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MINISTRY OF HEALTH

PROTOCOL FOR THE MANAGEMENT OF ACUTE MALNUTRITION

FEBRUARY 2018

Protocol for the Management of Acute Malnutrition

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ACRONYMS AND ABBREVIATIONS

BMI	Body mass index
CHW	Community health worker
CSB	Corn-soya blend
ECD	Early childhood development
ETAT	Emergency triage, assessment and treatment
ETAT+	Emergency triage, assessment and treatment plus admission
F100	Ready-to-use formula for transition and rehabilitation phase of inpatient care
F75	Ready-to-use formula for phase 1 of inpatient SAM care
FBF	Fortified blended food
Hb	Haemoglobin
HIV	Human immunodeficiency virus
IM	Intramuscular
IMAM	Integrated management of acute malnutrition
IMCI	Integrated management of childhood illnesses
IMPAC	Integrated management of pregnancy and childbirth
IP	Inpatient
IPF	Inpatient facility
IV	Intravenous
IYCF	Infant and young child feeding
MAM	Moderate acute malnutrition
MIYCF	Maternal, infant and young child feeding
MNP	Micronutrient powder
MUAC	Mid-upper arm circumference
NCHS	National Centre for Health Statistics, United States
NFNP	National Food and Nutrition Policy
OP	Outpatient
ORS	Oral rehydration solution
OTP	Outpatient therapeutic programme
PRBC	Packed red blood cells
ReSoMal	Rehydration solution for malnutrition
RUSF	Ready-to-use supplementary food
RUTF	Ready-to-use therapeutic food
SAM	Severe acute malnutrition
SFC	Supplementary feeding camp
SFP	Supplementary feeding programme
SS	Supplemental suckling
TB	Tuberculosis
WASH	Water, sanitation and hygiene
W/H	Weight-for-height
W/L	Weight-for-length
WHZ	Weight for height/length Z-score
WHO	World Health Organization



PREFACE

Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world – malnourished children are at risk of death or severe impairment of growth and psychological development.

This manual is for the treatment of patients with severe acute malnutrition in hospitals and health centres. It is intended for all health personnel, including paediatricians, doctors, nurses, nutritionists and all others that care for such patients.

Since the WHO publication Management of severe malnutrition: a manual for physicians and other senior health workers was produced in 1999, many advances have been made in the treatment of severe acute malnutrition. New evidence involving the use of ready-to-use-foods, and greater emphasis on community engagement, has enabled children with uncomplicated severe acute malnutrition to be treated as outpatients rather than requiring admission to hospital. Updated growth reference standards for children have been universally accepted, and mid-upper arm circumference has been adopted as a separate criterion for diagnosing acute malnutrition. There is also a better understanding of the needs and management of infants aged less than 6 months.

After a brief introduction to the pathophysiology, to explain why the treatment for severely malnourished children differs from the treatment of normal children, and definitions of severe acute malnutrition, the guideline's chapters follow the normal flow of patients from the community to the outpatient treatment in health centres and then to the hospital for the more serious cases with complications. Additional chapters deal with children under 6 months, older children, adolescents and adults as well as counselling, prevention and the treatment of moderately malnourished children. Organisational and reporting issues (including job descriptions, performance indicators and responsibilities as well as the Health Information Monitoring Services) are not included in this guideline, as they are integrated with the rest of the health services.

The Government intends that this protocol should replace any existing guide for treating severely malnourished patients and should be used throughout Rwanda.


Dr. Diane GASHUMBA
Minister of Health


The seal of the Ministry of Health of Rwanda is circular. It features a central shield with a sun, a star, and a banner. The shield is flanked by two figures holding hands. The text "MINISTÈRE DE LA SANTÉ" is written around the top inner edge of the circle, and "RWANDA" is at the bottom.

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1. PATHOPHYSIOLOGY OF SEVERE ACUTE MALNUTRITION (SAM)

It is important to have specific guidelines for the management of SAM, because of the profound physiological and metabolic changes that take place when a child becomes malnourished. A malnourished child's metabolism reduces activity, to adapt to the lack of nutrients and energy, and slows down to survive on a limited intake of essential nutrients in order to preserve essential body functions. These changes affect every cell, tissue and system. The process of change is called *reductive adaptation*.¹

The initial reductions do not alter the ability of the body to respond to minor changes but they impair its capacity to cope with stressful situations (infection, cold, an intravenous infusion or excessive oral liquids). For example, the circulatory system may be working properly at rest with no signs or symptoms but it may not be able to cope with a sudden increase of circulatory volume, such as after an infusion or a transfusion. Since the physiological responses to this increased volume are impaired, a simple infusion may result in cardiac failure, cardiogenic shock and lethal pulmonary oedema. Similar restriction applies to the digestive system – the amount of protein and other nutrients that can be absorbed in one meal is limited (so a large bolus of food may give diarrhoea). All other body functions – the immune system and its ability to respond to infection; the liver's ability to detoxify; the kidney's ability to excrete; and hormonal responses – are affected too.

Some of these changes in organ and system functions result in unusual signs and symptoms. For example, because of the changes in metabolic and physiological responses, children with SAM often do not present the typical clinical signs of infection (such as fever) that well-nourished children show when they are ill. In fact, infection very often presents with hypothermia. Importantly, the diagnosis of dehydration is very difficult in the malnourished patient and the signs normally used for diagnosis are present in the malnourished child that is not dehydrated. Moreover, these children do not respond to medical treatment in the same way as they would if they were well nourished. Therapeutic decisions that are lifesaving in a well-nourished child can be potentially fatal in the malnourished child. For children with SAM, treatment protocols for some medical complications, such as dehydration or shock, must be changed from the treatment protocols for ill children who are well nourished. Misdiagnosis of clinical signs is common: medical complications, inappropriate treatment and feeding of children with SAM contribute to slow convalescence and increased mortality rates. The pathophysiological responses of children with SAM increase the risk of life-threatening complications that can lead to death.

Successful management of SAM in children aims to restore their metabolism through correction of electrolyte imbalance, reversal of metabolic abnormalities, restoration of organ functions, and then provision of balanced nutrition for catch-up growth; it also treats underlying infections and other medical conditions. Rapid changes (such as rapid feeding or fluids) before the physiology is normalised can overwhelm the body systems, so feeding must initially be slow and increased progressively as appetite increases. The

¹ Jackson, A.A & Golden, M.H. (1983). 'Protein energy malnutrition'. In: Weatherall, D.J., Ed. Oxford Textbook of Medicine. Oxford University Press. pp 812-21.

appetite test is used as the criterion to move to a transition phase.

Nearly all children with severe malnutrition have bacterial infections. However, as a result of reductive adaptation, the usual signs of infection (inflammation or fever) are not usually present. Common infections in the severely malnourished child are septicaemia, urinary tract infection and pneumonia. In a child with SAM, it is assumed that infection is present and, on admission, he or she will be treated with broad-spectrum antibiotics. Particular infections and medical conditions that are identified (such as *Shigella*) are also treated specifically.

Great care should be exercised in prescribing drugs to children with SAM because they will have, for example, abnormal kidney and liver functions; changed levels of enzymes that metabolize and excrete drugs; excess entero-hepatic circulation (reabsorption) of drugs that are excreted in the bile; decreased body fat, hence increasing the concentration of fat-soluble drugs in the brain; and, in kwashiorkor, a possibly defective blood-brain barrier. Few drugs have had their pharmacokinetics, metabolism or side effects estimated in individuals with SAM. For instance, drugs such as paracetamol can cause serious hepatic damage, amphotericin B always reduces renal function, anti-histamine and anti-vomiting drugs result in severe depression of cerebral function, and ivermectin can cause convulsions.

Box 1 summarizes the main alterations in each of the body systems in SAM. Knowledge of these changes can aid understanding of the evolution and treatment of SAM and its complications.

Box 1. Physiological basis for treatment of SAM

Cardiovascular system <ul style="list-style-type: none">• Cardiac output and stroke volume are reduced.• Infusion of saline may cause an increase in venous pressure.• Any significant increase in blood volume can easily produce acute heart failure; any decrease will further compromise tissue perfusion.• Blood pressure is low.• Renal blood flow and circulation time are reduced.• Plasma volume is usually normal and red cell volume is reduced.	Gastrointestinal system <ul style="list-style-type: none">• Production of gastric acid is reduced.• Intestinal motility is reduced.• The pancreas is atrophied and production of digestive enzymes is reduced.• The mucosa of the small intestine is atrophied; secretion of digestive enzymes is reduced.• Absorption of nutrients is reduced when large amounts of food are eaten.• The eyes become sunken because of loss of orbital fat – this is not a reliable sign of dehydration.
Liver function <ul style="list-style-type: none">• Synthesis of all proteins is reduced.• Abnormal metabolites of amino acids are produced.• The capacity of the liver to take up, metabolize, and excrete toxins is severely reduced.• Energy production from substrates such as galactose and fructose is slower than normal.• Gluconeogenesis is reduced, with high risk of hypoglycaemia especially during infection.• Bile secretion is reduced.	Genitourinary system <ul style="list-style-type: none">• Glomerular filtration rate is reduced.• The capacity of the kidney to excrete excess sodium, acid or a water load is greatly reduced.• Urinary phosphate output is low.• Sodium excretion is greatly reduced.• Urinary tract infection is common.

Metabolism <ul style="list-style-type: none"> • Basic metabolic rate is reduced by about 30%. • Energy expenditure due to activity is very low. • Both heat generation and heat loss are impaired; the child becomes hypothermic in a cold environment and hyperthermic in a hot environment. 	Endocrine system <ul style="list-style-type: none"> • Insulin levels are reduced and the child has glucose intolerance. • Insulin growth factor 1 (IGF-1) levels are reduced, although growth hormone levels are increased. • Cortisol levels are usually increased.
Immune system <ul style="list-style-type: none"> • All aspects of immunity are reduced. • The lymph glands, tonsils and thymus are atrophied. • Cell-mediated immunity is severely depressed. • Levels of immunoglobulin A (IgA) in secretions are reduced. • Complement components are low. • Phagocytes do not kill ingested bacteria efficiently. • Tissue damage does not result in inflammation or migration of white cells to the affected area. • The acute-phase immune response is reduced. • Typical signs of infection, such as an increased white cell count and fever, are frequently absent. • Hypoglycaemia and hypothermia are signs of severe infection, usually associated with septic shock 	

2. DEFINITION OF SEVERE ACUTE MALNUTRITION

All patients that fulfil any of the criteria in Table 1 have SAM.

