Joint Statement.* Retrieved 16 February, 2016, from http://www.who.int/nutrition/publications/severemalnutrition/9789241598163/en/.

WHO. (2013). *Guideline–Updates on the Management of Severe-Acute Malnutrition in Infants and Children*. Geneva: WHO. Retrieved 16 February, 2016, from http://www.who.int/nutrition/publications/severemalnutrition/9789241598163_eng.pdf

WHO. (2012). Technical Note: Supplementary Foods for the Management of Moderate Acute Malnutrition in Infants and Children 6–59 Months of Age, Geneva: WHO. Retrieved 16 February, 2016, from http://apps.who.int/iris/bitstream/10665/75836/1/9789241504423_eng.pdf

WHO. (2009). WHO Child Growth Standards and the Identification of Severe Acute Malnutrition in Infants and Children: A WHO and UNICEF Joint Statement. Geneva: WHO. Retrieved 16 February, 2016, from http://www.who.int/nutrition/publications/severemalnutrition/9789241598163/en/

WHO, UNICEF, WFP and UNHCR (2010). Consultation on the Programmatic Aspects of the Management of Moderate Acute Malnutrition in Children Under Five Years of Age. Food and Nutrition Bulletin, 30(suppl 3). http://www.who.int/nutrition/topics/moderatemalnutrition_consultation_programmaticaspects_MM_report.pdf

WHO. (2000). The Management of Nutrition in Major Emergencies. Geneva: WHO. Retrieved 16 February, 2016, from http://www.who.int/nutrition/publications/emergencies/9241545208/en/

8. APPENDICES

APPENDIX 1. TITLE AND ABSTRACT SCREENING GUIDE FOR PEER REVIEW STUDIES[1]

#	Key guiding questions	Decision/action
1	Is this an intervention study?	Yes – include No – exclude Uncertain
2	If yes, was the intervention delivered in an emergency context?	Yes – include No – exclude Uncertain
3	Did the intervention target children under five?	Yes – include No – exclude Uncertain
4	Was the intervention delivered to treat/manage MAM or SAM?	Yes – include No – exclude Uncertain
6	Was the intervention delivered in a developing/low-middle income country?	Yes – include No – exclude Uncertain

Decision: obtain full text – Yes/ No

Decision comments

1 Only the titles of grey and unpublished reports were screened to determine eligibility and relevance

APPENDIX 2. FULL-TEXT SCREENING GUIDE

#	Key guiding questions	Decision/action
1	Has the target population met the definition of MAM and SAM as defined by WHO (2006) and NCHS (1977)?	Yes – include No – exclude Can't tell
2	Did the study state that the intervention was an outpatient and/ or inpatient therapeutic care for MAM or SAM?	Yes – include No – exclude Can't tell
3	Were any of the following therapeutic foods used to treat the children: F-100/F-75 or F-100/RUTF during stabilization phase (inpatient care) and RUTF during rehabilitation phase (outpatient care)?	Yes – include No – exclude Can't tell
4	Did the study use an appropriate study design e.g. RCT, controlled comparative, cohort (prospective/retrospective) and longitudinal before and after design (quantitative studies), semi-structured or unstructured interviews or participant/non participant observation (qualitative studies)?	Yes – include No – exclude Can't tell
5	Are the key outcomes of interest reported (recovery rate, default rate, relapse rate, mortality risk, repeated absence, repeated default and relapsed, reasons for relapse and/or default)?	Yes – include No – exclude Can't tell
6	Was the study published before 1980?	Yes – include No – exclude Can't tell

APPENDIX 3. QUANTITATIVE DATA EXTRACTION FORM: KEY INFORMATION

#	Quantitative information/data
1	First author
2	Country of study
3	Type of humanitarian emergency (Conflict, famine, flooding, mixed disasters)
4	Country and year of study
5	Year of publication
6	Publication source
8	Study design
9	Study methods ● Participants ● Recruitment ● Study sample ● Data collection ● Data analysis
11	Outcome measures ● Recovery rate ● Defaults rate/repeated episodes/repeated absence e.g. more than twice (or as defined by authors) ● Relapse rate/returned defaults (or as defined by authors) ● Mortality rate
12	Quality grading
13	Study limitations
14	Conclusions/remarks

