

KZN Guidelines on the Integrated Management of Acute Malnutrition (IMAM)



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

**GUIDELINES ON THE
INTEGRATED
MANAGEMENT
OF ACUTE
MALNUTRITION (IMAM)
IN
KWA-ZULU NATAL**

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KZN Department of Health Provincial Nutrition Directorate, District Nutrition Co-ordinators, and Facility Based Dietitians and Nutritionists

KZN CMAM Guidelines 2012

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List of Abbreviations

ADD	Admissions, Discharges and Deaths
AIDS	Acquired Immuno Deficiency Syndrome
ART	Antiretroviral Therapy
CMV	Complex for Minerals and Vitamins
CVP	Central Venous Pressure
DHIS	District Health Information System
EBF	Exclusive Breastfeeding
FBDG	Food Based Dietary Guidelines
GMPs	Growth Monitoring and Promotion Support
GMPr	Growth Monitoring and Promotion Routine
HIV	Human Immunodeficiency Virus
IC	Infant Cereal
ICU	Intensive Care Unit
IMCI	Integrated Management of Childhood Illness
IV	Intra venous
IYCF	Infant and Young Child Feeding
LFED	Lactose Free Energy Drink
MAM	Moderate Acute Malnutrition
MDT	Multidisciplinary Team
MUAC	Mid Upper Arm Circumference
MVT	Multivitamin Syrup
NAM	Not acutely malnourished
NFCS	National Food Consumption Survey
NG	Nasogastric Tube
NRAST	Nutrition Risk Assessment and Screening Tool
NSP	Nutrition Supplementation Programme
ORS	Oral Rehydration Solution
OTP	Outpatient Therapeutic Programme
OSP	Outpatient Supplementary Programme
RtHB	Road to Health Booklet
RUTF	Ready to Use Therapeutic Feeds
SAM	Severe Acute Malnutrition
SD	Standard Deviation
TB	Tuberculosis
VAD	Vitamin A Deficiency
WHZ	Weight for Height / Length score
WAZ	Weight for Agez score
WHO	World Health Organization



1. BACKGROUND

1.1 The Problem

Poverty remains a problem in South Africa, and KwaZulu-Natal (KZN) bears a substantial part of the national burden of poverty. The District Health Barometer (HST, 2010) shows KZN being one of three provinces with the most deprived Districts where 63% to 82% of households live on less than R800 per month. In addition, the 2008 findings of the National Income Dynamics Study (NIDS) also depicts KZN as having poverty rates of 63-80%. In 2008, 70.9% (2.902 million) of children in KZN lived in income poverty. In 2008, 54.5% of children (0-17 years) were found to be living in formal housing. However 49.4% were living in households with drinking water on-site, 50.6% with basic sanitation and 67.6% with an electricity connection. Poverty is associated with malnutrition and disease. Food insecurity frequently leads to poor nutrition, which in turn affects the functioning of the immune system, leading to increased susceptibility to disease. There is a synergistic effect between malnutrition, HIV and TB which has led the Academy of Sciences of South Africa to conclude that "South Africa is in the grip of three concurrent epidemics: malnutrition, brought about by a conglomeration of socio-economic factors; HIV/AIDS, caused by the human immunodeficiency virus; and active TB, caused by progressive infection with Mycobacterium tuberculosis. Although caused by separate factors, there is evidence that each epidemic acts synergistically to aggravate the other two" (ASSAF 2007). Disease in turn limits the ability to work or look for employment, thus creating a cycle of poverty and disease that is very difficult to break. Poor access to existing health services and inadequate knowledge on how to prevent illness and care for the sick children at community and household levels are further factors contributing to high rates of death of mothers and children. 34% of children who die in KZN are malnourished and 50% have clinical evidence of AIDS (Saving Children Report 2011).

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. Severe wasting during the first 24 months of life leads to a loss of up to 18 points of an individual's expected intelligence quotient score. The negative impact of undernutrition on the physical and mental potential of the population diminishes national productivity, costing countries as much as 3 percent of their gross domestic product. Addressing the majority of the global burden of undernutrition requires that nutrition programmes be integrated into health systems in sustainable ways. Some 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.

1.2 Purpose of the Guideline

It is against this background that the current guidelines on Integrated Management of Acute Malnutrition (IMAM), addresses the issue of improved management of severe acute malnutrition (SAM), particularly in children under 5 years of age. In the absence of standard protocols, mortality in children admitted to hospital with SAM can range between 20 -30% with the highest levels of 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%. These provincial guidelines on IMAM in KZN, includes inpatient care protocols on the management of SAM, and outpatient and community outreach components to manage moderate acute malnutrition (MAM) and prevent deterioration to SAM. Community outreach is an essential part of the IMAM approach since the success of the service relies on early detection and referral of cases with SAM through community participation, with an aim to reach children particularly early in the development of the acute malnutrition condition.

The FANTA (Food and Nutrition Technical Assistance) Generic Guidelines upon which the KZN CMAM 2012 Guidelines were based provide an excellent overview of the comprehensive package for Community Based Management of Acute Malnutrition which is a proven approach for effectively managing acute malnutrition. However, current capacity in the province prevents us from implementing the programme as is, and thus a gradual development towards implementation of such a programme is proposed. These guidelines aim to provide practical and easy-to-follow guidance based on WHO recommendations and the overall concept of CMAM recommended by FANTA. The Guidelines seek to improve early case detection and referral of SAM and MAM cases, the management of SAM in children 6 – 59 months in inpatient care and follow up to recovery in outpatient care, and community based frameworks. Infants under 6 months with SAM follow a specific treatment protocol in inpatient care only and guidance on outpatient management is provided for individual consultations. Whilst the focus of this guide is on children under 5, guidance is provided in section 4.3 on nutrition supplementation for the outpatient management of MAM and SAM in children over 5 years, adults and pregnant and lactating women. The principles of inpatient treatment are adapted from the WHO Ten Steps to managing SAM at health facilities (Appendix 23: Protocol for the inpatient Management of children with severe acute malnutrition in South Africa). Adaptations to the WHO protocol have been made in consultation with the National Department of Health: Nutrition Directorate and KZN Provincial Department of Health: Paediatrics and Child Health. The guideline is intended for doctors, nurses and dietitians and other health care workers who are responsible for the medical, dietary, social and rehabilitative management of children with SAM in KZN.

The guidelines also include a monitoring and evaluation framework to ensure compliance to the policy at all levels of care. In addition to clinical monitoring and evaluation, the district and provincial monitoring and evaluations will be used to strengthen the management support of the implementation of the guidelines at facility level.

Although dietitians are considered the custodians of nutrition information at facility level, implementation of this guide requires a strong multidisciplinary approach. A standardised, modular based multidisciplinary team (MDT) training will be developed and facilitated from the provincial office. District and facility based trainings will be expected to use the standardised training material.

1.3 Principles of the Integrated Management of Acute Malnutrition (IMAM)

For a number of years, the main intervention for the treatment of SAM globally has been inpatient care provided either in paediatric wards or specialised therapeutic feeding centres, and next following the WHO 1999 treatment protocol for SAM. The use of MUAC as an independent criterion for SAM for children is also approved and makes detection of SAM in the community and at the health facility simple and treatment more effective. WHO recommends that the majority of children with SAM over 6 months who have appetite and no medical complications can be treated in outpatient care without the need to have in patient treatment however we have found in KZN that SAM children are often brought in too late for referral resulting in higher case fatality, and thus decided to refer all SAM children < 5 years for admission. Deaths due to SAM are often due to poor primary case detection and referral, and poor adherence to the stabilisation and resuscitation protocol (Appendix 22: Severe Acute Malnutrition Emergency Treatment in South Africa). In admitting those SAM children without medical complications it is expected that they will recover faster and be discharged sooner than SAM children with complications.

The guidelines give guidance on how the improved PHC Engineering Structure in KZN will contribute to the community outreach element of IMAM to improve early case detection and referral, thereby reducing deaths. As the community outreach element is strengthened, the vision for IMAM in KZN is for SAM patients without medical complications to be treated at PHC level as outpatients.



1.3.1 Community Outreach

Good community outreach is essential to make sure that undernourished children are detected early and referred for treatment. The aim is to detect and start the treatment of SAM before the onset of life-threatening complications.

Several strategies are in place in KZN to promote community outreach by improving access to healthcare. Some of these strategies are outlined below:-

Operation Sukuma Sakhe (OSS)

Operation Sukuma Sakhe is a holistic program that deals with individual, household and community needs. This program addresses the challenges of extreme poverty and food insecurity which affects people in KZN. It focuses on creating healthy and sustainable communities and providing an integrated program addressing empowerment of women, children and the vulnerable groups.

Within OSS there is a Poverty Package that is aimed at addressing the immediate concerns pertaining to food security, basic household nutritional needs and asset investment into the households to create sustainability and self-sufficiency.

The Objectives of the Poverty Package

- The Poverty Package seeks to address the challenges:
 - of high incidences of malnutrition, hunger and related social ills within KZN;
 - accelerate the response to poverty and hunger;
 - ensure asset investment into households to create sustainable living;
 - ensure community buy-in and ownership of process; and
 - putting in place continuous monitoring on interventions.

The beneficiaries are pregnant women, lactating women (ill and food insecure), non-breastfed children (HIV affected, working mothers, food insecure households), malnourished children and adults and the elderly. The role of the Department of Health in the poverty package is to ensure early detection and early referral of individuals at risk and those who are already malnourished (See Appendix 21: Referral Pathway).

PHILAMNTWANA CENTRE'S

The aim of the PhilaMntwana centre is to reduce infant and child mortality. The nutritional and health status of all children under 5 years is monitored on a monthly basis. The services include Nutrition education, Vitamin A supplementation of children 12 – 59 months, growth monitoring and promotion (GMP) and referral to health facilities when required. The centres are run by Community Caregivers (CCG's) and they provide preventive and promotive services. GMP is an essential programme in preventing the development of both acute and chronic malnutrition. The creation of PhilanMntwana centres is envisaged to increase access and coverage to GMP at community level, thereby promoting early detection and early referral of malnourished children.

The "PHILA MNTWANA CENTRE" is an integral part of the OSS War Room

Data and information generated from the services provided should form part of the health agenda in the War Room meetings. The War Room convener and the Local Ward Councillor should be provided with reports on the health status of the children in the community at every War Room meeting. The Desk Charts should be updated and discussed at this level. These should inform interventions as deemed necessary.

Strengthening of Nutrition Services at PHC level

Integrated Management of Childhood Illnesses (IMCI)

Review of the Integrated Management of Childhood Illnesses (IMCI) booklet is currently being finalised by the National Department of Health: Child Health. This update will include an IMCI process flowchart on assessment, classification and treatment of malnutrition, as well as growth failure. It is expected that the chart booklet will be implemented from February 2014 and therefore provides a tool that will enable the IMCI trained healthcare worker to manage a malnourished child at PHC. This will assist with the early detection of at risk as well as already malnourished children under 5 years.

The Nutrition Advisor Programme

By April 2014, almost all fixed clinics across the province will have a permanently employed Nutrition Advisor (NA). The NA's were trained on basic nutrition and skilled on assessing nutritional status, classifying malnutrition and counselling on nutrition education amongst other topics. The placement of these advisors will promote increased case detection of malnutrition at community level and increase follow up support of malnutrition cases at community level.

Dietitian visits to PHCs

All clinical dietitians are required to visit a PHC facility once a month. With a target of 300 clinics per quarter, it is envisaged that all clinics will be visited at least twice in a year by a clinical dietitian. The provincial nutrition directorate has developed guidelines and tools for the dietitians that will guide them on monitoring and evaluating nutrition services at PHC level. The purpose of the guidelines is:

- To inform dietitians of the monitoring and evaluation process to be followed when visiting PHCs.
- To ensure that PHCs are given sufficient support to ensure appropriate, sustainable implementation on the INP.
- To improve the linkage between PHCs, hospitals, dietitians and nutrition advisors.
- To provide healthcare facilities with guidance on the implementation of nutrition interventions.
- To ensure that facilities understand their roles and responsibilities in the INP.
- To monitor and evaluate the role of nutrition advisors in the INP implementation at the facility.



2. ASSESS & CLASSIFY

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:

- SAM - defined by the presence of bilateral pitting pedal oedema or severe wasting (very low weight for length / height <-3 z-score) or MUAC <11.5 cm (in children 6 – 59 months). It is associated with other clinical signs such as a poor appetite. A child with SAM is highly vulnerable and at high risk of death.
- MAM - defined by moderate wasting (low weight for height/length z-score between -2 and -3 SD). MUAC between 11.5 and 12.4cm.

2.2 Pathophysiology of SAM

There are approximately 40 known essential nutrients which, 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 nutrients. 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, 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, children with SAM need to be provided with systematic medical treatment 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.

2.3 Why are SAM cases treated differently?

Children with same need to be treated carefully and differently from other children as their organ function is compromised and poor treatment can result in deterioration and death very quickly. The following points are some of the reasons why they needed to be treated differently:-

Invisible differences in children with SAM (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, puts child at risk of cross infection: unable to produce usual signs of infection, like fever.

2.4 Assess, Classify and Treat

2.4.1 Admission and Initial Treatment Procedures (0 – 59 months)

Step 1: Prioritize children that are clinically unwell to have first access. Welcome the child and caregiver. Provide shelter and drinking water.

Step 2: Define Nutritional Status. Check for bilateral pitting oedema, measure MUAC (6 – 59 months), weight and height. Refer to Weight for Length/Height Charts (Appendices 15 & 16). Record all measurements in the RtHB. All cases with oedema require admission. Classify as SAM, MAM or Not Acutely Malnourished (NAM) but at risk for malnutrition. All SAM patients are referred to inpatient management. In the event that a child with SAM without medical complications is not admitted, refer to Appendix 18 for the Outpatient Protocol for SAM patients without medical complications.

Step 3: Conduct a Medical Assessment. Take the child's medical history, conduct a physical examination. Determine if the child has a minor health problem. Record in RtHB. Refer any child with acute medical complications on IMCI Assessment (General Danger Sign, Pneumonia, Diarrhoeal Disease, Severe Anaemia, Fever) to inpatient care.

Step 4: Record treatment protocol (Inpatient Care or Outpatient Care (Growth Monitoring and Promotion Routine (GMPr), Growth Monitoring and Promotion Support (GMPs), Outpatient Supplementary Programme (OSP) or Inpatient Care). Every child must be assigned a nutrition classification at each visit.

Grades of Bilateral Pitting Oedema (Grading will affect feed volumes)

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

Assess¹ and classify children with SAM according to table 1. In KZN the current decision has been taken to refer all SAM cases for inpatient care considering that:-

- Majority of SAM cases are HIV / TB cases that require medical management.
- Most SAM deaths are due to late admissions and thus present with severe medical complications.
- SAM Admissions without medical complications will not follow the same 10 step protocol but will commence management in the rehabilitation phase to promote catch up growth.

Table1: Classification of SAM and MAM in children (0 – 59 months)

SEE NRAST POSTER FOR CHILDREN Appendix 19

Assess	Classify	Treat or Manage
Age: < 6 months Any of: <ul style="list-style-type: none"> • WLZ <-3SD or • Bilateral pitting oedema (all grades) or • Visible wasting and • Any IMCI Danger Sign 	SAM with complications	Admitted to hospital for inpatient stabilization care using the standard malnutrition protocol
Age: 6-59 months (with complications) WLZ or WHZ <-3SD or MUAC <11.5 cm Or Bilateral pitting oedema (all grades) and (any one sign) <ul style="list-style-type: none"> • No appetite • Not alert (lethargic) • IMCI general danger sign 		
Age: 6-59 months (without complication) WLZ or WHZ <-3SD or MUAC <11.5 cm AND <ul style="list-style-type: none"> • Good appetite • Alert • No IMCI general danger signs 	SAM without complications	Admitted to hospital for inpatient care. The MDT team should be made aware that this is a SAM child without complications and the patient is commenced on rehabilitation phase. Should the patient not be admitted for any reason, discharge via Dietitian for management on the Outpatient Therapeutic Programme (OTP) (Appendix 18).
Age: 0 – 6 months WHZ between -3SD & -2SD Not gaining weight / Weight loss	MAM	IMCI Feeding Assessment and Counselling (Appendix 13)
Age: 6 – 59 months MUAC between 11.5cm – 12.4cm or WHZ between -3SD & -2SD	MAM	Outpatient Supplementary Programme (OSP)

¹ All cases should be assessed for TB and HIV. If TB and/or HIV is present, refer SAM patient to hospital.

<p>Age 6 – 59 months MUAC >12.5cm WHZ between $\geq 2SD$ Assess the growth curve in the RtHB.</p>	<p>Not Acutely Malnourished but at risk for malnutrition: Poor weight gain No weight gain Weight loss</p>	<p>Growth Monitoring and Promotion Support (GMPs)</p>
<p>Age 0 – 6 Months Gaining weight well Feeding well Age 6 – 59 months Gaining weight well >-2 SD MUAC > 12.5cm Assess the growth curve in the RtHB</p>	<p>Not Malnourished Growing well</p>	<p>Growth Monitoring and Promotion Routine (GMPr)</p>

Complications to be assessed in a child with SAM in the SA treatment regime

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

- Less than 6 months old
- Anorexia (poor appetite)
- Intractable vomiting
- Convulsions
- Lethargy
- Unconsciousness
- Hypoglycaemia
- High fever (> 39°C)
- Hypothermia (< 36 °C)
- Severe dehydration
- Lower respiratory tract infection
- Persistent diarrhoea
- Respiratory distress e.g. tachypnea, chest in drawings
- Severe anaemia
- Eye signs of vitamin A deficiency
- Skin lesions
- Bleeding
- Shock
- Jaundice
- Weeping skin lesions
- Social complications impacting on care



3. INPATIENT MANAGEMENT OF SAM

SAM Patients admitted into inpatient will be of 2 categories.

SAM with complications - follow WHO ten step protocol from Step 1.

SAM with appetite and without complications - progress to rehabilitation phase.

The treatment has two phases, the stabilization phase, and the rehabilitation phase. There is gradual transition from the stabilization to rehabilitation phase. During the stabilization phase, the aim is to restore the cellular function, control infection, ensure the child is kept warm, receives appropriate nutritional 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 transition and rehabilitative feeding begin - usually after 3 to 7 days.

During rehabilitation phase, the child needs to rebuild body stores and wasted tissue. This phase is characterized by improving appetite and rapid weight gain. During this phase active social worker intervention should be facilitated and reestablishment of breastfeeding to ensure proper latching and feeding technique. The nutritional status of lactating mothers of all children less than 2 years should be assessed and she should be supplemented if necessary. Before discharge from inpatient care therapeutic targets must be met and appropriate follow up arranged. All healthcare workers managing the child with SAM at any point should be familiar with the referral pathway (Appendix 21)

Table 2 depicts a treatment timeline for SAM.

Table 2: Treatment timeline

Time frame for inpatient management severe acute malnutrition			
	Stabilisation		Rehabilitation
	Days 1-2	Days 3-7	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

Step 1: Treat / Prevent Hypoglycaemia and Initiate “Stabilizing” Feeding

Hypoglycaemia and hypothermia usually occur together and is a sign of infection. Check for hypoglycaemia whenever hypothermia occurs. Frequent feeding is important in preventing both conditions. Coexisting hypoglycaemia and pyrexia is also an indicator of the child needing urgent medical attention.

Treatment

Begin feeding immediately and do not miss feeds. Feed using a cup or spoon. Give a “stabilizing feed”² in a volume of 130 ml/kg/day divided into 3 hourly feeds, i.e. 16ml/kg 8 times daily. This feed will provide approximately 100kcal/kg/day of energy and 0.9g/kg/day of protein. 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/kg/day³.
- If danger signs, hypothermia or hypoglycaemia are present, feed a volume of 130 ml/kg/day **but** divided into 2 hourly feeds, i.e. 11 ml/kg 12 times daily, until these resolve.
- If the child is breastfed, encourage continued breastfeeding, but stabilizing feed is the priority. Give stabilizing feed and breastfeed in between.

Children below 6 months should be offered F75 as therapeutic feed if full breastfeeding is not established.

- If feeds are refused/not finished (child should take at least 80% of each feed)⁴ give the feeds via nasogastric (NG) tube. Prioritize oral feeding and only feed the leftover feed via NG tube. Check placement of tube before commencing feeding.
- 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 and plot the weight daily
- The only exceptions to feeding immediately are:
 - While shock is being corrected
 - Surgical abdominal emergency

Detect and Treat low blood sugar

- Test blood glucose level 3 hourly, you can stop 3hrly testing and resume routine testing when it is normal and stable for 24hours provided the child is not severely ill⁵.
- If the blood glucose <3 mmol/L in asymptomatic child give:
 - “stabilizing feed” immediately, **or**
 - sugar solution, oral, 5 mL/kg **or**
 - 50ml bolus of 10% dextrose

² F75- is a stabilizing 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. A table of feed volumes - Appendix 4

³ A table of feed volumes for gross oedema - Appendix 5

⁴ A table of total volumes taken is found - Appendix 4 or 5

⁵ If severely ill continue 3 hourly blood glucose testing



Check the Blood Glucose after 30 min. If the blood glucose is ≥ 3 mmol/l, continue normal feeds, monitor blood glucose see it remains above 3 mmol/L.

- If symptomatic or unresponsive hypoglycaemia give dextrose 10%⁶, IV, 2 mL/kg over 2-3 minutes.
 - Re Check the Blood Glucose after 30 min, if normal, continue feeds, monitor blood glucose see it remains above 3 mmol/L.

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

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 exclude other causes such as meningitis.

⁶ 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.