Table 1. Admission criteria for SAM

HEIGHT (cm) or AGE	ADMISSION CRITERIA
LESS THAN 6 MONTHS	<i>See separate section for these infants.</i>
45-120 CM IN HEIGHT FOR W/H Z-SCORE 6-59 MONTHS FOR MUAC*	<ul style="list-style-type: none"> ➤ W/H or W/L < -3 Z-score (WHO 2006 standards unisex table) or ➤ MUAC < 115 mm Or ➤ Presence of bilateral oedema
OLDER CHILDREN AND ADOLESCENTS 120.5-171 CM FOR W/H	<ul style="list-style-type: none"> ➤ W/H < 70% NCHS or ➤ Presence of bilateral oedema
140-190 CM FOR BMI IF ADULT (ADULTS ≥ 19 YEARS)	<ul style="list-style-type: none"> ➤ BMI < 16 with recent weight loss or ➤ Presence of bilateral oedema (unless there is another clear-cut cause)

*MUAC = mid-upper arm circumference

HEIGHT (cm) or AGE	ADMISSION CRITERIA
LESS THAN 6 MONTHS	<i>See separate section for these infants.</i>
OEDEMA (ALL AGES & HEIGHTS)	ALL patients with bilateral oedema are classified as SEVERELY malnourished, whether or not they also have anthropometric criteria (unless another pathology causing the oedema has been positively diagnosed).
CLASSIFICATION BY HEIGHT/LENGTH FOR WHZ AND BMI	
HEIGHT (cm) or AGE	ADMISSION CRITERIA
CHILD: 45 -120 CM ADOLESCENT: 120.5-171 CM ADULT: 140-190 CM	<ul style="list-style-type: none"> ➤ W/H or W/L < -3 Z-score (WHO 2006 standards unisex table) ➤ W/H < 70% National Centre for Health Statistics, United States (NCHS) ➤ BMI < 16 with recent weight loss
CLASSIFICATION BY AGE FOR MUAC	
CHILD: 6- 59 MONTHS	➤ MUAC < 115 m

D² 3 4 567

² See Annex 3: Weight-for-height table

³ See Annex 1: Anthropometric measurement techniques

⁴ See Annex 4: Weight-for-height table for adolescents

⁵ See Annex 3: Weight-for-height table

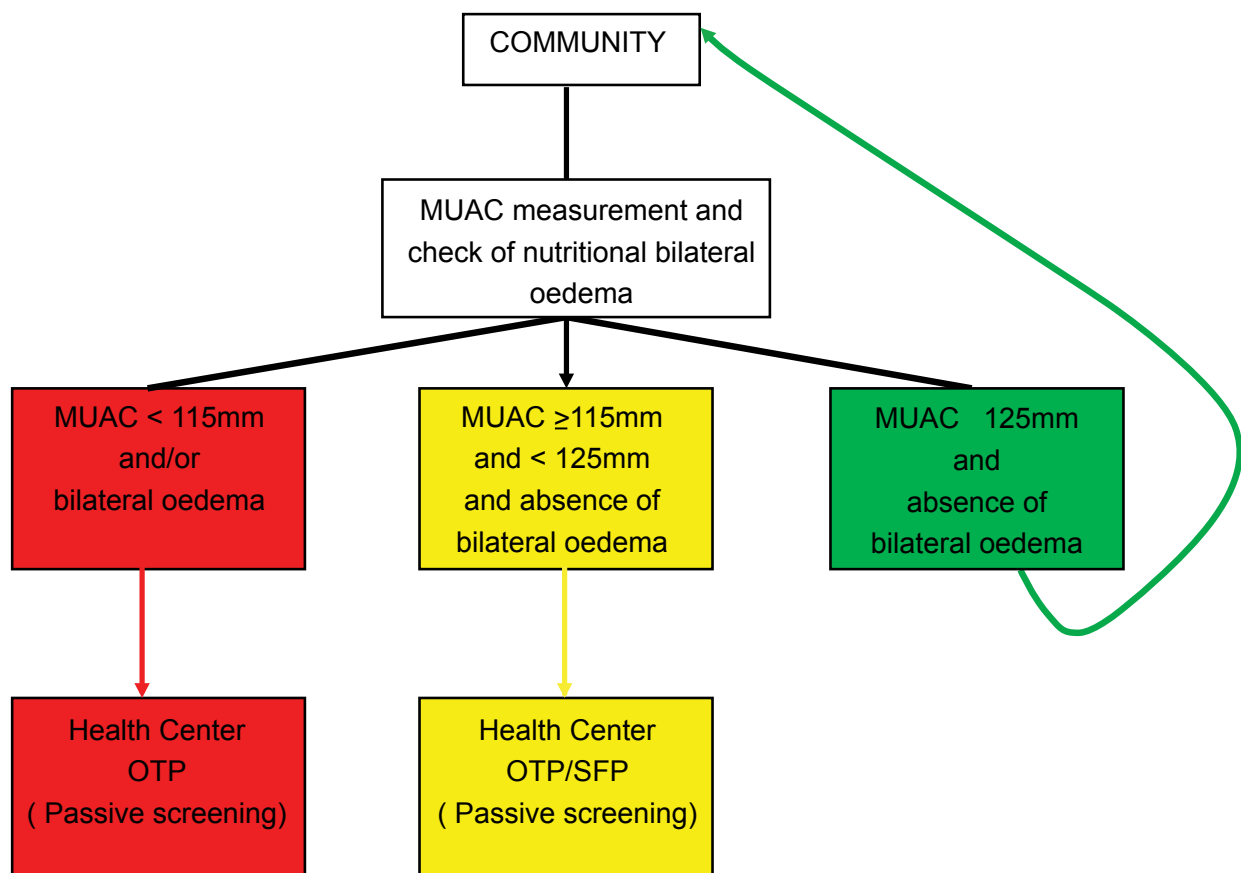
⁶ See Annex 4: Weight-for-height table for adolescents

⁷ See Annex 4: Weight-for-height table for adolescents

NOTE: it is important to emphasise that the patient is admitted as SAM if they fulfil ANY of these criteria (oedema, weight for height/length Z-score (WHZ) or MUAC) – even if the other criteria are not within the SAM range.

The anthropometric parameters are now used to define “marasmus”; oedema is used to define “kwashiorkor”. If a child has both an anthropometric deficit and oedema this is “marasmic-kwashiorkor”. These terms are commonly used in the older literature and textbooks. There may be other signs kwashiorkor, but it is now defined **ONLY** by the presence or absence of oedema.

All patients with SAM as defined above should be admitted for therapeutic treatment in either an outpatient therapeutic programme (OTP) or an inpatient facility (IPF), depending on the presence or absence of medical complications and appetite. Detection of patients with SAM should be done at all points where the patient has contact with the health system. This includes all community activities, in all health centres and hospitals; they are then referred to the appropriate service.



3. MANAGEMENT IN THE COMMUNITY

Although children with SAM have disturbed physiology and metabolism, many can be identified in the community before they develop medical complications. For the majority of cases identified early, safe and effective treatment can be provided on an outpatient basis, using ready-to-use therapeutic food (RUTF), simple medical protocols and weekly monitoring. The advantages are that effective treatment can be decentralized and offered close to people's homes, with minimal disruption to their existing livelihood, and without risk of cross-infection during inpatient care. The results are that large numbers of children with SAM can be quite simply treated.

3.1 Community engagement

In many areas most children with SAM are not brought to health facilities. In these places, only an approach with a strong community component can provide them with an appropriate intervention.

Community engagement covers a range of activities designed to open a dialogue, promote mutual understanding and encourage active, sustained engagement from the community to understand and tackle malnutrition. This involves actively improving case-finding and follow-up. The goal of community engagement is to improve treatment outcomes and coverage. If community members are unaware of the service, or the type of children that are malnourished, or are confused or misinformed about the service, they may not realise the benefits or become engaged. Promoting understanding is crucial, and strategies to engage the community should be planned and implemented before the start of treatment activities in health facilities. These should entail:

- **Community assessment** – interviews and discussion with key community informants (e.g. community health workers, positive deviant parents, caregivers, farmer promoters, community health clubs, community leaders, elders and opinion leaders, parents/women's groups, national women's committees, national youth committees, traditional healers) to determine local understanding of acute malnutrition, and identify available community resources (people, groups and communication mechanisms) and the factors that are likely to affect both service delivery and demand for services.
- **Community sensitization, mobilization and dialogue** – discussion with community representatives on the problem of SAM and how it can be easily treated; agreement on what will be done and who will be involved at community level; and setting up an ongoing dialogue for getting feedback from the community about any concerns with the service.
- **Development of messages and materials for broader sensitization and mobilization** – the next stage is to develop sensitization messages for SAM and the treatment choices, for one-to-one communication by the community workforce, using handbills/pamphlets, community radios/television etc.
- **Training for community-level actors** – on maternal, infant and young child nutrition (MIYCN), using Positive Deviance methodology, integrating nutrition into home-based early child development (ECD) for a better community-based nutrition programme (CBNP) implementation etc., depending on agreed roles (see below).

3.2 Community screening

Systematic case-finding within communities is important to ensure that infants and children with SAM are identified before they develop severe medical complications.

