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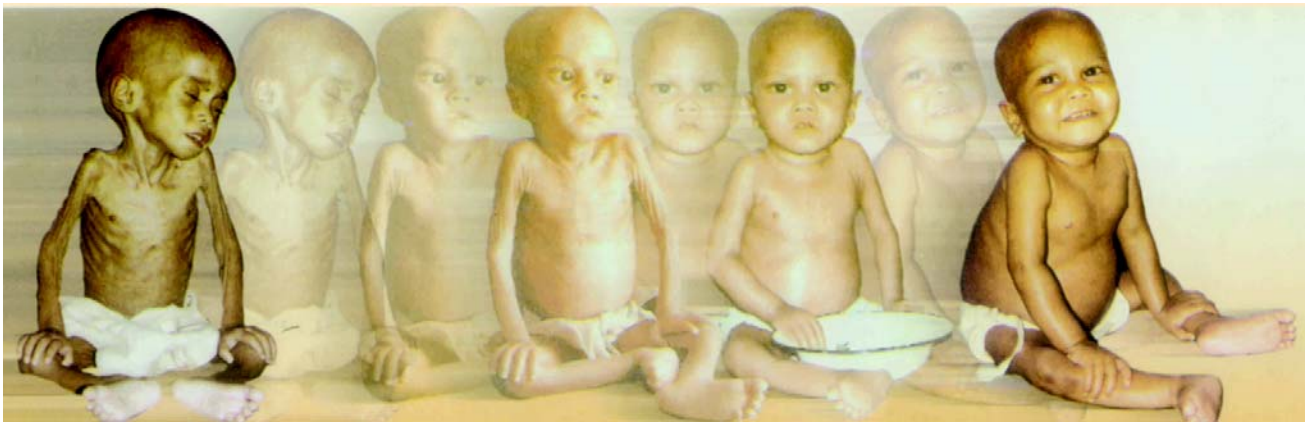
REPUBLIC OF SOUTH AFRICA

INTEGRATED MANAGEMENT OF CHILDREN WITH ACUTE MALNUTRITION IN SOUTH AFRICA



OPERATIONAL GUIDELINES
2015

INTEGRATED MANAGEMENT OF CHILDREN WITH ACUTE MALNUTRITION IN SOUTH AFRICA: OPERATIONAL GUIDELINES

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REDUCING MATERNAL AND CHILD MORTALITY THROUGH STRENGTHENING PRIMARY HEALTH CARE

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INTEGRATED MANAGEMENT OF CHILDREN WITH ACUTE MALNUTRITION IN SOUTH AFRICA: OPERATIONAL GUIDELINES

STANDARD TREATMENT GUIDELINES FOR SOUTH AFRICAN HOSPITALS AND PRIMARY HEALTH CARE FACILITIES

2015 EDITION

FOREWORD

'There can be no keener revelation of a society's soul than the way in which it treats its children.'

Tata Nelson R Mandela

The health and wellbeing of our children are among our highest priorities. We need policies and actions that meet the priorities, in order to ensure children are saved from preventable death as a result of moderate and severe acute malnutrition. The World Health Organization (WHO) published the first guidelines to prevent severe malnutrition in 2000. The community of Mount Frere in the Eastern Cape was one of the pilot sites used to inform these WHO guidelines. Considerable evidence has since been accumulated with the latest WHO recommendation released in November 2013. These guidelines have been adapted from the WHO recommendations into the local South African context and incorporated all the recent evidence.

The integrated management of acute malnutrition, and especially the management of severe acute malnutrition, is one of the key evidence-based nutrition interventions identified in the 2008 *Lancet* series on Maternal and Child Undernutrition. Scaling up the implementation of management of severe acute malnutrition in healthcare facilities using the WHO guidelines can reduce case-fatalities related to this condition by 55%. Attention to the continuum of maternal and child undernutrition is essential to attainment of Millennium Development Goal of reducing child mortality and must be prioritised. Among other interventions are breastfeeding, complementary feeding and vitamin A supplementation. Such interventions are incorporated in these guidelines for therapeutic treatment and further prevention of acute malnutrition.

We are grateful to everyone who actively participated in the formulation and adaptation process of these guidelines by submission of comments and appropriate evidence. This has been made possible by various stakeholders with different technical expertise in the area of child health and nutrition. We acknowledge the technical support that has been provided by our partners in the development of these guidelines. For this, I thank you.

We call upon all stakeholders to implement these guidelines in order to contribute towards achieving the goal of reducing child mortality and promoting a long and healthy life for our citizens, especially our children.

Dr A Motsoaledi, MP

Minister of Health

Date:

ACKNOWLEDGEMENTS

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We recognise Dr Gerald Boon from the Eastern Cape, for the draft template and inputs contributed as part of the Essential Drugs List (EDL) committee, and the entire EDL team. We further acknowledge international experts Prof Ann Ashworth Hill and Prof Allan Jackson for their valuable contributions in developing these guidelines. These guidelines are largely constructed from the WHO scientific recommendations and globally recognised best practices.

Recognition goes to Ms Lynn Moeng-Mahlangu for her guidance, and Ms Andiswa Ngqaka, who contributed and coordinated the compilation of these guidelines. All provincial nutrition managers are acknowledged for their inputs and best practices shared towards the finalisation of these guidelines.

Ms MP Matsoso

Director-General: Health

Date:

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
CCG	Community Caregivers
CHW	Community Health Worker
CMV	Complex for Minerals and Vitamins
CVP	Central Venous Pressure
CXR	Chest X-ray
DHIS	District Health Information System
EBF	Exclusive Breastfeeding
FBDG	Food Based Dietary Guidelines
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IMCI	Integrated Management of Childhood Illness
IV	Intravenous Therapy
IYCF	Infant and Young Child Feeding
MAM	Moderate Acute Malnutrition
MDGs	Millennium Development Goals
MTCT	Mother-to-Child Transmission
MUAC	Mid-Upper Arm Circumference
NIDS	National Indicators Data Sets
NFCS	National Food Consumption Survey
ORS	Oral Rehydration Solution
OTP	Outpatient Therapeutic Programme
OSP	Outpatient Supplementation Programme
PCP	Pneumocystis carinii pneumonia
PEPFAR	Unites States President's Emergency Plan for AIDS Relief
PHC	Primary Health Care
PIP	Problem Identification Programme
RtHB	Road to Health Booklet
RUSF	Ready-to-Use Supplementary Food
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SANHANES	South African National Health and Nutrition Examination Survey
SD	Standard Deviation
SFP	Supplementary Feeding Programme
TB	Tuberculosis
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAD	Vitamin A Deficiency
WHZ	Weight for Height z score
WAZ	Weight for Length z score
WBOT	Ward-based Outreach Team
WHO	World Health Organization

DEFINITIONS

Acute malnutrition: Also known as 'wasting', acute malnutrition is characterized by a rapid deterioration in nutritional status over a short period of time. In children, it can be measured using the weight-for-height nutritional index or mid-upper arm circumference. There are different levels of severity of acute malnutrition: moderate acute malnutrition (MAM) and severe acute malnutrition (SAM).

Ambulatory management of SAM: This is outpatient care for treatment and management of severe acute malnutrition that connects treatment in the health facility, but does not require admission to the health facility. Treatment is carried out while patients remain at home, and involves intermittent health facility visits and/or community outreach.

Community-based management of acute malnutrition (CMAM): Sometimes also referred to as **Integrated Management of Acute Malnutrition (IMAM)**. This approach aims to maximize coverage and access of the population to treatment of severe acute malnutrition by providing timely detection and treatment of acute malnutrition through community outreach and outpatient services, with inpatient care reserved for more critical cases. IMAM includes: inpatient care for children with SAM with medical complications and infants under 6 months of age with visible signs of SAM; outpatient care for children with SAM without medical complications; and community outreach for early case detection and treatment.

Complementary feeding: The use of age-appropriate, adequate and safe solid or semi-solid food in addition to breastmilk or a breastmilk substitute. The process starts when breastmilk or infant formula alone is no longer sufficient to meet the nutritional requirements of an infant. The target range for complementary feeding is generally considered to be 6–23 months. It is not recommended to provide any solid, semi-solid or soft foods, or liquids other than breastmilk to children less than 6 months of age.

Exclusive breastfeeding: An infant receives only breastmilk and no other liquids or solids, not even water, with the exception of oral rehydration salts (ORS) or drops or syrups consisting of vitamins, mineral supplements or medicines. Exclusive breastfeeding is recommended for infants aged 0-6 months.

In-patient management of SAM: Care which requires patients to be admitted to a health facility. Patients with severe acute malnutrition with medical complications (metabolic disturbances) are treated in inpatient care before continuing treatment in outpatient care.

Malnutrition: A broad term commonly used as an alternative to 'undernutrition', but which technically also refers to over-nutrition. People are malnourished if their diet does not provide adequate nutrients for growth and maintenance or if they are unable to fully utilize the food they eat due to illness (undernutrition). They are also malnourished if they consume too many calories (over-nutrition).

Moderate Acute Malnutrition (MAM): Moderate acute malnutrition (MAM) is defined as a weight-for-height between -3 and -2 z-scores below the median of the WHO child growth standards, or MUAC between 11.5 and 12.4 cm.

Nutrition Supplementation Programme (NSP) for underweight children: According to the NSP**,** all children who are at risk of being underweight (they are growth faltering) and those that are underweight (WAZ<-2SD) are entered into a nutrition supplementation programme (NSP, named differently in various provinces). NSP offers cereal based products or drinks in order to supplement children's home diet.

Oedema (nutritional): Bilateral symmetrical pitting oedema (fluid retention on both sides of the body), caused by increased fluid retention in extracellular spaces, is a clinical sign of severe acute malnutrition. There are different clinical grades of oedema: mild, moderate and severe.

Outpatient management of SAM or SAM ambulatory cases: This is treatment and management of severe acute malnutrition without medical complication or oedema in the outpatient care setting; and the case does not require admission to hospital inpatient facility. Medical and dietary treatment is carried out using strict outpatient treatment guidelines while patients remain at home, and involves intermittent health facility visits and/or community outreach.

Outpatient Therapeutic Programme (OTP): This treatment is *aimed* at providing treatment for children 6-59 months with severe acute malnutrition (SAM) who have an appetite (pass RUTF appetite test); without medical complications; and no oedema.

Ready to Use Therapeutic Food (RUTF): Specialized ready-to-eat, shelf-stable products, available as pastes, spreads or biscuits that are used in a prescribed manner to treat children with severe acute malnutrition.

Ready to Use Supplementary Food (RUSF): Specialized ready-to-eat, shelf-stable products, available as pastes, spreads or biscuits that meet the supplementary nutrient needs of those who have moderate acute malnutrition.

Recovering SAM cases: These are children who have recovered from SAM with medical complications and who have been discharged from inpatient care but are still anthropometrically severely malnourished, i.e. WHZ <-3SD or MUAC <11.5cm, no oedema. These children are transferred to outpatient care to continue treatment from home. Care can be provided, depending on setup, either at local primary health care clinic or Hospital outpatient department, preferably closer to the patient's home.

Rehabilitation phase: The third phase of treatment for complicated severe acute malnutrition or initial treatment for severe acute malnutrition with medical complications. It aims to promote rapid weight gain through regular feeds of high-nutrient and energy dense foods and is ideally implemented as outpatient treatment.

Severe acute malnutrition (SAM) is defined as *any one* of the following:

- Weight-for-height or –length below -3 standard deviations (SD)/ z-score <-3
- Mid-upper arm circumference (MUAC) of less than 11.5cm in children aged 6–60months (circumference of child's left upper arm)
- The presence of bilateral pitting pedal oedema.

Severe acute malnutrition incidence rate in children under five (DHIS): The number of new cases of severe acute malnourished children detected per 1 000 population of children under five. This measure is more accurately referred to as new case detection rates.

Severe acute malnutrition facility case fatality rate for children under five years (DHIS): The proportion of children under five years admitted and died due to severe acute malnutrition. This is an inpatient care facility performance indicator.

Severe acute malnutrition admissions (DHIS): The number of children admitted at a health facility meeting the severe acute malnutrition case definition (*see* severe acute malnutrition facility case fatality rate for children under five years).

Severe acute malnutrition ambulatory: The number of children meeting the severe acute malnutrition case definition who are not admitted at a health facility but managed on an ambulatory basis. These are SAM cases without oedema, no medical complications, with good appetite (passes the appetite test) and have a reliable caregiver to look after the child at home (mother, community caregiver and easy access to facility-based care).

Severe acute malnutrition with medical complications: these are children with oedema or poor appetite (fail the RUTF appetite test) or present with one or more general danger signs or medical conditions (listed on appendix 3) who require admission and treated as inpatients. Children under 6 months with SAM are regarded as SAM with medical complications and will require admission to inpatient care.

Severe acute malnutrition without medical complications: these are SAM children who do not have medical complications, have an appetite (pass the RUTF appetite test) and are clinically well and alert. They should be treated as outpatient for uncomplicated severe acute malnutrition.

Stabilisation phase: The initial phase of inpatient treatment for complicated severe acute malnutrition. It is intended to stabilise and readjust the patient's metabolism through the use of special foods (F-75) and medical treatment and allows for close monitoring of the patient and for urgent management if complications develop. It is also known as 'Phase I' or the 'initiation phase'.

Supplementary feeding programme (SFP): Sometime referred to as **Outpatient Supplementary Feeding Programme (OSP)**. There are two types of supplementary feeding programmes. Blanket supplementary feeding programmes aim to provide food supplement to all members of a specified at-risk group, regardless of whether they have moderate acute malnutrition or not. Targeted supplementary feeding programmes provide nutritional support targeted at individuals with moderate acute malnutrition.

To be effective, targeted supplementary feeding programmes should always be implemented when there is sufficient food supply or an adequate general food intake for the general population, while blanket supplementary feeding programmes are often implemented when general food distribution for the household has yet to be established or is inadequate for the level of food security in the population. The supplementary food is meant to be additional to, and not a substitute for, the general food intake.

Therapeutic feeding programme: A programme that treats severe acute malnutrition without medical complications, depending on setup, either at local primary health care clinic or Hospital outpatient department, preferably closer to the patient's home.

Transition phase: Second phase of inpatient treatment for severe acute malnutrition with medical complications. It is intended to adapt progressively to the large amounts of food and nutrients that will be offered in the rehabilitation phase (outpatient or inpatient), and to monitor the patient.

Undernutrition: An insufficient intake and/or inadequate absorption of energy, protein or micronutrients that in turn leads to nutritional deficiency.

Wasting: Anthropometrically defined as below minus 2 standard deviations from median weight-for-height (-length) of a reference population, or MUAC less than 12.5cm. Severe wasting is defined as weight-for-height less than -3 SD, or MUAC less than 11.5cm. Also see "acute malnutrition".

I. BACKGROUND

THE PROBLEM

Childhood undernutrition is a major global health problem and is the underlying cause of 35% of deaths among children under five years of age in the developing world. It further contributes to childhood morbidity, mortality, impaired intellectual development, suboptimal adult work capacity and increased risk of diseases in adulthood. According to the 2008 Lancet series on Maternal and Child Undernutrition, severe acute malnutrition (SAM) is one of the most important contributing causes of childhood mortality. An estimated 19 million children under five globally suffer from SAM, with half a million dying directly because of SAM each year.

Undernutrition also has a lasting effect on its survivors, reducing their income potential by leaving them less able to learn or perform physical labour and trapping them in a generational cycle of poverty. Undernutrition is responsible for 11% of disability-adjusted life-years among young children worldwide. Severe wasting during the first 24 months of life leads to a loss of up to 18 points from an individual's expected intelligence quotient (IQ) score. The negative impact of under-nutrition on the physical and mental potential of the population diminishes national productivity, costing countries as much as 3% of their gross domestic product.

The international aid community has traditionally considered high rates of acute malnutrition the result of crises such as drought and conflict rather than a chronic problem with developmental causes. As a public health concern, acute malnutrition has therefore mainly been the target of stand-alone, emergency nutrition interventions. While humanitarian emergencies do cause widespread undernutrition, in reality the majority of acutely malnourished children live in stable countries not currently experiencing a crisis. They are undernourished because of complex behavioural and environmental factors, rather than a temporary loss of access to food due to an emergency. Addressing the majority of the global burden of undernutrition requires that nutrition programmes be integrated into health systems in sustainable ways.

In 2000, United Nations (UN) member states adopted the Millennium Declaration, committing themselves to reducing poverty and improving the lives of the world's poorest citizens by 2015.A series of eight goals, known as the Millennium Development Goals (MDGs), lays out an action plan to reduce poverty, disease and hunger worldwide. MDG 1 aims to eradicate extreme poverty and hunger by 2015. MDG 4 aims to reduce child mortality by two-thirds by 2015. The achievement of these goals is threatened by global food price increases, inadequate mother and child feeding and care practices, civil strife and environmental disasters. Investment by the international community and national governments in evidence-based, high-impact nutrition interventions to prevent and treat acute malnutrition are therefore critical.

South Africa is in a nutrition transition in which undernutrition, notably stunting and micronutrient deficiencies, coexist with a rising incidence of overweight and obesity. The 2005 National Food Consumption Survey (NFCS) found that 18% of children were stunted, compared to a 21.6% prevalence in the 1999 survey. There is an increase in the prevalence of stunting, according to the South African National Health and Nutrition Examination Survey (SANHANES) (2012), which is 26.8%. About 9.3% of children were underweight, which was a reduction from 11% in children aged one to three years. Anaemia affects 27.9% of children, and 29.4% of women between 15 and 49 years of age. The 2005 survey also estimated that 63.6% of children, and 27.7% of women, had vitamin A deficiency. Zinc deficiency in children was 45.3%. At the national level, 51.6% of households experienced hunger, approximately 28.2% were at risk of hunger and 20.2% appeared to be food-insecure in 2005, according to the NFCS. According to SANHANES (2012), while there has been a decrease in households experiencing hunger, to 26%, the risk of hunger has remained the same, at 28.3%, and food insecurity has increased to 45.6%.

According to the *Saving Children* report (2005, 2009), over 60% of hospitalised children who died in South Africa were underweight and more than half of these had severe malnutrition. The high mortality is related to the high rate of children exposed to or infected with to HIV infection. Many severely malnourished children die at home, but even when hospital care is provided, case fatality rates may be high. Appropriate case management in health facilities, community referral systems and follow-up care following discharge could save the lives of many children and dramatically lower case fatality rates.