Step 2. Treat and Prevent Hypothermia

Treat immediately if the temperature is below 36.5°C

- Begin feeding straight away (or start rehydration if diarrhoea with dehydration)
- Facilitate active re-warming. This involves:-
 - Putting the child on the mother's bare chest (skin-skin contact) i.e. wrap mother and child in blankets – minimize clothing between the mother and child to ensure heat transfer to the child.
 - Place a heater nearby.
 - If no mother is present, or if mother-child heating is not possible, clothe and wrap the child, including the head with warmed blanket.
 - If warmed water bottles are used due to failure of all other options **do not apply direct heat to the skin** as they may burn the child – place warmed water bottles outside of the blankets wrapping the child.

Monitor

- During reheating check temperature every 30minutes until stabilized > 36.5°C as children with SAM are also not able to prevent themselves becoming overheated (hyperthermic) which is also dangerous.
- Record temperature, pulse and respiration rates every 4 hours
- To keep a child warm ensure the following
 - Keep the child, and especially the head, covered at all times especially at night.
 - Keep the child and clothing dry and change wet napkins regularly.
 - Avoid exposure during examination or bathing
 - Care for child in a warm area,(i.e. 25–30°C), away from window and avoid drafts
 - Ensure regular correct feeding
- Check underarm (axillary) temperature 3-4 hourly (after each feed is a good time). An axillary temperature < 36°C indicates urgent need to warm child.

Note: If a low reading thermometer is unavailable and the child's temperature is too low to register on an ordinary thermometer, assume the child has hypothermia.



Step 3. Prevent and treat dehydration

These children have poor cardiac function and are easily volume overloaded – Avoid intravenous (IV) infusions.

A child with SAM and diarrhoea is at serious risk as they have poor ability to respond to both shock and to fluid overload.

The most critical factor in managing a child with dehydration or shock is regular observation of the response to each therapeutic intervention.

Note: after treatment of shock reassess immediately, children on rehydration need 4 hourly assessments.

Anti-diarrhoeal medications are not used, i.e. kaolin and pectin, atropine and diphenoxylate, loperamide, antiemetics or pre/probiotics in the management of acute diarrhoea.

Determine if the child is in shock using table 3 and treat according to table 4.

Table 3: Recognizing shock and dehydration

Recognizing shock and dehydration	
Shock is recognized 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 (≥ 2 sec)	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 4: Treating child in shock and the child not in shock for dehydration

Patient in shock	Patient not in shock
<p>Give oxygen and treat immediately with normal saline (sodium chloride) 0.9%, IV, 10ml / kg given as a bolus over 10 minutes and monitor for a response.</p> <ul style="list-style-type: none"> ● Reassess for presence of shock or circulatory overload. If shock has resolved proceed to manage dehydration. Monitor every 10 minutes for signs of circulation overload. ● If signs of circulation overload are present – increasing liver span, rising pulse and respiratory rate, gallop rhythm, basal crepitations – stop infusion, manage appropriately. Consider need for referral for intensive care and inotropes. ● If shock has not improved or not resolved:- Repeat the fluid bolus while shock remains (providing evidence that circulatory overload is not present) until improvement is achieved, up to 4 times ● After the 4 x10ml/kg boluses, i.e. total of 40 ml/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. ● Once shock has been treated and the child is stable proceed to the management of dehydration. 	<p>Check for Dehydration</p> <p><i>If no dehydration present</i></p> <p>Show the caregiver how to give ORS with a cup and spoon using frequent small sips.</p> <p>Encourage caregiver to give 10 ml/kg after each diarrhoeal stool until diarrhoea stops.</p> <p>Continue to give normal feeds and reassess for dehydration frequently.</p> <p><i>If dehydration (severe or some dehydration) is present</i></p> <ul style="list-style-type: none"> ● Give ORS for malnourished children (5ml / kg / every 15 minutes for 4 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 4 hours: general condition, capillary filling time, level of consciousness, skin turgor, sunken eyes, respiratory rate, abdomen, if passing urine and number/quality of stools ● Note: If shock redevelops - treat as above for shock. <ul style="list-style-type: none"> ● If dehydration is improving - continue ● 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 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.

Table 5: IV fluid rates according to weight

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

If a child has very severe anaemia (<4g/dL) or severe anaemia (Hb 4-6g/dL) with respiratory distress:-

- Give packed cells 10ml/kg body weight slowly over 4 hours. If signs of heart failure, give 5 – 7ml / kg packed cells.
- Give furosemide 1mg/kg IV at the start and end of the transfusion.
- Keep a close eye for signs of fluid overload: further tachycardia, gallop rhythm, breathing even faster, puffy eyelids, enlarging liver size.

Encourage oral feeds to begin once level of consciousness is normal and child is not in severe distress.

Table 6: Response to assessment of child on IV treatment

Finding on assessment	Response
Shock	Treat for shock
No improvement or more dehydrated	Increase drip rate by 25%
Improving clinical condition	Continue current drip rate
No visible dehydration	Decrease drip rate by 30% until low enough to change to oral prevention
Repeat cycle 4 hourly until drip rate is low enough with no visible dehydration.	

Step 4: Correct Electrolyte Imbalance

All severely malnourished children have excess body sodium even though plasma sodium may be low (giving high sodium loads can kill). Deficiencies of potassium and magnesium are also present and may take at least 2 weeks to correct. Oedema is partly due to these imbalances. Do not treat oedema with a diuretic.

Electrolytes

- If the child is on Stabilizing feed (F75) which is not readily prepared but **with added** minerals and vitamin mix or if the child is on ready made commercial stabilizing feed, (Appendix 3), they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds.

In some situations where serum potassium levels are high (hyperkalemia) do not give additional potassium.



Step 5: Treat / Prevent Infection

In SAM, the usual signs of infection such as fever, are often absent and infections are often hidden. Early treatment of bacterial infections with effective antimicrobials improves the nutritional response to feeding, prevents septic shock and reduces mortality. Antibiotic use should be guided by local microbiological flora and the paediatric EDL. This guideline recommends:-

- Broad spectrum antibiotics AND
 - Measles vaccine if the child >6 months and not immunised. Delay if the child is in shock.
- 1. If child is severely ill (apathetic, lethargic) or has complications (hypoglycaemia, hypothermia, raw skin/fissures, meningitis, respiratory tract or urinary tract infection) and suspected to have /has severe sepsis⁷, give**

- Ceftriaxone IM/IV 100mg/kg daily for 7 days⁸

2. If child has complications without severe sepsis and not seriously ill give:

- Ampicillin 50mg/kg IM/IV 6-hourly for 7 days. Change to oral therapy after 2 days i.e. Amoxicillin 30mg/kg/dose 8 hourly for 7 days AND
- Gentamycin 7.5mg/kg IM/IV once daily for 7 days.

If child fails to improve after 48 hours, search for new infection then change to 3rd generation antibiotics, give

- Ceftriaxone IM/IV 100mg/kg daily for 5-7 days OR

If child does not improve after 5 days

Consult and/or refer to higher level of care

3. If the child has no complications, give antibiotics orally

- Amoxicillin 15mg/kg 8-hourly for 5 days

NOTE: Avoid steroids as these depress immune function. Continue use of cotrimoxazole to prevent PCP pneumonia if indicated.

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

Children 1–2 years

mebendazole, oral, 100 mg twice daily for 3 days

Children over 2 years

mebendazole, oral, 500 mg as a single dose immediately

5. Investigate and exclude tuberculosis (TB) and HIV

⁷ Severe sepsis includes serious bacterial infection presenting as septic shock meningitis, bacteraemia, urinary tract infection.

⁸ Avoid in the 1st month of life – rather use cefotaxime 50mg/kg/dose 6H IV

TB

- Do tuberculin skin test and read it within 48 hours
- Consider immediate empiric treatment of TB if there is strong evidence that it may be present e.g. CXR changes.

HIV

- Counsel and test for HIV. Record the findings.
- HIV treatment should normally be delayed until the acute phase of stabilization is completed – this will also allow time for some counselling before initiating HIV treatment, if it is required, during the rehabilitation phase.

6. Malaria

- Antimalarial treatment if the child has a positive blood film for malaria parasites.



Step 6: Correct Micronutrient Deficiencies

This step aims to correct micronutrient deficiencies.

Micronutrients

Vitamin A

- Give single age specific high dose Vitamin A capsule if the child has severe measles and / or clinical signs of Vitamin A deficiency and / or diarrhea.
- For children without the above complications and who are receiving F75, F100 or RUTF, no high dose Vitamin A supplementation is required.

Folic Acid

Only give stat dose of 5mg on day 1. Do not give daily dose of folic acid and MVT if CMV mix is given or if a child is on F75, F100 or RUTF.

Iron

- Only give Iron after the stabilization phase is completed. Iron supplementation is only given once the child is gaining weight and oedema has resolved – usually after 7 days. Give, 3mg/kg elemental iron⁹ per dose 8 hourly with meals when the child is on F100. Stop iron when child is taking full prescribed amount of RUTF.
- In children that are HIV positive, check iron status using Ferritin test before supplementing.

⁹ See elemental iron preparation - appendix 8

Step 7: Start Cautious Feeding

In the stabilisation phase a cautious approach is required because of the child's fragile physiological state and reduced homeostatic capacity. Feeding should be started as soon as possible after admission and should be designed to provide just sufficient energy and protein to maintain basic physiological processes. The essential features of feeding in the stabilisation phase are:-

- Small, frequent feeds of low osmolarity and low lactose
- Oral or nasogastric feeds (never parenteral)
- Energy: 100kcal / kg / day
- Protein: 0.9 - 1.0g/kg/day
- Feed Volume: 130ml / kg / day fluid when there is no oedema or mild (+, ++oedema)
- (100ml /kg /day) if the child has gross oedema (+++)
- Continued breastfeeding for breastfed children.

The suggested F75 starter feeding schedules are designed to meet this need. Give from a cup. Very weak children may be fed from a spoon, dropper or syringe. Volume and feeding frequency is gradually increased.

Table 7: F75 Starter feeding schedule

Days	Frequency	Vol / kg / Feed	Vol / kg / day
1 – 2	2 hourly	11ml	130ml
3 – 5	3 hourly	16ml	130ml
6 – 7	4 hourly	22ml	130ml

- For children with good appetite and no oedema, this schedule can be completed in 2 – 3 days.
- Appendix 4 shows the volume / feed already calculated according to body weight. Appendix 5 shows the feed volumes for children with severe oedema.
- Use the admission weight to calculate how much to give, even if the child loses or gains weight in this phase.
- If after allowing for any vomiting, intake does not reach (105ml/kg/day) despite frequent feeds, coaxing and re-offering, give the remaining feed by NG tube.

MONITOR AND NOTE:-

- Amounts offered and left over
- Vomiting
- Frequency of watery stool
- Daily body weight

During the stabilisation phase, diarrhoea should gradually diminish and oedematous children should lose weight.

HIV-infected children with SAM in whom persistent diarrhoea does not resolve with standard management should be investigated to exclude carbohydrate intolerance and infective causes, which may require different management, such as modification of fluid and feed intake, or antibiotics.

Assess ward if infection control measures are in place, particularly on handwashing and sterilising of feeding utensils and equipment.

Once the child's appetite returns to normal, usually within a week and/or oedema is lost or reduced, the wasted tissues need to be rebuilt.

- Change to a “rehabilitation / rebuilding / catch-upfeed¹⁰” known as F100 or Diluted F100 (<6 months).

Feeding starts with a **Transition period which is a cautious changeover of feed to rehabilitation feed**

Transition Process:

- For the first 2 days (day 1 and 2) replace the stabilizing feed with rehabilitation feed at equal amounts you were giving during the stabilizing feed.
- On day 3, gradually increase the volume of the catch-up feed by 10 ml per feed until some feed remains unfinished. Note for breastfed infants less than 6 months, you will not increase feeds but rather progress to Step 8 (Rehabilitation feeding using the Supplementary Suckling Technique)
- Carefully monitor pulse and respiration rate during the transition phase. If respirations increase by 5 or more breaths / min and pulse by 25 or more beats / min for 2 successive 4 hourly readings, reduce the volume per feed.

¹⁰ F100- is a nutrient dense therapeutic feed that contains 100kcal energy and 3g protein per 100ml- see appendix 6

Step 8: Achieve Catch up Growth

After the transition phase, a vigorous approach to feeding is required to achieve very high intakes and rapid weight gain of > 10g/kg/day. Feed freely as appetite permits up to 220kcal/kg/day (feed volume 150-220ml/kg/day)¹¹.

- Actively encourage the child to eat as often as possible

If the child is below 6 months, carefully manage the rehabilitation phase of the breastfeeding infant less than 6 months as below:-

Rehabilitation Feeding in Infants less than 6 months using the Supplementary Feeding Technique.

The main objective is to restore exclusive breastfeeding. Therefore, stimulate and support breastfeeding and supplement the child's breastfeeding with dilute F100 while stimulating production of breast milk.

- Breastfeed on demand or offer breastfeeding every three hours for at least 20 minutes (more if the child cries or demands more). The infant should be breastfed as frequently as possible.
- Between one half and one hour after a normal breastfeeding session, give maintenance amounts of therapeutic milk.

Quantities of F100-Diluted

- F100-Diluted is given at 130 ml/kg bodyweight/day, distributed across eight feeds per day.
- Use the table below for maintenance amounts of F100-Diluted to give to infants using the supplementary suckling technique.

Regulation of Amount of F100-Diluted Given

- The progress of the infant is monitored by the daily weight.
- If the infant loses weight or has a static weight over three consecutive days but continues to be hungry and is taking all the F100-Diluted, add 5 ml extra to each feed.
- Maintenance amounts of F100-Diluted are given using the supplementary suckling technique. If the volume of F100-Diluted being taken results in weight loss, either the maintenance requirement is higher than calculated or there is significant malabsorption.

If the infant grows regularly with the same quantity of milk, it means the quantity of breast milk is increasing it means the intake from breast milk is increasing and the infant is taking adequate quantities to meet his/her requirements.

- The infant should be weighed daily with a scale graduated to within 10 g (or 20 g).

¹¹ A table of rehabilitation/rebuilding/ catch-up feed – Appendix 7

Maintenance Amounts of F100-Diluted for Breastfed Infants

Child's Weight (kg)	F100-Diluted or (ml per feed if 8 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

Once Infant is Gaining Weight at 20 g per Day (Absolute Weight Gain)

- Gradually decrease the quantity of F100-Diluted by one-third of the maintenance intake so that the infant gets more breast milk.
- If the weight gain of 10 g per day is maintained for two-to-three days (after gradual decrease of F100-Diluted), stop F100-Diluted completely.
- If the weight gain is not maintained, increase the amount of F100-Diluted given to 75 percent of the maintenance amount for two-to-three days, and then reduce it again if weight gain is maintained.

Feeding Procedure

- Ensure good breastfeeding through good attachment and effective suckling. Avoid distractions and let the infant suckle the breast at his/her own speed.
- Build the mother's confidence to help milk flow.
- Encourage more frequent and longer breastfeeding sessions to increase milk production and remove any interference that might disrupt breastfeeding.
- Use the supplementary suckling technique to provide maintenance amounts of F100-Diluted OR, feed by cup and saucer or NGT by drip (using gravity not pumping).
- Only feed with a NGT when the infant is not taking sufficient milk by mouth. The use of NGT should not exceed three days and should be used in the stabilisation phase only.

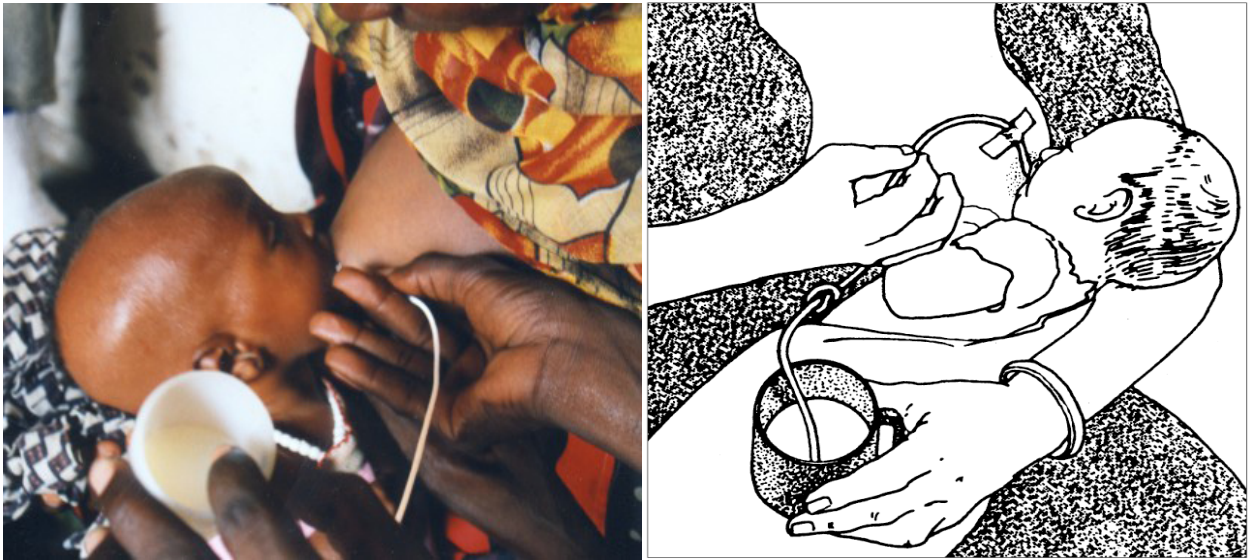
Feeding Technique

Use the supplementary suckling technique to re-establish or commence breastfeeding and also to provide maintenance amounts of F100-Diluted to severely malnourished infants. This technique entails the infant sucking at the breast while also taking supplementary F100-Diluted from a cup through a fine tube that runs alongside the nipple. The infant is nourished by the supplementary F100-Diluted while suckling stimulates the breast to produce more milk. The steps required in

using the supplementary suckling technique are simple. The caregiver holds a cup with the F100-Diluted. The end of a NGT (size n°8) is put in the cup and the tip of the tube is placed on the breast, at the nipple. The infant is offered the breast with the right attachment. The cup is placed 5-10 centimetres (cm) below the level of the nipple for easy suckling. When the child suckles more strongly, the cup can be lowered to up to 30 cm.

After feeding is completed, the tube is flushed through with clean water using a syringe. It is then spun (twirled) rapidly to remove the water in the lumen of the tube by centrifugal force. If convenient, the tube is then left exposed to direct sunlight.

Figure 1. Supplementary Suckling Technique



CHILD < 6 MONTHS WITH NO PROSPECT OF BREASTFEEDING

If the child less than 6 months is not breastfed, give diluted F100 at 130ml / kg / day. Feed 3 hourly. Increase feeds as per the child's appetite. In preparation for discharge via the dietitian the child can be switched to infant formula. Monitor for tolerance.

CHILD > 6 MONTHS

If the child is older than 6 months, give F100 as per the prescription table and introduce a balanced soft mixed high-energy diet and add oil or margarine or peanut butter to meals. Prepare food without added salt. Encourage breastfeeding for breastfed children.

- Progress to 5 feeds of F100 and ready to use therapeutic Food (RUTF). Replace the amounts of F100 gradually with RUTF at an exchange of 100ml F100 = 20g RUTF.
- The child may eat the ward diet as well.
- Ensure that the child is tolerating the RUTF at the prescribed amounts prior to discharge.
- Monitor weight gain and plot on weight chart daily. Desirable weight gain to rebuild wasted tissue is >10g/kg/day.
- Plot intake on 24 hour food intake chart chart
- Plan for ward feeds and plot on daily ward feeding chart

Step 9: Provide Sensory Stimulation and Emotional Support

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

- From admission provide tender loving care
- Structure play and activity in a cheerful stimulating environment encouraging mother's/care giver's involvement as far as possible preferably with the involvement of an Occupational Therapist / Physiotherapist.
- One aim should be to play with each child individually for 15 – 30 minutes each day, in addition to informal group play. The mother can be encouraged to facilitate individual play.

Aspects of child development to be promoted are as follows:

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

Step 10: Prepare for follow up after discharge

The ability of the family to provide adequate nutrition and care at home must be assured.

- **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:**

0 – 6 months	6 – 59 months
<ul style="list-style-type: none"> • Established breastfeeding • Bilateral pitting oedema resolved • Child clinically well and alert • Medical Complications resolved • Persistent and good weight gain (>5g/day) over 5 days • Ideally, severe wasting resolved (WHZ >-2 SD) 	<p>Appetite returned – tolerating RUTF</p> <ul style="list-style-type: none"> • Child clinically well and alert • Bilateral pitting oedema resolved • Medical Complications resolved • Persistent and good weight gain (>10g/kg/day) over 5 days • Ideally, severe wasting resolved (MUAC ≥ 11.5cm or WHZ >-3 SD)

- **Before Discharge:**
- **Investigate for TB.** Repeat the tuberculin skin test and read it within 48 hours. Record the findings.
- **Ensure Counselling and Test for HIV was done.** Record the findings.
- Ensure that information on family background and socio-economic status was obtained. Refer to Social Services (SASSA, Social Development, Home Affairs) and / or hospital social workers
- **Give health and nutrition education and enrol the child into the outpatient supplementation programme (OSP).** Share educational messages about the child and caregiver using the 16-Key Family Practices booklet which contains information about when to return urgently to Clinic, hygiene, infant feeding and complementary feeding advice, stimulation, family planning, HIV, immunization, role of male partner. Work with Dietitian to counsel mothers/caregivers on how to modify family foods, how often to feed and how much to give and emphasize that these practices will help to prevent the child developing malnutrition again.

FOR CHILDREN 0 – 6 MONTHS, investigate feeding practices as per IMCI protocol – see Appendix 13.