In the community, only mid-upper arm circumference (MUAC) and the presence of bilateral oedema are used to screen children over 6 months to determine whether or not they have SAM; children with a MUAC < 115 mm or oedema are then referred to the health centre. MUAC is measured with colour-coded tapes (Annex 1) by community health workers (CHWs), and can even be taken by mothers themselves to monitor their own children⁸ and report cases to CHWs for confirmation and referral. Therefore the community-based health workforce needs to be trained to identify the children affected by SAM with the coloured plastic strips and to recognize bilateral pitting oedema.

This workforce traditionally comes from and works in the community. It includes:

- Appropriately trained and accredited CHWs
- Trained volunteers (e.g. positive deviant parents, women and youth groups)
- Other community-based organizations that promote health through behaviour-change communications, health education and social mobilization
- Community-level actors engaged by other programmes (e.g. water, sanitation and hygiene (WASH) through community health club committees; agriculture and food security through farmer promoters for instance; and education/early childhood development), who contribute to promoting and improving community health
- Heads of households and other household decision-makers (e.g. mothers-in-law).

In order for identification to be “early”, this case-finding, using MUAC and examining for oedema, must be carried out on a regular basis (either ongoing or monthly), at all possible opportunities (during campaigns and in the home) at community level (see Box 2). Children identified as suffering from SAM are referred to the nearest health facility trained to give inpatient or outpatient therapeutic care.

The CHWs and other community workers should attend the health centre regularly for coordination meetings and “get to know” the staff and learn how they work with SAM children. They are also responsible for home visits of defaulters, failure-to-respond children and potential deaths. They can undertake follow-up activities, as SAM children frequently default and relapse⁹.

8 Ale F. et al. 'Mothers Screening for Malnutrition by Mid-Upper Arm Circumference Is Non-Inferior to Community Health Workers: Results From a Large-Scale Pragmatic Trial in Rural Niger'. Archives of Public Health 2016, 74:38.

9 Grellety, E. et al. 'Effects of Unconditional Cash Transfers on the Outcome of Treatment for Severe Acute Malnutrition (SAM): a Cluster-Randomised Trial in the Democratic Republic of the Congo'. BMC Medicine 2017. 15:87

Box 2. Opportunities for the identification of SAM at community level

- CHW visits, positive deviance health sessions, WASH meetings etc. – basically any activities the CHW carries out in the community
- Outreach clinics for immunization
- Child health days/weeks
- Health week
- Community-based growth monitoring and promotion activities
- Mothers' groups
- Early childhood development sessions conducted at community level


The community is not involved with clinical assessment or triage into in- or outpatient treatment, which occurs at primary health centres. All children with SAM found in the community are referred to the nearest health post/centre with trained staff.

3.3 Home visits

Home visits are carried out by a CHW, community volunteer or outreach worker. The home visit is an opportunity to assess:

- The carer's understanding of the messages received in the healthcare centre and of infant and young child feeding practices.
- Compliance with the treatment (RUTF and medication).
- The availability (and intake if applicable) of micronutrient powders (MNPs), corn-soya blend (CSB) and fortified blended foods (FBF).
- Cases of defaulters and reasons for non-compliance.
- Cases whose mothers have refused transfer to hospital.
- Reasons for non-compliance with treatment, absence or default.
- The availability of water and sanitation facilities, hygiene and food-safety practices.
- The medical condition of the child.
- Household food security, poverty level and coping mechanisms.
- Social problems and family dynamics (many children eating from the same plate, use of traditional porridge, polygamous discrimination of the mother, absent father/provider, isolation by neighbours etc.).
- Subscription to "mutuelle de santé" (health insurance).
- Specifically, the CHW should:
 - Observe the household and assess whether there are any social problems; possibly interview neighbours.
 - Assess hygiene, water management, waste disposal, cooking facilities, where RUTF is stored (and how much is left), level of poverty and coping strategies, type and quantity of family food present and stored.
 - Measure MUAC; weigh the child and determine weight gain; ask about reasons for defaulting and encourage return to the OTP.
 - Where possible, provide support for any problem identified.
 - Give counselling on health, and infant and young child feeding practices, including food safety.

MUAC screening and testing for oedema will result in children being triaged into those who do not have severe malnutrition, those with moderate acute malnutrition (MAM) and



those with SAM. Children with MAM are eligible for supplementary feeding programme (if it is available); those with SAM should always be referred to the health centre for further assessment and treatment.

If a MAM programme is not available, those with MAM could be sent to the health centre to have their weight-for-height/length measured. BUT it is critical that they are not sent away without any support. Such refusal to refer undermines the credibility of the CHWs and brings the programme into disrepute with the community. Repeated inaccurate referrals should lead to some treatment being given to all referrals and retraining of the CHW.

4. TRIAGE AT THE HEALTH FACILITY

The objective when the SAM patient first presents is to establish the severity of his/her condition, whether or not the child has a reasonable appetite or medical complications and how treatment should be arranged.

The majority of children with SAM should be initially identified and referred from the community. For all children attending the health centre directly, for whatever reason, the health centre staff should measure their MUAC and weight-for-height/length Z-score (WHZ) and test for oedema. For those with any of the SAM criteria, the staff will then test for appetite and the nurse will take a history, do a clinical examination and decide whether to treat the child in the OTP or refer to the inpatient facility (IPF).

4.1 The appetite test

4.1.1 The observed appetite test

Children with SAM suffering from infections may not show any signs. However, the major metabolic complications of SAM lead to a loss of appetite. Therefore, a critical criterion for deciding whether a patient should be sent to inpatient or outpatient care is the appetite test. Patients with a poor appetite probably have a covert complication or metabolic disturbance that may not be evident on examination; furthermore, they will not consume sufficient RUTF at home to improve and so are at risk of deterioration and death and require inpatient care. Appetite is tested by giving RUTF to the carer, who gently encourages the child to eat, then observing and noting whether the child eats the minimum amount recommended: this has been calculated as the amount required to maintain the child's weight if that amount is taken five times per day.

4.1.2 Why to do the appetite test?

- ◇ Reasonably accurate assessment of the appetite is often the only way to differentiate a complicated from an uncomplicated case of SAM. Other signs (integrated management of childhood illnesses, IMCI) of severe illness are less reliable in the severely malnourished child.
- ◇ By far the best sign of severe metabolic-malnutrition is a reduction in appetite, and the appetite test is the most important criterion to decide whether a patient should be sent for in- or outpatient management.
- ◇ A poor appetite means that the child has a significant infection or a major metabolic abnormality such as liver dysfunction, electrolyte imbalance and cell membrane damage or damaged biochemical pathways. These patients are at immediate risk of death. Furthermore, a child with a poor appetite will not take sufficient amount of the therapeutic diet at home to prevent deterioration.

4.1.3 How to do the appetite test

- *The healthcare provider*

- ◇ All children who will have an appetite test are normally tested together in the same area at the same time. This should be a separate quiet area. Children who have travelled a long distance should be allowed to rest first and given water or sugar-water to drink.
- ◇ Sometimes a child will not eat the RUTF because she is frightened, distressed or fearful of the environment or staff. This is particularly likely if there is a crowd, a lot of noise, other distressed children or intimidating health professionals (white coats, awe-inspiring tone). If a quiet area is not available then the appetite can be tested outside under shade. Watching other children take the RUTF gives confidence.
- ◇ Explain to the caretakers the purpose of the appetite test and how it will be carried out, and wash the hands of both the caretaker and the child. Allow the caretaker to sit comfortably with the child on her lap and offer the RUTF to the child.
- ◇ Give the RUTF from medicine-cups or the packet itself and water to drink in a cup:

Children with SAM suffering from infections may not show any signs. However, the major metabolic complications of SAM lead to a loss of appetite. Therefore, a critical criterion for deciding whether a patient should be sent

- *The mother*

- ◇ Initially allows her child to play with an RUTF packet or pot and become familiar with the environment. This sometimes helps the child become confident.
- ◇ Either gives the RUTF directly or puts a small amount on her finger and gives it to the child. The mother/other children/siblings must not consume any of the RUTF. It often helps if she pretends to take some and like it; seeing the mother eat the RUTF herself is the best way to encourage the child.
- ◇ If the child refuses, continue to quietly encourage the child and take time over the test. Do not force the child to take the RUTF.
- ◇ The test usually takes about fifteen minutes, but can take up to one hour with a shy or upset child or one with a marginal appetite.
- ◇ The child MUST be offered plenty of water to drink from a cup during the test.

- *The health provider should evaluate the result of the appetite test:*

Pass

A child who takes at least the amount shown in the 'moderate' column of Table 2 below passes the appetite test.

Table 2: Amount of RUTF to assess the appetite of severely malnourished children

APPETITE TEST “Moderate” is the minimum amount that malnourished patients should take to pass the appetite test						
BODY WEIGHT	PASTE IN SACHETS (PROPORTION OF WHOLE SACHET 92 G)			PASTE IN CONTAINERS (ML or GRAMMES)		
	Poor	Moderate	Good	Poor	Moderate	Good
Less than 4 kg	<1/8	1/8-1/4	>1/4	<15	15-25	>25
4-6.9 kg	<1/4	1/4-1/3	>1/3	<25	25-30	>35
7-9.9 kg	<1/3	1/3-1/2	>1/2	<35	35-50	>50
10-14.9 kg	<1/2	1/2-3/4	>3/4	<50	50-75	>75
15-29 kg	<3/4	3/4-1	>1	<100	100-150	>150
Over 30 kg	<1	>1		<150	>150	

Note: if different sized small medicine cups are used, a new table should be constructed, depending on the size of the cup. The table should be in the number of medicine-cups the child should take for his/her weight category. The majority of children will be from 4-6.9 kg so the minimum test to differentiate a poor appetite would then be one level medicine-cup of 25 ml.

Fail

A child that does not take at least the “moderate” amount of RUTF fails the test - the health provider will examine the child and probably refer him/her to the IPF.

Even if the child is not taking the RUTF because s/he does not like the taste or is frightened, the child does not pass the appetite test.