RATIONALE FOR THE GUIDELINES

In the absence of a standard protocol, mortality in children admitted to hospital with SAM ranges between 20 and 30% with the highest levels (50–60%) among those with oedematous malnutrition. With modern treatment regimens and improved access to treatment, case-fatality rates can be reduced to less than 5%, both in community and facilities. In South Africa, the approach to managing severe malnutrition was different across the country, with various provinces using different guidelines, frameworks and protocols, except in the Eastern Cape, KwaZulu-Natal, North West and Limpopo, which were implementing the WHO Severe Malnutrition Inpatient Management Ten-Step Protocol by 2006. This was mainly due to the absence of a national framework that facilitated a coordinated approach with clearly defined quality standards. The use of different guidelines made it difficult to quantify, qualify and provide a national picture of the extent of the problem and the impact of interventions aimed at reducing and preventing SAM. By June 2012, a national protocol to managing children with severe acute malnutrition was finalised and circulated to Heads of Departments (HODs) of the nine provinces. These guidelines, supplement the protocol (Appendix 17), and cover treatment of both inpatient and outpatient management of severe acute malnutrition and moderate acute malnutrition.

PURPOSE OF THE GUIDELINES

a. To provide guidance to health care personnel on an integrated approach for treating children with severe acute malnutrition and moderate acute malnutrition in South Africa.
b. To provide guidance on the ambulatory management of children with severe acute malnutrition and moderate acute malnutrition

TARGET GROUP FOR THE GUIDELINES

The guidelines are intended for doctors, nurses and dieticians and other healthcare workers who are responsible for the medical, dietary, social and rehabilitative management of children with acute malnutrition.

USE OF GUIDELINES IN CONTEXT OF OTHER SOUTH AFRICAN GUIDELINES TO PREVENT AND MANAGE UNDERNUTRITION

These guidelines should be used in conjunction with other guidelines to prevent and manage acute malnutrition, namely:

- Infant and Young Child Feeding Policy (IYCF) 2013
- Integrated Management of Childhood Illness (IMCI) 2014
- National Consolidated Guidelines for the Prevention of Mother-to-Child Transmission of HIV (PMTCT) and the Management of HIV in Children, Adolescents and Adults 2015
- Standard Treatment Guidelines and Essential Medicines List (Hospital-level Paediatrics) 2013
- Guidelines for Management of Common Childhood Illnesses in District Hospitals (to be released 2015)

For effective implementation of these guidelines at inpatient health facilities, children with SAM with medical complications should ideally be nursed in a separate section or corner of the children's ward. The parent or caregiver should be allowed to lodge in the facility for the duration of the child's admission[1].

[1] South African National Strategic Plan for CARMMA (2012)

2. INTRODUCTION

2.1. WHAT IS ACUTE MALNUTRITION?

Acute malnutrition is caused by a decrease in food consumption and/or illness resulting in bilateral pitting pedal oedema and/or a sudden weight loss. Anorexia or poor appetite and medical complications are clinical signs indicating or aggravating the severity of acute malnutrition.

There are two forms of acute malnutrition:

1. **Severe acute malnutrition (SAM)** is defined as *any one* of the following:
   - Weight-for-height or –length below -3 standard deviations (SD)/z-score <-3
   - Mid-upper arm circumference (MUAC) of less than 11.5cm in children aged 6–60 months (circumference of child's left upper arm) – *see Appendix 15 for MUAC measurement*.
   - The presence of bilateral pitting pedal oedema (nutritional).

   A child with SAM is highly vulnerable and at high risk of death.

2. **Moderate Acute Malnutrition (MAM)** is defined as a weight-for-height between -3 and -2 SD below the median of the WHO child growth standards/ z-score between -3 and -2; OR MUAC from 11.5 up to 12.5cm.

Pathophysiology of Severe Acute Malnutrition

There are approximately 40 known essential nutrients that, when not available in the right balance, result in undernutrition and increase the risk of severe illness and likelihood of death in young children. The nature and consequences of deficiencies of these essential nutrients is determined by the body's physiological response to their deprivation. The essential nutrients have been classified into Type 1 (functional) nutrients and Type 2 (growth) nutrients.

Examples of Type 1 nutrients are iron, iodine, vitamin C and vitamin A. In response to Type 1 nutrient deficiency, children's bodies continue to grow using up the stored nutrient, eventually leading to tissue depletion, metabolic dysfunction and consequent ill health. Examples of Type 1 nutrient deficiency include iron deficiency anaemia and scurvy. Even though the illness resulting from Type 1 nutrient deficiency has characteristic signs and symptoms, the deficiency is not identified through anthropometric measurements, although it may coexist with deficiencies that affect anthropometric measurements.

Examples of Type 2 nutrients are potassium, magnesium, zinc, selenium and amino acids. In response to a Type 2 nutrient deficiency, the body stops growing and repairing tissue to conserve nutrients, and the body breaks down its own tissue to make the nutrients available. While Type 2 nutrient deficiency can be identified through anthropometric measurements (wasting and stunting), identifying the deficit nutrients is complex because deficiency of one Type 2 nutrient is often accompanied by deficiency of another Type 1 nutrient. Undernutrition accompanied by infection can operate in a self-reinforcing downward cycle of tissue depletion and lowered resistance to disease.

The pathophysiological responses to nutrient depletion place children with SAM at increased risk of life-threatening complications that lead to increased risk of death. Therefore, successful management of SAM in children requires systematic medical treatment of underlying infections and a dietary treatment or rehabilitation with specially formulated therapeutic foods. These therapeutic foods have the correct balance of Type 1 and Type 2 nutrients and a high nutrient density and bioavailability. The treatment aims to restore the metabolism through correction of electrolyte balance and reversal of metabolic abnormalities, restoring the organ functions and provision of nutrients for catch-up of growth.

Because of the pathophysiological changes that accompany SAM, these children often do not present with typical clinical signs of infection that sick children without SAM have when they are ill, such as fever. Consequently, all children with SAM need to be provided with systematic antibiotics for underlying infections. Treatment protocols for children with SAM for some medical complications, such as dehydration or shock, also differ from the classical treatment protocols for ill children without SAM. Misdiagnosis of medical complications and inappropriate treatment and feeding of children with SAM contributes to slow convalescence and increased risk of death. Thus, adherence to these guidelines is critical.

2.2. VISIBLE AND INVISIBLE CHANGES IN CHILDREN WITH SAM

SAM children look and behave differently from non-malnourished children. However, these criteria below are not used to identify and classify of children with SAM.

Visible differences in malnutrition

Appearance	**Why?**
Very thin Swollen (oedema) Peeling skin Pale sparse hair	Loss of fat and muscle Metabolic imbalances Cell damage
Appetite Poor/no appetite or Very hungry (both occur)	 Infection Metabolic imbalances
Mood Miserable Apathetic	 Metabolic imbalances

Note: The critical elements of the definition of SAM should be used to diagnose SAM.

Invisible differences in children with SAM -*also see Appendix 1: Physiological basis for treatment of SAM*.

Heart: smaller, weaker and cannot tolerate excess fluid in the circulation.

Kidneys: cannot get rid of excess fluid or sodium.

Liver: less able to make glucose; cannot deal with excess protein.

Gut: thinner, weaker, less enzymes produced, less surface for absorbing.

Cells: damaged, lose potassium and accumulate sodium.

Immune system: damaged and weakened, putting child at risk of cross-infection; unable to produce usual signs of infection, like fever.

2.3. ASSESS, CLASSIFY AND MANAGE ALGORITHMS

Assess[2] and classify children with SAM, according to Table 2.1 below. The decision on how to treat these children should be informed by the decision tree outlined in Figure 2.1 and 2.2 below, which integrates IMCI danger signs.

[2] All cases should be assessed for TB and HIV. If TB and/or HIV is present, refer SAM patient to hospital.

Table 2.1: Classification of SAM based on age and presence of medical complications

Assess (case definition and category)	Classify	Principles of management
Age: under 6 months Any of: WLZ <-3SD Bilateral pitting oedema (all grades) or Visible wasting	Severe acute malnutrition with medical complications	Admitted to hospital for inpatient stabilisation care using the standard severe acute malnutrition protocol
Age: 6–59 months (with medical complications)[3] WLZ or WHZ <-3SD or MUAC<11.5cm or Bilateral pitting oedema (all grades) and (any one sign) No appetite Not alert (lethargic) IMCI general danger sign or medical condition[4]		
Age: 6–59 months (without medical complication) WLZ or WHZ <-3SD or MUAC<11.5 cm and No oedema Good appetite Alert No IMCI general danger signs or medical condition	Severe acute malnutrition without medical complications	Refer the child to the hospital for assessment and decision. Ambulatory management[5] of severe acute malnutrition, followed up at: Primary health care (PHC) centre Hospital outpatient department Household level care (for follow-up and referring)
Age: 6–59 months WLZ or WHZ between <-3SD and <-2SDor MUAC between 11.5 and 12.5 cm and No oedema Good appetite Alert No IMCI general danger signs or medical condition	Moderate acute malnutrition	Ambulatory management[6] of moderate acute malnutrition, followed up at: Primary health care (PHC) centre Hospital outpatient department Household level care (for follow-up and referring)

[3] If the case is less than 4 kg, classify the child as SAM with medical complications
[4] See Table 3
[5] If there are no ambulatory SAM/outpatient care services, refer all SAM patients to hospital for inpatient care.
[6] If there are no ambulatory SAM/outpatient care services, refer all SAM patients to hospital for inpatient care

Figure 2.1: Decision tree for the Integrated Management of Acute Malnutrition (IMAM)

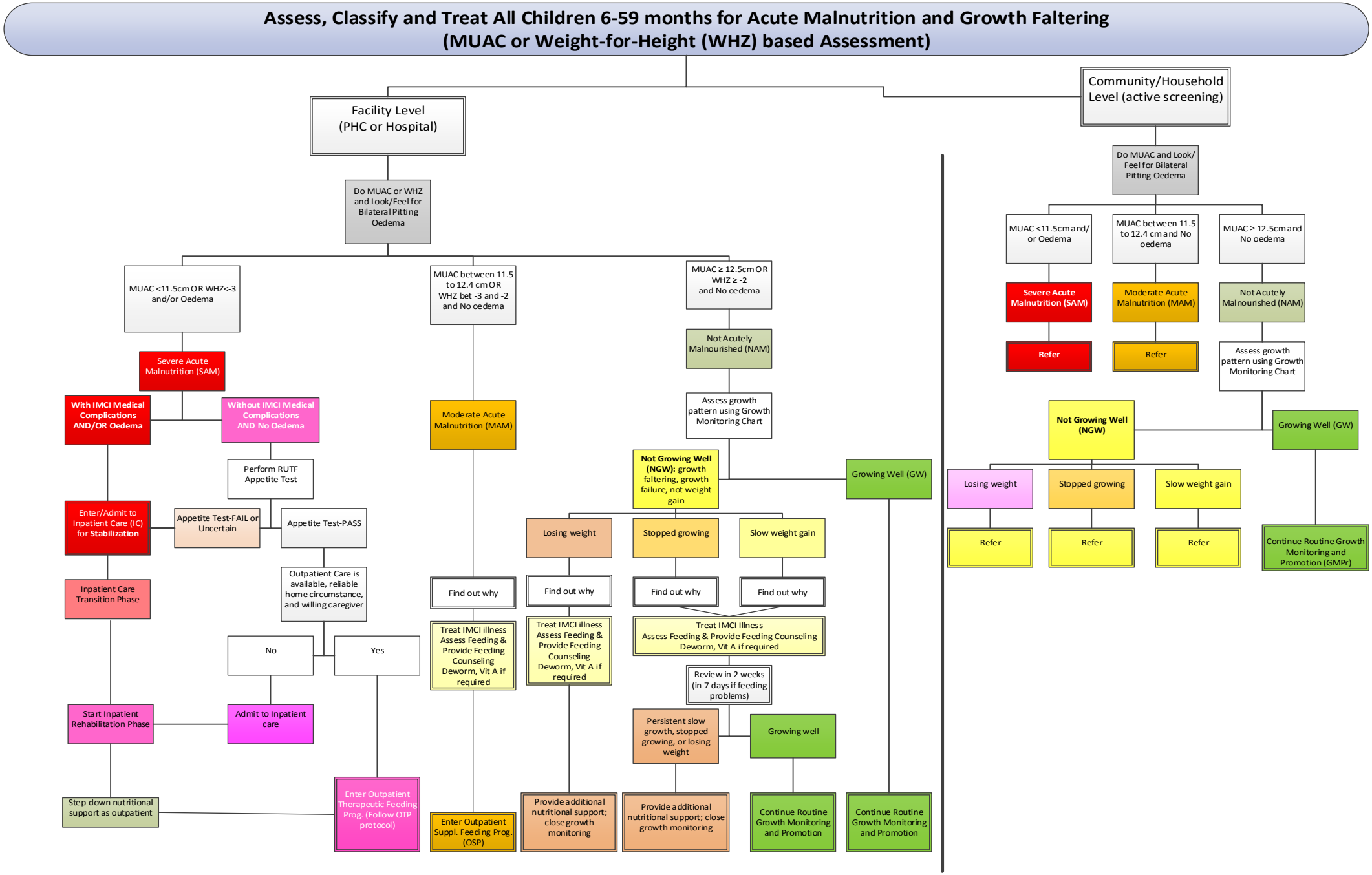
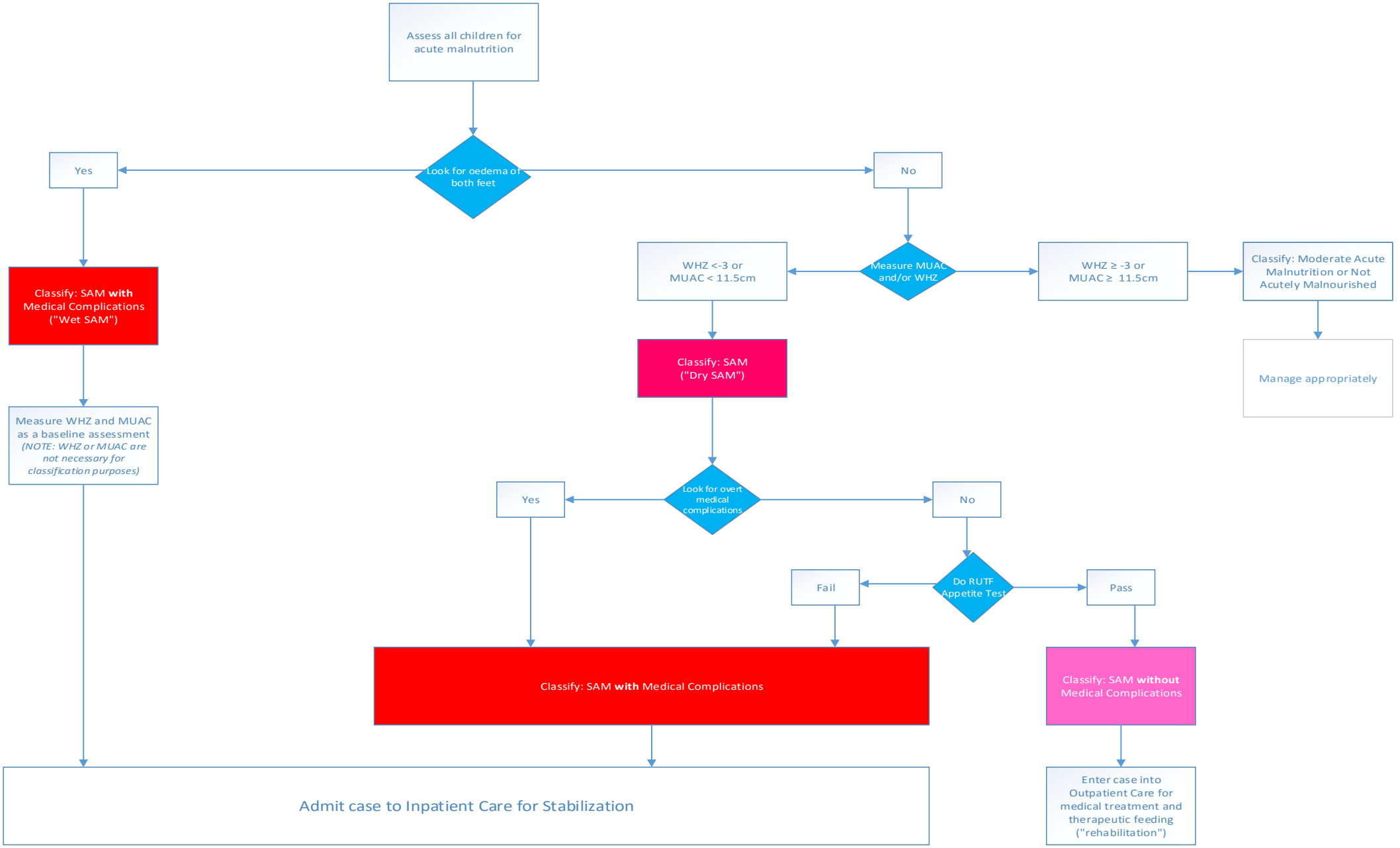


Figure 2.2: Decision tree for inpatient care of children with SAM



Check for presence of oedema and grade appropriately. All cases with oedema (any grade) should be admitted for inpatient care.[7]

Table 2.2: Grades of bilateral pitting pedal oedema

Grade	Definition
Absent or 0	No bilateral pitting oedema
Grade +	Mild: Both feet/ankles
Grade ++	Moderate: Both feet, plus lower legs, hands or lower arms
Grade +++	Severe: Generalised bilateral pitting oedema, including both feet, legs, arms and face

Often, the only sign of severe metabolic malnutrition is a reduction in appetite. By far the most important criterion to decide if a patient should be sent to inpatient or outpatient management (ambulatory cases) is the RUTF appetite test (Appendix 2). A poor appetite means that the child has a significant infection or a major metabolic abnormality such as liver dysfunction, electrolyte imbalance and cell membrane damage or damaged biochemical pathways. These are the patients at immediate risk of death***. It is imperative to assess for appetite using an RUTF appetite test -****see Appendix 2. All cases who fail the appetite test should be admitted for inpatient care.*

2.4. COMPLICATIONS TO BE ASSESSED IN A CHILD WITH SAM IN THE SOUTH AFRICAN TREATMENT REGIMEN

If there is anthropometric confirmation of SAM, the following signs must be assessed. The presence of any signs indicate the need for admission to hospital and intensive management as an inpatient.