- Ensure the child was registered on the Severe Acute Malnutrition Inpatient care register. Ensure the child is counted onto the District Health Information System (DHIS) and Admissions, Discharges and Deaths (ADD) Register.
- Establish a link with local PHC Clinic (Nutrition Advisor) and family's local Community Care Givers (CCG's) for home follow-up (See Referral Pathway).
- Prepare a **Discharge Summary** and write a brief clinical summary in the **RtHB**. Make follow-up plans to see the child in one week at hospital outpatient department or at local PHC clinic.



4.1 OUTPATIENT SUPPLEMENTATION PROGRAMME (OSP) FOR CHILDREN 6 – 59 MONTHS WITH MODERATE ACUTE MALNUTRITION (MAM)

OSP Admission:

Type 1: Recovered SAM cases referred from Inpatient care to OSP

Type 2: Newly Diagnosed, MAM cases referred from the community (PhilaMntwana Centres, NA / CCG Home visits)

- MUAC >11.5cm – <12.4cm OR
- WHZ between -3SD and -2SD AND
- Good appetite for food and
- Clinically Well and Alert

Dietary Treatment

An energy intake of 25 kcal/kg/day in addition to the requirements of non-malnourished children is likely to support a weight gain of 5 g/kg/day, based on average tissue composition.

(WHO Supplementary Food for the management of MAM in infants and children 6 – 59 months of age 2012)

Age 6 – 11 Months: OSP – Fortified Infant Cereal & RUTF

Children in this category normally have a dietary deficit in the home diet of 50%. The supplementation is thus based on assuming a home diet consumption of 50kcal / kg / day, and additional 25kcal / kg / day required for growth and deposition of new lean body tissue. Supplement is to provide additional 75kcal / kg / BW per day.

The average weight was taken in each category to calculate kcal requirements.

Dietary advise would be to use infant cereal independently and add RUTF to other home foods.

	Infant Cereal (IC) Daily	RUTF Daily	Monthly
4.0 – 4.9kg 338kcal / day	50g 120kcal	3 tsp (45g) 236kcal	6 x 250g boxes IC 3 x 450g RUTF
5.0 – 6.9kg 450kcal / day	50g 120kcal	4tsp (60g) 315kcal	6 x 250g box IC 4 x 450g RUTF
7.0 – 9.9kg 638kcal / day	50g 120kcal	7 tsp (105g) 551kcal	6 x 250g box IC 7 x 450g RUTF

Age 12 – 59 Months: OSP – Enriched Maize Meal (EMM) and RUTF			
	EMM Daily	RUTF Daily	Monthly
4.0 – 4.9kg 338kcal / day	50g 179kcal	2 tsp (30g) 156kcal	2 x 1kg pkt EMM 2 x 450g RUTF
5.0 – 6.9kg 450kcal / day	50g 179kcal	4tsp (60g) 315kcal	2 x 1kg pkt EMM 4 x 450g RUTF
7.0 – 9.9kg 638kcal/ Day	100g 358kcal	4 tsp (60g) 315kcal	4 x 1kg pkt EMM 4 x 450g RUTF
10.0 – 14.9kg 938kcal / day	150g 537kcal	5 tsp (75g) 394kcal	5 x 1kg pkt EMM 5 x 450g RUTF
15.0 – 19.9kg 1275kcal / day	150g 537kcal	8 tsp (120g) 630kcal	5 x 1kg pkt EMM 8 x 450g RUTF

Nutrition Education: Health and Nutrition Messages

- Educate the mother on the rationale behind therapeutic supplementation and that this is not a long term intervention.
- Explain that RUTF is a therapeutic feed specifically developed for children with malnutrition. It does not require water for preparation, however the child should drink water after consuming RUTF.
- For children > 6 months, wash the child’s hands and face before feeding.
- Counsel mother on identifying danger signs as in RtHB (Vomiting, Unable to breastfeed, diarrhoea with sunken eyes or sunken fontanelle, diarrhoea with blood, chest indrawing, child < 2 years not feeding and has fever, child lethargic or unconscious, cough and breathing rate more than 50 breaths per minute).
- Counsel mother on preparation of ORS at home and how to treat diarrhoea to prevent dehydration.
- Seek information to identify poor feeding practices or social circumstance that may have resulted in growth faltering. Refer to social worker if necessary



AGE CATEGORY: Birth – 6 months

- Assess and counsel on feeding as per Appendix 17 for both the breastfed and non – breastfed infant. Exclusive breastfeeding is recommended (i.e. give only breast milk and no other liquids or solids, not even water, with the exception of drops or syrup consisting of vitamins, mineral supplements or medication).
- Do not give other fluids.
- Breastfeed on demand i.e. as baby wants, both day and night.
- Feed at least 8-12 times a day.
- When away from the baby, leave expressed breast milk to feed with a cup.
- Avoid using bottles or artificial teats as these may interfere with suckling. Teats or dummies may cause nipple confusion. They are also difficult to clean and may carry germs that can make your baby sick.
- Clean baby's mouth regularly
- Take baby to the clinic every month.

AGE CATEGORY: 6 – 8 months

- From the age of 6 months, baby needs complementary foods in addition to breast milk, in order to grow well.
- Always breastfeed first before giving complementary foods.
- Introduce one new food at a time. Wait a few days before introducing another new food, to make sure he/ she can tolerate the new food
- Start by giving 2-3 tablespoons of thick porridge or infant cereal or mashed vegetables or meat 2-3 times a day.
- Give vegetables before fruit.
- Increase gradually to ½ cup per meal.
- By 8months, give baby small chewable foods.
- Let baby try to feed him/herself, but provide help.
- Avoid foods that can cause choking e.g. nuts, sweets, grapes, raw carrots
- Give one or two snacks (smaller meals) between main meals depending on baby's appetite.
- Add sugar, margarine or oil or powdered full cream milk to increase energy intake.
- Take your baby to the clinic every month

AGE CATEGORY: 9 – 11 months

- Give 3 – 4 meals per day of finely chopped, mashed or finger foods,
- Give mashed dried beans, egg yolk, minced meat, fish, chicken, chicken livers
- Increase portion size gradually to ½ cup
- Give one or two snacks (smaller meals) between main meals depending on baby's appetite.
- Feed baby from his/her own plate or bowl.
- Patiently help baby to eat, do not force him/ her to eat.
- Keep baby interested in the meal by removing distractions while he/ she is eating.
- Offer your baby clean, safe water after eating. Water must be boiled and cooled.
- Add sugar, margarine or oil, peanut butter or full cream milk powder to increase energy intake.
- Take your baby to the clinic every month.

AGE CATEGORY: 12 – 23 months

- Continue to breastfeed as often as the child wants, until he/she is 2 years and beyond
- If not breastfed, give at least 2 cups of full cream milk or maas every day.
- Continue to give 3 – 4 nutritious main meals and 1 – 2 smaller meals, depending on child's appetite.
- Give a variety of family foods.
- Give ¾ to 1 cup of mashed, chopped or soft foods.
- Breast milk should still be an important source of nutrition for the baby.
- Give foods rich in iron, Vitamin A and C
- Iron-rich foods: Liver, kidney, dark green leafy vegetables, egg yolk, dry beans, fortified cereals. Avoid drinking tea when eating these foods as it interferes with absorption of iron. Iron is best absorbed when taken with Vitamin C rich foods.
- Vitamin A-rich foods: Liver, dark green leafy vegetables, mango, paw paw, yellow sweet potato, full cream milk.
- Vitamin C-rich foods: Guavas, tomatoes, Citrus fruit e.g. oranges, naartjies
- Offer clean safe water regularly.
- Encourage your child to be active every day.
- Add sugar, oil or margarine, full cream milk and peanut butter to increase energy intake
- Teach baby to drink from a cup.
- If you offering sweets, treats or drinks, offer small amounts at / after meals.
- Take your child to the clinic every month.



AGE CATEGORY: 24 – 59 months

- Give at least 2 cups of full cream milk or maas every day.
- Encourage your child to eat a variety of foods.
- Feed your child 5 meals a day.
- Children need plenty of vegetables and fruit every day.
- Make starchy foods the basis of your child's main meals.
- Children can eat plenty of chicken, fish, eggs, beans, soya or peanut butter every day.
- Give foods rich in iron, Vitamin A and C (See above food lists)
- If your child has sweets, treats or drinks, offer small amounts at meals.
- Offer clean safe water regularly.
- Encourage your child to be active every day.
- Add sugar, oil or margarine, full cream milk and peanut butter to increase energy intake
- If you offer sweets or treats give small amounts with meals.
- Take your child to the clinic or Philamntwana site every 3 months.

Immunization , Vitamin A Prophylaxis Schedule and Deworming is up to date

Ensure immunizations are caught up. Record all doses given in the RtHB.

Malaria Treatment (for malaria prevalent areas)

- Routinely screen all children for malaria in endemic areas on admission regardless of their body temperature, if diagnostic tests are available. If in clinical doubt or symptoms, repeat the malaria test in the weeks following the initial test.
- If no diagnostic test is available but malaria symptoms are diagnosed, treat the child. Treat malaria according to the national treatment protocol with first-line artemisinin-based combination therapy (ACT) in compliance with Integrated Management of Childhood Illnesses (IMCI) treatment. In all cases of diagnosed or suspected malaria, the child is referred to inpatient care and treatment with a second-line antimalarial drug is provided

Note: A child with SAM cannot auto-regulate his/her body temperature well and tends to adopt the temperature of the environment; thus the child will feel hot on a hot day and cool on a cool day. In malaria-endemic areas, children with SAM should be provided with insecticide-treated bed nets to prevent malaria infection.

Criteria for discharge from OSP:

Note: A child should not remain on supplementation for > 6 months (across all categories). If there is no improvement after 2 months, investigate failure to response to treatment.

MUAC \geq 12.5cm or

WHZ \geq -2SD

Referral Process

The child exits the OSP and enters GMPs.

4.2 GROWTH MONITORING AND PROMOTION SUPPORT (GMPs) FOR CHILDREN 6 – 59 MONTHS (Not Acutely Malnourished but at risk)

GMPs Admission:

Type 1: Recovered MAM cases referred from the same PHC.

Type 2: Newly Diagnosed, NAM cases referred from the community / PhilaMntwana Centre

MUAC \geq 12.5cm or

WHZ between -2SD & -1SD and

Poor weight gain, no weight gain or weight loss following 2 successive visits on the RtHB.

Dietary Treatment

Age 6 – 11 Months: GMPs – Fortified Infant Cereal & RUTF

A deficit in the home diet of 50kcal is assumed. Supplement to provide additional 50kcal / kg / BW per day to prevent further growth faltering.

Average taken weight taken in each category

Recommendation would be to use infant cereal independently. Add RUTF to other foods

	Infant Cereal (with milk) Daily	RUTF Daily	Monthly
4.0 – 4.9kg 225kcal / day	50g 120kcal	1.5tsp (22g) 116kcal	2 x 450g RUTF 6 x 250g boxes
5.0 – 6.9kg 300kcal / day	50g 120kcal	2 tsp (30g) 156kcal	2 x 450g RUTF 6 x 250g boxes
7.0 – 9.9kg 400kcal / day	50g 120kcal	4 tsp (60g) 315kcal	4 x 450g RUTF 6 x 250g boxes
Age 12 – 59 Months: GMPs – Enriched Maize Meal (EMM) and RUTF			
	EMM Daily	RUTF Daily	Monthly
4.0 – 4.9kg 225kcal / day	50g 179kcal	1tsp (15g) 79kcal	2 x 1kg pkt EMM 1 x 450g RUTF
5.0 – 6.9kg 300kcal / day	50g 179kcal	1.5tsp (22g) 116kcal	2 x 1kg pkt EMM 2 x 450g RUTF
7.0 – 9.9kg 400kcal/ Day	100g 358kcal	1tsp (15g) 79kcal	4 x 1kg pkt EMM 1 x 450g RUTF
10.0 – 14.9kg 625kcal / day	100g 358kcal	3tsp (45g) 236kcal	4 x 1kg pkt EMM 3 x 450g RUTF
15.0 – 19.9kg 875kcal / day	150g 537kcal	4 tsp (60g) 315kcal	5 x 1kg pkt EMM 4 x 450g RUTF

Nutrition Education

As per OSP Protocol

Immunization and Vitamin A Prophylaxis Schedule is up to date

Ensure immunizations are caught up. Record the dose given in the RtHB.

Malaria Treatment (for malaria prevalent areas)

- As per OSP protocol (Pages 31 - 33)

Criteria for discharge from GMPs:

MUAC \geq 12.5cm or

WHZ $>$ -1SD and growing well

The child should remain on supplementation for 2 months after recovery to prevent relapse however a child should not remain on supplementation for $>$ 6 months (across all categories). If there is no improvement after 2 months, investigate failure to response to treatment.

4.3 NUTRITION SUPPLEMENTATION PROGRAMME (≥ 5 YEARS)

Nutrition Assessment, Counselling and Support (NACS) is essential for improved nutrition and health outcomes. Health care facilities can provide NACS services at different contact points, including antenatal care, maternity wards, paediatric wards, outpatient departments, antiretroviral therapy (ART) clinics for people with HIV, and TB clinics. Clients can be referred by other clinical services or by community health workers, community nutrition surveillance, home based care providers, and programs for orphans and vulnerable children. In all counselling sessions, attention should be given to enhancing food security and modifying family meals to increase energy and nutrient value.

Classification of the patient as SAM or MAM is based on anthropometric data, however clinicians should also assess a patient's risk to becoming SAM if the patient presents with dysphagia, severe mouth sores, vomiting, nausea and / or diarrhea.

Assessment and Classification: See NRAST POSTER FOR > 5 years (Appendix 20)

	MAM	SAM
5 – 9 years	MUAC 13.5 - 14.5cm OR BMI for age ≥-3SD &<-2SD	MUAC < 13.5cm or BMI for age <-3SD Or > 10% weight loss in the last 3 months Or Visible wasting / bilateral pitting oedema
10 – 14 years	MUAC 16.0 – 18cm or BMI for age ≥-3SD &<-2SD	MUAC < 16cm or BMI for age <-3SD Or >10% weight loss in the last 3 months Or Visible wasting / bilateral pitting oedema
>15 years	BMI 16 – 18.5kg/m ² MUAC 21 – 23 cm	BMI <16kg/m ² or MUAC < 21cm Or >10% weight loss in the last 3 months Or Visible wasting / bilateral pitting oedema
Pregnant & Lactating Women	MUAC 21 – 23cm	<21cm or Poor weight gain during pregnancy Or Visible wasting / bilateral pitting oedema



Dietary Treatment

As there is currently limited evidence and WHO Guidance on Nutrition Supplementation in these age categories, the following estimations are based on providing a percentage of the RDA of the nutrient requirements in the form of nutrient dense food supplements to complement the home diet to prevent further deterioration in nutritional status in MAM cases, and correct malnutrition in SAM cases. Patients should be counselled on how to prepare energy and nutrient dense meals at home. In cases of food insecurity, refer to the social worker. For pregnant and lactating women, the additional requirements for pregnancy and lactation were considered.

Clinicians are requested to use the below as a basis and rationalise their deviations where applicable.

	SUPPLEMENTATION PRODUCTS & CALCULATIONS	
	MAM (30% of RDA)	SAM (60% of RDA)
5- 9 years RDA estimate 1650kcal	500kcal EMM: 100g – 358kcal (2 servings) RUTF: 2tsp – 30g – 158kcal Monthly Issue: 3kg pkt EMM 2 x 450g RUTF	1000kcal EMM: 100g – 358kcal RUTF: 8tsp – 120g – 630kcal Monthly Issue: 3 pkt EMM 8 x 450g RUTF
10 – 14 years RDA estimate 2030kcal	610kcal EMM: 100g - 358kcal RUTF: 45g – 3tsp - 235 kcal Monthly Issue: 3pkt EMM 3 x 450g RUTF	1220kcal EMM: 200g – 716kcal RUTF: 90g – 716kcal 6pkt EMM 6 x 450g RUTF
>15 years RDA estimate 2100kcal	630kcal EMM: 100g - 358kcal RUTF: 60g - 4 tsp - 314kcal Monthly Issue: 3pkt EMM 4 x 450g RUTF	1260kcal EMM: 200g – 716kcal RUTF: 105g – 7tsp - 549kcal 6pkt EMM 7 x 450g RUTF
Pregnant Additional 285kcal / day to the > 15 years category prescription	915kcal EMM: 100g – 358kcal LFED: 150g – 537kcal Monthly Issue: 3pkt EMM 5 kg LFED	1545kcal EMM: 200g – 716kcal LFED: 200g – 716kcal Monthly Issue: 6 pkt EMM 6kg LFED
Lactating Women Additional 500kcal / day	1130kcal EMM: 100g – 358kcal LFED: 150g – 537kcal RUTF: 45g – 236 kcal Monthly Issue: 3pkt EMM 6kg LFED 3 x 450g RUTF	1760kcal EMM: 200g – 716kcal LFED: 200g – 716kcal RUTF: 60g – 314kcal Monthly Issue: 6 pkt EMM 6kg LFED 4 x 450g RUTF

Criteria for discharge:

	Discharge
5 – 9 years	MUAC >14.5cm or BMI for age between -2SD & -1SD
10 – 14 years	MUAC >18cm or BMI for age between -2SD & -1SD
>15 years	BMI > 18.5kg / m ² or MUAC >23cm
Pregnant & Lactating Women	MUAC > 23cm Pregnant Women: For the duration of pregnancy or until MUAC > 23cm. Lactating Women: MUAC > 23cm or if not improving, for the first years of child's life.

Referral Process

The patient remains on supplementation for 2 months after recovery to prevent relapse (excluding pregnant and lactating woman). The patient should not remain on supplementation for longer than 6 months. If no improvement after 2 months, investigate failure to respond to treatment.

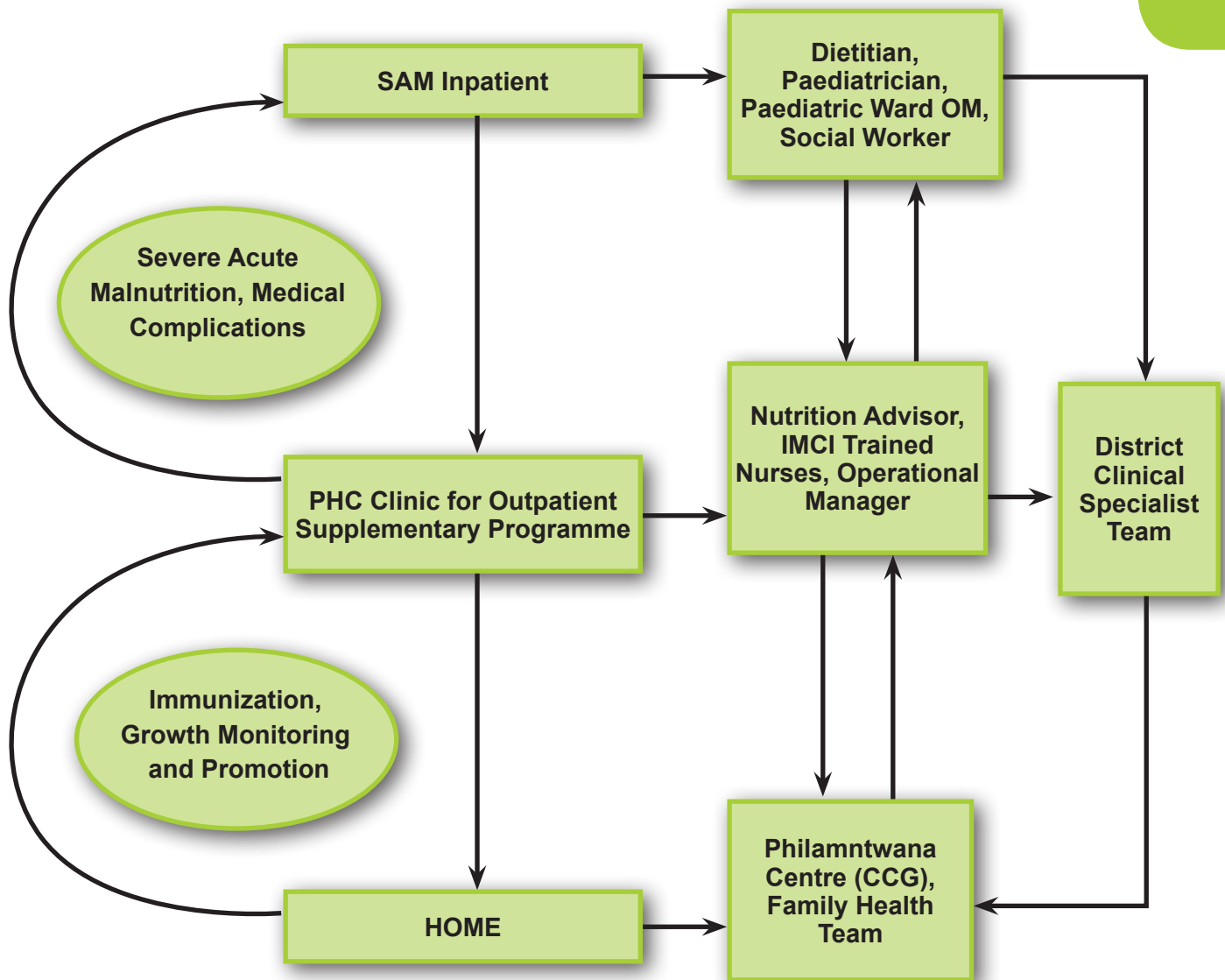


4.4 COMMUNITY OUTREACH

Community outreach mobilises communities; it raises awareness of the burden of malnutrition and aims of services, and builds support for them. Moreover, it strengthens the community's awareness of causes, signs and treatment of acute malnutrition, and promotes health and nutrition behaviour change and improved hygiene. Through community outreach, health care providers can better understand the needs of the local community and the factors that may act as barriers to accessing care, while promoting and supporting infant and child nutrition and care practices in the communities to prevent malnutrition. An understanding needs to be established of the link between the patient, health facility and community based care initiative, and the roles and responsibilities of the relevant healthcare workers.