APPENDIX 4. QUALITATIVE DATA EXTRACTION FORM: KEY INFORMATION

#	**Qualitative information/data**
1	First author
2	Country of study
3	Type of humanitarian emergency (Conflict, Famine, flooding, mixed disasters)
4	Year of study
5	Year of publication
6	Publication source
7	Study design
8	Study methods ● Participants ● Recruitment ● Study sample ● Data collection ● Data analysis
11	Programme delivery strategy/mechanisms
12	Outcomes of interest ● Reasons for programme uptake ● Reasons for defaults ● Reasons for relapse
13	Quality grading
14	Study Limitation
15	Conclusion/remarks

APPENDIX 5. QUALITY CHECKLIST: RANDOMISED CONTROL TRIAL STUDIES

#	Checklist – question	Responses (Yes =1, No =2, Can't tell=3)
1	Did the trial address a clearly focused issue?	
2	Was the assignment of patients to treatments randomized?	
3	Were patients, health workers and study blinded?	
4	Were the groups similar at the start of the trial?	
5	Aside from the experimental intervention, were the groups treated equally?	
6	Were all of the patients who entered the trial properly accounted for at its conclusion?	
7	How significant was the treatment effect?	
8	How precise was the estimate of the treatment effect?	
9	Can the results be applied? In your context? (Or to the local population?)	
10	Were all clinically important outcomes considered?	
11	Are the benefits worth the harms and costs?	

APPENDIX 6. QUALITY EVALUATION CHECKLIST: NON-RANDOMISED CONTROL TRIAL STUDIES

#	Checklist – question	Responses (Yes =1, No =2, Can't tell=3)
1	Did the study address a clearly focused issue?	
2	Was the cohort recruited in an acceptable way?	
3	Was the exposure accurately measured to minimise bias?	
4	Was the outcome accurately measured to minimise bias?	
5	Have the authors identified all important confounding factors?	
6	Have they taken into account of the confounding factors in the design and/or analysis?	
7	Was the follow-up of subjects complete enough?	
8	Was the follow-up of subjects long enough	
9	What are the results of this study?	
10	How precise are the results?	
11	Do you believe the results?	
12	Can the results be applied to the local population?	
13	Do the results of this study fit with other available evidence?	
14	What are the implications of this study for practice?	

APPENDIX 7. QUALITY EVALUATION CHECKLIST: QUALITATIVE STUDIES

#	Checklist – question	Responses (Yes =1, No =2, Can't tell=3)
1	Was there a clear statement of the aims?	
2	Is a qualitative methodology appropriate?	
3	Was the research design appropriate to address the aim of the research?	
4	Was the recruitment strategy appropriate to the aim of the research?	
5	Was the data collected in a way that addressed the research issue?	
6	Has the relationship between researcher and participants been adequately considered?	
7	Have ethical issues been taken into consideration?	
8	Was the data analysis sufficiently rigorous?	
9	Is there a clear statement of findings?	
10	How valuable is the research?	

APPENDIX 8. QUALITY EVALUATION CHECKLIST: SYSTEMATIC REVIEWS

#	Checklist – question	Responses (Yes =1, No =2, Can't tell=3)
1	Did the review address a clearly focused question?	
2	Did the authors look for the right type of papers?	
3	Do you think all the important, relevant studies were included?	
4	Did the review authors do enough to assess quality of the included studies?	
5	If the results of the review have been combined, was it reasonable to do so?	
6	What are the overall results of the review?	
7	How precise are the results?	
8	Can the results be applied to the local population? Were all important outcomes considered?	
9	Are the benefits worth the harm and cost?	