Table 2.3: Criteria for admission of SAM to inpatient care

Category	Signs or criteria
Age	Infants under 6 months of age
Signs of serious illness	Anorexia (poor appetite) High fever (>38.5°C) Hypothermia (<36°C) Jaundice Weeping skin lesions Bleeding Shock Eye signs of vitamin A deficiency Respiratory distress (rapid breathing, lower chest wall in-drawing) Hypoglycaemia Severe dehydration
IMCI general danger signs	Unable to feed or breastfeed Vomiting everything Convulsions in this illness Lethargic or unconscious
IMCI illness category	Severe pneumonia or very severe disease Pneumonia Diarrhoea with severe or some dehydration Severe persistent or persistent diarrhoea Severe dysentery Severe anaemia Suspected meningitis Suspected malaria

[7] While standard WHO guidelines recommend management of SAM cases with up to 2+ oedema without medical complications in the outpatient setting, the South African adaptation of these guidelines recommends admitting all cases of SAM with any grade of oedema (with or without medical complications) to inpatient care units.

3. INPATIENT MANAGEMENT OF SAM WITH MEDICAL COMPLICATIONS

The treatment has three phases, namely, the stabilisation phase followed by transition phase into the rehabilitation phase – *see Inpatient Protocols in Appendix 17*.

During the stabilisation phase, the aim is to restore cellular function, control infection, ensure the child is kept warm and receives appropriate dietary support (low protein, moderate calorie, trace element and appropriate mineral intake) and to detect/respond to serious complications such as low blood sugar, low temperature, poor feeding and diarrhoea. Only once the child begins to respond to this initial phase by losing oedema, developing a good appetite and becoming active should transitioning to rehabilitative feeding begin – usually after three to seven days, which could be earlier if child does not present with medical complications.

During the rehabilitation phase, the child needs to rebuild body stores and wasted tissue. This phase is characterised by improving appetite and rapid weight gain. Before discharge from inpatient care, therapeutic targets must be met, appropriate follow-up arranged and active social worker intervention should have been facilitated. The nutritional status of lactating mothers of all children less than two years should be assessed and she should be supplemented if necessary according to the Nutrition Supplementation Programme (NSP). Table 3.1 depicts a treatment timeline for SAM.

Table 3.1: Timeframe for inpatient management of SAM

	Stabilisation Days 1-2	Transition Days 3-7	Rehabilitation Weeks 2-6
1. Hypoglycaemia	→		
2. Hypothermia	→		
3. Dehydration	→		
4. Electrolytes	→		
5. Infection	→	→	→
6. Micronutrients	No iron →	→ Add iron	→
7. Initiate Feeding	→		
8. Catch-up growth			→
9. Sensory stimulation		→	→
10. Prepare for follow-up			→

3.1. STABILISATION PHASE

The following investigations are important in SAM cases (but should not delay initiation of treatment):

On admission

- Blood glucose test strip
- Ward haemoglobin or Full blood count
- Blood culture (but commence antibiotics irrespective of results)
- Chest X-ray, if respiratory distress
- Urine dipstick
- Tuberculin skin test (Mantoux test)
- Provider initiated HIV test with appropriate pre-test counselling

Stabilisation treatment regimen is as follows:

3.1.1. Prevent/treat hypoglycaemia (low blood sugar) and initiate 'stabilising' feeding

1. Begin feeding immediately and do not miss feeds. Feed using a cup or spoon.
2. Give a 'stabilising feed',[8] also known as F75, in a volume of 130ml/kg/day - *see feeding chart for F75 on Appendix 5* divided into three-hourly feeds, i.e.16ml/kg, eight times daily. This feed will provide approximately 100kcal/kg/day of energy and 0.9g/kg/day of protein.

> **Note:** If energy supplied is less than 100kcal/kg/day, the child's body will further breakdown tissue and continue to deteriorate.

- If the child has gross oedema (+++), reduce the volume to 100ml/kcal/day - *see feeding chart for F75 for gross oedema on Appendix 6*
- If danger signs, hypothermia or hypoglycaemia are present, feed a volume of 130ml/kg/day **but** divided into two-hourly feeds, i.e. 11ml/kg 12 times daily, until these resolve.
- If the child is breastfed, encourage continued breastfeeding, but stabilising feed is the priority. Give stabilising feed and breastfeed in between.

> **Note:** ***Children below 6 months*** should be offered stabilising feed as a therapeutic feed if full breastfeeding is not established.

- If feeds are refused/not finished (child should take at least 80% of each feed), give the feeds via a nasogastric tube.
- Monitor 24-hour intake: record feed taken, leftover and estimated vomited. If feed is vomited, offer the same amount to the child immediately. Monitor intake and output (i.e. vomiting, diarrhoea, urine output) in feed chart/fluid balance sheets.
- Weigh children at the same time of the day and plot the weight daily
- The only exceptions to feeding immediately may be:
  – while shock is being corrected;
  – surgical abdominal emergency.

3.1.2. Detect and treat low blood sugar/hypoglycaemia

- Test blood glucose level every three hours. You can stop testing when it is normal and stable for 24hours, provided the child is not severely ill.[9]

- If the blood glucose is <3 mmol/L in an ***asymptomatic***[10] child, give:
  – 'stabilising feed' immediately, **or**
  – sugar solution, oral, 5ml/kg**, or**
  – 50ml bolus of 10% dextrose

- Recheck the blood glucose after 30 min. If the blood glucose is ≥3mmol/l, continue normal feeds and continue to monitor blood glucose 2hourly until it remains above 3mmol/L for 24 hours.

- If ***symptomatic***[11] or ***unresponsive hypoglycaemia***, give dextrose 10%,[12] IV, 5ml/kg over 2–3 minutes.

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[8]F75 is a stabilising therapeutic feed that contains 75kcal energy and 0.9g protein per 100ml. It is low in protein, low in energy and has trace amounts of iron. F75 is available as ready to use or may be prepared at the ward kitchen or milk kitchen, *see recipe on Appendix 3*. This feed is ideal for all children 0-60 months. .

[9]If severely ill, continue three-hourly blood glucose testing.

[10] Classical or overt symptoms of hypoglycaemia (such seizures, sweating, tachycardia, etc) among SAM cases may not be easily observable due to serious metabolic decompensation. Always suspect hypoglycaemia when a SAM case has depressed level of consciousness.

[11] As above

[12]Mix 0.5ml/kg 50% dextrose with 2ml/kg of water for injection in a syringe; give 5ml/kg of the resulting 10% dextrose solution. Alternatively, give 5ml/kg neonatal maintenance solution, which also contains 10% dextrose.

- Recheck the blood glucose after 30 min. If the blood glucose is ≥3mmol/l, continue normal feeds and continue to monitor blood glucose 2hourly until it remains above 3mmol/L for 24 hours.

Note: If a child becomes unconscious and you are unable to check blood glucose, treat as low blood sugar while finding a way to confirm if the blood glucose is normal and excluding other causes, such as meningitis.

By keeping the child warm, feeding early and regularly, and treating infections, low blood sugar can be avoided in most children with severe acute malnutrition.

3.1.3. Prevent and treat low body temperature/hypothermia

To keep a child warm, ensure the following:

- Allow the mother/caregiver to sleep with child at night for warmth.
- Keep the child, and including the head, covered at all times, especially at night.
- Keep the child and clothing dry and change wet nappies immediately.
- Avoid exposure during examination or bathing.
- Care for child in a warm area,(i.e. 25–30°C), away from window and avoid draughts
- Ensure regular, correct feeding.

Monitor: Check underarm (axillary) temperature every three to four hours (after each feed is a good time). An axillary temperature of <36°C indicates an urgent need to warm the child.

Treat immediately if the temperature is below 36°C, as follows:

- Begin feeding straight away (or start rehydration if diarrhoea with dehydration).
- Follow the steps to prevent hypothermia and actively re-warming by:
  - Putting the child on the mother's bare chest (skin-to-skin contact), i.e. wrap mother and child in blankets – minimise clothing between the mother and child to ensure heat transfer to the child.
  - Placing a heater nearby
  - If no mother is present, or if mother to child heating is not possible, clothe and wrap the child, including the head, with warmed blanket.
  - If severely hypothermic or not improving, use other heating measures – ideally a radiant-temperature skin-controlled warmer, such as an open incubator.

Monitor: During reheating, check temperature every 30 minutes until stabilised (>36.5°C), as children with severe acute malnutrition are also not able to prevent themselves becoming overheated (hyperthermic), which is also dangerous.

3.1.4. Prevent and treat dehydration and hypovolaemic shock

Note: Anti-diarrhoeal medications, i.e. kaolin and pectin, atropine and diphenoxylate, loperamide, antiemetics or pre/probiotics, are not used in the management of acute diarrhoea. These children have poor cardiac reserves and are easily volume-overloaded –avoid intravenous (IV) infusions.

A child with severe acute malnutrition and diarrhoea is at serious risk of dying as they have poor ability to respond to both shock and fluid overload. Table 3.2 shows how to recognise shock and dehydration among SAM cases, and Table 3.3 shows the differences in treatment between a child in shock and child not in shock. The most critical factor in managing a child with dehydration or shock is regular observation of the response to each therapeutic intervention.

Table 3.2: Recognising shock and dehydration

Recognising shock and dehydration	
Shock is recognised by one or more of the following:	
Compensated shock	Delayed capillary refilling time (>3 seconds) Increased pulse rate Cool peripheries
Late (Preterminal)	Decreased level of consciousness Decreased blood pressure Decreased pulse volume
Dehydration is assessed after shock is dealt with.	
Severe Dehydration	**Some Dehydration**
Eyes sunken	Eyes sunken
Very slow skin pinch/turgor (≥2sec)	Slow skin pinch/turgor (<2 sec)
Drinking poorly	Drinks eagerly
	Irritable/restless
Other indicators of dehydration may be sought but are often less useful or less easily assessed, e.g. depressed fontanelle, absent tears, decreased passage of urine.	

Table 3.3: Treatment for a child in shock and not in shock

Child in shock	Child not in shock
Give oxygen and insert an IV line. Treat immediately with normal saline (sodium chloride) 0.9%, IV, 10ml/kg given as a bolus over 10 minutes, and monitor for a response.	***If there is no dehydration present*** Show the caregiver how to give Oral Rehydration Solution (ORS)[13] with a cup and spoon using frequent small sips. Encourage caregiver to give 10ml/kg after each diarrhoeal stool until diarrhoea stops. Continue to give normal feeds and reassess for dehydration frequently.
Then reassess for presence of shock or circulatory overload • If shock has resolved, proceed to manage dehydration. • If signs of circulation overload are present – increasing liver span, rising pulse and respiratory rate, gallop rhythm, basal crepitations – stop infusion, and manage appropriately for heart failure; consider need for referral for intensive care and inotropes. • If shock has not improved or not resolved: – Repeat the fluid bolus while shock remains (provided evidence of circulatory overload is not present) until improvement is achieved, up to four times. – After the 4 x 10ml/kg boluses, i.e. a total of 40ml/kg, has been given, with inadequate response, a further bolus can be started and the patient should be moved to intensive care unit (ICU) for central venous pressure (CVP) monitoring and inotropic support.	***If dehydration (severe or some dehydration) is present*** • Give ORS, oral, 20ml/kg every hour for four hours using frequent small sips (i.e. 5ml/kg every 15 minutes for four hours). • Show the caregiver how to give ORS with a cup and spoon • If child vomits, wait 10 minutes and then continue to offer more slowly. • Encourage caregiver to continue feeding the child, especially breastfeeding. • Review hydration after four hours: general condition, capillary filling time, level of consciousness, skin turgor, sunken eyes, respiratory rate, abdomen, if passing urine and number/quality of stools.

[13]South African Oral Rehydration Solution: Na^+ 64meq/L, K^+ 20meq/L, glucose 2g/100ml, citrate 10mmol/L.

Note:

- Once the shock has been treated and the child is stable, proceed to management of child with dehydration.
- After treatment of shock reassess immediately; children on rehydration need four-hourly assessments.
- Encourage oral feeds to begin once level of consciousness is normal and the child is not in severe distress.

Note:

- If shock reoccurs, treat as for shock.
- If dehydration is improving, continue as if there is no dehydration; prevent by offering 10ml/kg ORS orally after each loose stool.
- If dehydration is not improving, consider IV fluids with great care.
- Only if the child fails the above oral treatment for dehydration, then treat with IV Darrows half-strength with dextrose 5%, starting at a rate according to weight as shown table below.

2–10kg	10ml/kg/hr[14]
11–20kg	8ml/kg/hr
21–50kg	6ml/kg/hr
Fluid	½ Darrows/5%DW
In addition: ORAL FEEDS at normal feed volumes and times	

- Monitor response to IV fluid treatment as shown in table below:

Finding on assessment	Response
Shock	Treat for shock
No improvement or more dehydrated	Increase drip rate by 25%
Improving	Continue current drip rate
No visible dehydration	Decrease drip rate by 30% until low enough to change to oral prevention
Repeat cycle four-hourly until drip rate is low enough,[15] with no visible dehydration, to manage with oral prevention dehydration.	

Note: Do not give anti-diuretics, unless indicated (heart failure, fluid overload), because children with SAM lose more electrolytes.

3.1.5. Management of severe anaemia

If a child has very severe anaemia (Hb <4g/dl) and/or severe anaemia with respiratory distress (Hb 4–6g/dL) requiring urgent correction, treat carefully. Preferably administer packed red blood cells at 5–10ml/kg over four hours and continuously observe for signs of circulatory overload. Give furosemide 1mg/kg at the start and end of the transfusion.

Note: Do not prescribe iron during the stabilisation phase.

3.1.6. Prevent and Treat infections

Standard principles for infection control should be adhered to, such as hand washing with soap, preventing cross-infections, use of clean linen, etc.

a) Bacterial infection (septicaemia)

Treat all SAM cases on admissions for infections. Signs of infection are usually clinically not detectable. Start antibiotics immediately.

If child is severely ill (apathetic, lethargic) or has complications (hypoglycaemia, hypothermia, raw skin/fissures, meningitis, respiratory tract or urinary tract infection) and is suspected to have severe sepsis,[16] give:

- Ceftriaxone IM/IV 80mg/kg daily for seven days.[17]

[14]These rates are in line with current safety evidence. However, the need for regular four-hourly reassessment remains.
[15]Less than 5ml/kg/hour.
[16]Severe sepsis includes serious bacterial infection presenting as septic shock meningitis, bacteraemia, urinary tract infection.
[17]Avoid in the first month of life – rather use cefotaxime 50mg/kg/dose 6H IV.

If child has complications *without* severe sepsis and is not seriously ill, give:

- Ampicillin 50mg/kg IM/IV six-hourly for seven days.
- Change to oral therapy after two days i.e. Amoxicillin 30mg/kg/dose eight-hourly for seven days and
- Gentamicin 6mg/kg IM/IV once daily for seven days.

If the child fails to improve after 48 hours, search for new infection, then change to third-generation antibiotics, and give:

- Ceftriaxone IM/IV 80mg/kg daily for five to seven days, or guided by local microbiological flora.

If child does not improve after five days on the above intervention, consult and/or refer to higher level of care.

If the child has no complications (alert, feeding well), give antibiotics orally:

- Amoxicillin 30mg/kg 8-hourly for five days

Notes:

- Do not prescribe steroids, as these depress immune function.
- Give measles vaccine as per immunisation schedule, if due.
- Continue use of cotrimoxazole to prevent Pneumocystis carinii pneumonia (PCP) pneumonia, if indicated.

For possible intestinal infestation (this is not urgent and can be delayed until stabilisation phase is completed).

- ***Children one to two* years*:*** mebendazole, oral, 100mg twice daily for three days.
- ***Children over two years:*** mebendazole, oral, 500mg as a single dose immediately.

Investigate and exclude tuberculosis (TB) and HIV routinely in all cases of SAM.

- **Do tuberculin skin test (Mantoux) and read it within 48 hours.**
- Consider immediate empiric treatment of TB if there is strong evidence that it may be present, e.g. chest X-ray (CXR) changes.

b) HIV and AIDS

- Counsel and test for HIV. Record the findings.
- HIV treatment initiation should be delayed until the acute phase of stabilisation is completed; this will also allow time for some counselling before initiating HIV treatment, if it is required, during the rehabilitation phase.
- Children on ART should continue receiving treatment.

3.1.7. Ensure immunisations are up-to-date

If immunisations are behind, catch up immunisation **on admission day or before discharge**. Record the dose given in the Road to Health Booklet (RtHB). *Give measles vaccine as per immunisation schedule on admission, if due.*

3.1.8. Correct electrolyte imbalance, micronutrient and trace element deficiencies

a) Electrolytes and trace elements

- The following children should not receive additional potassium, magnesium, copper and zinc:
  - Children receiving commercially available ready-prepared F75 stabilisation feed
  - Children receiving stabilisation feed prepared in Hospital kitchens **with** added combined mineral and vitamin complex (CMVC)

- The following children should receive additional potassium, magnesium, copper and zinc (as per the table 3.4 below), prescribed individually:
  - Children receiving stabilisation feed prepared in Hospital kitchens **without** added combined mineral and vitamin complex (CMVC)

Table 3.4: Electrolyte and trace element prescriptions

Potassium chloride solution (3–4mmol/kg/day) 25–50 mg/kg/dose, oral, three times daily for seven to ten days until oedema subsides (even if serum potassium is normal!):

<10kg	250mg
>10kg	500mg

Plus trace element mix ($MgSO_4$ 280mg: $ZnSO_4$ 36mg: $CuSO_4$, 0.1mg/1ml oral solution). If trace element mix is not available, give magnesium and zinc individually.

Magnesium: give 0.4–0.6mmol/kg/day

<10kg	2.5ml daily oral
>10kg	5ml daily oral

If oral magnesium is not available, give a single IM injection of 50% $MgSO_4$ (0.3ml/kg body weight) to a maximum of 2ml, or a 1ml daily dose of 2% $MgSO_4$ for a week (can be mixed food).

Give elemental zinc (zinc sulphate, gluconate, acetate or picolinate)

<10kg	10mg
>10kg	20mg

b) Micronutrients

Vitamin A

Give single therapeutic dose to all new SAM cases, as follows:

<6months	50 000 IU
6–12months	100 000 IU
>12 months	200 000 IU

If the child has received prophylactic vitamin A supplementation in the past 30 days, defer the therapeutic dose until 30 days have elapsed.