4.1.1 REFERRAL PATHWAY (Nutrition Care)

Figure 2: Referral Pathway of the SAM Child



4.4.1 ROLES & RESPONSIBILITIES

Dietitian

The Dietitian will form part of the multidisciplinary team in the inpatient management of SAM patients. The Dietitian will review the assessment and classification of the patient, and prescribe and manage the nutritional care of the patient. All consultations should be recorded in the patient file. Upon discharge the Dietitian should ensure that appropriate follow up of the child will continue at PHC level and a link is established with the Nutrition Advisor at the PHC. The Dietitian should monitor how SAM patients are been followed up at PHC level when conducting PHC Monitoring and Evaluation visits. The dietitian will participate in clinical audits and death reviews pertaining to SAM < 5 years.

Paediatrician (medical officer should be involved in the absence of paediatrician)

The paediatrician will form part of the multidisciplinary team in the inpatient management of SAM patients and provide support on the medical management of SAM patients to doctors at POPD to ensure that emergency treatment protocol of SAM patients is followed and not delayed due to late diagnosis of SAM. The paediatrician will review the medical assessment and classification of SAM and manage the medical care of the patient. All consultations should be recorded in the patient file. The paediatrician will also participate in clinical audits and death reviews pertaining to SAM in children < 5 years.

Paediatric Nurse

The paediatric nurse will form part of the multidisciplinary team in the inpatient management of SAM patients and provide support on the monitoring of the patient, and recording of all relevant information pertaining to the patient.

Paediatric Operational Manager

The Paediatric Ward Operational Manager will be responsible for the overall requirements for the management of SAM patients. The Paediatric OM should be involved in the monthly death reviews conducted by the MDT and be made aware of the challenges experienced by the MDT in the management of SAM. The Paediatric OM will be also be responsible for collation of statistics on severe malnutrition and ensuring that sustainable referral systems of SAM patients are in place. The Paediatric OM will report to the Hospital Management on the above.

PHC IMCI Trained Professional Nurses

PHC based IMCI trained nurses will be involved the assessment and classification of all children attending their facilities. They will be involved in educating mothers on IMCI danger signs, SAM and MAM and educating mothers accordingly. They will be involved in monitoring patients registered in the outpatient supplementation programme where there is no available nutrition advisor. They will record all patient details and collect all data pertaining to child health and nutrition.

Nutrition Advisors

The PHC based Nutrition Advisor is responsible for the implementation of nutrition related interventions and works as part of the PHC based team. The Nutrition Advisor will be responsible for the following with regards to IMAM:

- ensure growth monitoring and promotion of all children under 5 years at the facility
- ensure nutrition assessment by taking MUAC measurements, weights, lengths, and interpretations of Z-scores.
- nutritional management of patients and ensuring that therapeutic supplements are available and issued according to protocol
- nutritional management of all patients registered on the outpatient supplementary programme

(OSP) and growth monitoring and promotion (GMPs).

- follow up on down referred cases of SAM. Link up with relevant CCGs to ensure household visits of discharged SAM cases
- proper keeping of records and reporting on the issuing of nutrition supplements.

PHC Operational Manager

The PHC Operational Manager will be responsible for submission of NA monthly report, CCG Monthly Summary Report (collated) and PHC facility statistics pertaining to child health and nutrition to the district.

Community Care Givers

CCG's will be expected to conduct home visits and report on the progress if:-

Child is absent or defaulting

Child is not gaining weight or losing weight on follow-up visit at PhilaMntwana Centre

Child has returned from inpatient care or refuses referral to inpatient care

CCG's based at Philamntwana Centres will submit weekly and monthly reports that include all children diagnosed with SAM and MAM.

District Clinical Specialist Team (DCST)

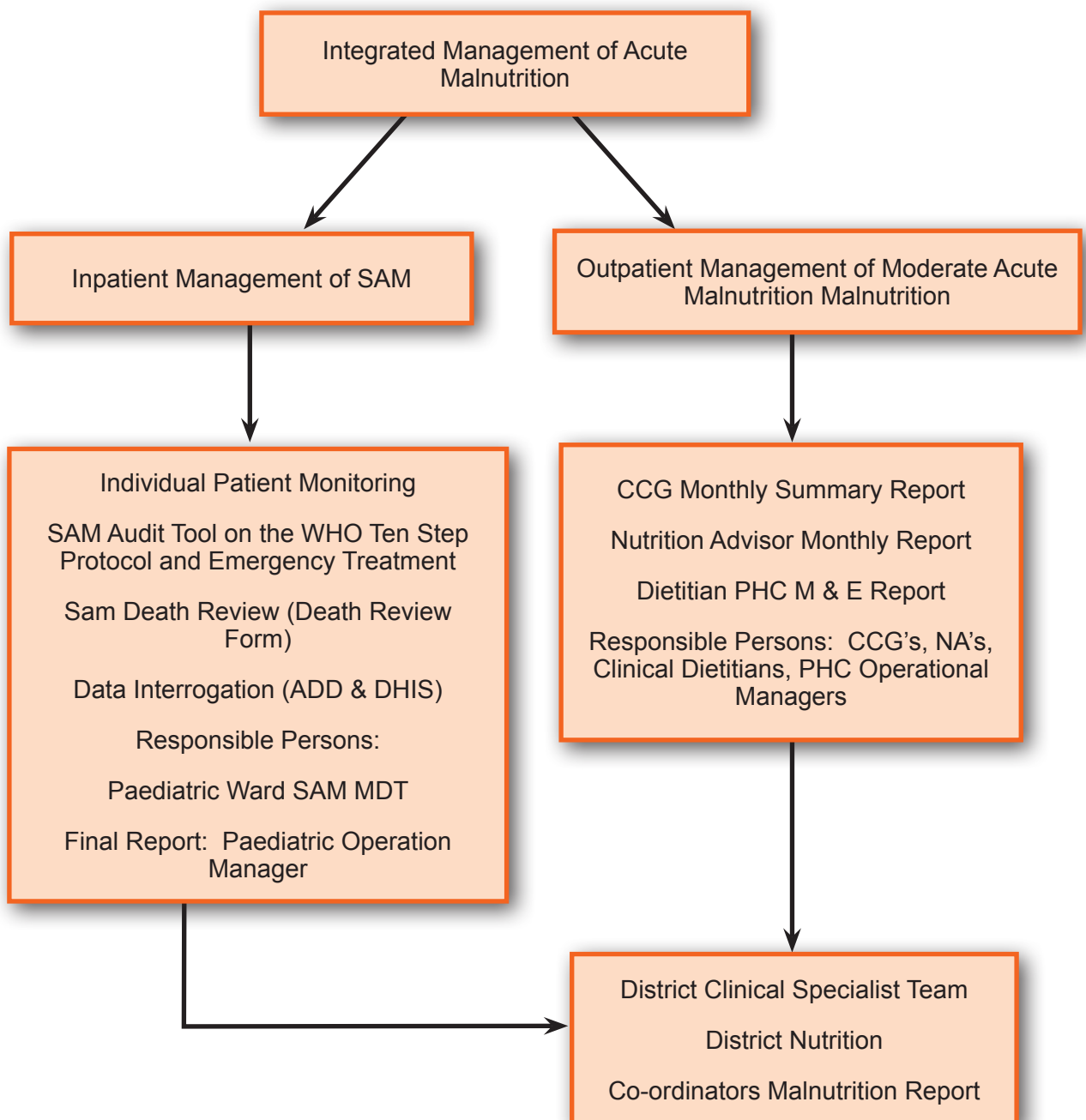
The DCST will conduct regular visits to facilities to ensure that clinical protocols and guidelines are followed and adhered to. They will conduct quality improvement visits, perform clinical audits and provide data on causes of death and modifiable factors to the hospital based MDT's. DCST will also work with the dietitians and NAs to support PHC Operational Managers on improving the quality of care provided to malnourished children and adults.

5 MONITORING AND EVALUATION FRAMEWORK

Monitoring is the periodic and timely collection of data to determine if activities are being implemented as planned. The monitoring process tracks indicators and is a 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 SAM and to use the lessons learnt. An effective M&E Framework (Figure 3) will help to identify desired outcomes from implementation. In the context of the current guidelines, monitoring will take place at inpatient level by the hospital based MDT and at outpatient level by the PHC team. All relevant team members should be familiar with and able to use the monitoring tools.

Figure 3: Monitoring and Evaluation Framework



5.1 INPATIENT MONITORING AND EVALUATION

Inpatient M & E involves monitoring individual patient progress, clinical audit and interrogation of inpatient data. The tools used will be:-

- Daily Monitoring of Individual Patient Progress - Standard patient monitoring tools for vital signs, fluid input and output, weight gain chart.
- Clinical Audit - Compliance to the WHO ten step protocol and emergency management protocol (Appendix 22 and 23), Death Review (Appendix 11)
- Interrogation of Data - A-D-D Triplet Register, DHIS Daily Hospital Data Collection Tools

The MDT managing SAM in the paediatric ward should be implementing the above, and reporting to the operation manager on the results. The malnutrition / child health committee should meet monthly to discuss gaps and challenges in the management of SAM. The Paediatric Operational Manager should review the data on the ADD Triplet and DHIS Monthly Data Reports.

5.1.1. Monitor Vital signs.

Monitor and record pulse, respirations and temperature every 4 hours

Danger signs are:

- Pulse rate increase by 25 or more beats / min
- Respiratory rate increase by 5 or more breaths/min
- Temperature drops below 35°C axillary
- Temperature increases suddenly to > 37.5°C axillary

5.1.2 Monitor Weight Gain

Weigh at the same time each day

Record daily weights on weight chart (Appendix 8)

Plot weights

Indicate where F100 began

Indicate desired discharge weight

Calculate weight gain

Calculate daily after child is on F100

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)

$$W2 - W1 = x \text{ kg}$$

$$x \text{ kg} \times 1000 = x \text{ grams gained}$$

Step 2:

Divide grams gained by yesterday's weight

$$\text{Grams gained} \div W1 = x \text{ g/kg/day}$$

5.1.3 Monitor Failure to Respond

Some children undergoing inpatient care might fail to respond to treatment or exhibit deterioration at different stages of the treatment. Criteria for defining failure to respond are listed below:

Criterion	Time after admission
Primary Failure to Respond	
Failure to regain appetite	4 – 7 days
Oedema is not reducing	4 – 7 days
Oedema is still present	10 days
Failure to gain at least 5g/kg / day.	10 days
Secondary Failure to respond	
Failure to gain at least 5g/kg / day. Static Weight	During inpatient rehabilitation phase: For 2 successive days For 3 successive days

Determine reason for failure to respond

- Insufficient food given / Poor intake
- Micronutrient deficiency?
- Malabsorption / Persistent Diarrhoea
- Insufficient attention given?
- Rumination (psychological stress affecting recovery)
- Unrecognized infection?
- Serious underlying disease?
- Facility / Staff challenges?

5.1.4 Conduct Death reviews¹²

- Review child's patient file when there is a death
- Go through death review form
- Discuss case as a team

¹² Death review form – Appendix 13

- Identify any areas of mismanagement
- Agree on any changes needed

The ADD Register should be accurately and completely filled in. This will be used for an analysis of the deaths due to malnutrition and patients failing to respond to treatment. Periodic review of these records (monthly) can help identify areas where case management practices should be carefully examined and improved. For example, deaths that occur within the first 2 days are often due to hypoglycaemia, unrecognised or mismanaged septic shock, or other serious infection, whereas deaths that occur after day 2 are often due to heart failure. An increase in deaths at night or at weekends suggests that monitoring and care of children at those times should be reviewed and improved. The objective should be to achieve a case fatality rate of <5%.

5.2 OUTPATIENT MONITORING & EVALUATION

Monitoring and Evaluation at the outpatient level will involve the PHC based IMCI Trained Nurses, PHC Outreach Teams / Family Health Teams, Nutrition Advisors and CCG's. The patient will be on the nutrition supplementation programme (> 5 years), outpatient supplementary programme (OSP) or (GMPs) facilitated from the PHC facility. Upon full recovery and exit from the NSP, OSP or GMPs, the child < 5 years will attend GMP routine screening at PhilaMntwana Centres and all other categories will continue routine medical check ups. The following tools will be used, and monthly data collection and reporting will be facilitated by the PHC Operational Manager.

Nutrition Advisor Monthly Report

- The nutrition advisor monthly report collects data on the number of children identified as SAM / MAM, referrals to CCG's, Adults with HIV & TB on therapeutic supplements, Pregnant and lactating women on therapeutic supplements. Nutrition Advisors should have dietitian referrals (down referrals) and CCG referrals (up referrals) within their recording system at the PHC. The NA will use the NSP register to track all patients being supplemented.

CCG Monthly Summary Sheet & CCG Weekly Tally Sheet

- The CCG Weekly Summary Sheet provides an indicator of how many children were identified as Red and / or Yellow on the MUAC tape. The Operational Manager needs to verify that this number of children were admitted into either outpatient care for MAM or inpatient care for SAM. The monthly summary sheet will be used for monthly data collection.

Supervision and Support at PhilaMntwana centres

- The CCG supervisors and Community Health Facilitators (CHF's) will supervise and monitor the activities conducted by the CCGs at the PhilaMntwana Centres. In the municipal wards with Family Health Teams (FHTs), the team will support the CCGs with all the activities. At district level, Maternal Child and Women's Health (MCWH) coordinator will be responsible for compiling reports on the status of all the sites in the district
- The District Manager remains overall responsible
- Other key team members include: the District Nutrition Coordinator, the PHC and Paediatric Nurse, District Clinical Specialists (DCS), Family Physician – DCS an CCG coordinator. The Deputy Manager – Clinical and Programmes is the team leader.

Dietitian Visits to PHC

- Every PHC facility should be visited by a Dietitian at least twice over a year to conduct Monitoring and Evaluation of the Integrated Nutrition Programme at the PHC. A review of the M & E reports by Dietitians will provide an indication to the districts and provincial office on the gaps in the nutrition services at PHC that require further support. Dietitians should also establish a referral system with the PHC's linked to their hospital for follow up of SAM discharges by the PHC based Nutrition Advisor.

5.2.1 Individual Monitoring at outpatient care

During Follow-up Visits

Individual monitoring of the child's progress should be carried out by the health care provider upon monthly (or as circumstances dictate) 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
- Height

Physical examination

- Weight gain:
 - The weight is marked and compared to the weight of the previous weeks. Plot weight for age and weight for length / height at every visit. Assess growth velocity on RtHB growth curves.
 - Children who lose weight or have no weight gain following 2 consecutive visits 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 refer.
 - Investigate reasons for weight loss / static weight.
- Body temperature
- Standard clinical signs: stool, vomiting, dehydration, cough, respiration, liver size, eyes, ears, skin condition and peri-anal lesions are assessed
- Any illness suffered by the child since the last visit
- Any action taken or medication given in response to a health condition

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 / EMM.

Follow-up action is based on the action protocol (see **Appendix 12. 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 2 absent visits).

5.2.2 Home Visits

The CCG 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 CCG should provide individual counselling to the caregiver and provides feedback to the health care provider.

Home visits for children with SAM are essential in the following high-risk or problem cases (see **Appendix 13 Action Protocol in outpatient care**):

- Child is absent from the follow up 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
- Child has returned from inpatient care or caregiver has refused inpatient care
- Child has a deteriorating / recurrent medical condition

Data Management and M&E from PhilaMntwana Centres

- Data will flow from the CCGs in each PhilaMntwana Centre to the central War Room, where it will be collated, analysed, interpreted, graphically represented and posted on the strategic points in the War Room.
- The monthly collated summary sheet should be forwarded to the CHF for verification and submission to the PHC Operational Manager
- The PHC coordinator will further verify the data for onward submission to the Facility Information Officer (FIO)
- Data will be fed back to the community leaders (local councillor and traditional leadership) via the War Rooms

5.3 Indicators for reporting to District Health Information System (DHIS) / National indicators data sets (NIDS)

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

INPATIENT DATA ELEMENTS

5.3.1 Severe acute malnutrition admissions (Inpatient)

These are the number of admissions with SAM should be collated daily in the ward register and submitted as monthly statistics to the FIO.

5.3.2 Severe acute malnutrition death

These are deaths due to severe acute malnutrition in children under 5 years, both due to primary or secondary factor SAM.

5.3.3 Vitamin A Curative dose

Percentage of Vitamin A given to SAM children < 5 years – curative dose

OUTPATIENT DATA ELEMENTS

The outpatient data elements listed below will be collected by all PHC facilities. The PHC Operational Manager will be responsible for verifying and submitting the data to hospitals.

- 5.3.4 Weighing coverage under 1 annualised
The children <1 year weighed during the reporting period as a percentage of the total number of expected weighing in the population. Expected weighing is defined as one weighing per month (12 per year) for children under 1 year.
- 5.3.5 Percentage of children under 5 years not gaining weight / growth faltering
The percentage of children weighed presenting with growth faltering or growth failure following 2 consecutive visits. (Refer to RtHB)
- 5.3.6 Underweight for age under 5 years incidence – annualised
The proportion of all children under 5 years weighed who were identified as having a weight-for-age of below -2 standard deviations
- 5.3.7 Children under 2 underweight for age incidence
Children under 2 years newly diagnosed as underweight (weight between -2 and -3 standard deviations) per 1000 children under 2 years in the population
- 5.3.8 Prevalence of underweight for age children under 5
Percentage of children under 5 years that were weighed and presented with a weight-for-age of below -2 standard deviations
- 5.3.9 Number of malnourished children under 5 receiving therapeutic supplements
- 5.3.10 Children under 5 with severe acute malnutrition new
- 5.3.11 Children under 5 with severe acute malnutrition ambulatory
- 5.3.12 Number of underweight lactating women receiving therapeutic supplements
- 5.3.13 Number of underweight pregnant women receiving therapeutic supplements
- 5.3.14 Number of underweight HIV+ patients 15 years and older receiving therapeutic supplements
- 5.3.15 Number of underweight TB patients 15 years and older receiving therapeutic supplements



CONCLUSION

As outlined in the background, there is a clear need for appropriate management of children with SAM in order to decrease child mortality in the province. It is envisaged that these guidelines will assist in the early detection, referral and management of MAM cases to prevent their deterioration to SAM. The inpatient protocol will assist in the standardized treatment of inpatients with SAM and contribute to a decrease in the case fatality due to SAM. We strongly advocate for adherence to the protocols on inpatient management, particularly the Emergency Treatment Protocol in facilities that have experienced high CFR due to SAM. The referral pathway should ensure continuum of care of the patient to prevent relapse into SAM.

The provincial office will provide support in the form of MDT district based trainings and regular M & E visits. The implementation of these guidelines will be reviewed in 2015. If new information or relevant changes to the guidelines arise before this time, a circular regarding these changes will be issued to all facilities.