APPENDIX 9. ASSESSMENT OF RISK OF BIAS OF RANDOMISED AND NON-RANDOMISED CONTROLLED STUDIES

RCTS	Details	Non RCTs	Details
Selection bias	-	Selection bias	-
Confounding	-	Confounding	-
Attrition bias	-	Attrition bias	-
Selective reporting bias	-	Selective reporting bias	-
Publication bias	-	Publication bias	-

APPENDIX 10. INITIAL SEARCH STRATEGY /OUTPUTS OF MEDLINE SCOPING SEARCH

Database: Ovid MEDLINE(R) in-process and other non-indexed citations and Ovid MEDLINE(R) <1946 to Present>

Search strategy:

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1. (malnourish$ or undernourish$ or malnutrition or undernutrition or kwashiorkor or marasmus).ti,ab. (39065)
2. Malnutrition/ (7780)
3. exp Protein-Energy Malnutrition/ (8495)
4. 1 or 2 or 3 (44198)
5. child, preschool/ or infant/ (1023482)
6. (child$ or baby or babies or infant$).ti,ab. (1300841)
7. 5 or 6 (1772685)
8. (humanitarian$ or conflict$ or famine$ or disaster$ or emergency relief or sub-saharan africa or south-east asia or latin america$).ti,ab. (130391)
9. Relief Work/ or Disaster Planning/ or starvation/ (22503)
10. 8 or 9 (146588)
11. child nutrition disorders/ (2457)
12. 10 and 11 (122)
13. 4 and 7 (16526)
14. 14 10 and 13 (813)
15. 15 12 or 14 (851

APPENDIX 11. LIST OF ORGANISATIONS AND CONTACTS FOR GREY LITERATURE

Organization	Email	Country	Primary or Alternative
Action Against Hunger UK	j.alvarez@actionagainsthunger.org.uk	UK	Primary
Action Against Hunger UK	s.guerrero@actionagainsthunger.org.uk	UK	Secondary
Action Contre la Faim (ACF)	nut@urgence.missions-acf.org	France	Secondary
Action Contre la Faim (ACF)	adisrael@actioncontrelafaim.org	France	Primary
Action Contre la Faim (ACF)	rlo@actioncontrelafaim.org	France	Alternative
Action Contre la Faim (ACF)	ysf@actioncontrelafaim.org	France	Alternative
Action Contre la Faim (ACF) Canada SMART	vsauveplane@actioncontrelafaim.ca	Canada	Secondary
Action Contre la Faim (ACF) Canada SMART	ptenaglia@actioncontrelafaim.ca	Canada	Primary
CARE	mary@nutritionpolicypractice.org	UK	Primary
CARE	jorgle@care.org	USA	Secondary
Centers for Disease Control and Prevention (CDC)	obilukha1@cdc.gov	USA	Secondary
Centers for Disease Control and Prevention (CDC)	ltalley@cdc.gov	USA	Primary
Centre for Research on the Epidemiology of Disasters (CRED)	chiara.altare@uclouvain.be	Belgium	Primary
Centre for Research on the Epidemiology of Disasters (CRED)	ghizlane.menebhi@uclouvain.be	Belgium	Secondary
CMAM Forum	rebecca@cmamforum.org	UK	Primary
CMAM Forum	nicky@cmamforum.org	France	Primary
Concern Worldwide	kate.culver@concern.net		Alternative
Concern Worldwide	sonya.kibler@concern.net		Alternative
Concern Worldwide	gudrun.stallkamp@concern.net	Ireland	Alternative
Concern Worldwide	ros.tamming@concern.net	Ireland	Alternative
Concern Worldwide	kate.golden@concern.net	Ireland	Secondary
Department for International Development (DFID)	a-perry@dfid.gov.uk	UK	Primary
DG ECHO	Catherine.Chazaly@ec.europa.eu	USA	Primary