Symptomatic Vitamin A deficiency: All children with clinical signs of severe vitamin A deficiency (eye changes: xerophthalmia, corneal ulceration, Bitot's spots, corneal clouding) should receive **three doses** of vitamin A. Give:

- Vitamin A immediately (day 1) and repeat same dose the following day (day 2) and third dose on day 14.
- Record the dose given in prescription and the RtHB.

Complicated Measles: Children with *complicated measles* should receive **three doses** of vitamin A. Give:

- Vitamin A immediately (day 1) and repeat same dose the following day (day 2) and give a third dose on day 14.

Folic acid

The following children should receive **Folic acid 2.5mg on day 1** only.

- Children receiving commercially available ready-prepared F75 stabilisation feed
- Children receiving stabilisation feed prepared in Hospital kitchens with added combined mineral and vitamin complex (CMVC)

The following children should receive additional Folic acid orally 2.5mg as a daily dose for at least 14 days or until RUTF has commenced:

- Children receiving stabilisation feed prepared in Hospital kitchens without added combined mineral and vitamin complex (CMVC)

Multivitamin

The following children should not receive multivitamins:

- Children receiving commercially available ready-prepared F75 stabilisation feed
- Children receiving stabilisation feed prepared in Hospital kitchens with added combined mineral and vitamin complex (CMVC)

The following children should receive additional multivitamins **5mls as a daily dose** for at least 14 days or until RUTF has commenced:

- Children receiving stabilisation feed prepared in Hospital kitchens without added combined mineral and vitamin complex (CMVC)

Iron after the stabilisation phase is completed

- Iron supplementation is only given once gaining weight and oedema has resolved – usually about seven days.
- Give **2mg/kg elemental iron** (see preparation for elemental iron on Appendix 8) per dose eight-hourly with meals only if the child is not on ready-to-use therapeutic feed (RUTF).
- Stop additional iron when child is taking full prescribed amount of RUTF.

3.2. REHABILITATION PHASE

3.2.1. Rebuilding wasted tissue

Once the child's appetite returns to normal, usually within a week, and medical complications are resolving, and/or oedema is lost or reduced, the wasted tissue needs to be rebuilt. Change to a 'rehabilitation/rebuilding/catch-up feed'[18] known as F100.

Feeding starts with a **transition phase, which is a changeover of feed to rehabilitation feed and a cautious increase in feed volume.**

Transition process:

- For the first two days (day one and two of transition) replace the stabilising feed (F75) with rehabilitation feed (F100) at equal amounts the child was receiving as stabilising feed.
- On day three, gradually increase the volume of the rehabilitation feed (F100) by 10ml per feed until some feed remains unfinished.

After the transition phase, feed freely as appetite permits up to 220kcal/kg/day (feed volume up to 220ml/kg/day) -see feeding chart for F100. Actively encourage the child to eat as often as possible. Rehabilitation phase to build body tissue and **rapid weight gain** can now begin safely. The tables below cover the type and amount of catch-up feeds required to build lost tissue.

Table 3.5: Feeding according to age groups

Children below 6 months	Children 6-59 months
• Breastfeeding is best, if fully re-established), **or** • Give *diluted* F100[19] at 130kcal/kg/day, **or** • Prescribe appropriate infant formula	• Continue breastfeeding • Continue rehabilitation feeds (F100) every 3 hours • Introduce a balanced, soft, mixed high-energy diet, and add oil or margarine or peanut butter to meals. Prepare food without added salt. • Once the child eating the ward diet (3 modified family meals a day), reduce the frequency of feeds from 8 feeds to 5 feeds (volume per feed remain the same). • In preparation for discharge from inpatient care, replace F100 with Ready to Use Therapeutic Food (RUTF) to sustain catch-up growth (see Appendix 10 for Amounts of RUTF to give). Encourage the child to drink clean water freely. • Upon discharge, refer the patient to outpatient care, with RUTF prescription as per Table 3.6 below.

The volumes of *diluted F100* prescribed for infants under 6 months is shown in table 3.6 below.

[18] F100 is a nutrient-dense therapeutic rehabilitation feed that contains 100kcal energy and 3g protein per 100ml. F100 is available as ready to use or may be prepared at the ward kitchen or milk kitchen, see recipe on Appendix 3. It is not ideal for children below 6 months hence should be prescribed for 6-60 months.

[19] Diluted F100 –Add 35ml water to 100ml prepared F100. This is ideal for children below 6 months.

Table 3.6: Maintenance amounts of diluted F100 for infants under 6 months

Child's weight (kg)	Diluted F100 (ml per feed in eight feeds per day)
≥1.2	25
1.3–1.5	30
1.6–1.7	35
1.8–2.1	40
2.2–2.4	45
2.5–2.7	50
2.8–2.9	55
3.0–3.4	60
3.5–3.9	65
4.0–4.4	70

3.2.2. Weight gain during rehabilitation phase (rapid catch-up growth)

Children below 6 months (breastfed): monitor if child is gaining ***20g per day*** (absolute weight gain).

- Gradually decrease the quantity of diluted F100 by one-third of the maintenance intake so that the infant gets more breastmilk.
- If the weight gain of 10g per day is maintained for two to three days (after gradual decrease of diluted F100), stop diluted F100 completely and return to normal feeding, preferably breastfeeding.
- If the weight gain is not maintained, increase the amount of diluted F100 to 75% of the maintenance amount for two to three days, and then reduce if weight gain is maintained.

Children 6-59 months: monitor weight gain and plot on weight chart daily (see Appendix 9 for weight grid charts). Desirable weight gain to rebuild wasted tissue is ***>10g/kg/day***.

- Plot intake on 24-hour food intake chart (see Appendix 11).
- Plan ward feeds and plot on daily ward feeding chart (see Appendix 12).

3.2.3. Provide stimulation, play and loving care

Stimulation, play and loving care will markedly improve the child's response to treatment and decrease the period of hospitalisation.

So …

- From admission, provide tender loving care.
- Structure play and activity in a cheerful, stimulating environment encouraging mother's/caregiver's involvement as far as possible.

Aspects of child development to be promoted are as follows:

- Cognitive skills
- Language skills
- Motor skills
- Exploratory skills
- Social skills.

Some suggestions

- Hang colourful objects from cot rails.
- Pick child up at least hourly for love, play and contact.
- Sing or have music playing.
- Use a kind, soothing voice.
- Immobile children –encourage passive limb movements and splashing in a warm bath.
- Mobile children – encourage play such as rolling, tumbling, kicking and tossing a ball, climbing stairs and walking uphill and downhill.

3.2.4. Prepare for discharge from inpatient care and into step-down ambulatory care

While still in the ward

- Involve the parents/caregivers in feeding and caring for the child as soon as possible, as they will care for the child in the long term.

Discharge the child from inpatient care to outpatient care when the following criteria are present:

- Appetite returned (RUTF appetite test passed)
- Bilateral pitting oedema resolved
- Child clinically well and alert
- Medical complications resolved
- Persistent and good weight gain (>10g/kg/day) over 5 consecutive days

Before discharge:

- **Investigate for TB**– repeat the tuberculin skin test if initial test was negative, and read it within 48 hours. Record the findings.
- **Ensure counselling and test for HIVs is done**– record the findings. Treat with ART.
- **Give health and nutritional education**–share educational messages about the child and caregiver, any booklets which contains information about when to return to the clinic urgently, hygiene, infant feeding and complementary feeding advice, stimulation, family planning, HIV, immunisation and the role of the male partner. Work with the dietician to counsel mothers/caregivers on how to modify family foods, how often to feed and how much to give. Start this counseling as soon as the child enters rehabilitation phase.
- **Ensure the child is counted onto the District Health Information System (DHIS) admissions, discharges and deaths tally sheet**. Check that the SAM case is counted only once as new case (either at PHC level or in the inpatient hospital unit).
- **Prepare a discharge summary** and write a brief clinical summary in the RtHB.
- **Establish a link with the local PHC clinic** and the family's local Community Health Workers (CHWs) for home follow-up.
- **Make follow-up plans**[20] to see the child in one week at the hospital outpatient department or at the local PHC clinic.
- **Ensure that information on family background and socio-economic status was obtained**– refer to social protection and development programme/scheme provided by Department of Social Development. These programmes may include Social relief of distress grant (while the child support grant is being processed) and the social support grant.
- **Community health workers (CHW) should ascertain location of community nutrition and development centres within their locality which will provide access to interim nutritious meals**. CHW can link households of children with SAM to extension officers from the Department of Agriculture, Forestry and Fisheries to assist with establishment of household food gardens. Link the household to poverty alleviation programmes within the municipal wards.

[20]Enrol the child in the national nutrition supplementation programme – Draft Nutrition Supplementation Guideline, 2012, as depicted in chapter 4.

4. OUTPATIENT MANAGEMENT OF SAM WITHOUT MEDICAL COMPLICATIONS

The Outpatient Therapeutic Programme (OTP) is *aimed* at providing treatment for **children 6-59 months**[21] with severe acute malnutrition (SAM) who:

- have an appetite (pass RUTF appetite test, see Appendix 2);
- without medical complications; and
- no oedema.

These children are also regarded as *SAM ambulatory* cases. Outpatient (ambulatory) services can be accessed through delivery of OTP at any one of the following service points, namely:

> **Primary health care facility:** If the patient is able to easily access the nearest PHC facility for weekly visits **and** the PHC facility is well prepared to provide adequate OTP care;
>
> **or**
>
> **Hospital outpatient department:** If the patient is able to easily access the hospital outpatient department (OPD)/dietetics department for weekly visits.

OTP programme relies on sufficient availability of RUTF. If RUTF is not available in the outpatient setting, then all SAM cases without medical complications should be referred for inpatient care in the hospital.

There are two types of SAM cases without medical complications that should be managed as outpatients:

> **Type 1:** Recovering SAM cases referred from inpatient care to OTP (Step-down care).
>
> **Type 2:** Newly identified SAM cases entered directly to outpatient care/OTP.

4.1. TYPE 1: RECOVERING SAM CASES REFERRED FROM INPATIENT CARE TO OUTPATIENT CARE/OTP (STEP-DOWN CARE)

- Children who have been referred from inpatient care or another outpatient care facility should not be given routine medicines for a second time as these have already been administered to them; refer to discharge summary on the RtHB.
- The child's records and documentation should be checked for details of medications already given, and, where applicable, the remaining schedule of medications and supplements should be continued according to inpatient management in Chapter 3 – see inpatient protocols on Appendix 17.
- If the child is on TB or HIV treatment, continue treatment in outpatient care.

The following criteria should be met before a Type 1 case is entered into OTP:

- Appetite returned (RUTF appetite test passed).
- Bilateral pitting oedema resolved.
- Child clinically well and alert.
- Medical complications resolved.
- Persistent and good weight gain (>10g/kg/day) over 5 consecutive days.

Note: If any of the symptoms or signs of medical complications are suspected, check Appendix 15 for appropriate action.

[21] Infants under 6 months with SAM should be classified as SAM with medical complications and not be managed as outpatients, and referred to inpatient care. Children who weight below 4kg should be referred to inpatient care.

Dietary treatment for Type 1 case

Children who have passed the RUTF appetite test (see Appendix 2) receive RUTF based on a dose of ±200kcal/kg bodyweight/day, given as a take-home feed. A weekly supply of RUTF is provided depending on the child's bodyweight (*see* Table 4.1). The dietary treatment is managed at home, with the children attending outpatient care sessions on a weekly basis for monitoring health and nutritional status and replenishing supplies of RUTF.

Quantities of RUTF to provide for Type 1 case

- Provide 200kcal per kg actual bodyweight per day of RUTF. Use the RUTF look-up Table 4.1 for the amounts of RUTF to give on each weekly visit, based on the child's weight at the time of the visit. One sachet of RUTF of 92g provides 500kcal.
- Explain to the caregiver the daily amount the child will need to consume.
- Prescribe the required RUTF supply to the caregiver.

Note: The child may take less as they start to eat well. Encourage the mother to give the full portion until the next visit. The healthcare worker will review the intake based on the weight gain.

Table 4.1: Dietary treatment using RUTF

Child's weight (kg)	Amount in grams per day	Packets per day	Total in grams per week	Packets per week
4.0*–4.9	200	2	1 400	14
5.0–6.9	250	2.5	1 750	18
7.0–8.4	300	3	2 100	21
8.5–9.4	350	3.5	2 450	25
9.5–10.4	400	4	2 800	28
10.5–11.9	450	4.5	3 150	32
≥12	500	5	3 500	35

* Infants <4kg are referred to inpatient care.

4.2. TYPE 2: NEWLY IDENTIFIED SAM CASES ENTERED DIRECTLY TO OUTPATIENT CARE/OTP

Identify and classify for SAM using:

- MUAC<11.5cm, or
- WHZ<-3SD

AND

The following criteria should be met before a Type 2 case is entered into OTP:

- No bilateral pitting oedema.
- No medical complications (see Appendix 3: Case definitions of medical complications with SAM).
- RUTF Appetite test passed.

Note: If any of the symptoms or signs of medical complications are suspected, check Appendix 15 for appropriate action.

Dietary treatment

Dietary treatment is the same as Type 1 (see Table 4.1).

Medical treatment

Children with SAM do not show the usual signs of infection, such as fever, and infections are hidden. Therefore, routine antibiotics and other medications are provided upon entering into OTP. The healthcare provider will decide if additional medication is needed for apparent medical conditions.

> **Note:** Children entering outpatient receive routine medication, including routine antibiotics.

- Give oral amoxicillin antibiotic treatment for a period of five days to be taken at home (give 10 days if needed), based on a dose 30mg/kg bodyweight/day.
- The first dose should be taken during the entry process under the supervision of the healthcare provider.
- An explanation should be given to the caregiver on how to complete the treatment at home.
- If there is a need for a second-line antibiotic drug, the child will be referred to inpatient care

Table 4.2: Routine medical treatment for children with SAM without medical complication - at outpatient care[22]

Intervention	Commence when	Age	Prescription	Dose
Antibiotic treatment with Amoxicillin	On entry	-	30mg/kg	8 hourly for 5 days
Vitamin A supplementation	On entry Do not repeat the dose of vitamin A if the child has already received Vitamin A in the past 30 days.	<6months	50 000 IU	Single dose on admission
		6–12months	100 000 IU	
		>12 months	200 000 IU	
Deworming with Mebendazole	On entry	<12 months	Do not use	-
		12–24 months	100mg twice daily	For 3 days
		>24months	500mg	Single dose on admission
Immunisation Schedule check and catch-up	On entry	Age-appropriate	According to EPI schedule; check measles vaccination.	According to EPI schedule
Iron and folic acid ***is not given as separate doses; they are included in RUTF.*** Screen for anaemia according to IMCI	On entry If anaemia is confirmed, refer to inpatient care	-	-	-

Consider HIV and TB in all cases of SAM

- Assess and classify for TB and HIV as per the IMCI case management.
- Newly diagnosed cases of HIV or TB with SAM without medical complications should be referred for inpatient care.
- If there is a strong suspicion of TB, refer the case for further evaluation and management to hospital.
- Children already on TB treatment or ART who are newly assessed as SAM, should be referred for inpatient care.

Follow-up care

Children with SAM without medical complications managed in the outpatient setting should be followed-up at the facility level weekly or every two weeks. At each visit, the child should be checked for oedema, medical complications and an RUTF appetite test should be completed. Any child with either oedema, medical complications or fails the RUTF appetite test should be referred to inpatient care for stabilization. Children with SAM in outpatient care who are receiving therapeutic feeding should be followed-up every one/two weeks to assess weight gain. The average weight gain during this intensive therapeutic feeding should be above 10g/kg/day provided the child consumes a total of

[22] Refer to South African IMCI Chart Booklet (2014)

200kcal/kg/day in the form of RUTF. Assess at each visit, weight gain, adherence to antibiotic treatment and adherence to therapeutic feeding regimen, assess and classify for medical illnesses, and provide ongoing health education and nutritional counselling as per the IMCI guidelines.

Criteria for exit from OTP (fully recovered):

- WHZ:>-2SD WHZ for two consecutive visits; and/or
- MUAC: >12.5cm
- No medical complications
- No oedema

5. MANAGEMENT OF MODERATE ACUTE MALNUTRITION (MAM) AT OUTPATIENT SUPPLEMENTATION PROGRAMME (OSP)

Moderate acute malnutrition (MAM) is defined by moderate wasting, i.e. low weight for height/length z-score between -2 and -3; Or MUAC between 12.5 and 11.5. The child does not have any oedema and has a good appetite. These cases can be safely managed in an ambulatory setting as long as there are no serious associated medical conditions. Causes of MAM, as with those for SAM, include inadequate nutrient intake accompanied by frequent minor inter-current illnesses (diarrhoea, pneumonia, etc.), that results in poor weight gain during recovery from these illnesses.

Outpatient (ambulatory) services can be accessed through delivery of Outpatient Supplementation Programme (OSP), which can be incorporated into the services of management of SAM and/or existing "nutritional supplementation programme of the underweight" at any one of the following service points, namely:

Primary Health Care Clinic: If the patient is able to easily access the nearest PHC clinic for 2 weekly/monthly visits and *the PHC clinic is well prepared to provide adequate OSP*, or

Hospital Outpatient Department: If the patient is able to easily access the Hospital Outpatient Department (OPD), and the *OPD is well prepared to provide adequate OSP*, or Dietetics Department for 2 weekly/monthly visits.

Criteria for entry into outpatient MAM services:

- WHZ between -3 and -2 SD OR MUAC between 12.5 and 11.5 cm
- Appetite good
- No bilateral pitting oedema
- Child clinically well and alert

Note: If any of the listed signs of serious illness are suspected, check Appendix 15 for action.

Principles of nutritional care and support: MAM is treated by adding a nutrient rich supplemental food that provides daily recommended dietary allowance of all micronutrients in addition to the child's daily home diet. Two options for supplementation are available as detailed below.

5.1. OPTION 1: FOOD-BASED APPROACH THROUGH ENRICHING HOME DIET

This approach involves dietary counseling and education of the caregiver/mother on options on how to modify home diet to enrich with with nutrient dense foods with a focus on plant based and animal based foods.

Health care workers should counsel and educate the mother or caregiver on feeding a child with moderate acute malnutrition. The following may be done in order to establish the intake of the child:

- diet history, and
- food frequency recall (to ascertain frequency of high quality nutrients given daily)

Nutrition education should include information on feeding practices as follows:

- Breastfeeding
- Complementary feeding
- Adding more nutrients into the child's diet

Only foods and feeding practices that are affordable, feasible and acceptable to families should be recommended. The children should consume a variety of foods that is age-appropriate. Children should be fed frequently, sufficient amounts and food with appropriate texture (thickness). Caregivers of children with moderate acute malnutrition need additional dietary counseling supported by cooking demonstrations, home visits and/or support/caregiver groups. Dietary advice for children with moderate acute malnutrition should specifically reinforce the quantity of nutrient and energy-dense foods that are needed to promote age-appropriate feeding practices needed for recovery.