4.2 Medical history and examination

On presentation, the health worker should have taken the anthropometry and performed the appetite test; the nurse now takes a clinical history and examines the child for medical complications before deciding whether the child should be referred to the IPF or treated in OTP.

After recording the MUAC, weight and height, look up the WHZ and test for bilateral pitting oedema.

4.2.1 Take the history

- Ask the mother why she has brought the child to the centre – i.e. what she has noticed wrong/changed with the child, when the complaints started and how they have progressed.
- Ask the systematic questions:
 - o Size at birth (small, normal, large), prematurity
 - o Able to drink or breastfeed
 - o Food and fluids taken in past few days
 - o Usual diet before current episode of illness
 - o Lethargic or unconscious
 - o Vomiting everything
 - o Has cough
 - o Had convulsions

- o Has recent and frequent diarrhoea; type of diarrhoea (watery/bloody)
- o Recent change in appearance of face (sinking of eyes)
- o Mother's perception of appetite
- o Has any other reported problem
- o Immunization history
- o Illness or contact with TB, HIV, measles (in family)
- o Family circumstances, (e.g. death of siblings, absent or illness of parents, poverty assessment, etc.)

4.2.2 Examine the child

- After the anthropometry, appetite test and history have been taken, observe the child for movements, alertness, cry, body tone and general demeanour. If the child appears critically ill, look for critical signs, then move directly to the emergency triage, assessment and treatment plus admission (ETAT+) protocol.
- Emergency and priority signs:
 - o Lethargic or unconscious
 - o Cold hands
 - o Slow capillary refill (>3 seconds)
 - o Weak (low volume) or rapid pulse
 - o Convulsion.
- Respiration: rapid or shallow, other difficulty in breathing (e.g. wheeze, stridor). NB the respiration rate in SAM children with pneumonia is usually about 5 breaths/minute lower than in normal children – the cut-off points are given in Table 3 below:

Table 3: Cut-off points for respiration rate in SAM children

Age	Normal respiration rate (breaths per minute)	Respiratory distress (breaths per minute)
<2 months	30 to 60	>60
2-12 months	30 to 50	>50
1-5 years	24 to 40	>40
Over 5 years	18 to 30	>30
Adolescent	12 to 16	>20
All ages	-	ANY CHEST INDRAWING

- Temperature:
 - o Hypothermia: axillary temperature <35.0 °C or rectal temperature <35.5 °C
 - o Fever (temperature ≥38.5 °C axillary or 39 °C rectal).
- Anaemia: assess palmar pallor (if hands not cold), otherwise observe mucus membranes/conjunctiva.
- Eyes: signs of vitamin A deficiency or eye infection.
- Skin: open skin sores or infection, rash (measles etc.)

- Signs of abnormality of the ears, mouth and look for mastoiditis.
- Tap spine for early signs of Pott's disease.

If the child has SAM, has no complications and has a reasonable appetite s/he should be treated as an outpatient.

If the child fails the appetite test or has any major medical complication, the child should be referred for inpatient management. If the mother refuses to go to the hospital, because of family circumstances for example, then the mother should be counselled realistically. If she decides not to go to the hospital, the staff can arrange to treat the child as an outpatient and give the child RUTF and the standard drugs, but this child should be seen daily or every other day until there is improvement. The mother must be told that she is “not bad” but she can change her mind at any time and the staff will respect her choice.

4.3 Decision from triage criteria on whether to treat as an in- or outpatient

Based on the assessments of appetite, history and examination described, children should be allocated to in- or outpatient care, taking the mother's choice into consideration and referred accordingly. The same parameters are used to monitor children during treatment and to make decisions on the need for transfer referral.

If ANY of these indicate that the patient needs inpatient treatment, the child should be referred to the IPF with the agreement of the caretaker. See Table 4 below.

Table 4. Classification of cases for initial referral to inpatient or outpatient care

Factor	Inpatient care	Outpatient care
Mother's choice	Mother is actually the primary healthcare worker for her own child. She knows the child and her home circumstances. The mother's choice must be respected. If not she will default, will not return and will not bring any other children in case the staff are angry with her or humiliate her. Legally she has the right to decide and we are her professional advisors.	
Appetite	Failed or equivocal appetite test	Passes appetite test
Bilateral oedema	Bilateral pitting oedema Grade 2 (++) & 3 (+++) Both marasmus and kwashiorkor (W/H < -3Z-score and bilateral oedema)	Bilateral pitting oedema Grade 1 (+) and W/H > -3Z
Skin	Open skin lesions	No open skin lesions
Medical	Any severe illness, using the IMCI	Alert with no medical
Complications	Criteria – respiratory tract infection, severe anaemia, clinical vitamin-A deficiency, dehydration, fever, lethargy, measles rash etc.	Complications

Candidiasis	Presence of severe candidiasis or other signs of severe immune-incompetence	Presence of severe candidiasis or other signs of severe immune-incompetence
Caretaker	No suitable or willing caretaker.	Reasonable home circumstances and a willing caretaker

4.4 Classification of nutritional oedema

Oedema caused by acute malnutrition presents with two special characteristics:

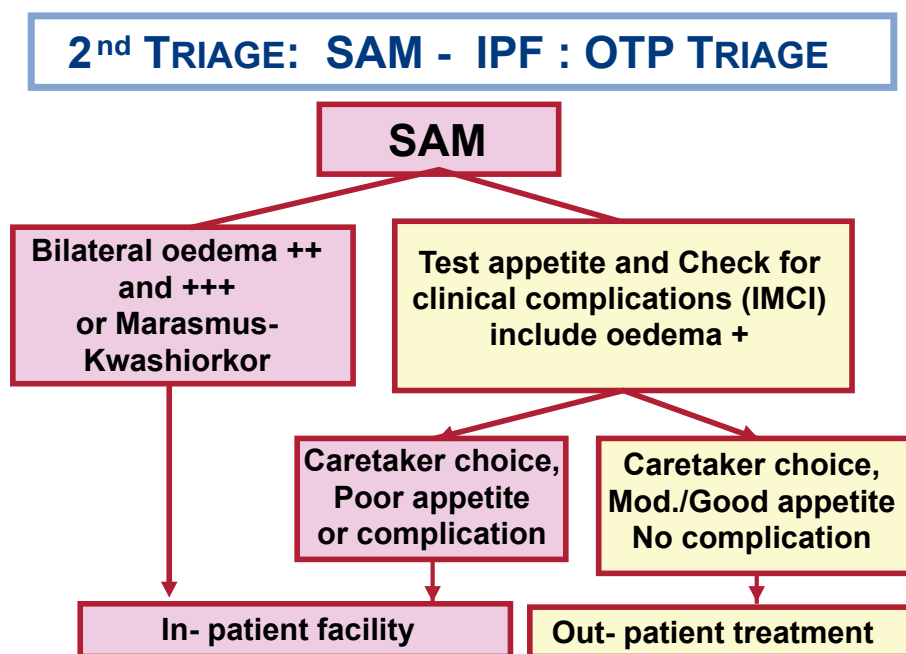
- It is bilateral (occurs equally on both left and right sides of the body).
- It is pitting (leaves an impression after pressure is applied).

Grades of oedema are classified according to the criteria shown in Table 5.

Table 5. Grades of oedema

GRADE	DEFINITION	BILATERAL PITTING OEDEMA FOUND:
Absent	No bilateral pitting oedema	
+	Mild bilateral pitting oedema	In the feet
++	Moderate bilateral pitting oedema	In the feet, lower legs, hands or lower arms
+++	Severe bilateral pitting oedema	Generally, including in the feet, hands, arms and face

Figure 1: Summary of triage decision-making for IPF or OTP



4.5 Transport of sick patients

Very ill malnourished children may be brought to an OTP distribution site or health centre and the protocol requires them to be “transferred” to an IPF.

However, it is commonly found that malnourished children who are relatively well before transport, deteriorate and die soon after arrival after a long or difficult journey. This is “transport trauma”.

Public transport is not recommended. Rather use an ambulance, as for other very ill patients.

It is recommended that, where possible, sick patients be stabilised at the OTP or nearest health centre before transport. The provisions in this protocol for the management of severe malnutrition for inpatients and its complications should be followed as far as feasible in the health centre. ¹⁰

4.5.1 IPF

The IPF should be contacted by telephone so that it can take responsibility for and “cover” the nurse in the field. The IPF reassures the nurse that it is the correct course of action not to transport the child and gives advice and support for the management of the patient. The telephone call, advice given and the name of the doctor and IPF contacted should be recorded on the patient’s chart.

4.5.2 OTP

The nurse must explain to the caretaker that the patient is critically ill and may die, but that the danger of transporting the patient to the hospital is greater than trying to stabilise him/her at the health centre. Again the mother’s choice should be followed.

4.5.3 District Hospital Nutrition Officer (focal point) and Emergency Department

- ◇ Mobilise the community about the problem of transport of sick patients from one centre to another.
- ◇ Explore solutions: 1) use a national or international NGO; 2) establish a community fund; 3) have an ambulance; 4) establish a phone consultation to treat patients without transport; 5) establish a local IPF to manage/stabilise complicated malnutrition cases close to an epicentre of malnutrition.
- ◇ Organise the transport of the critically ill transfer-patients:
 - o Organise payment for transport (lend money, subsidise the cost, provide free transport for poorest cases or pay for transport).
 - o Train staff about care during the transport:
- ◇ The vehicle must drive slowly.
- ◇ It must not be crowded.

¹⁰Transport trauma is one of the main reasons why IPFs should be established as close to the patient’s village as possible. Many of the advantages of having OTPs close to the patient’s home apply equally to IPFs.