For further information, please contact the KZN Provincial Nutrition Directorate on the details below:-

KZN Department of Health

Nutrition Directorate

Telephone: 033 395 2326 / 2726

Fax: 033 395 3053

Email: Admin.Nutrition@kznhealth.gov.za

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APPENDICES

Appendix 1: Physiological basis for treatment of severe acute malnutrition

Affected Organ/System	Effects	Treatment
Cardiovascular system <i>Heart is smaller, weaker cannot handle excess fluid in circulation</i>	<p>Cardiac output and stroke volume are reduced.</p> <p>Infusion of saline may cause an increase in venous pressure</p> <p>Any increase in blood volume can easily produce acute heart failure; any decrease will further compromise tissue perfusion.</p> <p>Blood pressure is low.</p> <p>Renal perfusion and circulation time are reduced.</p> <p>Plasma volume is usually normal and red cell volume is reduced.</p>	<p>If the child appears dehydrated, give ORS or F75; do not give fluids intravenously unless the child is in shock.</p> <p>Restrict blood transfusion to 10ml/kg.</p>
Liver <i>Less able to make glucose</i>	<p>Synthesis of all proteins is reduced.</p> <p>Abnormal metabolites of amino acids are produced.</p> <p>Capacity of liver to take up, metabolize and excrete toxins is severely reduced.</p> <p>Energy production from substrates such as galactose and fructose is much slower than normal.</p> <p>Gluconeogenesis is reduced, which increases the risk of hypoglycaemia during infection.</p> <p>Bile secretion is reduced.</p>	<p>Do not give child large meals.</p> <p>Ensure amount of protein given does not exceed metabolic capacity of the liver but sufficient to support synthesis of proteins (0.9g/100ml)</p> <p>Reduce the dosage of drugs that depend on hepatic disposal or are hepatotoxic.</p> <p>Ensure sufficient carbohydrates given to child to avoid the need for gluconeogenesis.</p> <p>Do not give iron supplements, which may be dangerous because transferring levels are reduced.</p>
Genitourinary system <i>Cannot get rid of excess fluid and sodium</i>	<p>Glomerular filtration is reduced.</p> <p>Capacity of kidneys to excrete excess acid or a water load is greatly reduced.</p> <p>Urinary phosphate output is low.</p> <p>Sodium excretion is reduced.</p> <p>Urinary tract infection is common.</p>	<p>Prevent further tissue breakdown by treating any infection and providing adequate energy.</p> <p>Do not give child more protein than is required to maintain tissues.</p> <p>Ensure that high-quality proteins are given, with balanced amino acids.</p> <p>Restrict dietary sodium.</p> <p>Ensure water intake is sufficient and not excessive</p>
Gastrointestinal system <i>Gut weaker, micro villi thinner or flattened</i>	<p>Production of gastric acid is reduced.</p> <p>Intestinal motility is reduced.</p> <p>Pancreas is atrophied and production of digestive enzymes is reduced.</p> <p>Absorption of nutrients is reduced when large amounts of foods are eaten.</p>	<p>Give child small, frequent feeds.</p> <p>If absorption is poor, increase the frequency and reduce the size of each feed (feed 2hrly instead of 3 hourly or 4 hourly).</p> <p>If there is malabsorption of fat, treatment with pancreatic enzymes may be useful.</p>

<p>Immune system</p> <p><i>Damaged and weakened</i></p>	<p>All aspects of immunity are diminished.</p> <p>Lymph glands, tonsils and the thymus is severely atrophied.</p> <p>Cell-mediated (T-cell) immunity is severely depressed.</p> <p>IgA levels secretions are reduced</p> <p>Complement components are low.</p> <p>Phagocytes do not kill ingested bacteria efficiently.</p> <p>Tissue damage does not result in inflammation or migration of white cells to the affected area. Acute phase immune response is diminished.</p> <p>Typical signs of infection such as an increased white cell count and fever are frequently absent.</p> <p>Hypoglycaemia and hypothermia are both signs of infection and are usually associated with septic shock.</p>	<p>Treat all children with broad spectrum antimicrobial.</p> <p>Because of the risk of transmission of infection, ensure that the newly admitted children are kept apart from children who are recovering from infection.</p>
<p>Endocrine system</p>	<p>Insulin levels are reduced and the child has glucose intolerance.</p> <p>Insulin growth factor 1 (IGF-1) levels are reduced, although growth hormone factors are increased.</p> <p>Cortisol levels usually increased.</p>	<p>Give the child small, frequent feeds.</p> <p>Do not give steroids.</p>
<p>Circulatory system</p>	<p>Basal metabolic rate is reduced by about 30%.</p> <p>Energy expenditure due to activity is very low.</p> <p>Both heat generation and heat loss are impaired; the child becomes hypothermic in cold environment and hyperthermic in a hot environment.</p>	<p>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 closed at night and keep temperature of the living environment at 25-30°C.</p> <p>If a child has fever, cool the child by sponging with tepid (not cold) water (never alcohol rubs).</p>
<p>Cellular system</p> <p><i>Cells are damaged and become leaky</i></p>	<p>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.</p> <p>Protein synthesis is reduced.</p>	<p>Give large doses of potassium and magnesium to all children.</p> <p>Restrict Sodium intake.</p>
<p>Skin, muscles and glands</p>	<p>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.</p> <p>Many glands including the sweat, 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</p>	<p>Rehydrate the child with ORS or F75.</p>



Appendix 2: Case Definitions of Medical Complications with SAM

Medical Complication	Case Definition
Anorexia, poor appetite*	Child is unable to drink or breastfeed.
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 eye-lid retraction: child sleeps with eyes slightly open.
High fever	Child has a high body temperature – axillary temperature $\geq 38.5^{\circ}\text{C}$ or rectal temperature $\geq 39^{\circ}\text{C}$ – taking into consideration the ambient temperature.
Hypothermia	Child has a low body temperature – axillary temperature $< 35^{\circ}\text{C}$ or rectal temperature $< 35.5^{\circ}\text{C}$ – 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 which 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 2-12 months: 50 breaths per minute or more; if child is 12 months - 5 years: 40 breaths per minute or more) or chest indrawing.
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 60 g.
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 color of the skin, mucus membranes, or eyes. The yellow coloring comes from bilirubin, a byproduct 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 skin or internally, where blood leaks from blood vessels inside the body.

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

Appendix 3: Recipes for making stabilizing feed (F75) and catch-up feed (F100)

F75	F100	Recipe for Diluted F100	
Full-cream cow's milk	300ml	880ml	<ul style="list-style-type: none"> • Add 35ml of water to 100 ml of F100 all prepared, which will yield 135ml of F100 Diluted. Discard any excess milk after use.
Sugar	100g	75g	
Oil	20ml	20ml	<ul style="list-style-type: none"> • If you need more than 135 ml use 200ml F100 add 70 ml of water to make 270ml F100 diluted and discard any excess milk after use.
CMV	1 scoop	1 scoop	
Water: make up to	1000ml	1000ml	

F75		F100	
<i>Containing per 100ml:</i>		<i>Containing per 100ml:</i>	
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 4: Stabilizing feed (F75) Feeding Chart

Weight of child (kg)	Volume of F-75 per feed (ml) ^a			Daily total (130 ml/kg)	80% of daily total ^{4a} (minimum)
	Every 2 hours ^b (12 feeds)	Every 3 hours ^c (8 feeds)	Every 4 hours (6 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

^aVolumes in these columns are rounded to the nearest 5 ml.

^bFeed 2-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 3-hourly feeds.

^cAfter a day on 3-hourly feeds: If no vomiting, less diarrhoea, and finishing most feeds, change to 4-hourly feeds.

Appendix 5: Stabilizing feed (F75) Feeding Chart for Children with Gross (+++) Oedema

Weight with +++ oedema (kg)	Volume of F-75 per feed (ml) ^a			Daily total (100 ml/kg)	80% of daily total ^a (minimum)
	Every 2 hours ^b (12 feeds)	Every 3 hours ^c (8 feeds)	Every 4 hours (6 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

^aVolumes in these columns are rounded to the nearest 5 ml. ^bFeed 2-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 3-hourly feeds. ^cAfter a day on 3-hourly feeds: If no vomiting, less diarrhoea, and finishing most feeds, change to 4-hourly feeds.



Appendix 6: Ranges of catch-up feed for free feeding

Weight of child (kg)	Range of volumes per 3-hourly feed of		Range of volumes per 4-hourly feed of F-100		Range of daily volumes of F-100	
	F-100 (8 feeds daily) *		(6 feeds daily) *		Minimum (150 ml/kg/day)	Maximum ml (220 ml/kg/day)
	Minimum ml	Maximum ml	Minimum ml	Maximum ml		
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 7: Elemental Iron Preparation

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



Appendix 8: Weight Chart

Name: _____

Weight on admission: _____ kg

Height/length: _____ cm

Oedema on admission:

0 + ++ +++

Desired weight at discharge

(-1SD, 90% w/h): _____ kg

Enter likely range of weights on the vertical axis in an appropriate scale (e.g. each row representing 0.1kg). allow rows below the starting weight in case weight decreases: weight may decrease by as much as 30% if the child has severe oedema
Draw a bold horizontal line across the graph to show the desired discharge weight.

Days 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26



Appendix 9: 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 10: Daily Ward Feed Chart

DAILY WARD FEED CHART

DATE: _____ WARD: _____

Name of Child	F75			F100		
	Number feeds	Amount/feed (ml)	Total (ml)	Number feeds	Amount/feed (ml)	Total (ml)
<i>F75 (total ml) needed for 24 hours</i>				<i>F100 (total ml) needed for 24 hours</i>		
<i>Amount needed for 12 hours*</i>				<i>Amount needed for 12 hours*</i>		
<i>Amount to prepare for 12 hours (round up to whole litre)</i>				<i>Amount to prepare for 12 hours (round up to whole litre)</i>		
<i>Amount to re-warm (or prepare) every 3 hours**</i>				<i>Amount to re-warm (or prepare) every 3 hours**</i>		

* Divide ml needed for 24 hours by 2 ** Divide amount to prepare for 12 hours by 4

Appendix 11: Death Review Form for Severe Acute Malnutrition

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	
<i>Circle when child died</i>	<24 hours Day 2-3 Day 4-7 >7days
<i>Circle if child died during night and/or at weekend</i>	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.		
<i>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 '?'. Write '–' to show you have checked and no error or omission was found.</i>	Enter YES if true	COMMENT
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 30min 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 5 breaths/min)(<i>Check especially in 6 hours before death</i>)		
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 2 hours		
d) Child's PR and RR were not monitored every 10 min 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: <i>check antibiotic prescription and nurses' medicine chart and check vital signs chart for evidence of infection</i>		
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 (<i>check especially for omission of gentamicin</i>)		
3. Vitamin A was not given on Day 1		
Weak areas of treatment: (<i>include quality of record keeping and monitoring</i>)		



Suspected cause of death:		
Agreed Actions	By Whom	When

Appendix 12: Action Protocol in Outpatient Care

Sign	Referral to Inpatient Care	Require a Special Home Visit
GENERAL CONDITION	Deteriorating	Child is absent or defaulting
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 during the 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 eye-lid retraction: child sleeps with eyes slightly open.	
	Low level of blood glucose < 3 mmol/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 not gaining weight or losing weight on follow-up visit
HIGH FEVER	Axillary temperature $\geq 37.5^{\circ}\text{C}$	Child is not losing oedema
HYPOTHERMIA	Axillary temperature $< 36^{\circ}\text{C}$	
RESPIRATION RATE	≥ 60 respirations/minute for children under 2 months	
	≥ 50 respirations/minute from 2-12 months	
	≥ 40 respirations/minute from 1-5 years	
	≥ 30 respirations/minute for children over 5 years	
	Any chest in-drawing	
ANAEMIA	Palmer pallor or unusual paleness of skin	Child has returned from inpatient care or refuses referral to inpatient care
SKIN LESION	Broken skin, fissures, flaking of skin	
SUPERFICIAL INFECTION	Any infection requiring intramuscular antibiotic treatment	
WEIGHT CHANGES	Below admission weight on week 3	
	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

Appendix13:**Infant Feeding Assessment, Counselling and Support in the child 0 – 6 months**

Breastfed child	Non – Breastfed Child
<ul style="list-style-type: none"> • How is feeding going? • How many times do you breastfeed in 24 hours? • For how long does the baby feed? • If expressed milk, how much does the baby drink? • Does your baby get any other food or drink? If yes, how often. • If the baby has not fed in the last hour, ask the mum if she is willing to put baby to the breast and assess a breastfeed. • Check latching, attachment and suckling. 	<ul style="list-style-type: none"> • How is feeding going? • What milk are you giving? • How many times during the day and night and how much at each feed? • How are you preparing the feed? • Are you giving any breastmilk at all? • What foods and fluids in addition to breastmilk are given? • Is bottle or cup been used to give the feed? • How are you cleaning the utensils?
<p>Feeding Problem and / or Poor Growth</p> <ul style="list-style-type: none"> • Advise the mother to breastfeed as often and for as long as the infant wants, day and night. • If not well attached or not sucking effectively, teach correct positioning and attachment. • If breastfeeding less than 8 times in 24 hours, advise to increase frequency of feeding. • Advise on common breastfeeding problems. • If giving other foods and drinks, counsel mother on exclusive breastfeeding, stopping all other foods or drinks and cup feeding. • If the mother has thrush, teach her to treat accordingly. • Assess nutritional and social status of mother and treat / refer if necessary. • Follow up in 7 days. 	<p>Feeding Problem and / or Poor Growth</p> <ul style="list-style-type: none"> • Counsel on feeding and explain the guidelines for safe replacement feeding. • Identify and address concerns of mother and family about feeding, especially those established above. • If a bottle is being used, counsel on cup feeding. • Refer to Dietitian and social worker if necessary.

BREASTMILK SUBSTITUTE PREPARATION GUIDELINES

Breastmilk substitutes will be prescribed by the hospital Dietitian on an individual basis upon discharge for the child under 6 months with no prospect for breastfeeding. The BMS will be prescribed up until the social grant for the infant is secured and the mother is able to then purchase the BMS.

1. Wash your hands with soap and warm water before preparing babies feed
2. Wash the feeding cup with soap and warm water and rinse with warm water
3. Boil all the feeding equipment for 5 minutes
4. Boil drinking water for 5 minutes, cover the water and allow to become lukewarm.
5. Consult the feeding table on the tin to know how much to prepare.
6. Pour the exact amount of water into the cup. You can use a bottle to measure water
7. Add the correct amount of level scoops to the water. Use only the scoop that is provided
8. Mix the breastmilk substitute well until the powder is fully dissolved.
9. Close the container tightly after each use and store in a cool, dry area out of reach
10. The BMS powder must be used within 2 weeks of opening
11. Only prepare 1 feed at a time and feed immediately

BREASTMILK IS ALWAYS BEST

IT PROVIDES THE BEST FOOD FOR BABIES AND REDUCES THE RISK OF ILLNESS

IF THE INFANT IS NOT BREASTFED; ALWAYS FIRST CONSIDER RELACTATION



Appendix 14: Weight-for-Length Look-Up Table for Children 6-23 Months [WHO 2006 Child Growth Standards]

Length is measured for children under 2 years or less than 87 cm height. For children 2 years or older or 87 cm height or greater, height is measured. Recumbent length is, on average, 0.7 cm greater than standing height; although the difference is of no importance to individual children, a correction may be made by subtracting 0.7 cm from all lengths above 86.9 cm if standing height cannot be measured.

Boys' weight (kg)				Length (cm)	Girls' weight (kg)			
-3 SD	-2 SD	-1 SD	Median		Median	-1 SD	-2 SD	-3 SD
1.9	2.0	2.2	2.4	45	2.5	2.3	2.1	1.9
2.0	2.2	2.4	2.6	46	2.6	2.4	2.2	2.0
2.1	2.3	2.5	2.8	47	2.8	2.6	2.4	2.2
2.3	2.5	2.7	2.9	48	3.0	2.7	2.5	2.3
2.4	2.6	2.9	3.1	49	3.2	2.9	2.6	2.4
2.6	2.8	3.0	3.3	50	3.4	3.1	2.8	2.6
2.7	3.0	3.2	3.5	51	3.6	3.3	3.0	2.8
2.9	3.2	3.5	3.8	52	3.8	3.5	3.2	2.9
3.1	3.4	3.7	4.0	53	4.0	3.7	3.4	3.1
3.3	3.6	3.9	4.3	54	4.3	3.9	3.6	3.3
3.6	3.8	4.2	4.5	55	4.5	4.2	3.8	3.5
3.8	4.1	4.4	4.8	56	4.8	4.4	4.0	3.7
4.0	4.3	4.7	5.1	57	5.1	4.6	4.3	3.9
4.3	4.6	5.0	5.4	58	5.4	4.9	4.5	4.1
4.5	4.8	5.3	5.7	59	5.6	5.1	4.7	4.3
4.7	5.1	5.5	6.0	60	5.9	5.4	4.9	4.5
4.9	5.3	5.8	6.3	61	6.1	5.6	5.1	4.7
5.1	5.6	6.0	6.5	62	6.4	5.8	5.3	4.9
5.3	5.8	6.2	6.8	63	6.6	6.0	5.5	5.1
5.5	6.0	6.5	7.0	64	6.9	6.3	5.7	5.3
5.7	6.2	6.7	7.3	65	7.1	6.5	5.9	5.5
5.9	6.4	6.9	7.5	66	7.3	6.7	6.1	5.6
6.1	6.6	7.1	7.7	67	7.5	6.9	6.3	5.8
6.3	6.8	7.3	8.0	68	7.7	7.1	6.5	6.0
6.5	7.0	7.6	8.2	69	8.0	7.3	6.7	6.1
6.6	7.2	7.8	8.4	70	8.2	7.5	6.9	6.3
6.8	7.4	8.0	8.6	71	8.4	7.7	7.0	6.5
7.0	7.6	8.2	8.9	72	8.6	7.8	7.2	6.6
7.2	7.7	8.4	9.1	73	8.8	8.0	7.4	6.8
7.3	7.9	8.6	9.3	74	9.0	8.2	7.5	6.9
7.5	8.1	8.8	9.5	75	9.1	8.4	7.7	7.1
7.6	8.3	8.9	9.7	76	9.3	8.5	7.8	7.2
7.8	8.4	9.1	9.9	77	9.5	8.7	8.0	7.4
7.9	8.6	9.3	10.1	78	9.7	8.9	8.2	7.5
8.1	8.7	9.5	10.3	79	9.9	9.1	8.3	7.7
8.2	8.9	9.6	10.4	80	10.1	9.2	8.5	7.8
8.4	9.1	9.8	10.6	81	10.3	9.4	8.7	8.0
8.5	9.2	10.0	10.8	82	10.5	9.6	8.8	8.1
8.7	9.4	10.2	11.0	83	10.7	9.8	9.0	8.3
8.9	9.6	10.4	11.3	84	11.0	10.1	9.2	8.5
9.1	9.8	10.6	11.5	85	11.2	10.3	9.4	8.7
9.3	10.0	10.8	11.7	86	11.5	10.5	9.7	8.9
9.5	10.2	11.1	12.0	87	11.7	10.7	9.9	9.1
9.7	10.5	11.3	12.2	88	12.0	11.0	10.1	9.3
9.9	10.7	11.5	12.5	89	12.2	11.2	10.3	9.5
10.1	10.9	11.8	12.7	90	12.5	11.4	10.5	9.7
10.3	11.1	12.0	13.0	91	12.7	11.7	10.7	9.9
10.5	11.3	12.2	13.2	92	13.0	11.9	10.9	10.1
10.7	11.5	12.4	13.4	93	13.2	12.1	11.1	10.2
10.8	11.7	12.6	13.7	94	13.5	12.3	11.3	10.4
11.0	11.9	12.8	13.9	95	13.7	12.6	11.5	10.6
11.2	12.1	13.1	14.1	96	14.0	12.8	11.7	10.8
11.4	12.3	13.3	14.4	97	14.2	13.0	12.0	11.0
11.6	12.5	13.5	14.6	98	14.5	13.3	12.2	11.2
11.8	12.7	13.7	14.9	99	14.8	13.5	12.4	11.4
12.0	12.9	14.0	15.2	100	15.0	13.7	12.6	11.6

Appendix 15: Weight-for-Height Look-Up Table, Children 24-59 Months [WHO 2006 Child Growth Standards]

Length is measured for children under 2 years or less than 87 cm height. For children 2 years or older or 87 cm height or more, height is measured. Recumbent length is, on average, 0.7 cm greater than standing height; although the difference is of no importance to individual children, a correction may be made by subtracting 0.7 cm from all lengths greater than 86.9 cm if standing height cannot be measured.

Boys' weight (kg)				Length (cm)	Girls' weight (kg)			
-3 SD	-2 SD	-1 SD	Median		Median	-1 SD	-2 SD	-3 SD
5.9	6.3	6.9	7.4	65	7.2	6.6	6.1	5.6
6.1	6.5	7.1	7.7	66	7.5	6.8	6.3	5.8
6.2	6.7	7.3	7.9	67	7.7	7.0	6.4	5.9
6.4	6.9	7.5	8.1	68	7.9	7.2	6.6	6.1
6.6	7.1	7.7	8.4	69	8.1	7.4	6.8	6.3
6.8	7.3	7.9	8.6	70	8.3	7.6	7.0	6.4
6.9	7.5	8.1	8.8	71	8.5	7.8	7.1	6.6
7.1	7.7	8.3	9.0	72	8.7	8.0	7.3	6.7
7.3	7.9	8.5	9.2	73	8.9	8.1	7.5	6.9
7.4	8.0	8.7	9.4	74	9.1	8.3	7.6	7.0
7.6	8.2	8.9	9.6	75	9.3	8.5	7.8	7.2
7.7	8.4	9.1	9.8	76	9.5	8.7	8.0	7.3
7.9	8.5	9.2	10.0	77	9.6	8.8	8.1	7.5
8.0	8.7	9.4	10.2	78	9.8	9.0	8.3	7.6
8.2	8.8	9.6	10.4	79	10.0	9.2	8.4	7.8
8.3	9.0	9.7	10.6	80	10.2	9.4	8.6	7.9
8.5	9.2	9.9	10.8	81	10.4	9.6	8.8	8.1
8.7	9.3	10.1	11.0	82	10.7	9.8	9.0	8.3
8.8	9.5	10.3	11.2	83	10.9	10.0	9.2	8.5
9.0	9.7	10.5	11.4	84	11.1	10.2	9.4	8.6
9.2	10.0	10.8	11.7	85	11.4	10.4	9.6	8.8
9.4	10.2	11.0	11.9	86	11.6	10.7	9.8	9.0
9.6	10.4	11.2	12.2	87	11.9	10.9	10.0	9.2
9.8	10.6	11.5	12.4	88	12.1	11.1	10.2	9.4
10.0	10.8	11.7	12.6	89	12.4	11.4	10.4	9.6
10.2	11.0	11.9	12.9	90	12.6	11.6	10.6	9.8
10.4	11.2	12.1	13.1	91	12.9	11.8	10.9	10.0
10.6	11.4	12.3	13.4	92	13.1	12.0	11.1	10.2
10.8	11.6	12.6	13.6	93	13.4	12.3	11.3	10.4
11.0	11.8	12.8	13.8	94	13.6	12.5	11.5	10.6
11.1	12.0	13.0	14.1	95	13.9	12.7	11.7	10.8
11.3	12.2	13.2	14.3	96	14.1	12.9	11.9	10.9
11.5	12.4	13.4	14.6	97	14.4	13.2	12.1	11.1
11.7	12.6	13.7	14.8	98	14.7	13.4	12.3	11.3
11.9	12.9	13.9	15.1	99	14.9	13.7	12.5	11.5
12.1	13.1	14.2	15.4	100	15.2	13.9	12.8	11.7
12.3	13.3	14.4	15.6	101	15.5	14.2	13.0	12.0
12.5	13.6	14.7	15.9	102	15.8	14.5	13.3	12.2
12.8	13.8	14.9	16.2	103	16.1	14.7	13.5	12.4
13.0	14.0	15.2	16.5	104	16.4	15.0	13.8	12.6
13.2	14.3	15.5	16.8	105	16.8	15.3	14.0	12.9
13.4	14.5	15.8	17.2	106	17.1	15.6	14.3	13.1
13.7	14.8	16.1	17.5	107	17.5	15.9	14.6	13.4
13.9	15.1	16.4	17.8	108	17.8	16.3	14.9	13.7
14.1	15.3	16.7	18.2	109	18.2	16.6	15.2	13.9
14.4	15.6	17.0	18.5	110	18.6	17.0	15.5	14.2
14.6	15.9	17.3	18.9	111	19.0	17.3	15.8	14.5
14.9	16.2	17.6	19.2	112	19.4	17.7	16.2	14.8
15.2	16.5	18.0	19.6	113	19.8	18.0	16.5	15.1
15.4	16.8	18.3	20.0	114	20.2	18.4	16.8	15.4
15.7	17.1	18.6	20.4	115	20.7	18.8	17.2	15.7
16.0	17.4	19.0	20.8	116	21.1	19.2	17.5	16.0
16.2	17.7	19.3	21.2	117	21.5	19.6	17.8	16.3
16.5	18.0	19.7	21.6	118	22.0	19.9	18.2	16.6
16.8	18.3	20.0	22.0	119	22.4	20.3	18.5	16.9
17.1	18.6	20.4	22.4	120	22.8	20.7	18.9	17.3



APPENDIX 16: Clinical Audit of the WHO Ten Step Protocol and Emergency Management Protocol

- Conduct monthly audit on 3 SAM cases.
- Identify gaps and challenges in the management of SAM Inpatient.
- Report the challenges and recommendations to the medical manager and district nutrition co-ordinator.