Table 5.1: Sample meal combination

Starch	Protein	Fat	Other
Bread	Peanut butter*	Margarine Oil	Syrup/Jam
Pap Potato	Peanut butter* FC Milk or Inkomazi or Milk powder Eggs Sardines, Pilchard Liver Chicken Beef (steak, mince, chops, stew) Mutton (Steak, mince, chops, stew) Pork (chops, stew)		Sugar (Pap)
Rice or Samp	Beans		
Vegetables	Peanut butter*		Sugar
Tea	FC Milk with Milk powder		Sugar
Try to include Sardines, Eggs, Beans, Liver & Chicken			
* Peanut butter can be counted as a fat and protein			

Sample meal plans according to age-groups - *see Appendix 16*.

5.2. OPTION 2: SUPPLEMENTATION THROUGH READY-TO-USE SUPPLEMENTARY FEEDS

This approach applies to situations where child/family is food and nutrient insecure and/or non-response to Option 1: Food-based approach (as above).

Children receive RUSF (ready-to-use supplementary feed) or RUTF (ready-to-use therapeutic feed) based on a total daily caloric dose of ±175 kcal/kg bodyweight/day, given as a take-home feed (100kcal/kg/day from home food-based diet and additional 75 kcal/kg/day RUSF/RUTF).

A weekly supply of RUSF/RUTF is provided depending on the child's bodyweight (*see* Table 5.2).
The dietary treatment is managed at home, with the children attending outpatient care sessions on a two weekly to monthly basis for monitoring health and nutritional status and replenishing stocks of RUSF/RUTF.

Quantities of RUSF/RUTF to provide

- Provide an additional 75 kcal per kg actual bodyweight per day of ready-to-use supplementary food (RUSF) or ready-to-use therapeutic food (RUTF) to the diet of child.
- Use the RUSF/RUTF look-up (see Table 5.2) for the amounts to give on each monthly visit, based on the child's weight at the time of the visit. One sachet of RUSF/RUTF of 92g provides 500kcal.
- Explain the daily amount the child will need to consume to the caregiver.
- Give the required RUSF/RUTF ration to the caregiver to supplement.

Note: The child may take less as they start to eat well. Encourage the mother to give most of the ration until the next visit. The healthcare worker will review the intake based on the weight gain.

Table 5.2: Dietary treatment using RUSF/RUTF at 75kcal/kg/day

Child's weight (kg)	Amount in grams per day Additional 75kcal/kg/day	Amount in grams *per week* Additional 75kcal/kg/day	Amount in grams *per month (30 days)*	Amount in packets per month (30 days)	Amount in jarsper month
4.0*–4.9	60 (1.5 sachets /3Tbs)	420	1800	45x40g	8x250g or 4x450g
5.0–6.9	80 (2 sachets /4 Tbs)	560	2400	60x40g	10x250gor 6x450g
7.0–8.4	100 (2.5 sachets /5 Tbs)	700	3000	75x40g	12x250gor 7x450g
8.5–9.4	120 (3 sachets /6 Tbs)	840	3600	90x40g	15x250g or 8x450g
9.5–10.4	130 (3.5 sachets /6.5 Tbs)	910	3900	98x40g	16x250g or & 9x450g
10.5–11.9	150 (4 sachets /7.5 Tbs)	1050	4500	113x40g	18x250g or 10x450g
≥12	170 (4.5 sachets /8 Tbs	1190	5100	128x40g	21x250g or 12x450g

* Infants <4kg are referred to inpatient care

**Tbs – Tablespoon = 20g

Medical management

Usually there is an immediate inter-current acute infection, such acute diarrhoea or pneumonia, among children with MAM. Manage these acute infections promptly and adequately using the standard treatment guidelines in IMCI chart booklet. Failure to adequately and completely treat these inter-current illnesses will put the child at risk of becoming a SAM and increase his risk of early death within a few days or weeks. All complicated cases not recovering from MAM or emerging medical illnesses should be referred to hospital for further evaluation and treatment.

Consider HIV and TB in all cases of MAM

- Assess and classify for TB and HIV as per the IMCI case management
- Newly diagnosed cases of HIV or TB with SAM without medical complications should be referred for inpatient care.
- If there is a strong suspicion of TB, refer the case for further evaluation and management to hospital.
- Children already on TB treatment or ART who are newly assessed as SAM, should be referred for inpatient care.

Follow-up care

Children with MAM who are receiving supplementary feeding should be followed-up every two weeks to assess weight gain. The average weight gain during this intensive supplementary feeding should be between 6-8g/kg/day provided the child consumes an additional 75kcal/kg/day over an above his daily home diet/food intake of about 100kcal/kg/day. Assess at each visit, weight gain, adherence to the supplementary feeding regimen, medical illnesses, and provide ongoing health education and nutritional counselling as per the IMCI guidelines.

Criteria for exit from supplementary feeding programme:

- WHZ: >-2SD WHZ for two consecutive visits and/or
- MUAC: >12.5cm for two consecutive visits

6. MONITORING AND EVALUATION FRAMEWORK

An effective Monitoring and Evaluation Framework will help to identify desired outcomes from implementation.

Monitoring is the periodic and timely collection of data to determine if activities are being implemented as planned. The monitoring process tracks indicators and means of verification at the output level.

The ***Evaluation*** process assists in determining the achievement of goals and objectives. Evaluation will give an opportunity to assess comprehensively and document the effectiveness of the inpatient management of severe acute malnutrition. Evaluation is seen as a process to determine the impact and effectiveness of a program in order to use the lessons learned.

6.1. CASE MANAGEMENT IN INPATIENT CARE

6.1.1. Monitor vital signs

Monitor pulse (and respirations and temperature) every four hours.
Note: Increase in pulse may mean infection or heart failure.

- Count beats per minute (or per 30 seconds and multiply by two) and record
- Watch the child's chest while the child is quiet
- Count breaths per minute
- Count for one full minute
- Look for breathing movement on chest or abdomen
- Record

Danger signs are:

- Pulse rate increases by 25 or more beats per minute (over-hydration)
- Respiratory rate increases by five or more breaths per minute (over-hydration)
- Temperature drops below 35°C axillary (hypothermic)
- Temperature increases suddenly (pyrexia)

6.1.2. Monitor weight gain

- Weigh at the same time each day
- Record daily weights on weight chart
- Plot weights
- Indicate where rehabilitation feed (F100 or diluted F100) began
- Indicate desired discharge weight

Calculate weight gain

- Calculate daily after child is on rehabilitation feed
- Calculate weight gain in grams per kilogram body weight (g/kg/day)

  Good: 10g/kg/day +

  Moderate: 5-10g/kg/day

  Poor: <5g/kg/day

Step 1: Subtract child's weight yesterday (W1) from child's weight today (W2)

W2 – W1 = Xkg
Xkg x 1000 = Xgrams gained

Step 2: Divide grams gained by yesterday's weight

Grams gained ÷ W1 = **Xg/kg/day**

6.1.3. Monitor failure to respond

Determine failure to respond:

- Insufficient food given?
- Micronutrient deficiency?
- Insufficient attention given?
- Rumination?
- Unrecognised infection?
- Serious underlying disease?

6.1.4. Conduct death reviews[23]

- Review child's notes when there is a death
- Go through death review form
- Discuss case as a team
- Identify any areas of mismanagement
- Agree on any changes needed

6.1.5. Problem solving

Patient records should be monitored periodically for compliant implementation in order to:

- Identify problems
- Correct individual problems privately
- Discuss wider problems as a group
- Identify solutions together

6.2. INDIVIDUAL MONITORING AT OUTPATIENT CARE

6.2.1.During follow-up visits

Individual monitoring of the child's progress should be carried out by the healthcare provider upon weekly (or, as circumstances dictate, biweekly) return visits to the health facility or outreach point. The following parameters are monitored and recorded on the Road to Health Booklet (RtHB) during the follow-up visit:

Anthropometry

- MUAC
- Weight

Physical examination

- Degree of bilateral pitting oedema
- Weight gain:
  - The weight is marked and compared to the weight of the previous weeks and with the target weight for discharge (*see* Appendix 14: Guidance table to identify target weight for discharge).
  - Children who lose weight or have no weight gain or have their weight fluctuating receive special attention during the medical examination, and, according to the evaluation, a decision is taken to continue treatment in outpatient care, or to refer.
- Body temperature
- Standard clinical signs: stool, vomiting, dehydration, cough, respiration, liver size, eyes, ears, skin condition and peri-anal lesions are assessed.
- RUTF Appetite test
- Any illness suffered by the child since the last visit
- Any action taken or medication given in response to a health condition.

[23] Death review form – see Appendix 13 – combined with regular Child Mortality Review Meetings using Child Health Care Problem Identification Programme (PIP) tool.

- At each follow-up visit, the caregiver should be informed of the child's progress, and individual and/or group counselling is provided on standardised health and education messages.
- After the initial weeks of treatment, special attention should be paid to the gradual introduction of quality complementary foods to prepare the child for gradual weaning off the RUTF.
- Follow-up action is based on the action protocol (see Appendix 15: Action protocol in outpatient care).The action protocol describes when to decide for home visit, referral to inpatient care or referral for medical investigation. Children who were absent for one or more visits are tracked in the community (including those who were discharged because they became defaulters after three absent visits).

6.2.2. Home visits

The community outreach worker, under the supervision of the ward-based outreach team (WBOT) leader, covering the geographical area of a child's place of origin should be assigned to conduct home visits for children requiring special attention during the treatment process. Home visits should include assessing the nutrition and health condition of the child, compliance with feeding practices for RUTF and home caring practices. The community health worker (CHW) should provide individual counselling to the caregiver and provide feedback to the healthcare provider.

Home visits for children with SAM are essential in the following high-risk or problem cases (*see* Appendix 15: Action protocol in outpatient care):

- Child is absent from the weekly session, or is a defaulter (absent for two consecutive visits)
- Child is not gaining weight or is losing weight on a follow-up visit (non-response to treatment)
- Child's oedema is recurring/not reducing (non-response to treatment)
- Child has returned from inpatient care or caregiver has refused inpatient care
- Child has a deteriorating medical condition

A system to monitor home visits should be kept at the outpatient care site.

6.3. INDICATORS FOR REPORTING TO THE DISTRICT HEALTH INFORMATION SYSTEM (DHIS) / NATIONAL INDICATORS DATA SET (NIDS)

Data elements that are critical in monitoring children with severe acute malnutrition:

- Monitor all these indicators at all levels, i.e. facility, primary health care clinic, district and province, before the indicators are submitted to the national DHIS.
- Monitoring includes verification and cleaning of the data before is it submitted to the higher level. All data should be interrogated at hospital level before it is submitted to the district, and then to the provincial and national levels.

6.3.1. Child under five years severe acute malnutrition incidence (annualised)

This indicator gives an indication of new cases that are classified as severely acute malnourished in a 1000 population of children under five years of age. Severe visible wasting is not included as a diagnostic criterion. However, all malnourished children should be clinically examined as part of routine management. Since such cases might be referred to a hospital, the referral hospital should NOT count cases referred. Only record children presenting for the first time with severe acute malnutrition during this episode (i.e. new cases), not those coming for follow-up. A child previously identified with severe malnutrition that has recovered, but who is later found to have severe malnutrition again, should be counted again (new episode). Count the child regardless of the cause of the severe malnutrition.

Data element for this indicator is: child under five years with severe acute malnutrition new. It uses the population size of children under five years of age as a denominator. This indicator actually measures new cases detected in the public health care system.

6.3.2. Child under five years severe acute malnutrition case fatality rate

This indicator provides information on the ratio of children who died due to severe acute malnutrition to those who were admitted in the hospital for management of the severe acute malnutrition for that reporting period.

Data elements that contribute to this indicator are:

- Child under five years severe acute malnutrition death
- Child under five years severe acute malnutrition admitted

These are the number of admissions with severe acute malnutrition that should be collated daily in the ward register and submitted as monthly statistics to the hospital information office.

To calculate ward case fatality rates:

- For big wards, calculate monthly
- For small wards, calculate every three months

A case fatality rate of:

- >20% is unacceptable
- 11–20% is poor
- 5–10% is moderate
- <5% is acceptable

To calculate ward case fatality ratio:

- Determine number of severely malnourished patients admitted in last month
- Determine number of patients who died (wait until you know the outcomes of all patients in that month)
- Divide number of deaths by number of patients
- Express as percentage (%)

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8. APPENDICES

APPENDIX 1: PHYSIOLOGICAL BASIS FOR TREATMENT OF SEVERE ACUTE MALNUTRITION

Affected organ/system	Effects	Treatment
Cardiovascular system ***Heart is smaller, weaker cannot handle excess fluid in circulation***	Cardiac output and stroke volume are reduced. Infusion of saline may cause an increase in venous pressure Any increase in blood volume can easily produce acute heart failure; any decrease will further compromise tissue perfusion. Blood pressure is low. Renal perfusion and circulation time are reduced. Plasma volume is usually normal and red cell volume is reduced.	If the child appears dehydrated, give ORS or F75; do not give fluids intravenously unless the child is in shock. Restrict blood transfusion to 10ml/kg and give diuretic.
Liver ***Less able to make glucose***	Synthesis of all proteins is reduced. Abnormal metabolites of amino acids are produced. Capacity of liver to take up, metabolise and excrete toxins is severely reduced. Energy production from substrates such as galactose and fructose is much slower than normal. Gluconeogenesis is reduced, which increases the risk of hypoglycaemia during infection. Bile secretion is reduced.	Do not give child large meals. Ensure amount of protein given does not exceed metabolic capacity of the liver but sufficient to support synthesis of proteins (0.9g/100ml) Reduce the dosage of drugs that depend on hepatic disposal or are hepatoxic. Ensure sufficient carbohydrates given to child to avoid the need for gluconeogenesis. Do not give iron supplements, which may be dangerous because transferring levels are reduced.
Genitourinary system ***Cannot get rid of excess fluid and sodium***	Glomerular filtration is reduced. Capacity of kidneys to excrete excess acid or a water load is greatly reduced. Urinary phosphate output is low. Sodium excretion is reduced. Urinary tract infection is common.	Prevent further tissue breakdown by treating any infection and providing adequate energy. Do not give child more protein than is required to maintain tissues. Ensure that high-quality proteins are given, with balanced amino acids. Avoid nutrients that give a cidliad such as magnesium chloride. Restrict dietary sodium. Ensure water intake is sufficient and not excessive.
Gastrointestinal system ***Gut weaker, micro villi thinner or flattened***	Production of gastric acid is reduced. Intestinal motility is reduced. Pancreas is atrophied and production of digestive enzymes is reduced. Absorption of nutrients is reduced when large amounts of foods are eaten.	Give child small, frequent feeds. If absorption is poor, increase the frequency and reduce the size of each feed (feed two-hourly instead of three-hourly or four-hourly). If there is malabsorption of fat, treatment with pancreatic enzymes may be useful.
Immune system ***Damaged and weakened***	All aspects of immunity are diminished. Lymph glands, tonsils and the thymus is severely atrophied. Cell-mediated (T-cell) immunity is severely depressed. IgA level secretions are reduced Complement components are low. Phagocytes do not kill ingested bacteria efficiently. Tissue damage does not result in inflammation or migration of white cells to the affected area. Acute phase immune response is diminished. Typical signs of infection, such as an increased white cell count and fever, are frequently absent. Hypoglycaemia and hypothermia are both signs of infection and are usually associated with septic shock.	Treat all children with broad-spectrum antimicrobial. Because of the risk of transmission of infection, ensure that the newly admitted children are kept apart from children who are recovering from infection.
Endocrine system	Insulin levels are reduced and the child has glucose intolerance. Insulin growth factor 1 (IGF-1) levels are reduced, although growth hormone factors are increased. Cortisol levels are usually increased.	Give the child small, frequent feeds. Do not give steroids.
Circulatory system	Basic metabolic rate is reduced by about 30%. Energy expenditure due to activity is very low.	Keep the child warm to prevent hypothermia; dry the child quickly and properly after bathing and cover with clothes and blankets, ensure that windows are kept

Affected organ/system	Effects	Treatment
	Both heat generation and heat loss are impaired; the child becomes hypothermic in cold environment and hyperthermic in a hot environment.	closed at night and keep temperature of the living environment at 25–30˚C. If a child has fever, cool the child by sponging with tepid (not cold) water (never alcohol rubs).
Cellular system ***Cells are damaged and become lea***	Sodium pump activity is reduced and cell membranes are more permeable than normal, which leads to an increase in intracellular sodium and decrease in intracellular potassium and magnesium. Protein synthesis is reduced.	Give large doses of potassium and magnesium to all children. Restrict sodium intake.
Skin, muscles and glands	The skin and subcutaneous fat are atrophied, which leads to loose folds of skin. Many signs of dehydration are unreliable; eyes may be sunken because of loss of subcutaneous fat in the orbit. Many glands, including the seat, tear and salivary glands are atrophied; the child has dryness of the mouth and eyes and sweat production is reduced. Respiratory muscles are easily fatigued; the child is lacking energy	Rehydrate the child with ORS or F75.

APPENDIX 2: RUTF APPETITE TEST

Aim for use of RUTF: To ensure catch-up growth in a minimum of approximately 6 weeks.

How to do the appetite test

1. The appetite test should be conducted in a separate, quiet area.
2. Explain to the mother/caregiver the purpose of the appetite test and how it will be carried out.
3. The mother/caregiver, where possible, should wash her/his hands.
4. The mother/caregiver should sit comfortably with the child on her/his lap and either offer the RUTF from the packet or put a small amount on her/his finger and give it to the child.
5. The mother/caregiver should offer the child the RUTF gently, encouraging the child all the time. If the child refuses, then the mother/caregiver should continue to encourage the child quietly and take time over the test. The test usually takes about 30 minutes, but may take up to one hour. The child must not be forced to take the RUTF.
6. The child needs to be offered plenty of water to drink from a cup as he/she is taking the RUTF.

The result of the appetite test

Pass:

- A child that takes at least the amount shown in the table below passes the appetite test.