Organization	Email	Country	Primary or Alternative
DG ECHO	marie-sophie.whitney@echofiled.eu	Senegal	Primary
Emergency Nutrition Network (ENN)	thom@ennonline.net	UK	Alternative
Emergency Nutrition Network (ENN)	cmadolan@aol.com	UK	Primary
Emergency Nutrition Network (ENN)	marie@ennonline.net/marie.mcgrath@gmail.com	UK	Secondary
Emergency Nutrition Network (ENN)	jshoham@easynet.co.uk	UK	Alternative
Food and Agriculture Organization (FAO)	charlotte.dufour@fao.org	Italy	Primary
Food and Agriculture Organization (FAO)	BibiG@nepad.org	Italy	Secondary
Food and Agriculture Organization (FAO)	Domitille.Kauffmann@fao.org	Italy	Alternative
Food and Agriculture Organization (FAO)	brian.thompson@fao.org	Italy	Alternative
Food and Nutrition Technical Assistance (FANTA)	gbergeron@fhi360.org	USA	Secondary
Food and Nutrition Technical Assistance (FANTA)	TLloren@fhi360.org	USA	Primary
Global Alliance for Improved Nutrition (GAIN)	ggarrett@gainhealth.org	Switzerland	Primary
Global Alliance for Improved Nutrition (GAIN)	cmanus@gainhealth.org	UK	Alternative
Global Alliance for Improved Nutrition (GAIN)	dmorgan@gainhealth.org	UK	Secondary
GOAL	hbarthorp@goal.ie	Ireland	Primary
GOAL	oserrano@goal.ie	UK	
Helen Keller International (HKI)	idiop@hki.org	USA	Primary
Helen Keller International (HKI)	jnielsen@hki.org	USA	Secondary
HelpAge International	pfritsch@helpage.org	UK	Primary
HelpAge International	mskinner@helpage.org	UK	Secondary
Independent	mijaververs@hotmail.com	Switzerland	Primary
International Committee of the Red Cross (ICRC)	vcaptier@icrc.org	Switzerland	Primary
International Committee of the Red Cross (ICRC)	mducemarques@icrc.org	Switzerland	Secondary
International Federation of Red Cross and Red Crescent Societies (IFRC)	kiflemariam.amdemariam@ifrc.org	Switzerland	Alternative
International Federation of Red Cross and Red Crescent Societies (IFRC)	nathalie.bonvin@ifrc.org	Switzerland	Primary

Organization	Email	Country	Primary or Alternative
International Federation of Red Cross and Red Crescent Societies (IFRC)	yvonne.klynman@ifrc.org	Switzerland	Alternative
International Federation of Red Cross and Red Crescent Societies (IFRC)	amanda.mcclelland@ifrc.org	Switzerland	Secondary
International Federation of Red Cross and Red Crescent Societies (IFRC)	hilary.motsiri@ifrc.org	Switzerland	Alternative
International Medical Corps (IMC)	cabla@internationalmedicalcorps.org	USA	Primary
International Medical Corps (IMC)	gomondi@unicef.org	Kenya	GNC RRT
International Medical Corps (IMC)	ibollemeijer@internationalmedicalcorps.org	USA	Alternative
International Medical Corps (IMC)	ebusquet@internationalmedicalcorps.org		Alternative
International Medical Corps (IMC)	arutishauser-perera@internationalmedicalcorps.org	USA	Secondary
International Orthodox Christian Charities (IOCC)	fasfahani@iocc.org		Alternative
International Orthodox Christian Charities (IOCC)	pderjany@iocc.org		Alternative
International Orthodox Christian Charities (IOCC)	sdunlap@iocc.org		Alternative
International Orthodox Christian Charities (IOCC)	dousta@iocc.org		Alternative
International Orthodox Christian Charities (IOCC)	lberbari@iocc.org	Lebanon	Primary
International Orthodox Christian Charities (IOCC)	yzamamiri@iocc.org		Alternative
International Rescue Committee (IRC)	jeanette.bailey@rescue.org	USA	Secondary
International Rescue Committee (IRC)	lara.ho@rescue.org	Switzerland	Alternative
International Rescue Committee (IRC)	casie.tesfai@rescue.org	USA	Primary
Médecins Sans Frontières (MSF)	nathalie.avril@geneva.msf.org	Switzerland	Primary
Médecins Sans Frontières (MSF)	kevin.phelan@newyork.msf.org	France	Secondary
Merlin (Merlin will merge with SC UK in Q3)	andi.kendle@merlin.org.uk	Switzerland	Primary
Micronutrient Initiative (MI)	kharding@micronutrient.org	Canada	Primary
Nutrition Works	paulreesthomas@googlemail.com	UK	Primary
OFDA/USAID	boyderin24@gmail.com eboy@usaid.gov	USA	Secondary
OFDA/USAID	bdancheck@usaid.gov	USA	Alternative
OFDA/USAID	pmorris@usaid.gov	Switzerland	Alternative