- ◇ It should stop for 5 minutes every 20-30 minutes during the drive to lessen the effects of motion sickness on the sick patient.
- ◇ Water must be available.
- ◇ Children should be nursed by their mother.
- ◇ Do not give drugs to sedate or prevent motion sickness (vomiting) to malnourished patients (this is particularly important).
- ◇ Anticipate vehicle breakdown, seasonally impassable roads (flooding, etc. during the rainy season).
- ◇ Pre-position stocks if seasonally impassable roads are anticipated (stocks of RUTF, train village volunteers if team cannot travel).
- ◇ Consider having an “emergency kit” for IPF-style stabilisation of children prior to transport, if transport difficult/impossible or if mother refuses to travel.
- ◇ Regularly evaluate the outcome of patients that have been transported under difficult circumstances. Detailed analysis of death during and for 48 hours after transport should be undertaken by the District Nutrition Officer and actions taken (such as opening a satellite IPF). The time of leaving and the time of arrival at the destination facility should be noted on the transfer form and analysed periodically to determine if this is a major problem within the district.
- ◇ Establish regular meetings between the IPF doctors and the OTP staff in order to facilitate communication between the different teams and give confidence to the IPF about the judgement of the OTP/community staff.
- ◇ Monthly reports should be checked and updated for deaths occurring during transport. Transfer times reported on the transfer form should be examined and if they are excessive, ways of resolving the problem should then be explored.

5. OUTPATIENT MANAGEMENT OF SAM IN CHILDREN AGED OVER 6 MONTHS

Outpatient care is suitable for children aged 6 months and above with SAM without complications and a good appetite: the vast majority of cases have these characteristics. It should also be used for nearly all children transferred after successful initial management in an IPF.

Children admitted de novo for outpatient management of SAM should receive medical and therapeutic feeding treatment according to their weight, and a weekly medical examination to monitor their progress. If they are not gaining weight rapidly they should have their appetite tests repeated. Box 3 gives an overview of OTP management.

Box 3. Overview of activities in outpatient management of SAM

- Observe for critical illness: emergency signs and prompt treatment followed by referral to IPF (see ETAT)
- Welcome children to the centre and offer them sugar-water to drink

Full assessment (repeated as necessary)

- History and examination
- Differential diagnoses (decision: treatment as inpatient or outpatient)

Treatment

- Prevention of hypoglycaemia
- Management of non-critical infections and other medical conditions
- Commencement of nutritional rehabilitation

Weekly care

- Anthropometric measurements (MUAC and weight). Height is only measured on admission, when the “target” weight for discharge is determined.
- Repeat appetite test if not gaining weight appropriately.
- Monitoring for signs of improvement, complications, failure to respond to treatment. Regular education sessions including: hygiene promotion, infant and young child feeding (IYCF), emotional and sensory stimulation of a child, family planning, HIV prevention, etc.
- Psychosocial support of mother or caretaker.
- Health and nutrition counselling of mother or caretaker.
- Preparation for discharge (final vaccination, arrangement of follow-up).

End of active treatment

- Follow up, home visits, etc.

5.1 Tools for OTP

- MUAC tapes (115mm)
- Scale, length board, WHZ tables (WHO 2006)
- Registration book, patient charts (OTP charts)
- RUTF, sugar, safe drinking water, medical measuring cup or scale (5 g precision)
- Water and soap to wash hands

- Thermometer
- Examination tools (stethoscope, otoscope etc.)
- Transfer forms
- Drugs

5.2 Initial assessment

When children and caretakers attend a health facility, they have often travelled for many hours. Transport can lead to serious deterioration of sick or malnourished children. There must be a comfortable place for patients to wait, in the shade, with water freely available; the children should be immediately given a drink of sugar-water (approximately 10% sugar in water i.e. approximately 10 g or 2 small sugar spoons in 100 ml of boiled water): this will prevent hypoglycaemia. However the children who are so ill that they cannot take the drink should be referred to IPF immediately without waiting.

During triage (see previous chapter), the child's anthropometry has been taken, oedema assessed and the presence of SAM confirmed. The appetite test will have been performed and the history and examination taken.

5.3 Ensure decision-making for outpatient or inpatient care was appropriate during triage

If during the assessment there is a medical complication or a poor appetite or oedema (grade ++ or ++++) or if the child has a combination of SAM anthropometric criteria and oedema (e.g. oedema and $WHZ < -3Z$ = "marasmic-kwashiorkor"), refer him/her for inpatient treatment with the mother's consent. If the mother does not consent then see the chapters on IPF management and complications, and attempt to follow the procedures outlined there.

If the child has a reasonable appetite and no complications, retain in OTP as described in this section of the guidelines.

5.3.1 First priorities

1. Record on the OTP chart the administrative and baseline information, anthropometry history, clinical examination and appetite test.
2. Register the patient in the facility registration book and assign both an admission number and ID number (e.g. insurance number) in order to be able to follow the patient if he/she is transferred to another facility (e.g. IPF or another OTP closer to home).
3. Explain to the caretaker the severity of the child's condition and that s/he can be treated as an outpatient.
4. Outline the management: s/he must come back each week for follow-up and to obtain fresh supplies of the special food (RUTF) used as a medicine to treat the child; explain the child's expected progress and when s/he will be judged fully recovered, and that treatment is likely to take about two months (less for oedema (only +) cases).
5. Prescribe the routine medicine and any other treatment the child may need. Teach the caretaker how to give the drug(s) and observe the first dose being given.

6. Check the child's vaccination schedule and vaccinate if not already fully immunized; this is not a priority and can be given at week 4 before discharge (when the patient is nutritionally improved and their immune function is better).
7. Explain the signs of deterioration to the caretaker and ensure that she or he knows they must come back to the health facility at any time if the child's condition deteriorates, even if they do not have an appointment.
8. Give one week's supply of RUTF. Observe the caretaker feeding the child with RUTF. Ensure she or he understands how to give the RUTF at home.
9. Go over the key messages with the caretaker.
10. Make an appointment for the next visit.
11. At subsequent visits give health and nutrition counselling (e.g. for appropriate infant and young child feeding practices) and education sessions.

5.4 Medical management

5.4.1 Treatment to be given in the clinic

On admission, routine medicines should be given to all SAM children as shown in Table 6.

Table 6 Medication for newly admitted OTP patients: omit for patients transferred from IPF.

MEDICATION	WHEN GIVEN
Amoxicillin	On admission for all new patients – 5 days
Antimalaria drugs: lumefantrine-artemether (according to national protocol)	At any time if clinical signs indicative and paracheck/ microscopy confirm
Mebendazol/albendazol	Single dose on second week: 400 mg for children aged over 2 years, 200 mg for children aged 1-2 years.
Vitamin A (if RUTF not available)	If diet does not contain vitamin A (stock-out RUTF), to be given on admission unless already given in last 3–4 months. Do not given to children with oedema on admission; instead give a single dose on discharge.
Measles vaccination	One dose in week 4 The risk of nosocomial infections in OTP is low except if there is an outbreak of measles, when all children should be given vaccine.

Note: Children who have been transferred from hospital-based management of SAM should not receive routine medications that have already been administered during their hospital stay (e.g. antibiotics). However, if any treatments received during inpatient care are incomplete (e.g. for clinical vitamin A deficiency), this information should be included on referral documents and the doses required to complete that treatment given during outpatient follow-up care.

•Antibiotics

A course of oral antibiotic such as amoxicillin should be given to all children to treat any underlying infections. (Never give chloramphenicol to children less than 5 kg as they are

in danger of the “grey baby syndrome”).

The first dose of amoxicillin should be taken during the admission process, under the supervision of the healthcare provider. An explanation should be given to the caretaker on how to complete the treatment at home. The recommended dosage for amoxicillin is 25 mg/kg twice a day for 5 days.

▪ **Worm treatment**

A single dose of albendazol/mebendazol should be given on the second or fourth visit for outpatient treatment; the dose required is shown in Table 7. Albendazol is preferred but where albendazol is not available, mebendazol should be given.

Table 7. Mebendazol/albendazol drug dosage

AGE (WEIGHT) OF THE CHILD	MEBENDAZOL (single dose before food)	ALBENDAZOL (single dose before food)
1 year or below	None	None
1–2 years (or <10 kg)	500 mg	200 mg
≥ 2 years (or ≥ 10 kg)	500 mg	400 mg

When treating infants, the tablets should be crushed into small pieces before administration.

▪ **Vitamin A**

Children with SAM do not require a high dose of vitamin A as a supplement if they are receiving RUTF that complies with WHO specifications (and therefore already contains sufficient vitamin A), or vitamin A is part of other daily supplements. THE CHILD WILL RECEIVE THE DOSE OF vitamin A at 4th week before discharge (if the child did not receive routine Vitamin A)

Vitamin A deficiency

Children with eye signs of vitamin A deficiency (e.g. corneal ulceration, xerophthalmia, corneal xerosis, cloudiness, keratomalacia) should be transferred to IPF immediately, as the condition of the eyes can deteriorate rapidly and there is a high risk of blindness. Check carefully at each visit during an outbreak of measles.

If eye signs of vitamin A deficiency have been identified, the first high dose of vitamin A should be given to the child before transfer to the IPF. The dose MUST be recorded on the referral slip.

Table 8. First dose vitamin A before transfer to IPF

AGE OF THE CHILD	VITAMIN A
6–12 months	100,000 IU
> 12 months	200,000 IU

If the mother declines to go to the IPF then treat for vitamin A deficiency as per the schedule in Chapter 6 (on the management of complications).

▪ Other medical treatments

The less serious medical conditions that affect the child with SAM without medical complications should be treated using the IMCI protocols.

Anaemia

Iron supplementation may be harmful during the acute phases of SAM, because it can promote infections, increase the severity of malaria and cause oxidative stress to damage the tissues. Therefore, if the child does not need specific treatment, RUTF contains 10.6 mg iron plus 193 µg of folic acid per 500 kcal (92 g packet). Any patient with severe anaemia (severe palmo/plantar or conjunctiva pallor AND/OR Hb < 6 g/dl where feasible) should be referred to IPF, where laboratory testing can be done and the anaemia treated accordingly.

Diarrhoea

Diarrhoea is often a precipitating cause leading to SAM. However, the use of standard WHO oral rehydration therapy is not recommended for children with SAM.