Fail:

- A child that does not take at least the amount of RUTF shown in the table below should be referred for in-patient care.
- Even if the caregiver/health worker thinks the child is not taking the RUTF because he/she does not like the taste or is frightened, the child still needs to be referred to inpatient care for at least a short time. If it is later found that the child actually takes sufficient RUTF to pass the test, then they can immediately be transferred to the outpatient treatment.

The following table gives the **MINIMUM** amount of RUTF that should be taken.

Body weight (kg)	Sachet (approx. 90g)
4–6.9	¼ to 1/3
7–9.9	1/3 to ½
15–29	¾ to 1
>30kg	>1

Important considerations:

- The appetite test should always be performed carefully. Patients who fail their appetite tests should always be offered treatment as inpatients. If there is any doubt, then the patient should be referred for inpatient treatment until the appetite returns (this is also the main criterion for an inpatient to continue treatment as an outpatient).
- The patient has to take at least the amount that will maintain body weight. A patient should not be sent home if they are likely to continue to deteriorate because they will not take sufficient therapeutic food. Ideally, they should take at least the amount that children are given during the transition phase of inpatient treatment before they progress to Phase 2 (good appetite during the test).
- Sometimes a child will not eat the RUTF because he/she is frightened, distressed or fearful of the environment or staff. This is particularly likely if there is a crowd, a lot of noise, other distressed children or intimidating health professionals (white coats, awe-inspiring tone). The appetite test should be conducted a separate quiet area. If a quiet area is not possible, then the appetite can be tested outside.
- The appetite test must be carried out at each visit for outpatients. Failure of an appetite test at any time is an indication for full evaluation and probably transfer for inpatient assessment and treatment.
- During the second and subsequent visits the intake should be very good if the patient is to recover reasonably quickly.
- If the appetite is good during the appetite test and the rate of weight gain at home is poor then a home visit should be arranged. It may then be necessary to bring a child into inpatient care to do a simple ‘trial of feeding’ to differentiate i) a metabolic problem with the patient from ii) a difficulty with the home environment; such a trail-of-feeding, in a structured environment (e.g. TFU), is also frequently the first step in investigating failure to respond to treatment.

APPENDIX 3: CASE DEFINITIONS OF MEDICAL COMPLICATIONS WITH SAM

Medical complication	Case definition
Anorexia, poor appetite*	Child is unable to drink or breastfeed. Child failed RUTF appetite test.
Intractable vomiting*	Child is vomiting after every oral intake
Convulsions*	During a convulsion, the child has uncontrollable movements of limbs and/or face, and/or rolling eyes and/or loss of consciousness. Ask the mother if the child had convulsions during this current illness.
Lethargy, not alert*	Child is difficult to wake. Ask the mother if the child is drowsy, shows no interest in what is happening around him/her, does not look at the mother or watch her face when talking, or is unusually sleepy.
Unconsciousness*	Child does not respond to painful stimuli (e.g. injection).
Hypoglycaemia	There are often no clinical signs for hypoglycaemia. One sign that does occur in a child with SAM is eyelid retraction: child sleeps with eyes slightly open.
High fever	Child has a high body temperature – axillary temperature ≥38.5°C or rectal temperature ≥39°C – taking into consideration the ambient temperature. Consider malaria in endemic areas.
Hypothermia	Child has a low body temperature – axillary temperature <35°C or rectal temperature <35.5°C – taking into consideration the ambient temperature.
Severe dehydration	For children with SAM, diagnosis of severe dehydration is based on recent history of diarrhoea, vomiting, high fever or sweating, and on recent appearance of clinical signs of dehydration as reported by the caregiver.
Persistent diarrhoea	An episode of diarrhoea that starts acutely but which lasts at least 14 days.
Lower respiratory tract infection	Child has a cough with difficult breathing, fast breathing (if child is 2 to 12 months: 50 breaths per minute or more; if child is 12 months to5 years: 40 breaths per minute or more) or chest in-drawing.
Severe anaemia	Child has palmer pallor or unusual paleness of the skin (compare the colour of the child's palm with the palms of other children); Haemoglobin (Hb) <40 grams per litre (g/l), or if there is respiratory distress and Hb is between 40 and 60g.
Eye signs of vitamin A deficiency	Stages of xerophthalmia are: conjunctival xerosis or dry, opaque and dull conjunctiva with or without Bitot's spots (foamy material on conjunctiva); corneal xerosis or dry and dull cornea; keratomalacia or ulceration, necrosis, perforation of cornea, leading to total blindness.
Skin lesion	Child has broken skin, fissures or flaking of skin.
Jaundice	Jaundice is a yellow colour of the skin, mucus membranes, or eyes. The yellow colouring comes from bilirubin, a by-product of old red blood cells.
Bleeding	Bleeding occur externally, either through a natural opening such as the mouth, nose, ear, vagina or anus, or through a break in the skinor internally, where blood leaks from blood vessels inside the body.

* denotes Integrated Management of Childhood Illness (IMCI) danger signs

APPENDIX 4: RECIPES FOR MAKING STABILISING FEED (F75) AND CATCH-UP FEED (F100)

	F75	F100
Full cream cow's milk	300ml	880ml
Sugar	100g	75g
Oil	20ml	20ml
CMV	1 scoop	1 scoop
Water: make up to	1000ml	1000ml

F75		F100	
Containing per 100ml:		*Containing per 100ml:*	
Energy	75kcal	Energy	100kcal
Protein	0.9g	Protein	2.5–3.0g
Fat	2.0g	Fat	5.5–6.0g
Carbohydrate	13g	Carbohydrate	8–10g
Vitamin A	150mcg	Vitamin A	171mcg
Vitamin D	3.0mcg	Vitamin D	3.0mcg
Vitamin B1	0.07mg	Vitamin C	10mg
Vitamin B2	0.2mg	Vitamin B1	0.1mg
Vitamin B6	0.07mg	Vitamin B2	0.3mg
Vitamin B12	0.1mcg	Vitamin B6	0.1mg
Vitamin C	10mg	Vitamin B12	0.3mcg
Folic acid	35mcg	Vitamin K	4.0mcg
Niacin	1.0mg	Folic acid	40mcg
Vitamin K	4mcg	Niacin	1.0mg
Calcium	32mg	Calcium	91mg
Phosphorus	24mg	Phosphorus	76mg
Magnesium	10.5mg	Magnesium	15mg
Potassium	157mg	Potassium	209mg
Zinc	2.0mg	Zinc	2.2mg
Selenium	4.7mcg	Selenium	4.7mcg
Copper	0.28mg	Copper	0.26mg
Iron	<0.03mg	Iron	<0.06mg
Sodium	<13mg	Sodium	<46mg
Osmolarity	280mOsm/litre	Osmolarity	320mOsm/litre

APPENDIX 5: STABILISING FEED (F75) FEEDING CHART

Weight of child (kg)	Volume of F75 per feed (ml)[a]			Daily total (130ml/kg)	80% of daily total[a] (minimum)
	Every two hours[b] (12 feeds)	Every three hours[c] (eight feeds)	Every four hours (six feeds)		
2.0	20	30	45	260	210
2.2	25	35	50	286	230
2.4	25	40	55	312	250
2.6	30	45	55	338	265
2.8	30	45	60	364	290
3.0	35	50	65	390	310
3.2	35	55	70	416	335
3.4	35	55	75	442	355
3.6	40	60	80	468	375
3.8	40	60	85	494	395
4.0	45	65	90	520	415
4.2	45	70	90	546	435
4.4	50	70	95	572	460
4.6	50	75	100	598	480
4.8	55	80	105	624	500
5.0	55	80	110	650	520
5.2	55	85	115	676	540
5.4	60	90	120	702	560
5.6	60	90	125	728	580
5.8	65	95	130	754	605
6.0	65	100	130	780	625
6.2	70	100	135	806	645
6.4	70	105	140	832	665
6.6	75	110	145	858	685
6.8	75	110	150	884	705
7.0	75	115	155	910	730
7.2	80	120	160	936	750
7.4	80	120	160	962	770
7.6	85	125	165	988	790
7.8	85	130	170	1014	810
8.0	90	130	175	1040	830
8.2	90	135	180	1066	855
8.4	90	140	185	1092	875
8.6	95	140	190	1118	895
8.8	95	145	195	1144	915
9.0	100	145	200	1170	935
9.2	100	150	200	1196	960
9.4	105	155	205	1222	980
9.6	105	155	210	1248	1000
9.8	110	160	215	1274	1020
10.0	110	160	220	1300	1040

[a]Volumes in these columns are rounded to the nearest 5ml.

[b]Feed two-hourly for at least the first day. Then, when little or no vomiting, modest diarrhoea (<5 watery stools per day),and finishing most feeds, change to three-hourly feeds.

[c]After a day on three-hourly feeds: if no vomiting, less diarrhoea and finishing most feeds, change to four-hourly feeds.

APPENDIX 6: STABILISING FEED (F75) FEEDING CHART FOR CHILDREN WITH GROSS(+++) OEDEMA

Weightwith +++ oedema (kg)	Volume of F75 per feed (ml)[a]			Daily total (100ml/kg)	80% of daily total[a] (minimum)
	Every two hours[b] (12 feeds)	Every three hours[c] (eight feeds)	Every four hours (six feeds)		
3.0	25	40	50	300	240
3.2	25	40	55	320	255
3.4	30	45	60	340	270
3.6	30	45	60	360	290
3.8	30	50	65	380	305
4.0	35	50	65	400	320
4.2	35	55	70	420	335
4.4	35	55	75	440	350
4.6	40	60	75	460	370
4.8	40	60	80	480	385
5.0	40	65	85	500	400
5.2	45	65	85	520	415
5.4	45	70	90	540	430
5.6	45	70	95	560	450
5.8	50	75	95	580	465
6.0	50	75	100	600	480
6.2	50	80	105	620	495
6.4	55	80	105	640	510
6.6	55	85	110	660	530
6.8	55	85	115	680	545
7.0	60	90	115	700	560
7.2	60	90	120	720	575
7.4	60	95	125	740	590
7.6	65	95	125	760	610
7.8	65	100	130	780	625
8.0	65	100	135	800	640
8.2	70	105	135	820	655
8.4	70	105	140	840	670
8.6	70	110	145	860	690
8.8	75	110	145	880	705
9.0	75	115	150	900	720
9.2	75	115	155	920	735
9.4	80	120	155	940	750
9.6	80	120	160	960	770
9.8	80	125	165	980	785
10.0	85	125	165	1000	800
10.2	85	130	170	1020	815
10.4	85	130	175	1040	830
10.6	90	135	175	1060	850
10.8	90	135	180	1080	865
11.0	90	140	185	1100	880
11.2	95	140	185	1120	895
11.4	95	145	190	1140	910
11.6	95	145	195	1160	930
11.8	100	150	195	1180	945
12.0	100	150	200	1200	960

[a]Volumes in these columns are rounded to the nearest 5ml.

[b]Feed two-hourly for at least the first day. Then, when little or no vomiting, modest diarrhoea (<5 watery stools per day),and finishing most feeds, change to three-hourly feeds.

[c]After a day on three-hourly feeds: if no vomiting, less diarrhoea and finishing most feeds, change to four-hourly feeds.

APPENDIX 7: RANGES OF CATCH-UP FEED (F100) FOR FREE FEEDING

Weight of child (kg)	Range of volumes per three-hourly feed of F100 (eight feeds daily) *		Range of volumes per four-hourly feed of F100 (six feeds daily) *		Range of daily volumes of F100	
	Minimum ml	Maximum ml	Minimum ml	Maximum ml	Minimum (150ml/kg/day)	Maximum ml (220ml/kg/day)
2.0	40	55	50	75	300	440
2.2	40	60	55	80	330	484
2.4	45	65	60	90	360	528
2.6	50	70	65	95	390	572
2.8	55	75	70	105	420	616
3.0	55	85	75	110	450	660
3.2	60	90	80	115	480	704
3.4	65	95	85	125	510	748
3.6	70	100	90	130	540	792
3.8	70	105	95	140	570	836
4.0	75	110	100	145	600	880
4.2	80	115	105	155	630	924
4.4	85	120	110	160	660	968
4.6	85	125	115	170	690	1012
4.8	90	130	120	175	720	1056
5.0	95	140	125	185	750	1100
5.2	100	145	130	190	780	1144
5.4	100	150	135	200	810	1188
5.6	105	155	140	205	840	1232
5.8	110	160	145	215	870	1276
6.0	115	165	150	220	900	1320
6.2	115	170	155	230	930	1364
6.4	120	175	160	235	960	1408
6.6	125	180	165	240	990	1452
6.8	130	180	170	250	1020	1496
7.0	130	195	175	255	1050	1540
7.2	135	200	180	265	1080	1588
7.4	140	205	185	270	1110	1628
7.6	145	210	190	280	1140	1672
7.8	145	215	195	285	1170	1716
8.0	150	220	200	295	1200	1760
8.2	155	225	205	300	1230	1804
8.4	158	230	210	310	1260	1848
8.6	160	235	215	315	1290	1892
8.8	165	240	220	325	1320	1936
9.0	170	250	225	330	1350	1980
9.2	175	255	230	335	1380	2024
9.4	175	260	235	345	1410	2068
9.6	145	265	240	350	1140	2112
9.8	185	270	245	360	1470	2156
10.0	190	275	250	365	1500	2200

*Volumes per feed are rounded to the nearest 5ml.

APPENDIX 8: ELEMENTAL IRON PREPARATION

Ferrous gluconate elixir	350mg/5ml	40mg elemental iron/5ml	8mg elemental iron per ml
Ferrous gluconate syrup	250mg/5ml	30mg elemental iron per 5ml	6mg elemental iron per ml
Ferrous lactate drops		25mg elemental iron/ml	1mg elemental iron in 0.04ml
Ferroussulphate compound tablets	170mg	±65mg elemental iron per tablet	

APPENDIX 9: WEIGHT CHART

Name_____

Weight on admission: kg

MUAC on admission: cm

Height / length: cm

Bilateral pitting oedema on admission:

0 + ++ +++

Weight at referral to

outpatient care: kg

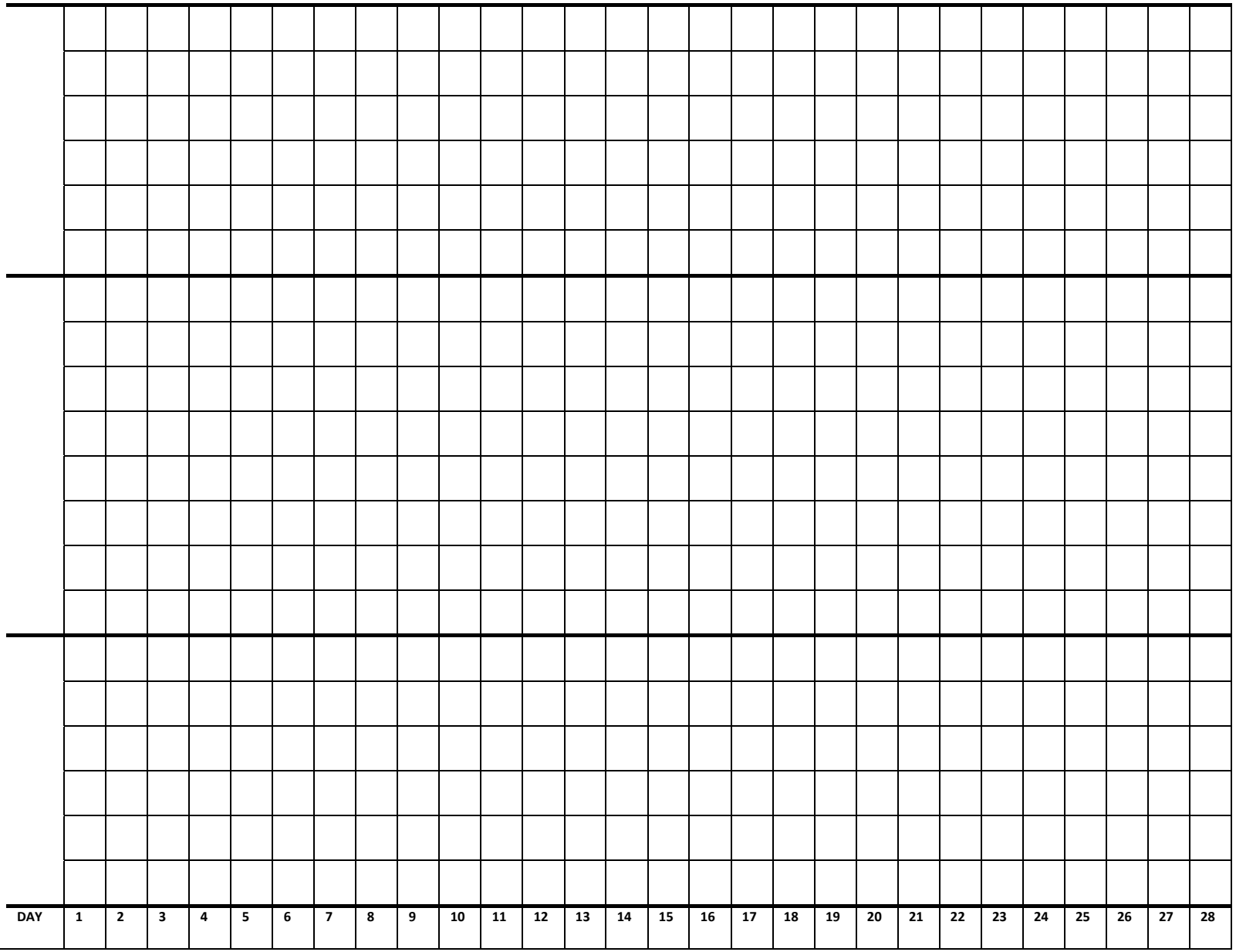
MUAC at referral to

outpatient care: cm

Weight at discharge if treatment until full recovery in inpatient care: kg

MUAC at discharge if treatment until full recovery in inpatient care: cm

Weight (Use appropriate scale.)



APPENDIX 10: AMOUNTS OF DAILY RUTF TO GIVE REPLACING F100

Weight (kg)	RUTF (gram/day)	RUTF (sachet/day)	Energy (kcal)
3–3.4	90	1	500
3.5–3.9	100	1	550
4–4.9	110	1.25	600
5–5.9	130	1.5	700
6–6.9	150	1.75	800
7–7.9	180	2	1000
8–8.9	200	2	1000
9–9.9	220	2.5	1100
10–11.9	250	3	1200
12–14.9	300	3.5	1350
15–19.9	370	4	1600
25–39	450	5	2000
40–60	500	6	2700

The amounts represent an average increase in energy of between10 and 50% of total intake depending upon actual and child.