STATUS ON ADMISSION	PATIENT 1	PATIENT 2	PATIENT 3
Age			
Sex			
Admission weight (kg)			
Length/height (cm)			
Weigh-for-height SD score			
Oedema grade (0 + ++ +++)			
Dermatosis grade (0 + ++ +++)			
HIV status			
Where was the child referred from?			
New admission, or re-admission			
EMERGENCY TREATMENT			
Was blood sugar tested at OPD?			
Was temperature taken at at OPD?			
If child had signs of shock was she stabilized? <i>On oxygen, 0.9 Normal Saline (NaCl) at 10ml/kg over 10 minutes. Repeat bolus until stabilised</i>			
Is pulse and respiration of a child in shock monitored every 10minutes?			
Is child is in septic shock? <i>To be admitted to ICU for CVP line and start on inotropes</i>			
Does child have severe anaemia? (Hb 4-6g/dL & respiratory distress) <i>Given 10ml/kg packed cells (or 5-7ml/kg if signs of heart failure)</i>			
WARD: HYPOGLYCAEMIA			
What time was the child admitted in the ward? (<i><2hours of admission at OPD</i>)			
How soon was the child fed after admission in the ward?			
Was blood sugar tested on admission?			
If blood sugar was below 3 mmol/l was glucose solution or feeds given immediately?			
Is blood sugar tested every 3 hourly if below 3mmol/l			

Is the child fed 3 hourly?			
HYPOTHERMIA			
Is temperature recorded?			
If temperature is below 36.5 °c was the child warmed? <i>Allowing mother to sleep with the child or placing a heater</i>			
Is the child covered with a blanket?			
Are malnourished children nursed in a separate ward or corner?			
Is the room warm and free from draughts ?			
DEHYDRATION			
Was ORS given? <i>Check TREATMENT PLAN/protocol for guidance</i>			
How often was it given?			
Is ORS replaced by stabilization feed during feeding times			
If child vomits, is a feed re-offered			
If IV fluids given was the protocol for treatment of shock used correctly? <i>See Emergency Treatment chart</i>			
PREVENTION OF DEHYDRATION			
Was ORS given for each loose stool?			
ELECTROLYTE IMBALANCE			
Is combined mineral and vitamin complex (CMV) added to feeds added if available? OR			
Is trace element mix given if available AND			
Is potassium given 3 times a day?			
Is magnesium given daily?			
Is salt limited in the diet? OR			
Is the child offered RTU stabilizing feed with all the electrolytes?			
INFECTION TREATED			
Is the child treated with antibiotics?			
If the child is severely ill (lethargic, apathetic) <i>Give Ceftriaxone 100mg/kg/day</i>			
If child the has medical complications <i>Ampicillin IV/IM 50mg/day 6-hourly for 7-days Gentamicin IV/IM 7.5mg/kg for 7-days</i>			
If the child has no medical complications <i>Give Amoxicillin 15mg/kg 8-hourly for 5 days</i>			
Did child have PCP pneumonia? <i>Cotrimoxazole given</i>			

Was mebendazole given? 1-2years or <10kg 100mg po for 3days >2years or >10kg 500mg po single dose			
How soon were antibiotics commenced after admission?			
Is the immunisation schedule up to date?			
Is TB investigated?			
Is HIV counseling & testing done?			
MICRONUTRIENT DEFICIENCIES			
Is Vitamin A given only if the child has had diarrhoea or measles or eye signs of vitamin A deficiency?			
Substantiate micronutrient supplementation			
Iron 3mg/kg/day (to be given during the rehabilitation phase)			
Was iron given during the rehabilitation phase or when the child starts gaining weight?			
STABILIZING FEEDING			
Is the child fed with stabilizing feed for the initial phase?			
Is the child fed 3 hourly?			
Is the child having intake and output charts?			
Are the following charted?			
Amount to be taken?			
Amount taken?			
Amount left over?			
Total?			
Is the child taking 80% of the amount prescribed?			
If not, is the child fed by nasogastric tube?			
Is totalling of intake and output done daily?			
Was the child transferred to catch up feed as soon as they regain appetite?			
Is breastfeeding re-established if possible?			
TRANSITION & CATCH-UP GROWTH			
Is child transitioned cautiously? For 2 days, repalce F75 with same amount of F100 On day 3, increase each feed by 10ml until some feed remains			
Is the child fed 3 hourly?			
If the child is eager to eat, is the child progressed to 5 feeds F100 and 3 family meals?			
Is the mother/care giver involved in the child's feeding?			

Is the child weighed daily?			
Is weight recorded?			
Is weight plotted correctly?			
Is the child gaining weight well (>10g/kg/day)			
If the child is ready for discharge, is child introduced to RUTF in preparation for discharge			
STIMULATION, PLAY & LOVING CARE			
Is the mother/care giver admitted with the child			
Is she encouraged to play with the child?			
Are there toys available in the ward?			
Is there a play schedule in the ward?			
Occupational Therapist/ Physiotherapist involved in play therapy if available			
PREPARATION FOR FOLLOW UP AFTER DISCHARGE			
Is Tuberculin Skin Test repeated before discharge?			
Are the findings of HIV and Aids test recorded or current known status recorded?			
Was information on the family background and socio- economic status obtained & recorded?			
Was the child referred to the social worker?			
Was the child seen by the social worker?			
Did the mother receive help with necessary documents to start the process of child support grant if necessary?			
Did the mother attend any health education sessions? <i>Get health information about herself and child</i>			
Did the mother attend any nutrition education sessions?			
Does child meet discharge criteria? <i>Good Appetite</i> <i>Infection resolved</i> <i>Oedema resolved</i> <i>consecutive weight gain for 5 days</i>			
If criteria not met, is the child referred to outpatient therapeutic programme for weekly follow-up? State name or address of OTP centre			
Was the referral letter written and given to mother?			
Weighing:			
Is the scale balanced before weighing?			
Are children weighed naked?			
Temperature taking			
Thermometer shaken			
Correct time taken			
Read correctly and recorded			



Feeding			
Frequency of feeding			
Time of feeding			
If correct amount is fed			
If any other food is given by parents			
If mothers drink children's feeds			

A tool for monitoring the implementation of the WHO guidelines for management of severe malnutrition

Name of facility: _____

Month: _____

Name of paediatric nurse: _____

Indicators	No/%
A. Total ward admissions	
B. Total ward deaths	
C. General ward fatality rate % = $(B/A \times 100)$	
D. Admissions due to severe malnutrition	D (i). Kwashiorkor (oedematous)
E.	D (ii). Marasmus (wasting)
F.	D (iii). Marasmic kwashiorkor
G. Total admissions due to severe malnutrition [D (i) + D (ii) + D (iii)]	
H. Total number of deaths due to severe malnutrition	
I. Case fatality rate for severe malnutrition % = $(F/E \times 100)$	
J. Number of children admitted and receiving child support grant	
K. Number of children admitted with severe malnutrition receiving child support grant	

Resource availability

(Indicate by ticking Yes or No which of the following resources were available during the concerned month)

ITEMS	YES	NO
Glucostix/Dextrostix or glucometer		
Child weighing scales (note if x10g, x25g, x50g, x100g)		
Pan-type scale/sling to weigh very ill children		
Graph paper for weight charts		
Fluid intake/output charts		
Paediatric nasogastric tubes		
Paediatric giving set		
Glucose/Dextrose (10% oral)		
Sterile Glucose/Dextrose (10% or 50%)		

½ strength Darrow's with 5% dextrose;		
Half-normal saline with 5% dextrose,		
Ringers lactate.		
Oral rehydration solution (ORSOL)		
Oxygen		
Multivitamins		
KCl solution for malnutrition		
Mineral mix (Mg/Zn/Cu)		
Ferrous sulphate (or other iron preparation)		
Folic acid		
Vitamin A		
Metronidazole		
Co-trimoxazole (Bactrim)		
Ampicillin		
Gentamicin		
Chloramphenicol		
Mebendazole		
Laminated enlarged protocol of 10 steps in visible location		
Full cream fresh or long-life milk		
Sugar		
Oil		
If there is a wash basin in the ward with running water		
If soap/hexadine is visible		
Working fridge		
Electric food blender		
A separate room for malnourished children		
Blankets for every child		
Any toys available		
Mothers/carers present		
Food for mothers		
Washing facilities for mothers		
Mattresses for mothers		
Blankets for mothers		
Ward heater		
Problems keeping malnutrition ward warm		
Reliable electricity supply		

¹ South African Oral Rehydration Solution. Na⁺ 64 meq/L, K⁺ 20 meq/L, Glucose 2g/100ml, Citrate 10 mmol/L

² These rates are in line with current safety evidence. However, the need for regular 4 hourly reassessment remains.

³ Less than 5 ml/kg/hour

APPENDIX 18: Outpatient Therapeutic Protocol for SAM patients (0 – 59 months) without medical complications

4. OUTPATIENT MANAGEMENT OF SAM (AMBULATORY)

The Outpatient Therapeutic program (OTP) is aimed at providing treatment for children 6-59 months with severe acute malnutrition (SAM) who have an appetite and are without medical complications and were not admitted for inpatient management. These children are the SAM ambulatory cases according to DHIS. Ambulatory/Outpatient services can be accessed through delivery of OTP at any of the following service points:

- **Primary Health Care Clinic:** If Patient is able to easily access the nearest PHC clinic for weekly visits and the PHC clinic is well prepared to provide adequate OTP care.

OR

- **Hospital Outpatient Department:** If Patient is able to easily access the Hospital Dietetics Department for weekly visits

There are 2 types of SAM cases without medical complications that will be managed as outpatients:

Type 1: Recovering SAM cases referred from Inpatient care to OTP

Children who have been referred from inpatient care or another outpatient care site should not be given routine medicines for a second time as they have already been administered to them. 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 protocol.

Type 2: Newly Identified SAM cases admitted directly to Outpatient care/OTP

Dietary Treatment

Children receive RUTF based on a dose of +/- 200 kcal/kg bodyweight/day given as a take-home feed. A weekly supply of RUTF is provided depending on the child's bodyweight. The dietary treatment is managed at home, with the child attending outpatient care sessions on a weekly basis for monitoring health and nutritional status and replenishing stocks of RUTF. Use the RUTF look-up table below for the amounts of RUTF to give on each weekly visit, based on the child's weight at the time of the visit. Explain the daily amount the child will need to consume to the caregiver.

Dietary Treatment using RUTF

Child's Weight (kg)	Grams per day	Tubs per week
4.0* – 4.9	180 (12 tsp)	3 x 450g
5.0 – 6.9	225 (15 tsp)	4 x 450g
7.0 – 8.4	250 (18 tsp)	4 x 450g
8.5 – 9.4	315 (21 tsp)	5 x 450g
9.5 – 10.4	375 (25 tsp)	6 x 450g
10.5 – 11.9	420 (28 tsp)	7 x 450g
≥12	465 (31 tsp)	8 x 450g

Antibiotic Treatment

- Give oral antibiotic treatment for a period of five days to be taken at home (give 10 days if needed), based on a dose 50-100 mg/kg bodyweight/day.
- The first dose should be taken during the admission process under the supervision of the health care 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

Measles vaccination

- Give a single vaccine on week four (or upon discharge) if there is no record of a previous vaccination.
- Infants under 12 months who receive a measles vaccination will need one routine measles vaccination when they have reached 12 months.
- In the case of a measles epidemic in the area, provide measles vaccination upon admission to outpatient care and repeat the vaccination on week four (or upon discharge).

Deworming Treatment

- Give a single dose of Mebendazole at the second week in treatment, in compliance with the IMCI treatment protocol and/or adapt according to the national protocol.
- Do not give Mebendazole to children under 1 year.

Children 1–2 years

mebendazole, oral, 100 mg twice daily for 3 days

Children over 2 years

mebendazole, oral, 500 mg as a single dose immediately

Exclude HIV and TB

- Consider immediate empiric treatment of TB if there is strong evidence that it may be present e.g. CXR changes. HIV treatment should normally be delayed until the acute phase of stabilization is completed – this will also allow time for some counselling before initiating HIV treatment, if it is required, during the rehabilitation phase

Vitamin A

- Refer any child with signs of vitamin A deficiency to inpatient care for immediate start of treatment, as the condition of the eyes can deteriorate very rapidly and the risk of blindness is high.

Iron and Folic Acid

- Iron and folic acid are NOT to be given.
- Where anaemia is identified according to IMCI protocols, children are referred to inpatient care and receive treatment in compliance with the IMCI treatment protocol.

Vaccination Schedule Update

Ensure immunizations are caught up. Record the dose given in the RtHB.

Malaria Treatment (for malaria prevalent areas in South Africa)

- Routinely screen all children for malaria in endemic areas on admission regardless of their body temperature, if diagnostic tests are available. If in clinical doubt or symptoms, repeat the malaria test in the weeks following the initial test.
- If no diagnostic test is available but malaria symptoms are diagnosed, treat the child.
- Treat malaria according to the national treatment protocol with first-line artemisinin-based combination therapy (ACT) in compliance with Integrated Management of Childhood Illnesses (IMCI) treatment.

Note: A child with SAM cannot auto-regulate his/her body temperature well and tends to adopt the temperature of the environment; thus the child will feel hot on a hot day and cool on a cool day.

In malaria-endemic areas, children with SAM should be provided with insecticide-treated bed nets to prevent malaria.

In the case of malaria, the child is referred to inpatient care and treatment with a second-line antimalarial drug is provided

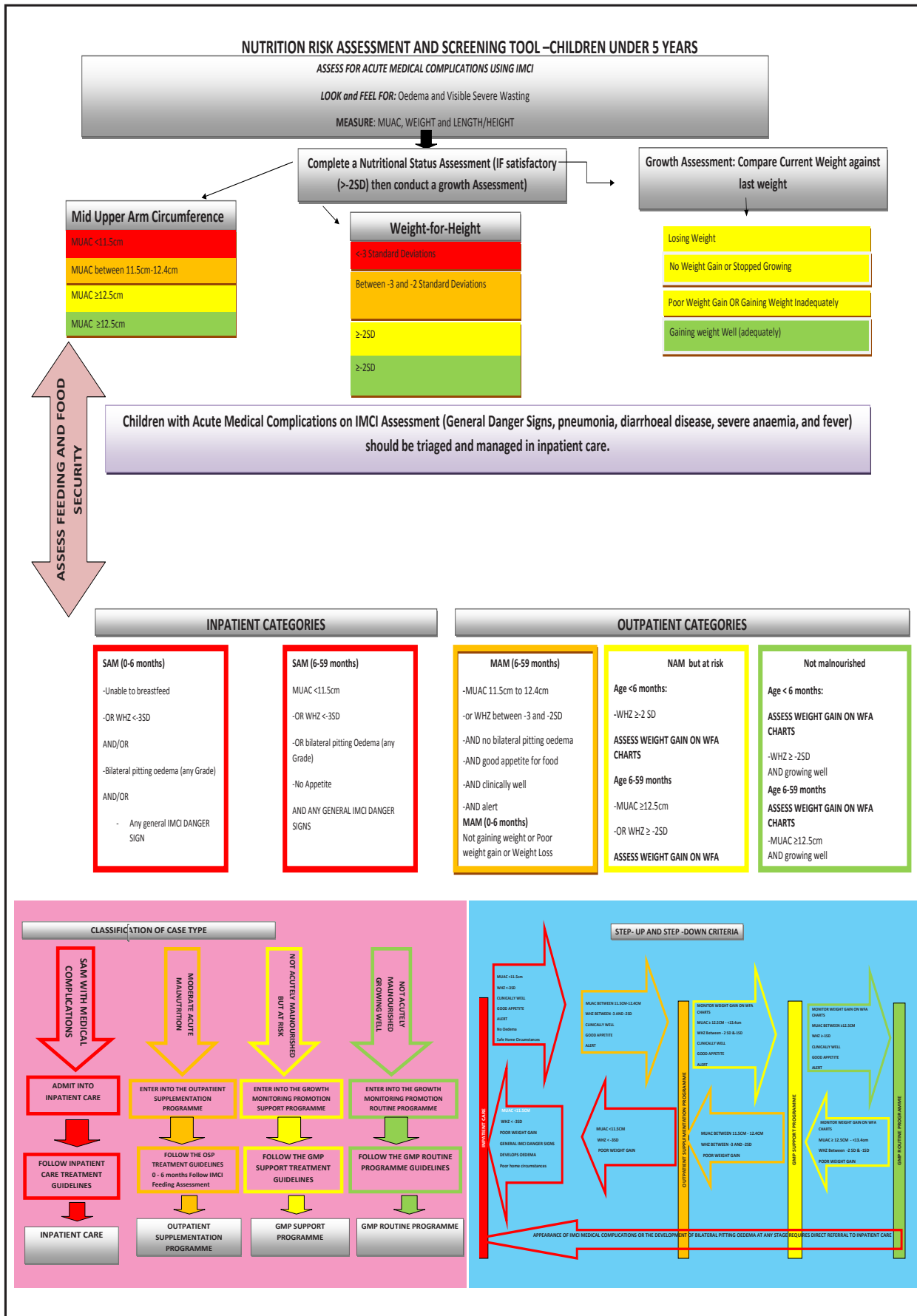
Criteria for discharge from OTP and admission into OSP:

WHZ : >-2SD (preferably at -1SD) WHZ for two consecutive visits and/or

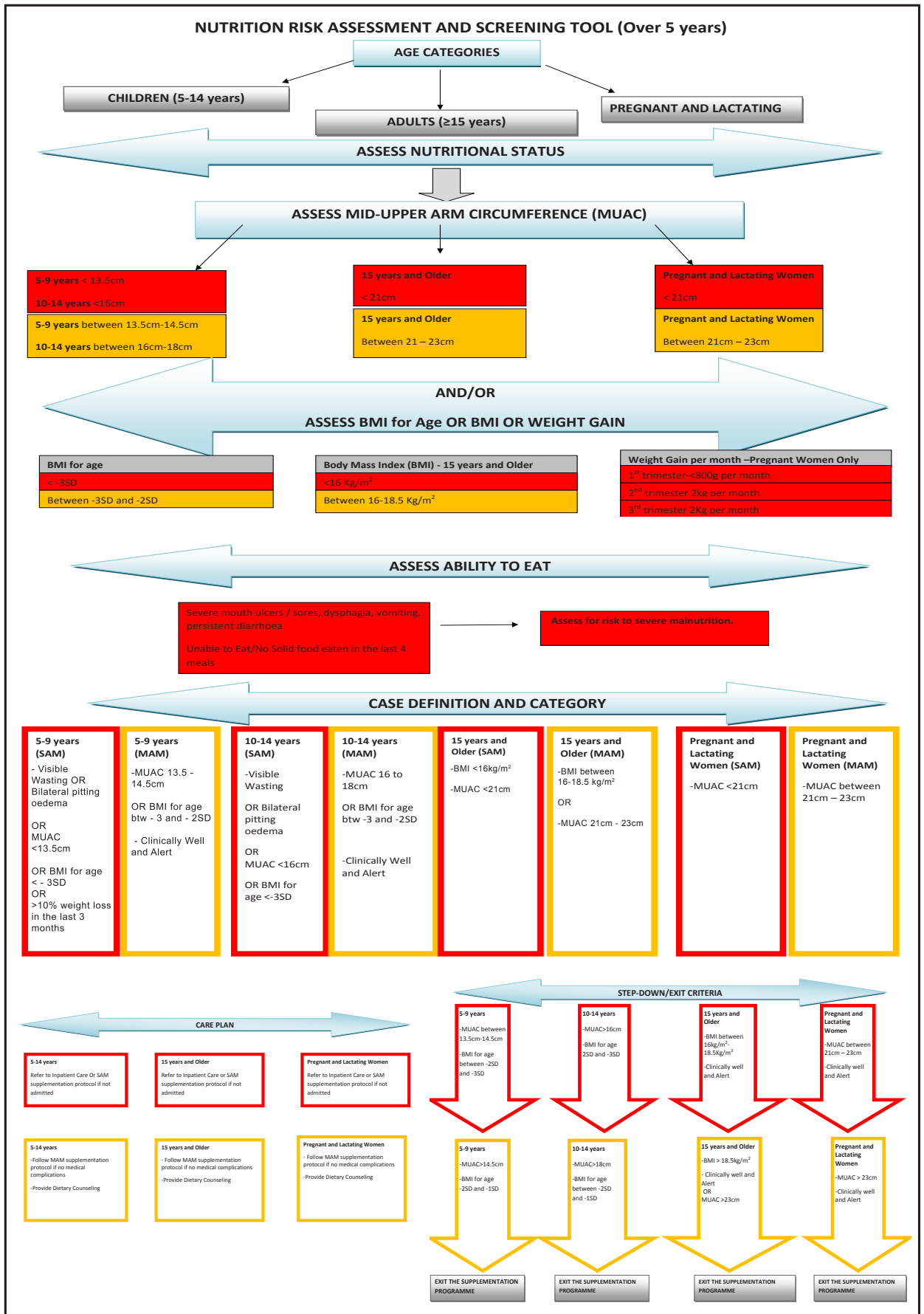
MUAC: >11.5cm (preferable at 12cm if MUAC used alone)