In the case of diarrhoea, a recent onset of frequent watery diarrhoea (> 3 watery stools per day), vomiting and sinking of the eyes SINCE THE START of the diarrhoea show that the child is dehydrated and needs oral rehydration with a special fluid called ReSoMal (rehydration solution for malnutrition). If there are any other signs of deterioration, such as lethargy or weight loss then an immediate transfer to IPF is important, provided that transport is available. Children with SAM already have some sinking of their eyes due to loss of fat from the orbit, and the “skin-pinch” is unreliable because of loss of fat from the subcutaneous tissues. If the eyes also have a “staring” frightened appearance due to retraction of the eyelids, this is also a sign of dehydration. In the case of recent and frequent watery stools, if ReSoMal is not available the child should receive a first dose of diluted oral rehydration therapy before referral to hospital.

The effect of diarrhoea without severe dehydration on the nutrition status of children can be minimized by continued feeding, breastfeeding and administration of RUTF, since the paste provides a daily supplement of zinc. And also if the child has not lost weight but only has small frequent stools it can be managed with observation in the health centre. Children with long-standing (persistent) diarrhoea are not dehydrated unless they have an acute exacerbation. Children with oedema are not dehydrated. It is never dangerous to give sugar-water, and this should always be available and given during transport.

5.5 Dietary treatment in outpatient care

Children with SAM need safe, palatable, nutrient-dense food. It must have a high energy content and increased amounts of ALL the vitamins and minerals needed for growth¹¹ (see specifications in Annex 18). RUTFs are soft or crushable foods that can be consumed easily by children from 6 months of age without adding water.

¹¹ Transport trauma is one of the main reasons why IPFs should be established as close to the patient's village as possible. Many of the advantages of having OTPs close to the patient's home apply equally to IPFs.

When there are no medical complications, a malnourished child with appetite, if aged 6 months or more, is given a standard dose of RUTF adjusted to their weight. This is consumed at home, directly from a container or the packet, at any time of the day or night. Because RUTF does not contain water, children **MUST** be offered safe drinking water at the same time. Any opened package that is not consumed may be safely kept to eat later, but must be covered to prevent insects and rodents from contaminating the food.

The dietary management in outpatient care is based on supplying 100% of nutritional needs with RUTF. As RUTF contains all the nutrients that are needed to recover in adequate amounts, other foods are not necessary for full recovery. However, the child often wishes to take food with the rest of the family; this is perfectly acceptable but the additional local foods should be nutrient-dense. Many local foods contain anti-nutrients which can impair the absorption of the nutrients from the RUTF and reduce the appetite; the RUTF should be taken 2 hours before or after a family meal – and if possible during the night. Before any meal, including RUTF, children less than 2 years should be offered breast milk.

RUTF is given at 170 kcal/kg per day and can be presented in the form of a paste or a special therapeutic biscuit (e.g. BP100 – not the biscuits used as supplementary feed for moderate malnutrition or prevention). If therapeutic biscuits are used for younger children, aged 6–24 months, the biscuits can be mixed with safe water to make porridge. Table 9 gives the recommended dosage based on the weight of the child.

Table 9. Recommended dosage of RUTF according to the weight of the child

WEIGHT CATEGORY (KG)	RUTF PASTE		RUTF SACHETS (92 G)		BISCUIT (BP100)®	
	GRAMMES PER DAY	GRAMMES PER WEEK	SACHET PER DAY	SACHET PER WEEK	BARS PER DAY	BARS PER WEEK
3.0 – 3.4	105	750	1¼	8	2	14
3.5 – 4.9	130	900	1½	10	2½	17½
5.0 – 6.9	200	1400	2	15	4	28
7.0 – 9.9	260	1800	3	20	5	35
>10.0	400	2800	4	30	7	49

Note: The package size is commonly 92 g/500 kcal. Locally manufactured therapeutic pastes can be supplied in different quantities per packet or pot; if so, ration tables should be adapted.

The average weight gain of OTP patients is much less than IPF where the diet is given under supervision; this is due to sharing of the diet and the amount of family food that is taken. The amount of kcal per day can be decreased by a third without changing the rate of weight gain. This avoids wasting resources and can decrease sharing at home. The appetite at the beginning of the treatment is not very good and it takes some time for the appetite to improve. Excess RUTF given initially can encourage sharing from the start of treatment. For this reason, the amount can be increased more gradually, but this complicates the instructions and is not generally recommended. IF the centre is facing a stock-out then a reduced amount of RUTF should be given to all the children (a

supplementary table to face this contingency is given in Annex 9).

To ensure proper use of therapeutic foods at home, it is important to provide detailed, clear information to the caretaker, and check that it has been understood. Box 4 presents messages for the caretaker.

Box 4. Treating with RUTF at home: messages for the caretaker

- The RUTF is a food and a medicine for the very thin or swollen child only.
- The RUTF is the food the child needs in order to recover. The child should complete his or her daily ration of RUTF before being given other food. The child should continue to be breastfed on demand. Sick children often don't like to eat. Give small regular meals of therapeutic paste and encourage the child to eat often.
- Always offer breast milk before and plenty of clean water during/after s/he is eating the RUTF. Children need to drink more than normal when taking the diet.
- For infants and children aged less than 2 years, continue to put the child to the breast regularly. Offer breast milk BEFORE every feed.
- Wash children's hands and face with soap and water before feeding, if possible.
- Keep food clean and protected from insects, rodents and pets.
- Sick children get cold quickly. Always keep the child covered and warm.
- The RUTF is a food and a medicine for the very thin or swollen child only.
- The RUTF is the food the child needs in order to recover. The child should complete his or her daily ration of RUTF before being given other food. The child should continue to be breastfed on demand. Sick children often don't like to eat. Give small regular meals of therapeutic paste and encourage the child to eat often.
- Always offer breast milk before and plenty of clean water during/after s/he is eating the RUTF. Children need to drink more than normal when taking the diet.
- For infants and children aged less than 2 years, continue to put the child to the breast regularly. Offer breast milk BEFORE every feed.
- Wash children's hands and face with soap and water before feeding, if possible.
- Keep food clean and protected from insects, rodents and pets.
- Sick children get cold quickly. Always keep the child covered and warm.

Note: There is always some degree of sharing, even if this is denied by the family – calculations of the rate of weight gain against the amount “supposed” to be taken by the child is used to calculate the maximum that the child has taken and shows that this is always the case. The family must not be forced to tell lies or feel guilty by the staff if they insist that there has to be no sharing at all.

5.6 Monitoring and follow-up treatment as an outpatient

During weekly visits, the child is again weighed and MUAC measured, assessed for danger signs, given RUTF and, if weight gain is not satisfactory, is given a repeat appetite test. If there is weight loss or if medical complications are identified, a full assessment is made and transfer to the IPF is considered. The information recorded on the chart during admission provides baseline data for comparison during follow-up and the course of treatment.

The child is monitored weekly, but the caretaker must understand that if s/he is concerned about the child at any time, s/he should return to the centre.

In certain circumstances, once the child is recovering, fortnightly follow-up may be

considered, but **ONLY IF** the distance to the health facility is excessive. Remarks: this should be exceptional, as 15 days is a long time for a SAM child. A home visit needs then to be organized. If this is common then an OTP should be established closer to the children's home, possibly with a mobile team (offering all health services including OTP, vaccination, IMCI etc.).

Education sessions and health & nutrition counselling focusing on appropriate infant and young child feeding practices should be given during OTP visits.

Table 10 summarises the activities carried out during the weekly OTP sessions.

Table 10. Activities required at follow-up visits

ACTIVITY	FREQUENCY
Weight	Each week
MUAC	Each week
Check for oedema	Each week
Height/length	Once only
Medical history	Each week
Physical examination (including temperature and respiratory rate)	Each week
Appetite test	Where indicated
Medical treatment	Where indicated
Home visit	Where indicated
Vaccinations	Where indicated
Evaluation of health and nutrition status progress and feed-back of and to caretaker	Each week
Education sessions, individual counselling, emotional stimulation for child, support for caretaker	Each week
Provision of take-home RUTF and, where indicated, medicine	Each week

The possible outcomes of each visit are: child is making good progress; a home visit is needed; more counselling is indicated; referral to IPF. Table 11 indicates the criteria the health worker will use to decide on the outcomes.

If the child is making good progress, has good appetite, is gaining weight, MUAC is increasing, oedema is absent or decreasing, there are no severe medical complications, and the child is regularly attending weekly follow-up visits, then he or she can continue in outpatient care until he or she reaches the criteria for discharge.

Table 11. Action table for follow-up visits: on follow-up visits, the danger signs should be reassessed

SIGNS	TRANSFER TO INPATIENT CARE	HOME VISIT
<i>General condition</i>	Deteriorating	Child is absent, defaulting, not gaining weight or losing weight on two consecutive visits.
<i>Bilateral pitting oedema</i>	Grade ++	
	Any grade of bilateral pitting oedema with severe wasting (marasmus-kwashiorkor)	
	Increase in bilateral pitting oedema	
	Bilateral pitting oedema not reducing by week 3	
<i>Anorexia</i>	Poor appetite or unable to eat – failed appetite test	

SIGNS	TRANSFER TO INPATIENT CARE	HOME VISIT
<i>Vomiting</i>	Intractable vomiting	Follow-up home visits are essential if the caretaker refuses transfer to inpatient care.
<i>Convulsions</i>	Ask mother if the child has had convulsions since the previous visit	
<i>Lethargy or not alert</i>	Child is difficult to wake	
<i>Unconscious</i>	Child does not respond to painful stimuli	
<i>Hypoglycaemia</i>	A clinical sign in a child with SAM is eyelid retraction: child sleeps with eyes slightly open	
<i>Dehydration</i>	Dehydration based primarily on recent history of diarrhoea and recent appearance of clinical signs of dehydration as reported by the mother/ caretaker	
<i>High fever</i>	Axillary temperature $\geq 38.5^{\circ}\text{C}$, rectal temperature $\geq 39^{\circ}\text{C}$	
<i>Hypothermia</i>	Axillary temperature $< 35^{\circ}\text{C}$, rectal temperature $< 35.5^{\circ}\text{C}$	
<i>Respiration rate</i>	≥ 60 respirations/min for children aged under 2 months	
	≥ 50 respirations/min for children aged 2–12 months	
	≥ 40 respirations/min for children aged 1–5 years	
	≥ 30 respirations/min for children aged over 5 years	
	Any chest indrawing	
<i>Anaemia</i>	Palmar pallor or unusual paleness of the mucosa	
<i>Skin lesions or infections</i>	Broken skin, fissures, flaking of skin or any infection requiring intramuscular (IM) antibiotics	

<i>Weight changes not explained by a home visit to identify social causes</i>	Weight loss of 5% of body weight at any visit	Follow-up home visits are essential if the caretaker refuses transfer to inpatient care.
	Weight loss for two consecutive visits	
	Static weight for three consecutive visits	
	Remarks: these are failure to respond to treatment and need to be investigated first at household level and then decision should be taken. The cause may be nutritional, social or medical.	
<i>Request by caretaker for inpatient care</i>	Mother/caretaker requests treatment of child in inpatient care for social reasons (decided by supervisor)	
<i>Not responding to treatment</i>	A child that is not responding to treatment is referred to IPF if a home visit does not find a social cause.	