If both F100 and RUTF are given, they can be substituted on the basis of about 100ml F100 = 20g RUTF.

APPENDIX 11: 24-HOUR FOOD INTAKE CHART

Complete one chart for every 24-hour period

Name:_____Hospital ID number: _____Admission weight (kg):

_____Today's weight (kg): _____

Date: _____ Type of feed: _____ Give: _____ feeds of _____ ml

Time	a. Amount offered (ml)	b. Amount left in cup (ml)	c. Amount taken orally (a–b)	d. Amount taken by NG, if needed (ml)	e. Estimated amount vomited (ml)	f. Watery diarrhoea (if present, yes)
		Column totals	c.	d.	e.	Total yes:

Total volume taken over 24 hours=amount taken orally (c)+amount taken by NG (d) - total amount vomited (e)= _____ml

APPENDIX 12: DAILY WARD FEED CHART

DAILY WARD FEED CHART

DATE:_____WARD:_____

*Divide ml needed for 24 hours by two; ** Divide amount to prepare for 12 hours by four

Name of child	F75			F100		
	Number feeds	Amount/ feed (ml)	Total (ml)	Number feeds	Amount/feed (ml)	Total (ml)
F75 (total ml) needed for 24 hours				*F100 (total ml) needed for 24 hours*		
*Amount needed for 12 hours**				*Amount needed for 12 hours**		
Amount to prepare for 12 hours (round up to whole litre)				*Amount to prepare for 12 hours (round up to whole litre)*		
*Amount to re-warm (or prepare) every three hours***				*Amount to re-warm (or prepare) every three hours***		

APPENDIX 13: DEATH REVIEW FORM FOR SEVERE ACUTE MALNUTRITION (DEATH AUDIT FORM)

Some children are so ill that even with the best care they cannot be saved. This form is to help identify any errors or omissions in care, or lack of supplies, that may have contributed to a child's death, so that these can be discussed and problems identified and solved. The questions below relate to common causes of preventable death in severe malnutrition. If other errors, omissions or problems in care are identified when reviewing patients' records, then these should also be discussed and resolved. If any of the information is not available, discuss how to rectify for the future.

CHILD NAME:	**WARD:**	
RECORD NUMBER:	**READMISSION: YES/NO**	
STAFF ON DUTY AT TIME OF DEATH:		
TIME DOCTOR WAS CALLED: _____ TIME DOCTOR ARRIVED:		
DEATH REVIEW CARRIED OUT BY:		
DESCRIPTION OF EVENTS PRECEDING DEATH:		
Age (months)		
HIV status		
Oedema grade (0 + ++ +++)		
Was child admitted elsewhere immediately before referral to this hospital? If YES, name of hospital and duration of treatment	YES/NO	
Date and time admitted to current ward		
Date and time of death		
Circle when child died	<24 hours Day 2–3 Day 4–7 >7days	
Circle if child died during night and/or at weekend	Night shift Weekend	
***If child died within 24 hours**, answer questions (a)and (b)*		
a) Circle time child spent waiting in OPD	<2 hours > 2 hours	
b) Was child treated in casualty of current hospital? If YES, were IV fluids or rehydration fluids given in casualty?	YES/NO YES/NO	
***If child died <24 hours,** consider especially delays in treatment and administration of IV fluids(including any given in casualty or at referring hospital).* ***For all deaths,** consider especially the possibility of hypoglycaemia, hypothermia, heart failure (from fluid overload) and sepsis.*		
If the following statements are true, write YES (to indicate presence of danger sign or an error or omission in care). If the record is incomplete or unclear, write '?'.	**Enter YES if true**	**COMMENT**

Write ' – ' to show you have checked and no error or omission was found.		
Hypoglycaemia/hypothermia: *check waiting time, intake charts and vital signs chart for evidence of low temperature*		
1. Transfer from OPD was slow (>2 hours)		
2. F75 (or 10% glucose/sucrose solution) was not given within 30minutes of arriving on ward		
3. F75 prescription was incorrect (amount, frequency)*(Note: preparation/recipe may also need to be checked)*		
4. Some feeds were missed *(Note: check especially night feeds; feeds may be charted but not given)*		
5. Child was refusing or eating poorly, but NG tube was not passed		
6. Child had evidence of low temperature		
Heart failure: *check for inappropriate treatments, fluids prescribed, monitoring, timing of transition and provision of potassium (NB: fluid overload can be misdiagnosed as pneumonia)*		
1. Child received IV fluids or blood transfusion in last 48 hours *If YES, answer questions (a–f) below*		
a) Child had evidence of gasping, or increased PR (by 25 beats/min) and RR (by five breaths/min)*(Check especially in six hours before death)*		
b) IV fluids were given but child was not in shock		
c) IV fluid was wrong type (e.g. N saline), or wrong volume, or given for longer than two hours		
d) Child's PR and RR were not monitored every 10 minutes during IV		
e) Blood transfusion was given for anaemia on Day 1 but Hb was not <4g/dl		
f) Blood transfusion was given after the first day, or more than one transfusion was given		
2. Wrong volume of ORS as prescribed, or was continued for too long		
3. Child's PR and RR were not monitored at least hourly during rehydration		
4. Potassium was not provided (either in feeds or separately)		
5. Child was going through transition to F100 and transition to F100 was too early (had oedema and/or not hungry), or amount was too large		
Sepsis: *check antibiotic prescription and nurses' medicine chart and check vital signs chart for evidence of infection*		

1. Child had evidence of severe infection, or raw skin/fissures		
2. Antibiotics were not prescribed from Day 1, or wrong choice of drugs, or doses were missed *(check especially for omission of gentamicin)*		
3. Vitamin A was not given on Day 1		
Weak areas of treatment: *(include quality of record keeping and monitoring)*		
Suspected cause of death:		

Agreed actions	**By whom**	**When**

APPENDIX 14: ACTION PROTOCOL IN OUTPATIENT CARE

Sign	Referral to inpatient care	Require a special home visit
GENERAL CONDITION	Deteriorating	
BILATERAL PITTING OEDEMA	Any grade bilateral pitting oedema	
	Any grade of bilateral pitting oedema with severe wasting (marasmic kwashiorkor)	
	Appearance of bilateral pitting oedema	
ANOREXIA*	Poor appetite or unable to eat – failed appetite test	
VOMITING*	Intractable vomiting	
CONVULSIONS*	Ask mother if the child had convulsions since the previous visit	
LETHARGY, NOT ALERT*	Child is difficult to awake	
UNCONSCIOUSNESS*	Child does not respond to painful stimuli	
HYPOGLYCAEMIA	A clinical sign in a child with SAM is eyelid retraction: child sleeps with eyes slightly open. Low level of blood glucose<3mmol/l	
DEHYDRATION	Severe dehydration based primarily on recent history of diarrhoea, vomiting, fever or sweating and on recent appearance of clinical signs of dehydration as reported by the mother/caregiver	Child is absent or defaulting
HIGH FEVER	Axillary temperature ≥37.5°C	Child is not gaining weight or losing weight on follow-up visit
HYPOTHERMIA	Axillary temperature <36°C	
RESPIRATIONRATE	≥60respirations/minute for children under two months	
	≥50respirations/minute from2 to 12 months	
	≥40respirations/minutefrom1 to 5 years	
	≥30 respirations/minute for children over 5 years	Child has returned from inpatient care or refuses referral to inpatient care
	Anychestin-drawing	
ANAEMIA	Palmerpallor or unusual paleness of skin	
SKIN LESION	Broken skin, fissures, flaking of skin	
SUPERFICIAL INFECTION	Any infection requiring intramuscular antibiotic treatment	
WEIGHTCHANGES	Below admission weight on week three	
	Weight loss for three consecutive visits	
	Static weight for three consecutive visits	
REQUEST	Mother/caregiver requests treatment of child in inpatient care for social reasons (decided by supervisor)	
NOT RESPONDING	Child that is not responding to treatment is referred to inpatient care or hospital for further medical investigation.	

* Integrated Management of Childhood Illness (IMCI) danger signs.

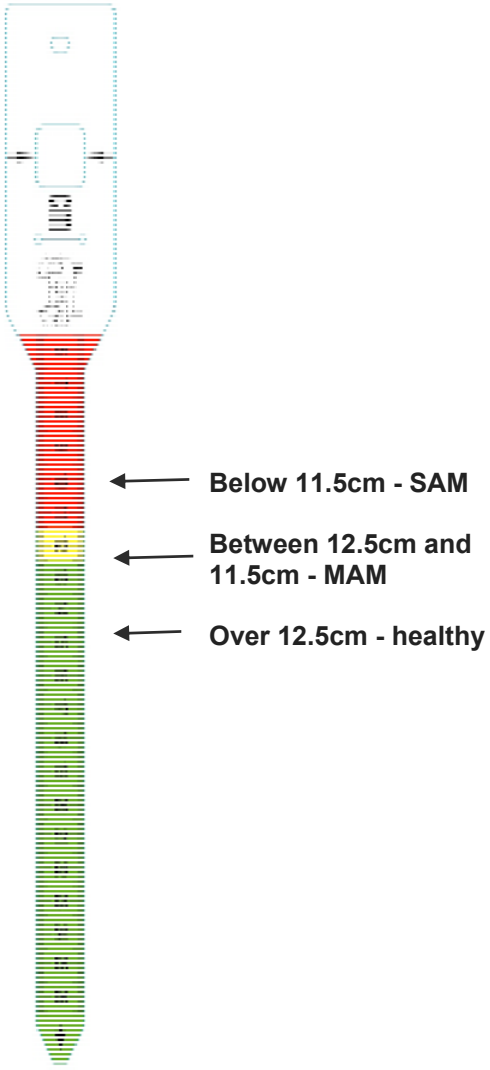
APPENDIX 15: MUAC MEASUREMENTS

MID-UPPER ARM CIRCUMFERENCE, OR MUAC

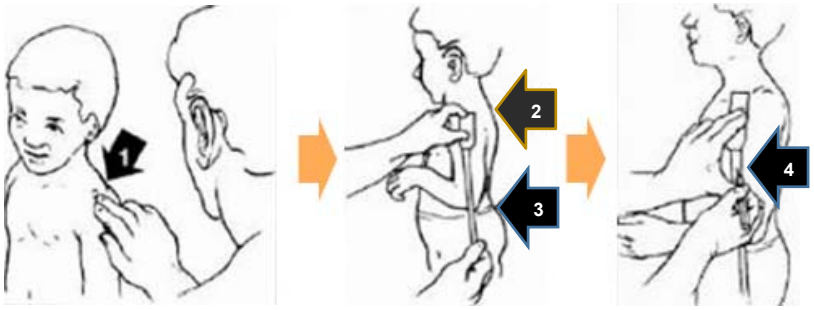
MUAC is used for children 6–59 months. It is essential to use the age cut-off of six months for MUAC. It is not recommended to use a height cut-off as proxy for six months of age; in a stunted population, many infants six months or older will have a height less than 65cm. If the birth date is unconfirmed, use the recall of the mother/caregiver to estimate the infant's age.

How to measure MUAC[24]:

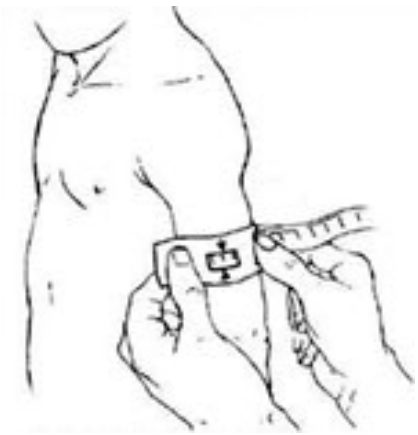
- MUAC is always taken on the left arm.
- Measure the length of the child's upper arm, between the bone at the top of the shoulder and the tip of the elbow (the child's arm should be bent). (see below)
- Find the midpoint of the upper arm and mark it with a pen. It is recommended to use a string instead of the MUAC tape to find the midpoint. (see below)
- The child's arm should then be relaxed, falling alongside his/her body.
- Wrap the MUAC tape around the child's arm, such that all of it is in contact with the child's skin. It should be neither too tight nor too loose. (see below)
  - For the numbered tapes, feed the end of the tape down through the first opening and up through the third opening. The measurement is read from the middle window where the arrows point inward. MUAC can be recorded with a precision of one millimetre.
  - For the simple three-color tape (red, yellow, green), slide the end through the first opening and then through the second opening. Read the colour that shows through the window at the point the two arrows indicate.



Finding the mid-point of the upper arm



Taking the measurement



[24] Images – UNICEF: http://www.unicef.org/nutrition/training/3.1.3/1.html

APPENDIX 16: MEAL PLANS[25]

AGE CATEGORY: 6– 11 months Additional Energy Supplements needed to achieve catch-up growth			
For children growing well	**For children not growing well (losing weight or stopped growing)**	**For MAM**	**For SAM without medical complications / or SAM in catch-up growth phase**
Breakfast ¼ cup Porridge 1 TBS F/C milk powder 1tsp sugar 1 tsp oil/ margarine Water	2 tsp peanut butter 1 tsp sugar 1 tsp oil/ margarine	2 tsp peanut butter 1 tsp sugar	2 tsp peanut butter 1 tsp sugar 1 tsp oil/ margarine
Snack: ¼ cup Infant cereal 1 TBS F/C milk powder Water	2 TBS F/C milk powder	1 tsp oil 3 TBS F/ C milk	1 tsp oil 3 TBS F/ C milk powder
Lunch: ¼ cup mashed potato 1 TBS F/ C milk powder Water	1 tsp oil/ margarine	1 TBS F/C milk powder ¼ cup butternut 1 heaped ladle cooked sugar beans + 1 tsp oil	1 TBS F/C milk powder ¼ cup butternut 1 heaped ladle cooked sugar beans + 2 tsp oil
Snack: ¼ cup cooked and mashed apple + 1 tsp sugar	1 tsp sugar	1 tsp sugar	
Dinner: ¼ cup mashed Sweet potato 1 heaped TBS mashed carrot 2 TBS cooked minced meat + 1 tsp oil Water	+ 2TBS F/C milk powder 1 tsp oil/ margarine 1 tsp oil/ margarine	+ 2 TBS F/C milk powder 1 tsp oil/ margarine 1 tsp oil/ margarine	+ 1 TBS F/C milk powder 1 tsp oil/ margarine 1 tsp oil/ margarine
Snack:		½ cup Infant cereal 3 TBS F/ C milk powder	
Breastfeeding on demand			

AGE CATEGORY: 12 – 23 months Additional Energy Supplements needed to achieve catch-up growth			
Baseline (100Kcal/kg = 3437 KJ)	**GMPs (50 Kcal/kg=1718 KJ)**	**OSP (75 Kcal/kg = 2557 KJ)**	**OTP(100 Kcal/kg=3436 KJ)**
Breakfast: 1 cup Porridge 1 heaped TBS F/C milk powder 1tsp sugar Water	1 tsp sugar 2 level tsp peanut butter 1 tsp oil/ margarine	1 tsp sugar 1 level tsp peanut butter 1 tsp margarine 1 slice brown bread	2 heaped tsp F/C milk powder 1 tsp sugar 2 level tsp peanut butter 1 tsp margarine 1 slice brown bread 1 tsp margarine
Snack: 1 medium Apple			
Lunch: ½ cup Phuthu(crumbly porridge) 1 cup maas Water	1 tsp sugar 1 heaped tsp milk powder	2 tsp sugar 2 heaped tsp milk powder	2 tsp sugar 2 heaped tsp milk powder
Snack: 1 glass Full cream milk 1 TBS F/C milk powder	2 TBS F/C milk powder	1 TBS milk powder	2 TBS milk powder

[25] Adopted with permission from Kwa-Zulu Natal IMAM Guidelines

Dinner: ½ cup cooked rice 1 ladle cooked beans 2 Heaped TBS butternut 2 Heaped TBS spinach Water	1 tsp oil/ margarine 1 tsp oil/ margarine 1 tsp oil/ margarine 1 tsp oil/ margarine	1 tsp oil/ margarine 1 tsp oil/ margarine 1 tsp oil/ margarine	1 tsp oil/ margarine 1 tsp oil/ margarine 1 tsp oil/ margarine 1 tsp oil/ margarine
Snack:		Tea + 2 tsp sugar + 2 heaped tsp milk powder 1 slice brown bread 1 tsp margarine 1 tsp Jam	Tea + 2 tsp sugar + 2 heaped tsp milk powder 2 slice brown bread 1 tsp margarine 2 tsp Jam

AGE CATEGORY: 24 – 59 months Additional Energy Supplements needed to achieve catch-up growth

Baseline (100 Kcal/kg=4312 KJ)	**GMPs (50 Kcal/kg=2155 KJ)**	**OSP (75 Kcal/kg=3233 KJ)**	**OTP(100 Kcal/kg=4311 KJ)**
Breakfast 1 cup Porridge 1 heaped TBS milk 1tsp sugar	2 level tsp peanut butter 1 tsp sugar 1 tsp oil/ margarine	1 level tsp peanut butter 1 tsp sugar 1 tsp oil/ margarine	1 level tsp peanut butter 1 heaped TBS F/ C milk 1 tsp sugar 1 tsp margarine 1 slice brown bread
Snack: 1 medium Apple	1 cup mashed potato 1 leveled ladle mince ¼ cup mixed vegetables	1 cup mashed potato 1 leveled ladle mince ¼ cup mixed vegetables	
Lunch: ½ cup Phuthu 1 cup maas	1 tsp sugar 1 heaped tsp F/ C milk	1 heaped tsp F/C milk	1 tsp sugar 1 heaped tsp F/C milk
Snack: 1 slice brown bread 1 tsp peanut butter 1 glass Full cream milk	1 tsp margarine	1 tsp margarine	1 tsp margarine
Dinner: ½ cup rice 1 ladles cooked sugar beans ¼ cup boiled carrot ¼ cup boiled spinach	1 tsp margarine 1 tsp margarine	1 tsp oil/ margarine	1 tsp oil/ margarine 1 tsp oil/ margarine
Snack:	Tea + 2 tsp sugar + 2 heaped tsp milk powder 1 slice brown bread 1 tsp margarine 1 tsp peanut butter	Tea + 2 tsp sugar + 2 heaped tsp milk powder 2 slice brown bread 1 tsp peanut butter	Tea + 2 tsp sugar + 2 heaped tsp milk powder 2 slice brown bread 1 tsp margarine 1 tsp peanut butter