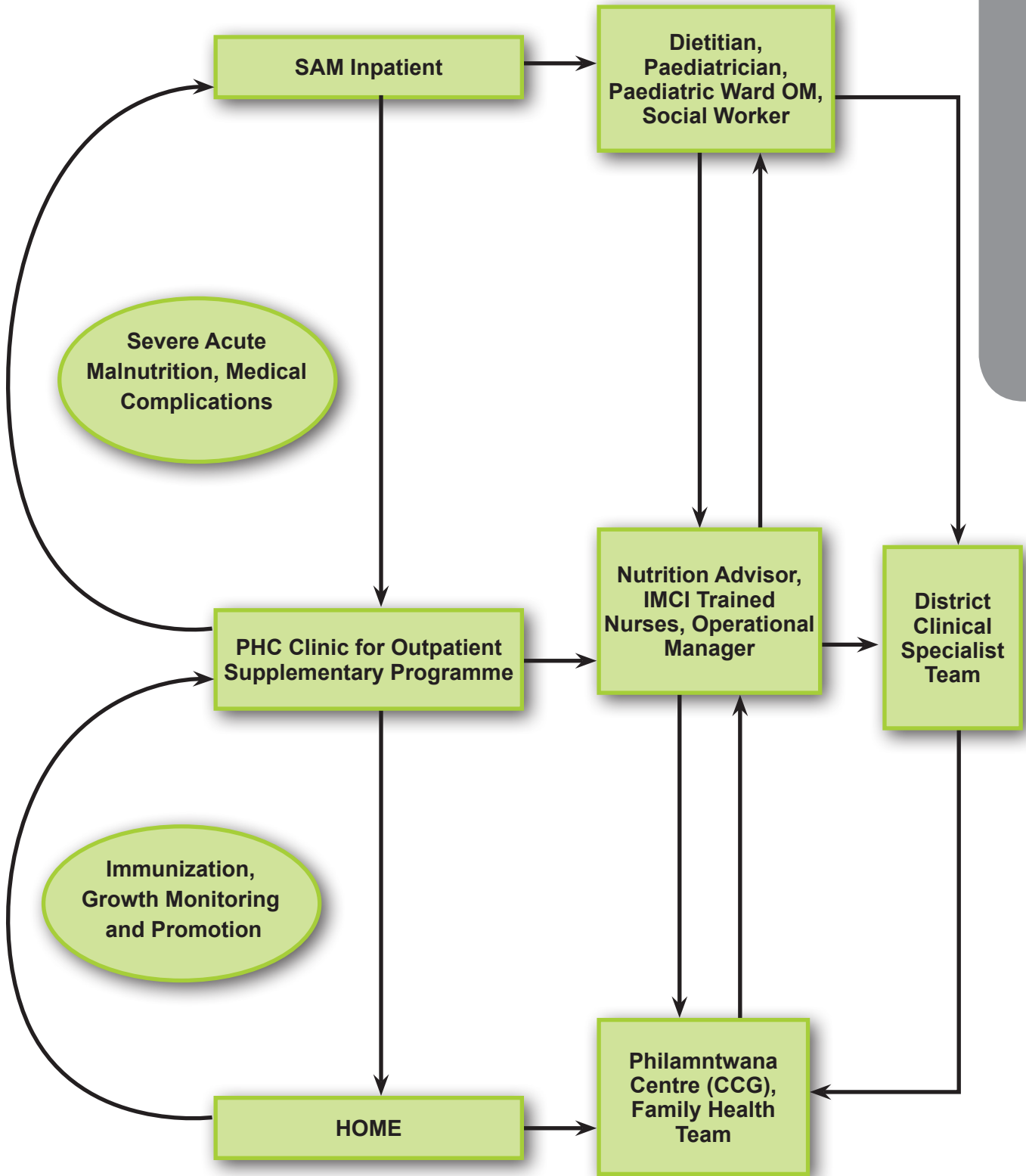
No oedema





APPENDIX 20:





APPENDIX 22:

SEVERE ACUTE MALNUTRITION EMERGENCY TREATMENT IN SOUTH AFRICA

Complicated cases of Severe Acute Malnutrition have a very high risk of dying during the first 48 hours of admission. Early recognition of emergency signs and early treatment will improve likelihood of survival in hospital.

CONDITION	IMMEDIATE ACTION
<p>Treat shock</p> <p>Shock is suspected in these children if the child is lethargic or unconscious, and has cold hands</p> <p>Plus either:</p> <p>Weak fast pulse or Slow capillary refill (longer than 3 seconds)</p> <p>Monitor closely: children in shock need frequent monitoring of vital signs (pulse rate and volume, respiratory rate, urine output, glucose, etc)</p>	<p>If child is in shock:</p> <ol style="list-style-type: none"> 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. <p>If there are no signs of improvement assume child has septic shock:</p> <ul style="list-style-type: none"> ✓ 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. <ol style="list-style-type: none"> 4. Only transfer the child to ward once signs of shock have resolved.
<p>Treat very severe anaemia</p> <p>Very severe anaemia is Hb<4g/dL</p>	<p>If very severe anaemia (or Hb 4-6g/dl AND respiratory distress):</p> <ol style="list-style-type: none"> 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. <p>NB Keep a close eye for signs of fluid overload: further tachycardia, gallop rhythm, breathing even faster, puffy eyelids, enlarging liver size</p>
<p>Treat hypoglycaemia</p> <p>Hypoglycaemia is a blood glucose <3mmol/L</p> <p>Assume hypoglycaemia if no dextrostix available</p>	<p>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 ill¹.</p> <ul style="list-style-type: none"> ▪ If the blood glucose <3 mmol/L in asymptomatic child, give orally or by NG tube: <ul style="list-style-type: none"> ▪ immediate feed of a “stabilizing feed (F75)”, or ▪ 50ml bolus of 10% dextrose, or ▪ sugar solution 5 ml/kg ▪ Re-Check the Blood Glucose after 30 min, if normal continue normal feeds, monitor blood glucose to see it remains above 3 mmol/L. <ul style="list-style-type: none"> ▪ If symptomatic or unresponsive hypoglycaemia give dextrose 10%², IV, 2 ml/kg over 2-3 minutes³. <p>Re-Check the Blood Glucose after 30 min, if normal, continue feeds, monitor blood glucose to see it remains above 3 mmol/L.</p>
<p>Treat hypothermia</p> <p>Hypothermia is axillary/underarm temperature <35°C.</p>	<p>Take temperature at outpatients/casualty and on admission in the ward. (Ensure thermometer is well shaken down).</p> <p>If the temperature is below 36.5°C:</p> <ol style="list-style-type: none"> 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 them. Cover the child’s head. <p>Or clothe the child, apply a warmed blanket and place a heater or lamp nearby.</p> <ol style="list-style-type: none"> 3. Feed 2-3hourly (8-12 feeds in 24 hours). <p>Monitor during re-warming</p> <ul style="list-style-type: none"> ▪ Take temperature every two hours: stop active re-warming when temperature rises above 36.5°C. Take temperature every 30 minutes if heater is used because the child may become overheated.
<p>Emergency Eye Care</p> <p>Corneal Ulceration is a sign of severe Vitamin A deficiency.</p>	<p>If corneal ulceration:</p> <ol style="list-style-type: none"> 1. Give Vitamin A immediately (<6 months 50,000IU, 6-11 months 100,000 IU, 12-59 months 200,000IU) only if the child has signs of Vitamin A deficiency or has measles or diarrhoea. <p>Record dose given in prescription chart and RTHB.</p> <ol style="list-style-type: none"> 2. Instil one drop atropine (1%) into affected eye to relax the eye and prevent the lens from pushing out.

(Footnotes)

1. If severely ill continue 3 hrly blood glucose testing

2. 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.

3. Previously 5 ml/kg – recent APLS suggests 2ml/kg.




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<p style="text-align: center;">PROTOCOL FOR THE IN-PATIENT MANAGEMENT OF CHILDREN WITH SEVERE ACUTE MALNUTRITION IN SOUTH AFRICA</p> <p style="text-align: center;"><i>“Severely malnourished children are different from other children; so they need different treatment.”</i></p>			
<p>1. HYPOGLYCAEMIA (Low blood sugar)</p> <p>Hypoglycaemia is a blood glucose <3mmol/L</p>	<p>For all children:-</p> <ol style="list-style-type: none"> 1. Feed immediately "stabilizing feed" /F75 every 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). 2. Encourage mothers to stay with very ill children to watch for any deterioration, help feed and keep child warm. 	<ol style="list-style-type: none"> 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. 	<p>Perform Dextrostix test in outpatients/casualty and on admission on all patients. If conscious and blood sugar is below 3 mmol/L:-</p> <ol style="list-style-type: none"> 1. If hypoglycaemic, feed 2hourly (12 feeds in 24 hours). Use feeding chart to find amount to give. Start straightaway. 2. Give 50 ml of 10% glucose (to prepare mix 10ml 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 (2ml/kg of sterile 10% glucose: prepare 1ml/kg 50% dextrose mixed with 4ml/kg sterile water), followed by 50ml of 10% glucose via NG tube. Monitor response to treatment. 3. Monitor blood sugar 3-hourly until stable especially in first 48hours. If blood sugar is persistently low, review feed and look for infections.
<p>2. HYPOTHERMIA (Low temperature)</p> <p>Hypothermia is Axillary/underarm temperature <36.5°C</p>	<p>For all children:-</p> <ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Cold extremities 2. Lethargic 3. Poor appetite <p>NOTE: Hypothermia in malnourished children often indicates co-existing hypoglycaemia and serious infection.</p>	<p>Take temperature at outpatients/casualty and on admission. (Ensure thermometer is well shaken down).</p> <p>If the temperature is below 36.5°C:</p> <ol style="list-style-type: none"> 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). <p>Monitor during re-warming.</p> <ul style="list-style-type: none"> • Take temperature every two hours: stop active re-warming when temperature rises above 36.5°C • Take temperature every 30 minutes if heater is used because the child may become overheated.
<p>3. SOME OR SEVERE DEHYDRATION (WITHOUT SHOCK) (Too little fluid in the body)</p>	<ol style="list-style-type: none"> 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 	<p>Profuse watery diarrhoea, sunken eyes, slow skin pinch, absent tears, dry mouth, very thirsty, reduced urine output.</p>	<p>DO NOT GIVE IV FLUIDS EXCEPT IN SHOCK (see Emergency Treatment Wall Chart for treating shock)</p> <p>If there is some or severe dehydration:</p> <ol style="list-style-type: none"> 1. Give ORS, oral or by NG tube, 5ml/kg every 15min for 4 hours. Show the caregiver how to give ORS with a cup and spoon. If child vomits wait 10 minutes and then continue more slowly. 2. Stop ORS when there are 3 or more hydration signs, or signs of overhydration. <p>Monitor during rehydration for signs of overhydration:-</p> <ul style="list-style-type: none"> • 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. <p>Encourage caregiver to continue breastfeeding.</p> <p>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 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</p>
<p>4. ELECTROLYTE IMBALANCE (Too little potassium and magnesium, and too much sodium)</p>	<ol style="list-style-type: none"> 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. <p>Give extra potassium and magnesium (either as CMV in feeds or as a supplement)</p>	<p>Oedema develops or worsens, poor appetite and apathy.</p>	<ol style="list-style-type: none"> 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. <p>If not receiving feed with CMV then:</p> <ol style="list-style-type: none"> 2. Give daily: extra potassium (4mmol/kg/day body weight) and magnesium (0.4-0.6mmol/kg/day). For potassium, give Oral <i>Mist Pot Chlor</i> (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% MgSO4 daily mixed with food.
<p>5. INFECTIONS</p>	<ol style="list-style-type: none"> 1. Good nursing care 2. Reduce overcrowding if possible (separate room or ward for malnourished children) 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" 5. Give measles vaccine to unimmunized children over 6 months of age. 	<p>NOTE: The usual signs of infection, such as fever, are often absent so assume all severely malnourished children have infection and treat with antibiotics. Hypothermia and hypoglycaemia are signs of severe infection.</p> <p>NOTE: Ensure all doses are given. Give them on time.</p>	<p>Starting on the first day, give antibiotics to all children.</p> <ol style="list-style-type: none"> 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 100mg/kg/day. 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: 7.5mg/kg IM/IV once daily for 7 days. Check renal function. 3. If the child has no medical complications, give antibiotics orally Amoxicillin 15mg/kg 8-hourly for 5 days. 4. If a child fails to improve after 48 hours, search for new infection, then change to Ceftriaxone 100mg/kg daily IM/IV for 5-7 days (or guided by local microbiological flora)NOTE: Avoid steroids as these depress immune function. Give measles vaccine if due. Continue use of cotrimoxazole to prevent PCP pneumonia if indicated. 5. Treat for intestinal infestation (parasitic worms) once stable: <ul style="list-style-type: none"> 1-2 yrs old or < 10kg Mebendazole 100mg po bd for 3 days > 2 yrs and > 10kg Mebendazole 500mg po single dose <p>Investigate for TB. Do Tuberculin Skin Test and read it within 48 hours. Record the findings. Counsel and Test for HIV. Record the finding</p>

APPENDIX 24:


Simplified field tables

BMI-for-age BOYS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
5: 1	61	12.1	13.0	14.1	15.3	16.6	18.3	20.2
5: 2	62	12.1	13.0	14.1	15.3	16.6	18.3	20.2
5: 3	63	12.1	13.0	14.1	15.3	16.7	18.3	20.2
5: 4	64	12.1	13.0	14.1	15.3	16.7	18.3	20.3
5: 5	65	12.1	13.0	14.1	15.3	16.7	18.3	20.3
5: 6	66	12.1	13.0	14.1	15.3	16.7	18.4	20.4
5: 7	67	12.1	13.0	14.1	15.3	16.7	18.4	20.4
5: 8	68	12.1	13.0	14.1	15.3	16.7	18.4	20.5
5: 9	69	12.1	13.0	14.1	15.3	16.7	18.4	20.5
5: 10	70	12.1	13.0	14.1	15.3	16.7	18.5	20.6
5: 11	71	12.1	13.0	14.1	15.3	16.7	18.5	20.6
6: 0	72	12.1	13.0	14.1	15.3	16.8	18.5	20.7
6: 1	73	12.1	13.0	14.1	15.3	16.8	18.6	20.8
6: 2	74	12.2	13.1	14.1	15.3	16.8	18.6	20.8
6: 3	75	12.2	13.1	14.1	15.3	16.8	18.6	20.9
6: 4	76	12.2	13.1	14.1	15.4	16.8	18.7	21.0
6: 5	77	12.2	13.1	14.1	15.4	16.9	18.7	21.0
6: 6	78	12.2	13.1	14.1	15.4	16.9	18.7	21.1
6: 7	79	12.2	13.1	14.1	15.4	16.9	18.8	21.2
6: 8	80	12.2	13.1	14.2	15.4	16.9	18.8	21.3
6: 9	81	12.2	13.1	14.2	15.4	17.0	18.9	21.3
6: 10	82	12.2	13.1	14.2	15.4	17.0	18.9	21.4
6: 11	83	12.2	13.1	14.2	15.5	17.0	19.0	21.5
7: 0	84	12.3	13.1	14.2	15.5	17.0	19.0	21.6
7: 1	85	12.3	13.2	14.2	15.5	17.1	19.1	21.7
7: 2	86	12.3	13.2	14.2	15.5	17.1	19.1	21.8
7: 3	87	12.3	13.2	14.3	15.5	17.1	19.2	21.9
7: 4	88	12.3	13.2	14.3	15.6	17.2	19.2	22.0
7: 5	89	12.3	13.2	14.3	15.6	17.2	19.3	22.0
7: 6	90	12.3	13.2	14.3	15.6	17.2	19.3	22.1



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BMI-for-age BOYS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
7: 7	91	12.3	13.2	14.3	15.6	17.3	19.4	22.2
7: 8	92	12.3	13.2	14.3	15.6	17.3	19.4	22.4
7: 9	93	12.4	13.3	14.3	15.7	17.3	19.5	22.5
7: 10	94	12.4	13.3	14.4	15.7	17.4	19.6	22.6
7: 11	95	12.4	13.3	14.4	15.7	17.4	19.6	22.7
8: 0	96	12.4	13.3	14.4	15.7	17.4	19.7	22.8
8: 1	97	12.4	13.3	14.4	15.8	17.5	19.7	22.9
8: 2	98	12.4	13.3	14.4	15.8	17.5	19.8	23.0
8: 3	99	12.4	13.3	14.4	15.8	17.5	19.9	23.1
8: 4	100	12.4	13.4	14.5	15.8	17.6	19.9	23.3
8: 5	101	12.5	13.4	14.5	15.9	17.6	20.0	23.4
8: 6	102	12.5	13.4	14.5	15.9	17.7	20.1	23.5
8: 7	103	12.5	13.4	14.5	15.9	17.7	20.1	23.6
8: 8	104	12.5	13.4	14.5	15.9	17.7	20.2	23.8
8: 9	105	12.5	13.4	14.6	16.0	17.8	20.3	23.9
8: 10	106	12.5	13.5	14.6	16.0	17.8	20.3	24.0
8: 11	107	12.5	13.5	14.6	16.0	17.9	20.4	24.2
9: 0	108	12.6	13.5	14.6	16.0	17.9	20.5	24.3
9: 1	109	12.6	13.5	14.6	16.1	18.0	20.5	24.4
9: 2	110	12.6	13.5	14.7	16.1	18.0	20.6	24.6
9: 3	111	12.6	13.5	14.7	16.1	18.0	20.7	24.7
9: 4	112	12.6	13.6	14.7	16.2	18.1	20.8	24.9
9: 5	113	12.6	13.6	14.7	16.2	18.1	20.8	25.0
9: 6	114	12.7	13.6	14.8	16.2	18.2	20.9	25.1
9: 7	115	12.7	13.6	14.8	16.3	18.2	21.0	25.3
9: 8	116	12.7	13.6	14.8	16.3	18.3	21.1	25.5
9: 9	117	12.7	13.7	14.8	16.3	18.3	21.2	25.6
9: 10	118	12.7	13.7	14.9	16.4	18.4	21.2	25.8
9: 11	119	12.8	13.7	14.9	16.4	18.4	21.3	25.9
10: 0	120	12.8	13.7	14.9	16.4	18.5	21.4	26.1


**BMI-for-age BOYS
5 to 19 years (z-scores)**



**World Health
Organization**

Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
10: 1	121	12.8	13.8	15.0	16.5	18.5	21.5	26.2
10: 2	122	12.8	13.8	15.0	16.5	18.6	21.6	26.4
10: 3	123	12.8	13.8	15.0	16.6	18.6	21.7	26.6
10: 4	124	12.9	13.8	15.0	16.6	18.7	21.7	26.7
10: 5	125	12.9	13.9	15.1	16.6	18.8	21.8	26.9
10: 6	126	12.9	13.9	15.1	16.7	18.8	21.9	27.0
10: 7	127	12.9	13.9	15.1	16.7	18.9	22.0	27.2
10: 8	128	13.0	13.9	15.2	16.8	18.9	22.1	27.4
10: 9	129	13.0	14.0	15.2	16.8	19.0	22.2	27.5
10: 10	130	13.0	14.0	15.2	16.9	19.0	22.3	27.7
10: 11	131	13.0	14.0	15.3	16.9	19.1	22.4	27.9
11: 0	132	13.1	14.1	15.3	16.9	19.2	22.5	28.0
11: 1	133	13.1	14.1	15.3	17.0	19.2	22.5	28.2
11: 2	134	13.1	14.1	15.4	17.0	19.3	22.6	28.4
11: 3	135	13.1	14.1	15.4	17.1	19.3	22.7	28.5
11: 4	136	13.2	14.2	15.5	17.1	19.4	22.8	28.7
11: 5	137	13.2	14.2	15.5	17.2	19.5	22.9	28.8
11: 6	138	13.2	14.2	15.5	17.2	19.5	23.0	29.0
11: 7	139	13.2	14.3	15.6	17.3	19.6	23.1	29.2
11: 8	140	13.3	14.3	15.6	17.3	19.7	23.2	29.3
11: 9	141	13.3	14.3	15.7	17.4	19.7	23.3	29.5
11: 10	142	13.3	14.4	15.7	17.4	19.8	23.4	29.6
11: 11	143	13.4	14.4	15.7	17.5	19.9	23.5	29.8
12: 0	144	13.4	14.5	15.8	17.5	19.9	23.6	30.0
12: 1	145	13.4	14.5	15.8	17.6	20.0	23.7	30.1
12: 2	146	13.5	14.5	15.9	17.6	20.1	23.8	30.3
12: 3	147	13.5	14.6	15.9	17.7	20.2	23.9	30.4
12: 4	148	13.5	14.6	16.0	17.8	20.2	24.0	30.6
12: 5	149	13.6	14.6	16.0	17.8	20.3	24.1	30.7
12: 6	150	13.6	14.7	16.1	17.9	20.4	24.2	30.9