Home visits should be done by the CHW for patients who are absent or, defaulting, dead or non-responding etc. The procedure is described in Chapter 3.

The health worker should check any patient for HIV testing and TB screening: if positive, refer the child for appropriate treatment.

5.7 Failure to respond to treatment as an outpatient

Children with SAM may be slow to respond, or may not respond to treatment. It is important to find out the reason and take appropriate action.

The criteria for failure to respond are given in Table 12. Children fulfilling any of these criteria must be diagnosed as failure-to-respond and the failure-to-respond procedures followed.

Table 12. Failure to respond criteria ¹²

CRITERIA FOR FAILURE TO RESPOND	TIME AFTER ADMISSION
Failure to gain any weight (non-oedematous children)	21 days
Weight loss since admission to programme (non-oedematous children)	14 days
Failure to start to lose oedema	14 days
Oedema still present	21 days
Failure of appetite test	At any visit
Weight loss of 5% of body weight (non-oedematous children)	At any visit

¹² See Annex 10: Weight loss 5% table

Weight loss for two successive visits	At any visit
Failure to start to gain weight satisfactorily after loss of oedema (kwashiorkor) or from day 14 (marasmus) onwards.	At any visit

Do NOT simply monitor a failing child and carry on with routine treatment. Discharging the child at the end of 12 weeks as a failure is not ethical: do not abandon such children – instead take actions earlier during follow up (refer to IPF, home visits etc.).

Many causes of non-response are attributable to the functioning and the performance of the service where the child is receiving the treatment; most of the others are related to the socioeconomic circumstances of the child; some are related to underlying medical problems. There is no point in referring a child to the IPF for social problems; if many children fail to respond, the most likely reason is the quality of the service.

Box 5. Causes of failure to respond to treatment as an outpatient

Causes related to the quality of programme

- Breaks in the supply of RUTF (common and brings the whole programme into disrepute with the community, undermines efforts at community mobilisation)
- Initial triage assessment was inadequate and has missed a reason that the child is not suitable for direct admission to OTP
- Poor or non-observed assessment of appetite on admission and follow-up visits
- Inadequate counselling given to caretakers
- Routine drugs are not available
- Excessive time between distributions and follow-up visits
- Mother refused to go to the IPF when the child had a poor appetite or medical complication (reasons vary, but often relate to staff attitudes, cost and distance).

Causes related to the child's socioeconomic situation

- Excessive sharing of therapeutic paste at household level e.g. lack of food in the household leading to most of the RUTF being shared among family members; no (or low) income, leading to sale of RUTF.
- Discrimination against the mother or family for social reasons
- Absence of a social network to help in times of stress
- Poor feeding or caring practices, owing to lack of time for the caretaker or daily pressures, or poor knowledge about appropriate infant and young child feeding practices
- Poor health, depression, trauma, absence or death of the caretaker or family provider.

Causes related to the health status of the child

- TB or HIV infection
- Vitamin or mineral deficiency
- Unrecognized infection, persistent diarrhoea, dysentery, otitis, pneumonia, urinary tract infection, malaria, helminthiasis, hepatitis
- Other serious underlying disease, such as congenital abnormalities, neurological damage, inborn errors of metabolism
- Psychological trauma etc.

5.8 End of outpatient care treatment

5.8.1 Criteria for the end of treatment

The criteria shown in Box 6 are used to determine when the child can be discharged to follow-up. The same criteria can be used for monitoring and reporting. It should be recognized that early discharge results in increased relapse rates.

A child admitted on a specific measurement should be identified as cured on the same measurement.

Box 6. Criteria for admission and discharge from outpatient treatment (children aged 6–59 mo.)

CRITERIA FOR DISCHARGE TO FOLLOW-UP		
Cured	Discharged with MUAC: MUAC \geq 125 mm	and clinically well
	Discharged with weight-for-height/length: weight-for-height \geq –1.5 Z-score ^b	
	Admitted with oedema: no oedema for 2 consecutive weeks and either MUAC \geq 125 mm or weight-for-height/length \geq –1.5 Z-score	
Confirmed default	Absent for three consecutive visits	Defaulters during 3 weeks of absence can die and it is important for our information to know if he/she is an unconfirmed or confirmed defaulter
Unconfirmed default	Absent for three consecutive visits	Absent for 3 weeks, without a home visit to determine if the child died
Died	Died during treatment in OTP	This should be confirmed with a home visit: otherwise several deaths will be inappropriately classified as defaulting
Non-recovered ^a	Did not meet the discharge criteria after four months in treatment	RARE: action should be taken long before this stage.

^a Note that a child or person whose condition is not responding to treatment should have a home visit and investigation of social or medical conditions and underlying pathologies, or referred to IPF for closer monitoring. Movements between inpatient and outpatient treatment are transfers rather than discharges and should be recorded as such.

^b WHO recommends > -2 Z-score, but most programmes have a higher relapse rate unless the criterion is set at -1.5 Z-score. The old WHO recommendation of > -1 Z-score led to unrealistically long patient treatment. HOWEVER it can be reduced to > -2 Z-score

where follow up is good and the community is engaged and motivated.

In addition to anthropometric criteria, the following services should be in place before discharge:

- Efforts to re-initiate and/or encourage exclusive breastfeeding
- Counselling to caretakers on appropriate infant and child feeding practices has been provided
- Stimulation of emotional and physical development has been initiated and taught to the mother for continued practice at home and into the future (see Chapter 9)
- The mother or caretaker has been provided with psychosocial support (see Chapter 11).

5.8.2 Procedures for the end of treatment

When a child fulfils the criteria for the end of treatment, the healthcare worker will:

1. Complete the patient's chart with the required discharge information.
2. Check that all drugs and vaccines have been given before discharge.
3. Give a final ration of RUTF for the ensuing 7 days to take home.
4. Give the caretaker support for appropriate complementary feeding or child feeding and improved family foods. This may be done through individual counselling or, where possible, linking to ongoing nutrition support programmes. These can include health and nutrition education sessions, counselling on infant and young child feeding practices (refer to maternal, infant and young child (MIYCN) counselling cards).
5. In emergency settings where access to food is disrupted, all children discharged from OTP should be referred to a supplementary feeding programme, regardless of their anthropometric measurements, for 3 months' follow-up in that programme.
6. Ensure that the caretaker knows how to recognise the signs of deterioration of the child and tell her that, if this occurs, the child should be brought back to the health facility to be assessed.
7. Complete the facility register book.
8. At the end of the month, complete the monthly report form with the discharge details of all children leaving the OTP during that month, with any corrections from previous months.

6. MANAGEMENT OF COMPLICATIONS OF SEVERE ACUTE MALNUTRITION IN CHILDREN OVER 6 MONTHS OF AGE

As children with SAM usually have complications, these need to be addressed when the child is first admitted. This section of the protocol should be read in conjunction with the routine management of children in IPF.

When a patient develops a complication, always transfer him/her to acute-phase for treatment (inpatients are transferred back to acute-phase if they are in transition phase; outpatients are referred to the IPF if suitable transport is available and the inpatient facility is within a reasonable distance of the OTP site, otherwise where feasible, attempts to start phase 1 and treat the complications should be started before transport in consultation by phone with the IPF).

Stabilization of critically ill children with SAM is crucial. Where the child is not in immediate risk of death, full assessment, routine and specific treatment, and daily quality care are considered.

6.1 Emergency Triage Assessment and Treatment in hospital settings

Health workers who are involved in ETAT+ of ill children presenting at the hospital should assess the children's nutritional status as early as possible, because the principles and procedures of ETAT+ differ for children with SAM compared to well-nourished children.

6.1.1 Principles of ETAT+

When first seen, every child with SAM must be examined for emergency critical signs and, if present, treated before any other action is initiated.

Box 7. Summary of steps in Emergency Triage Assessment and Treatment (ETAT)

First, check for emergency signs in three steps.

- *Step 1:* If there is any airway or breathing problem manage the airway and give oxygen.
- *Step 2:* If the child is in shock due to diarrhoea with very severe dehydration start intravenous (IV) fluid resuscitation and give oxygen.
- *Step 3:* If the child is unconscious or convulsing, give IV glucose for hypoglycaemia. Give an anticonvulsant for convulsions.

If emergency signs are found:

- Call for help, but do not delay starting treatment.
- Carry out emergency investigations (blood glucose, blood smear, haemoglobin). Send blood for typing and cross-matching if the child is in shock, appears to be severely anaemic or is bleeding significantly.
- After stabilization proceed to assessing, diagnosing and treating the underlying problem.