APPENDIX 17: SOUTH AFRICAN PROTOCOL FOR INPATIENT MANAGEMENT OF SEVERE ACUTE MALNUTRITION WITH MEDICAL COMPLICATIONS (EMERGENCY CARE AND STANDARD INPATIENT CARE)

SEVEREACUTE MALNUTRITION EMERGENCY TREATMENT IN SOUTH AFRICA *Complicated cases of Severe Acute Malnutrition have a very high risk of dying during first 48 hours of admission. Early recognition of emergency signs and early treatment will improve likelihood of survival in hospital.*	
CONDITION	**IMMEDIATE ACTION**
Treat shock Shock is suspected in these children if the child is lethargic or unconscious, and cold hands **Plus either**: Weak fast pulse **or** Slow capillary refill (longer than 3 seconds) **Monitor closely:** children in shock need frequent monitoring of vital signs (pulse rate and volume, respiratory rate, urine output, glucose, etc)	**If child is in shock:** 1. Give oxygen. Treat and prevent hypoglycaemia and hypothermia. 2. Give IV 0.9% Normal Saline bolus fluid at 10ml/kg over 10minutes. Monitor response. 3. If there are signs of improvement (e.g. slower pulse and respirations)repeat bolus 10ml/kg over 10 minutes, until max 40ml/kg in 1 hour. Each time, check response to previous bolus before giving further fluid. Then switch to oral rehydration if further fluid is needed. If there are no signs of improvement assume child has *septic shock*: ✓ Admit to ICU for CVP line. Start inotropic support. ✓ Start broad-spectrum antibiotics (Ceftriaxone). Treat and prevent hypoglycaemia/hypothermia. ✓ Admit the child to high care bed for monitoring. Discuss further case management with your referral hospital. 4. Only transfer the child to ward once signs of shock have resolved.
Treat very severe anaemia Severe anaemia is Hb<4g/dL	**If very severe anaemia (or Hb 4-6g/dl AND respiratory distress):** 1. Give packed cells 10ml/kg body weight slowly over 4 hours. If signs of heart failure, give 5-7ml/kg packed cells. 2. Give furosemide 1mg/kg IV at the start and end of the transfusion. NB Keep a close eye for signs of fluid overload: further tachycardia, gallop rhythm, breathing even faster, puffy eyelids, enlarging liver size
Treat hypoglycaemia Hypoglycaemia is a blood glucose <3mmol/L Assume hypoglycaemia if no dextrostix available	Test blood glucose level 3 hourly, you can stop testing when it is normal and stable for 24 hours provided the child is not severely ill[26]. a) If the blood glucose <3 mmol/L in **asymptomatic** child, give orally or by NG tube: immediate feed of a "stabilizing feed (F75)", **or** 50ml bolus of 10% dextrose, **or** sugar solution 5 ml/kg b) Re-Check the Blood Glucose after 30 min, if normal continue normal feeds, monitor blood glucose to see it remains above 3 mmol/L. c) If symptomatic or unresponsive hypoglycaemia give dextrose 10%27, IV, 5 ml/kg over 2-3 minutes28. d) Re-Check the Blood Glucose after 30 min, if normal, continue feeds, monitor blood glucose to see it remains above 3 mmol/L.
Treat hypothermia Hypothermia is axillary/underarm temperature <35^{0}C.	**Take temperature** at outpatients/casualty and on admission in the ward. (Ensure thermometer is well shaken down). **If the temperature is below 36^{0}C**: a) Begin feeding straightaway (or start rehydration if diarrhoea with dehydration).

[26] If severely ill continue 3 hourly blood glucose testing
[27] Mix 0.5ml/kg 50% Dextrose with 2 ml/kg of water for injection in a syringe – give 2ml/kg of the resulting 10% dextrose solution/ alternatively give 2ml/kg neonatal maintenance solution which also contains 10% dextrose.
[28] Previously 5 ml/kg – recent APLS suggests 2ml/kg.

	b) Active re-warming: Put the child on the mother's bare chest (skin-to-skin contact) and cover them. Cover the child's head. Or clothe the child, apply a warmed blanket and place a heater or lamp nearby. c) Feed 2-3hourly (8-12 feeds in 24 hours). Monitor during re-warming Take temperature every two hours: stop active re-warming when temperature rises above 36.5^0CTake temperature every 30 minutes if heater is used because the child may become overheated.
Emergency Eye Care Corneal Ulceration is a sign of severe Vitamin A deficiency.	**If corneal ulceration:** 1. Give Vitamin A immediately (<6 months 50,000IU, 6-11 months 100,000 IU, 12-59 months 200,000IU) and repeat same dose the following day. Record dose given in prescription chart and RTHB. 2. Instil one drop atropine (1%) into affected eye to relax the eye and prevent the lens from pushing out. *Note: All children with clinical signs of vitamin A deficiency and children with measles should receive vitamin A on days 1, 2 and 14.*

PROTOCOL FOR THE IN-PATIENT MANAGEMENT OF CHILDREN WITH SEVERE ACUTE MALNUTRITION IN SOUTH AFRICA

"Severely malnourished children are different from other children; so they need different treatment"

CONDITION	PREVENTION	WARNING SIGNS	IMMEDIATE ACTION
1. Hypoglycaemia **(Low blood sugar)** Hypoglycaemia is a blood glucose <3mmol/L	For all children:- Feed immediately "stabilizing feed" /F75every 3 hours (8 feeds), day and night. Start straightaway i.e. on arrival at hospital and within 30 minutes after admission. (Use feeding chart to find amount to give). **Encourage mothers to stay with very ill children to watch for any deterioration, help feed and keep child warm.**	1. Low temperature (hypothermia) noted on routine check. 2. Child feels cold. 3. Child becomes drowsy or lethargic. 4. Signs of Shock 5. If blood sugar is low, monitor blood sugar every 30 minutes to 60 minutes and intervene accordingly.	**Perform Dextrostix test** in outpatients/casualty and on admission on all patients. **If conscious and blood sugar is below 3 mmol/L:-** 1. If hypoglycaemic, feed 2hourly (12 feeds in 24 hours). Use feeding chart to find amount to give. Start straightaway. Afterwards, feed 3-4hours. 2. Give 50 ml of 10% glucose (to prepare mix10ml 50% dextrose with 40ml sterile water) or sugar solution (1 rounded teaspoon sugar in 3 tablespoons of plain water) orally or if child refuses, via nasogastric tube (NG tube). If 10% glucose is not available, give sugar solution or F75 rather than wait for glucose. Test again 30 minutes after treatment. If blood sugar is still low, repeat oral 50ml 10% glucose or sugar solution. Consider putting up a short IV line. **If unconscious**, give dextrose IV (5ml/kg of sterile 10% glucose: prepare 1ml/kg 50% dextrose mixed with 4ml/kg sterile water), followed by oral 50ml of 10% glucose or oral sugar solution or via NG tube. Monitor response to treatment. Monitor blood sugar 3-hourly until stable especially in first 48hours. If blood sugar is persistently low, review feed and look for infections.
2. Hypothermia *(Low temperature)* Hypothermia is Axillary/underarm temperature <35^{0}C	For all children:- 1. Feed straightaway and then every 2-3 hours, day and night. 2. Keep warm. Cover with a blanket. Let mother sleep with child to keep child warm. 3. Keep room warm, no draughts. 4. Keep bedding/clothes dry. Dry carefully after bathing (do not bathe if very ill). 5. Avoid exposure during examinations, bathing.	1. Cold extremities 2.Lethargic 3. Poor appetite **NOTE:** Hypothermia in malnourished children often indicates co-existing hypoglycaemia and serious infection.	**Take temperature** at outpatients/casualty and on admission. (Ensure thermometer is well shaken down). **If the temperature is below 36^{0}C**: 1. Begin feeding straightaway (or start rehydration if diarrhoea with dehydration). 2. Active re-warming: Put the child on the mother's bare chest (skin- to - skin contact) and cover the child. Cover the child's head, clothe the child, apply a warmed blanket and place a heater or lamp nearby. 3. Feed 2-3hourly (8-12 feeds in 24 hours). Check temperature 3-4 hourly. Monitor during re-warming. Take temperature every two hours: stop active re-warming when temperature rises above 36.5^{0}C Take temperature every 30 minutes if heater is used because the child may become overheated.
			DO NOT GIVE IV FLUIDS EXCEPT IN SHOCK

3. Some or Severe Dehydration (without Shock) *(Too little fluid in the body)*	1. When a child has watery diarrhoea, give 10ml/kg Oral Rehydration Solution (ORS) after each loose stool to replace stool losses to prevent dehydration. 2. Treat some or severe dehydration with ORS to prevent severe dehydration or shock	Profuse watery diarrhoea, sunken eyes, slow skin pinch, absent tears, dry mouth, very thirsty, reduced urine output.	**(see Emergency Treatment Wall Chart for treating shock)** If there is some or severe dehydration: Give ORS, oral or by NG tube, 20ml/kg every hour for 4 hours (i.e. 5 mL/kg every 15min for 4hours using frequent small sips. Show the caregiver how to give ORS with a cup and spoon If child vomits wait 10 minutes and then continue more slowly. 3. Stop ORS when there are 3 or more hydration signs, or signs of over-hydration. **Monitor during rehydration for signs of over-hydration:** • increasing oedema and puffy eyelids • increasing pulse and respiratory rate Check for signs at least hourly. Stop if pulse increases by 25 beats/minute and respiratory rate by 5 breaths/minute. **Encourage caregiver to continue feeding** the child, especially if breast-feeding. **Review at least hourly** general condition, capillary filling time, level of consciousness, skin turgor, sunken eyes, respiratory rate, abdomen, if passing urine and number/quality of stools – If shock redevelops, treat for shock (see Emergency Wall Chart). If dehydration is improving – continue for up to 10 hours If there is no dehydration go to prevention 10ml/kg ORS orally after each loose stool If dehydration is not improving consider IV fluids with great care.
4. Electrolyte imbalance *(Too little potassium and magnesium, and too much sodium)*	1. Use ORS 60mmol sodium/L and F75 formula as these are low in sodium. 2. Do not add salt to food. **3. Do not treat oedema with diuretics** **Give extra potassium and magnesium (either as CMV in feeds or as a supplement)**	Oedema develops or worsens, poor appetite and apathy	1. If the child is on **Stabilizing feed with added minerals and vitamins** (CMV) they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds daily, **or** 2. **Give daily: extra potassium** (4mmol/kg/day body weight) and magnesium (0.4-0.6mmol/kg/day). **For potassium**, give Oral *Mist Pot Chloride(*MPC) solution: MPC 1ml/kg 8 hourly (1ml=1mmol K+), **AND Trace element mix** (contains MgSO4 280mg/ml, ZnSO4 36mg/ml, CuSO4 0.1mg/ml,) daily orally, **or magnesium individually**, give a single IM injection of 50% magnesium sulphate (0.3ml/kg body weight) to a maximum of 2ml. or 1ml of 2% MgS04 daily mixed with food.
5. Infections	1. Good nursing care 2. Reduce overcrowding if possible (separate room or ward for malnourished children)	NOTE: The usual signs of infection, such as fever, are often absent so **assume all** severely	**Starting on the first day, give antibiotics to all children.** 1. **If the child is severely ill** (apathetic, lethargic) or has complications (hypoglycaemia, hypothermia, raw skin/fissures, meningitis, respiratory tract or urinary tract infection) give IV/IM **Ceftriaxone 80mg/kg/day** for 7days

	3. Wash hands before preparing feeds and before and after dealing with any child. 4. Follow Guidelines for "safe preparation, storage and handling of feeds" 4. Give measles vaccine to unimmunized children over 6 months of age.	malnourished children have infection and treat with antibiotics. Hypothermia and hypoglycaemia are signs of severe infection. ***NOTE***: Ensure all doses are given. Give them on time.	2. **If the child has medical complications** but not seriously ill, give IV/IM **Ampicillin**: 50mg/kg IM/IV 6-hourly for 7 days AND **Gentamicin**: 6mg/kg IM/IV once daily for 7 days. If a child fails to improve after 48 hours, **search for new infection, then** change to Ceftriaxone 80mg/kg daily IM/IV for 5-7 days (or guided by local microbiological flora). If child does not improve after 5 days • Refer to higher level of care *3.* **If the child has no medical complications,** give antibiotics orally **Amoxicillin** 30mg/kg/dose 8-hourly for 5 days ***NOTE***: *Avoid steroids as these depress immune function. Give measles vaccine if due. Continue use of cotrimoxazole to prevent PCP pneumonia if indicated.* **Treat for intestinal infestation (parasitic worms)** once stable: 1-2 yrs old **or**< 10kg Mebendazole 100mg po bd for 3 days > 2 yrs **and**> 10kg Mebendazole 500mg po single dose **Investigate for TB**. Do Tuberculin Skin Test and read it within 48 hours. Record the findings. **Counsel and Test for HIV**. Record the findings.

CONDITION	MANAGEMENT
6. Micronutrient Deficiencies	**Give**: **1. Vitamin A orally on day 1.** If under 6 months give 50,000 units; if 6-11 months give 100,000 units; and if 12-59 months give 200,000 units. If the child has any signs of vitamin A deficiency (eye changes: xeropthalmia/drying of the eye), **repeat** this dose on day 2 and day 14. Children with severe measles should receive vitamin A on days 1,2 and 14 **2. Folic acid 2.5mg daily orally.** (Folic acid is in CMVC, if CMVC is used in feeds then give only the 5mg dose of day 1) **3. Multivitamin syrup 5 ml daily orally.** (Multivitamins are in CMVC, so if CMVC is used in feeds then omit the syrup 4. If the child is on **Stabilizing feed with added minerals and vitamins** (CMVC) they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds, **or** 5. If CMV is not used, **give daily orally trace element mix (TEM)** (ZnSO4 36mg/ml, CuSO4 0.1mg/ml, MgSO4 280mg/ml): 2.5ml if weight up to 10kg OR 5ml if weight ≥ 10kg **6. If CMV or TEM not available then give elemental Zinc** (2mg/kg body weight/day) and copper sulphate solution (0.3mg Cu/kg body weight/day). **7. Start iron** (2mg/kg/day) when you change to the F100 catch-up formula. **(DO NOT GIVE IRON IN THE INITIAL & STABILISATION PHASE EVEN IF ANAEMIC)**
7. Stabilisation feeding (stabilisation phase)	**1. Give stabilizing feed** (F75- feeding chart for volumes). These provide Energy: 100kcal/kg/day and Protein: 0.9g /kg/day. The fluid requirement is130ml/kg/day. **2. Give 8-12 feeds over 24 hours.** Monitor intake and output (vomiting, diarrhoea, urine output) in Feed Chart/Fluid Balance Charts. Keep a 24-hour intake chart. Measure feeds carefully. Record leftovers. 3. If the child has **gross oedema (Oedema 3+), reduce the volume to 100 ml/kg/day** (see F75 feed chart for gross oedema for volumes)

	4. If the child has poor appetite, **encourage the child to finish the feed**. If not finished, keep the leftovers and re-offer later. If less than 80% of the amount offered is not taken, insert a nasogastric tube in order to feed the child. If in doubt, check feeding chart for intakes. 5. If the child is breastfed, **encourage continued breastfeeding**. **6. Weigh daily** and plot weight daily.
8. Transition feeding and Catch-up growth rehabilitation phase	**1. Transition to catch-up feed (F100)**[29] as soon as appetite has returned (usually within one week) and/or oedema is lost or is reduced. Change to F100 (this provides energy: 150-220Kcal/kg/day and Protein: 4-6 g/kg/day). **Transition Phase**: for 2 days, replace F75 with the same amount of F100. On day 3, increase each feed by 10ml until some feed remains. **2. Give 8 feeds over 24 hours**. As the child is eager to eat, progress to 5 feeds of F100 and 3 specially modified family meals, high in energy and protein. Ready-to-Use Therapeutic Food (RUTF) may be introduced and given at discharge for catch-up growth. **3. Encourage the child to eat** as much as possible, so that the child can gain weight rapidly. If the child has finished everything, offer more and increase subsequent feeds. Make sure that the child is actively fed. Involve the mother/caregiver in the feeding all the time. **4. Weigh daily** and plot weight daily. Use daily weight chart for recording and monitoring weight changes.
9. Loving care, play and stimulation	**1. Provide** tender loving care **2. Help and encourage mothers** to comfort, feed, and play with their children **3. Involve mother/caregiver** in all the play/stimulation exercises. **4. Involve an occupational therapist** and /or physiotherapist to plan a stimulation programme for the ward. **4. Give structured play** when the child is well enough.
10. Preparation for follow-up after discharge	**1. Investigate for TB**. Repeat Tuberculin Skin Test if initial response was negative, and read it within 48 hours. Record the findings. **2. Ensure counselling and Test for HIVs was done. Record the findings.** **3. Involve mother** in the discharge process and follow-up plans. 3. Obtain information on family background and **socio-economic status**. Refer to Social Services (SASSA, Social Development, Home Affairs) and/or hospital social workers **4. Give health and nutritional education.** Issue mother/caregiver with the **Family Booklet for Child Health**. Share educational messages about the child and self or example, Family Practices booklet containing information on when to return urgently to Clinic, hygiene, infant feeding and complementary feeding advice, stimulation, family planning, HIV, immunization, role of male partner). Work with Dietician to counsel mothers/caregivers on how to modify family foods, how often to feed and how much to give. **5. Register** child on **the Severe Acute Malnutrition In-Patient care register**. Ensure the child is counted onto the district health information system (**DHIS**) admissions, discharges and/or deaths tally sheet. 6. Establish a link with local PHC Clinic and family's local Community Care Givers (CCG's) for **home follow-up**. **6. Discharge Criteria**: Discharge when there are signs of improvement: Good appetite, infection resolved, oedema resolved **AND** consecutive weight gain for 5 days (>5-10g/kg/day) 7. Prepare a **Discharge Summary** and write a brief clinical summary in **RTHB**. 8. Send a **referral letter to the local PHC clinic**. Ensure child is enrolled on nutrition supplementation programme at local clinic or child returns to hospital outpatient in one week.

[29] Do not give F100 to children below 6 months. Encourage mother to breastfeed, try diluted F100 or choose an appropriate infant formula

NOTES

INTEGRATED MANAGEMENT OF CHILDREN WITH ACUTE MALNUTRITION IN SOUTH AFRICA

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