Organization	Email	Country	Primary or Alternative
OFDA/USAID	mphelan@us.goal.ie	USA	Primary
OFDA/USAID	swalia@usaid.gov	USA	Alternative
Plan International	suzanne.brinkmann@plan-international.org	UK	Primary
Plan International	killen.otieno@plan-international.org	UK	Secondary
Samaritan's Purse	gbabu@samaritan.org	USA	Secondary
Samaritan's Purse	jtanaka@samaritan.org	USA	Primary
Save the Children UK	a.donnelly@savethechildren.org.uk	UK	Alternative
Save the Children UK	g.lecuziat@savethechildren.org.uk	UK	Secondary
Save the Children UK	C.Prudhon@savethechildren.org.uk	UK	
Save the Children UK	s.fuller@savethechildren.org.uk	UK	Alternative
Save the Children UK	e.keane@savethechildren.org.uk	UK	Alternative
Save the Children UK (maternity leave 02.2014)	a.maclaine@savethechildren.org.uk	UK	Alternative
Save the Children USA	sbutler@savechildren.org	USA	Primary
Save the Children USA	nconnell@savechildren.org	USA	Secondary
Standing Committee on Nutrition (SCN)	scn@who.int	Switzerland	Secondary
Standing Committee on Nutrition (SCN)	wustefeldm@who.int	Switzerland	Primary
The Earth Institute Columbia University	jfanzo@gmail.com	RDC	Primary
UCL Institute for Global Health	a.seal@ucl.ac.uk	UK	Primary
UNHCR	andresen@unhcr.org	Switzerland	Secondary
UNHCR	oman@unhcr.org	Switzerland	Primary
UNHCR	wilkinso@unhcr.org	Switzerland	Primary
UNICEF	mfbourgeois@unicef.org	Belgium	Alternative
UNICEF	lmatunga@unicef.org	Somalia	Primary
UNICEF	gmmoloney@unicef.org	Kenya	Primary
UNICEF USA	diane.holland@unicef.org	USA	Primary
UNICEF USA	drio@unicef.org	USA	Secondary
UNICEF/GNC-CT	jippe@unicef.org	Switzerland	Primary
UNICEF/GNC-CT	asaparbekov@unicef.org	Switzerland	Primary
Université Catholique de Louvain	hedwig.deconinck@gmail.com	Belgium	IM/KM TF

Organization	Email	Country	Primary or Alternative
Valid International	kate@validinternational.org	UK	Secondary
Valid International	anne@validinternational.org	UK	Primary
World Food Programme (WFP)	lynnda.kiess@wfp.org	Italy	Primary
World Food Programme (WFP)	kathryn.ogden@wfp.org	Italy	Primary
World Food Programme (WFP)	allison.oman@wfp.org	Kenya	Alternative
World Food Programme (WFP)	britta.schumacher@wpf.org	Italy	Alternative
World Health Organization (WHO)	bloessneerm@who.int	Switzerland	Secondary
World Health Organization (WHO)	weiseprinzoz@who.int	Switzerland	Primary
World Vision (maternity leave 02.2014)	sarah_carr@worldvision.ca	Canada	Alternative
World Vision (maternity leave 02.2014)	colleen_emary@worldvision.ca	Canada	Alternative
World Vision International (WVI)	diane_baik@worlvision.ca	Canada	Alternative
World Vision International (WVI)	antony_peter@worldvision.ca	Canada	Primary
World Vision International (WVI)	mesfin_teklu@wvi.org	Switzerland	Primary

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