BMI-for-age BOYS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
12: 7	151	13.6	14.7	16.1	17.9	20.4	24.3	31.0
12: 8	152	13.7	14.8	16.2	18.0	20.5	24.4	31.1
12: 9	153	13.7	14.8	16.2	18.0	20.6	24.5	31.3
12: 10	154	13.7	14.8	16.3	18.1	20.7	24.6	31.4
12: 11	155	13.8	14.9	16.3	18.2	20.8	24.7	31.6
13: 0	156	13.8	14.9	16.4	18.2	20.8	24.8	31.7
13: 1	157	13.8	15.0	16.4	18.3	20.9	24.9	31.8
13: 2	158	13.9	15.0	16.5	18.4	21.0	25.0	31.9
13: 3	159	13.9	15.1	16.5	18.4	21.1	25.1	32.1
13: 4	160	14.0	15.1	16.6	18.5	21.1	25.2	32.2
13: 5	161	14.0	15.2	16.6	18.6	21.2	25.2	32.3
13: 6	162	14.0	15.2	16.7	18.6	21.3	25.3	32.4
13: 7	163	14.1	15.2	16.7	18.7	21.4	25.4	32.6
13: 8	164	14.1	15.3	16.8	18.7	21.5	25.5	32.7
13: 9	165	14.1	15.3	16.8	18.8	21.5	25.6	32.8
13: 10	166	14.2	15.4	16.9	18.9	21.6	25.7	32.9
13: 11	167	14.2	15.4	17.0	18.9	21.7	25.8	33.0
14: 0	168	14.3	15.5	17.0	19.0	21.8	25.9	33.1
14: 1	169	14.3	15.5	17.1	19.1	21.8	26.0	33.2
14: 2	170	14.3	15.6	17.1	19.1	21.9	26.1	33.3
14: 3	171	14.4	15.6	17.2	19.2	22.0	26.2	33.4
14: 4	172	14.4	15.7	17.2	19.3	22.1	26.3	33.5
14: 5	173	14.5	15.7	17.3	19.3	22.2	26.4	33.5
14: 6	174	14.5	15.7	17.3	19.4	22.2	26.5	33.6
14: 7	175	14.5	15.8	17.4	19.5	22.3	26.5	33.7
14: 8	176	14.6	15.8	17.4	19.5	22.4	26.6	33.8
14: 9	177	14.6	15.9	17.5	19.6	22.5	26.7	33.9
14: 10	178	14.6	15.9	17.5	19.6	22.5	26.8	33.9
14: 11	179	14.7	16.0	17.6	19.7	22.6	26.9	34.0
15: 0	180	14.7	16.0	17.6	19.8	22.7	27.0	34.1

BMI-for-age BOYS 5 to 19 years (z-scores)




**World Health
Organization**

Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
15: 1	181	14.7	16.1	17.7	19.8	22.8	27.1	34.1
15: 2	182	14.8	16.1	17.8	19.9	22.8	27.1	34.2
15: 3	183	14.8	16.1	17.8	20.0	22.9	27.2	34.3
15: 4	184	14.8	16.2	17.9	20.0	23.0	27.3	34.3
15: 5	185	14.9	16.2	17.9	20.1	23.0	27.4	34.4
15: 6	186	14.9	16.3	18.0	20.1	23.1	27.4	34.5
15: 7	187	15.0	16.3	18.0	20.2	23.2	27.5	34.5
15: 8	188	15.0	16.3	18.1	20.3	23.3	27.6	34.6
15: 9	189	15.0	16.4	18.1	20.3	23.3	27.7	34.6
15: 10	190	15.0	16.4	18.2	20.4	23.4	27.7	34.7
15: 11	191	15.1	16.5	18.2	20.4	23.5	27.8	34.7
16: 0	192	15.1	16.5	18.2	20.5	23.5	27.9	34.8
16: 1	193	15.1	16.5	18.3	20.6	23.6	27.9	34.8
16: 2	194	15.2	16.6	18.3	20.6	23.7	28.0	34.8
16: 3	195	15.2	16.6	18.4	20.7	23.7	28.1	34.9
16: 4	196	15.2	16.7	18.4	20.7	23.8	28.1	34.9
16: 5	197	15.3	16.7	18.5	20.8	23.8	28.2	35.0
16: 6	198	15.3	16.7	18.5	20.8	23.9	28.3	35.0
16: 7	199	15.3	16.8	18.6	20.9	24.0	28.3	35.0
16: 8	200	15.3	16.8	18.6	20.9	24.0	28.4	35.1
16: 9	201	15.4	16.8	18.7	21.0	24.1	28.5	35.1
16: 10	202	15.4	16.9	18.7	21.0	24.2	28.5	35.1
16: 11	203	15.4	16.9	18.7	21.1	24.2	28.6	35.2
17: 0	204	15.4	16.9	18.8	21.1	24.3	28.6	35.2
17: 1	205	15.5	17.0	18.8	21.2	24.3	28.7	35.2
17: 2	206	15.5	17.0	18.9	21.2	24.4	28.7	35.2
17: 3	207	15.5	17.0	18.9	21.3	24.4	28.8	35.3
17: 4	208	15.5	17.1	18.9	21.3	24.5	28.9	35.3
17: 5	209	15.6	17.1	19.0	21.4	24.5	28.9	35.3
17: 6	210	15.6	17.1	19.0	21.4	24.6	29.0	35.3




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BMI-for-age BOYS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
17: 7	211	15.6	17.1	19.1	21.5	24.7	29.0	35.4
17: 8	212	15.6	17.2	19.1	21.5	24.7	29.1	35.4
17: 9	213	15.6	17.2	19.1	21.6	24.8	29.1	35.4
17: 10	214	15.7	17.2	19.2	21.6	24.8	29.2	35.4
17: 11	215	15.7	17.3	19.2	21.7	24.9	29.2	35.4
18: 0	216	15.7	17.3	19.2	21.7	24.9	29.2	35.4
18: 1	217	15.7	17.3	19.3	21.8	25.0	29.3	35.4
18: 2	218	15.7	17.3	19.3	21.8	25.0	29.3	35.5
18: 3	219	15.7	17.4	19.3	21.8	25.1	29.4	35.5
18: 4	220	15.8	17.4	19.4	21.9	25.1	29.4	35.5
18: 5	221	15.8	17.4	19.4	21.9	25.1	29.5	35.5
18: 6	222	15.8	17.4	19.4	22.0	25.2	29.5	35.5
18: 7	223	15.8	17.5	19.5	22.0	25.2	29.5	35.5
18: 8	224	15.8	17.5	19.5	22.0	25.3	29.6	35.5
18: 9	225	15.8	17.5	19.5	22.1	25.3	29.6	35.5
18: 10	226	15.8	17.5	19.6	22.1	25.4	29.6	35.5
18: 11	227	15.8	17.5	19.6	22.2	25.4	29.7	35.5
19: 0	228	15.9	17.6	19.6	22.2	25.4	29.7	35.5
2007 WHO Reference								


Simplified field tables

BMI-for-age GIRLS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
5: 1	61	11.8	12.7	13.9	15.2	16.9	18.9	21.3
5: 2	62	11.8	12.7	13.9	15.2	16.9	18.9	21.4
5: 3	63	11.8	12.7	13.9	15.2	16.9	18.9	21.5
5: 4	64	11.8	12.7	13.9	15.2	16.9	18.9	21.5
5: 5	65	11.7	12.7	13.9	15.2	16.9	19.0	21.6
5: 6	66	11.7	12.7	13.9	15.2	16.9	19.0	21.7
5: 7	67	11.7	12.7	13.9	15.2	16.9	19.0	21.7
5: 8	68	11.7	12.7	13.9	15.3	17.0	19.1	21.8
5: 9	69	11.7	12.7	13.9	15.3	17.0	19.1	21.9
5: 10	70	11.7	12.7	13.9	15.3	17.0	19.1	22.0
5: 11	71	11.7	12.7	13.9	15.3	17.0	19.2	22.1
6: 0	72	11.7	12.7	13.9	15.3	17.0	19.2	22.1
6: 1	73	11.7	12.7	13.9	15.3	17.0	19.3	22.2
6: 2	74	11.7	12.7	13.9	15.3	17.0	19.3	22.3
6: 3	75	11.7	12.7	13.9	15.3	17.1	19.3	22.4
6: 4	76	11.7	12.7	13.9	15.3	17.1	19.4	22.5
6: 5	77	11.7	12.7	13.9	15.3	17.1	19.4	22.6
6: 6	78	11.7	12.7	13.9	15.3	17.1	19.5	22.7
6: 7	79	11.7	12.7	13.9	15.3	17.2	19.5	22.8
6: 8	80	11.7	12.7	13.9	15.3	17.2	19.6	22.9
6: 9	81	11.7	12.7	13.9	15.4	17.2	19.6	23.0
6: 10	82	11.7	12.7	13.9	15.4	17.2	19.7	23.1
6: 11	83	11.7	12.7	13.9	15.4	17.3	19.7	23.2
7: 0	84	11.8	12.7	13.9	15.4	17.3	19.8	23.3
7: 1	85	11.8	12.7	13.9	15.4	17.3	19.8	23.4
7: 2	86	11.8	12.8	14.0	15.4	17.4	19.9	23.5
7: 3	87	11.8	12.8	14.0	15.5	17.4	20.0	23.6
7: 4	88	11.8	12.8	14.0	15.5	17.4	20.0	23.7
7: 5	89	11.8	12.8	14.0	15.5	17.5	20.1	23.9
7: 6	90	11.8	12.8	14.0	15.5	17.5	20.1	24.0



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BMI-for-age GIRLS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
7: 7	91	11.8	12.8	14.0	15.5	17.5	20.2	24.1
7: 8	92	11.8	12.8	14.0	15.6	17.6	20.3	24.2
7: 9	93	11.8	12.8	14.1	15.6	17.6	20.3	24.4
7: 10	94	11.9	12.9	14.1	15.6	17.6	20.4	24.5
7: 11	95	11.9	12.9	14.1	15.7	17.7	20.5	24.6
8: 0	96	11.9	12.9	14.1	15.7	17.7	20.6	24.8
8: 1	97	11.9	12.9	14.1	15.7	17.8	20.6	24.9
8: 2	98	11.9	12.9	14.2	15.7	17.8	20.7	25.1
8: 3	99	11.9	12.9	14.2	15.8	17.9	20.8	25.2
8: 4	100	11.9	13.0	14.2	15.8	17.9	20.9	25.3
8: 5	101	12.0	13.0	14.2	15.8	18.0	20.9	25.5
8: 6	102	12.0	13.0	14.3	15.9	18.0	21.0	25.6
8: 7	103	12.0	13.0	14.3	15.9	18.1	21.1	25.8
8: 8	104	12.0	13.0	14.3	15.9	18.1	21.2	25.9
8: 9	105	12.0	13.1	14.3	16.0	18.2	21.3	26.1
8: 10	106	12.1	13.1	14.4	16.0	18.2	21.3	26.2
8: 11	107	12.1	13.1	14.4	16.1	18.3	21.4	26.4
9: 0	108	12.1	13.1	14.4	16.1	18.3	21.5	26.5
9: 1	109	12.1	13.2	14.5	16.1	18.4	21.6	26.7
9: 2	110	12.1	13.2	14.5	16.2	18.4	21.7	26.8
9: 3	111	12.2	13.2	14.5	16.2	18.5	21.8	27.0
9: 4	112	12.2	13.2	14.6	16.3	18.6	21.9	27.2
9: 5	113	12.2	13.3	14.6	16.3	18.6	21.9	27.3
9: 6	114	12.2	13.3	14.6	16.3	18.7	22.0	27.5
9: 7	115	12.3	13.3	14.7	16.4	18.7	22.1	27.6
9: 8	116	12.3	13.4	14.7	16.4	18.8	22.2	27.8
9: 9	117	12.3	13.4	14.7	16.5	18.8	22.3	27.9
9: 10	118	12.3	13.4	14.8	16.5	18.9	22.4	28.1
9: 11	119	12.4	13.4	14.8	16.6	19.0	22.5	28.2
10: 0	120	12.4	13.5	14.8	16.6	19.0	22.6	28.4

Year: Month		Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
10: 1	121	121	12.4	13.5	14.9	16.7	19.1	22.7	28.5
10: 2	122	122	12.4	13.5	14.9	16.7	19.2	22.8	28.7
10: 3	123	123	12.5	13.6	15.0	16.8	19.2	22.8	28.8
10: 4	124	124	12.5	13.6	15.0	16.8	19.3	22.9	29.0
10: 5	125	125	12.5	13.6	15.0	16.9	19.4	23.0	29.1
10: 6	126	126	12.5	13.7	15.1	16.9	19.4	23.1	29.3
10: 7	127	127	12.6	13.7	15.1	17.0	19.5	23.2	29.4
10: 8	128	128	12.6	13.7	15.2	17.0	19.6	23.3	29.6
10: 9	129	129	12.6	13.8	15.2	17.1	19.6	23.4	29.7
10: 10	130	130	12.7	13.8	15.3	17.1	19.7	23.5	29.9
10: 11	131	131	12.7	13.8	15.3	17.2	19.8	23.6	30.0
11: 0	132	132	12.7	13.9	15.3	17.2	19.9	23.7	30.2
11: 1	133	133	12.8	13.9	15.4	17.3	19.9	23.8	30.3
11: 2	134	134	12.8	14.0	15.4	17.4	20.0	23.9	30.5
11: 3	135	135	12.8	14.0	15.5	17.4	20.1	24.0	30.6
11: 4	136	136	12.9	14.0	15.5	17.5	20.2	24.1	30.8
11: 5	137	137	12.9	14.1	15.6	17.5	20.2	24.2	30.9
11: 6	138	138	12.9	14.1	15.6	17.6	20.3	24.3	31.1
11: 7	139	139	13.0	14.2	15.7	17.7	20.4	24.4	31.2
11: 8	140	140	13.0	14.2	15.7	17.7	20.5	24.5	31.4
11: 9	141	141	13.0	14.3	15.8	17.8	20.6	24.7	31.5
11: 10	142	142	13.1	14.3	15.8	17.9	20.6	24.8	31.6
11: 11	143	143	13.1	14.3	15.9	17.9	20.7	24.9	31.8
12: 0	144	144	13.2	14.4	16.0	18.0	20.8	25.0	31.9
12: 1	145	145	13.2	14.4	16.0	18.1	20.9	25.1	32.0
12: 2	146	146	13.2	14.5	16.1	18.1	21.0	25.2	32.2
12: 3	147	147	13.3	14.5	16.1	18.2	21.1	25.3	32.3
12: 4	148	148	13.3	14.6	16.2	18.3	21.1	25.4	32.4
12: 5	149	149	13.3	14.6	16.2	18.3	21.2	25.5	32.6
12: 6	150	150	13.4	14.7	16.3	18.4	21.3	25.6	32.7



World Health Organization



BMI-for-age GIRLS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
12: 7	151	13.4	14.7	16.3	18.5	21.4	25.7	32.8
12: 8	152	13.5	14.8	16.4	18.5	21.5	25.8	33.0
12: 9	153	13.5	14.8	16.4	18.6	21.6	25.9	33.1
12: 10	154	13.5	14.8	16.5	18.7	21.6	26.0	33.2
12: 11	155	13.6	14.9	16.6	18.7	21.7	26.1	33.3
13: 0	156	13.6	14.9	16.6	18.8	21.8	26.2	33.4
13: 1	157	13.6	15.0	16.7	18.9	21.9	26.3	33.6
13: 2	158	13.7	15.0	16.7	18.9	22.0	26.4	33.7
13: 3	159	13.7	15.1	16.8	19.0	22.0	26.5	33.8
13: 4	160	13.8	15.1	16.8	19.1	22.1	26.6	33.9
13: 5	161	13.8	15.2	16.9	19.1	22.2	26.7	34.0
13: 6	162	13.8	15.2	16.9	19.2	22.3	26.8	34.1
13: 7	163	13.9	15.2	17.0	19.3	22.4	26.9	34.2
13: 8	164	13.9	15.3	17.0	19.3	22.4	27.0	34.3
13: 9	165	13.9	15.3	17.1	19.4	22.5	27.1	34.4
13: 10	166	14.0	15.4	17.1	19.4	22.6	27.1	34.5
13: 11	167	14.0	15.4	17.2	19.5	22.7	27.2	34.6
14: 0	168	14.0	15.4	17.2	19.6	22.7	27.3	34.7
14: 1	169	14.1	15.5	17.3	19.6	22.8	27.4	34.7
14: 2	170	14.1	15.5	17.3	19.7	22.9	27.5	34.8
14: 3	171	14.1	15.6	17.4	19.7	22.9	27.6	34.9
14: 4	172	14.1	15.6	17.4	19.8	23.0	27.7	35.0
14: 5	173	14.2	15.6	17.5	19.9	23.1	27.7	35.1
14: 6	174	14.2	15.7	17.5	19.9	23.1	27.8	35.1
14: 7	175	14.2	15.7	17.6	20.0	23.2	27.9	35.2
14: 8	176	14.3	15.7	17.6	20.0	23.3	28.0	35.3
14: 9	177	14.3	15.8	17.6	20.1	23.3	28.0	35.4
14: 10	178	14.3	15.8	17.7	20.1	23.4	28.1	35.4
14: 11	179	14.3	15.8	17.7	20.2	23.5	28.2	35.5
15: 0	180	14.4	15.9	17.8	20.2	23.5	28.2	35.5


**BMI-for-age GIRLS
5 to 19 years (z-scores)**



**World Health
Organization**

Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
15: 1	181	14.4	15.9	17.8	20.3	23.6	28.3	35.6
15: 2	182	14.4	15.9	17.8	20.3	23.6	28.4	35.7
15: 3	183	14.4	16.0	17.9	20.4	23.7	28.4	35.7
15: 4	184	14.5	16.0	17.9	20.4	23.7	28.5	35.8
15: 5	185	14.5	16.0	17.9	20.4	23.8	28.5	35.8
15: 6	186	14.5	16.0	18.0	20.5	23.8	28.6	35.8
15: 7	187	14.5	16.1	18.0	20.5	23.9	28.6	35.9
15: 8	188	14.5	16.1	18.0	20.6	23.9	28.7	35.9
15: 9	189	14.5	16.1	18.1	20.6	24.0	28.7	36.0
15: 10	190	14.6	16.1	18.1	20.6	24.0	28.8	36.0
15: 11	191	14.6	16.2	18.1	20.7	24.1	28.8	36.0
16: 0	192	14.6	16.2	18.2	20.7	24.1	28.9	36.1
16: 1	193	14.6	16.2	18.2	20.7	24.1	28.9	36.1
16: 2	194	14.6	16.2	18.2	20.8	24.2	29.0	36.1
16: 3	195	14.6	16.2	18.2	20.8	24.2	29.0	36.1
16: 4	196	14.6	16.2	18.3	20.8	24.3	29.0	36.2
16: 5	197	14.6	16.3	18.3	20.9	24.3	29.1	36.2
16: 6	198	14.7	16.3	18.3	20.9	24.3	29.1	36.2
16: 7	199	14.7	16.3	18.3	20.9	24.4	29.1	36.2
16: 8	200	14.7	16.3	18.3	20.9	24.4	29.2	36.2
16: 9	201	14.7	16.3	18.4	21.0	24.4	29.2	36.3
16: 10	202	14.7	16.3	18.4	21.0	24.4	29.2	36.3
16: 11	203	14.7	16.3	18.4	21.0	24.5	29.3	36.3
17: 0	204	14.7	16.4	18.4	21.0	24.5	29.3	36.3
17: 1	205	14.7	16.4	18.4	21.1	24.5	29.3	36.3
17: 2	206	14.7	16.4	18.4	21.1	24.6	29.3	36.3
17: 3	207	14.7	16.4	18.5	21.1	24.6	29.4	36.3
17: 4	208	14.7	16.4	18.5	21.1	24.6	29.4	36.3
17: 5	209	14.7	16.4	18.5	21.1	24.6	29.4	36.3
17: 6	210	14.7	16.4	18.5	21.2	24.6	29.4	36.3



BMI-for-age GIRLS 5 to 19 years (z-scores)		 World Health Organization						
Year: Month	Months	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
17: 7	211	14.7	16.4	18.5	21.2	24.7	29.4	36.3
17: 8	212	14.7	16.4	18.5	21.2	24.7	29.5	36.3
17: 9	213	14.7	16.4	18.5	21.2	24.7	29.5	36.3
17: 10	214	14.7	16.4	18.5	21.2	24.7	29.5	36.3
17: 11	215	14.7	16.4	18.6	21.2	24.8	29.5	36.3
18: 0	216	14.7	16.4	18.6	21.3	24.8	29.5	36.3
18: 1	217	14.7	16.5	18.6	21.3	24.8	29.5	36.3
18: 2	218	14.7	16.5	18.6	21.3	24.8	29.6	36.3
18: 3	219	14.7	16.5	18.6	21.3	24.8	29.6	36.3
18: 4	220	14.7	16.5	18.6	21.3	24.8	29.6	36.3
18: 5	221	14.7	16.5	18.6	21.3	24.9	29.6	36.2
18: 6	222	14.7	16.5	18.6	21.3	24.9	29.6	36.2
18: 7	223	14.7	16.5	18.6	21.4	24.9	29.6	36.2
18: 8	224	14.7	16.5	18.6	21.4	24.9	29.6	36.2
18: 9	225	14.7	16.5	18.7	21.4	24.9	29.6	36.2
18: 10	226	14.7	16.5	18.7	21.4	24.9	29.6	36.2
18: 11	227	14.7	16.5	18.7	21.4	25.0	29.7	36.2
19: 0	228	14.7	16.5	18.7	21.4	25.0	29.7	36.2
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