ETAT procedures in children with SAM

In order of emergency, assess and treat the ABCD:

Airway and breathing, “A” and “B”:

- Does the child’s airway appear obstructed? Look and listen to determine whether there is poor air movement during breathing.
- Does the child have severe respiratory distress? (Head nodding, grunting, central cyanosis, fast breathing, retractions, not able to feed.)

See Section 6.1.6 for treatment of severe pneumonia.

Circulation “C”

- Check the radial pulse, capillary refill time, and coldness of extremities. If you cannot feel a radial pulse of an infant (less than 1 year of age), feel the central pulse. If the room is very cold, rely on the femoral/carotid pulse to determine whether the child is in shock.

See Section 6.1.2 on management of shock

Disability “D”

Level of consciousness: Is the child lethargic or in coma (unconscious)? Check the level of consciousness on the “AVPU” scale (A alert, V responds to voice, P responds to pain, U unconscious).

Convulsions: Is the child convulsing?

See Section 6.1.9 on treatment of convulsions.

Hypoglycaemia

- Does the child sleep with eyelids open? Does the child have a low body temperature ($< 36.5^{\circ}\text{C}$), limpness and diminution in the level consciousness?

See Section 6.1.10 for treatment of hypoglycaemia

Hypothermia – hyperthermia

- Does the child have a low body temperature ($< 35.0^{\circ}\text{C}$ axillary or $< 35.5^{\circ}\text{C}$ rectal). Low body temperature is a sign of hypoglycaemia and sepsis. Warming the child is an emergency treatment.
- Does the child have a very high body temperature ($\geq 38.5^{\circ}\text{C}$ axillary or $\geq 38^{\circ}\text{C}$ rectal)? Cooling the child with tepid sponging is used.

Note: A child with SAM has disturbances of body temperature regulation and tends to take the temperature of the environment. Keeping the child warm is a routine treatment.

See Section 6.1.11 on the management of hypothermia and hyperthermia

Severe anaemia

- Does the child show severe pallor?

See Section 6.1.8 on treatment of very severe anaemia.

Severe dehydration without shock

- Does the child have diarrhoea with recent sunken eyes? Ask the mother/carer whether the child has had recent and frequent watery diarrhoea or vomiting and if the face has changed in appearance.

See Section 6.1.3 on treatment of dehydration without shock.

6.1.2 Shock

▪ Diagnosis

Signs of shock are cold hands, capillary refill time longer than 3 seconds, and weak and fast pulse, or a very slow pulse.

The common causes of shock in SAM are septicaemia, severe dehydration, cardiogenic, toxicity from traditional medicines or therapeutic drugs (e.g. excess metronidazole), hepatic failure and severe hypernatraemia. Frequently, several of these causes appear simultaneously in SAM children (e.g. septicaemia leading to compromised heart and hepatic function). Children with SAM do not usually have haemorrhagic shock or anaphylaxis.

▪ Treatment of hypovolemic shock

- Start a critical care chart and record the respiratory rate, pulse rate, capillary refill time, level of consciousness, liver size (mark on the skin with a marker pen) and weight.
- Give oxygen through nasal prongs or a nasal catheter, with a flow of 1–2 L/min.
- Insert an IV line and draw blood for emergency laboratory investigations.
- Give 10% glucose solution, 5 ml/kg IV, followed by 50 ml of 10% glucose or sucrose by nasogastric tube, to prevent/ treat hypoglycaemia.
- Keep the child warm to prevent or treat hypothermia.
- Give IV ceftriaxone 100 mg/kg per day divided 12 hourly or IV cefotaxime 150 mg/kg per day divided 8 hourly and IV ciprofloxacin 20 mg/kg per day divided 12 hourly.
- Initiate and carefully monitor specific IV fluid: give 15 ml/kg over 1 hour.
- ☒ Do not handle the child any more than is essential for treatment.

▪ Intravenous fluid management

IV fluid used is Ringer's lactate solution with 5% dextrose.

If Ringer's lactate is not available, use half-normal saline with 5% dextrose. Add 10% sterile potassium chloride solution 20 mmol/L when using Ringer's lactate solution, with 5% dextrose or half-normal saline with 5% dextrose for IV fluid management, if it can be made safely.

Table 13. Amounts of IV fluid for children with SAM and shock due to severe dehydration to give in the first hour (do not give an initial bolus to SAM children)

WEIGHT OF CHILD (KG)	VOLUME IV FLUID TO GIVE OVER 1 HOUR (15 ML/KG)	WEIGHT OF CHILD (KG)	VOLUME IV FLUID TO GIVE OVER 1 HOUR (15 ML/KG)
4	60 ml	12	180 ml
6	90 ml	14	210 ml
8	120 ml	16	240 ml
10	150 ml	18	270 ml

During an initial IV infusion DO NOT give any ReSoMal or other fluid by nasogastric tube to a child in shock; further management must be based upon the response of the child to the infusion.

Monitor signs of fluid overload such as increasing pulse rate (≥ 15 beats/min), increasing respiratory rate (≥ 5 breaths/min), liver enlargement, fine crackles throughout lung fields, raised jugular venous pressure, development of galloping heart rhythm, puffy eyelids and increasing oedema. Stop the infusion immediately if any of these signs appear.

NOTE: for children who are truly dehydrated, the response to treatment is remarkable and obvious with a gain in weight towards the target “rehydrated weight”. If a prompt response is not observed then the diagnosis of shock due to dehydration was incorrect and an alternative diagnosis should be considered.

•Reassess the child after 1 hour:

If the child shows signs of improvement (falling pulse and respiratory rates), then:

- If still unconscious: repeat the same amount of IV fluid (15 ml/kg) for another hour without giving any fluid by mouth or nasogastric tube at this stage. Weigh to check fluid balance – if there is gain in weight and improvement is maintained then the diagnosis of dehydration as the cause of the shock is confirmed.
- If conscious: switch to oral or nasogastric rehydration with ReSoMal at 10 ml/kg per hour.
 - o If the weight of the child remains steady, increase the volume given orally by steps of 5 ml/kg per day until there is steady weight gain and continued improvement.
 - o Stop all rehydration fluid when the child reaches his/her rehydrated “target weight”.
- When rehydrated and conscious, start therapeutic feeding with F75: the amounts to be given and frequency are detailed in the table for routine care (see table 14).
- If the child vomits, give the diet by nasogastric tube. If the child continues to vomit repeatedly, give the diet more slowly. If the problem does not resolve, stop feeding the child and give maintenance IV fluids at a rate of 4 ml/kg per hour.

If the child fails to improve after the first hour with the 15 ml/kg IV fluid treatment, then the diagnosis was incorrect and needs revision to a second different diagnostic.

- Treatment of septic shock
- Start a critical care chart and record the respiratory rate, pulse rate, capillary refill time, level of consciousness, liver size (mark liver edge on the skin) and weight.
- Give oxygen through nasal prongs or a nasal catheter, with a flow of 1–2 L/min.
- Insert an IV line and draw blood for emergency laboratory investigations.
- Give 10% glucose solution, 5 ml/kg IV, followed by 50 ml of 10% glucose or sucrose by nasogastric (NG) tube, to prevent/ treat hypoglycaemia.
- Keep the child warm to prevent or treat hypothermia.
- Give IV ceftriaxone 100 mg/kg per day divided 12 hourly or IV cefotaxime 150 mg/kg per day divided 8 hourly and IV ciprofloxacin 20 mg/kg per day divided 12 hourly.
- Give maintenance IV fluid, 4 ml/kg per hour (do not exceed this volume) while waiting for the blood:

- o When blood is available, stop all IV fluids and transfuse packed red blood cells (PRBC), this can be done by giving 5 ml/kg over 3-4 hours, then waiting for about 8 hours and repeating the infusion of a second 5 ml/kg. If this is not possible then give 10 ml/kg very slowly over a minimum of 4 hours and monitor closely.

- o During the blood transfusion, stop all other intake of food or fluid – nothing by mouth or nasogastric tube or IV. This minimizes the risk of precipitation of heart failure.

- o Blood transfusions should only be given to children with SAM within the first 24 hours of admission. This is because, as the F75 starts to heal the cells, a large amount of sodium effluxes from the cells and potassium enters the cells. This sodium expands the plasma volume, enlarges the liver and drops the haemoglobin concentration. This physiological readjustment of body electrolytes makes the child very vulnerable to volume overload, so any blood transfusion must be given before F75 starts to heal the body.

- o After the transfusion do not give anything orally for at least 3 hours to allow time for the circulation to adjust to the new blood volume; after a minimum of 3 hours wait start re-feeding with F75 by nasogastric tube or orally.

- If there are signs of liver failure (e.g. purpura, jaundice, enlarged tender liver), give vitamin K1, 1 mg IV single dose

Note: the treatment with IV fluids of children with SAM with shock differs from that for a well-nourished child. This is because shocks arising from dehydration, sepsis and the other causes often coexist and are very difficult to differentiate on clinical grounds. SAM patients are particularly susceptible to rapid changes in blood volume and readily go into heart failure from fluid overload.

6.1.3 Dehydration but no shock

■ Diagnosis

Dehydration tends to be over-diagnosed and its severity overestimated in children with SAM. This is because it is difficult to estimate dehydration status accurately in a child with SAM using clinical signs alone. Assume that children with frequent and recent watery diarrhoea may have some dehydration. Low blood volume is common in children with oedema – this is not due to dehydration, even if the child has diarrhoea; it is due to

vascular dilatation from excess production of the physiological vaso-dilator, nitric oxide, in kwashiorkor children and does not require specific treatment.

Signs of dehydration in children who have SAM with diarrhoea are recent sunken eyes with the eyes having a staring appearance (eyelid retraction). Therefore, the mother or carer should be asked whether the eyes only became sunken after the diarrhoea started.

▪ *Treatment of dehydration without shock*

If dehydration is confirmed and there are no signs of shock, do not insert an IV line but proceed to full assessment and treatment.

Treatment consists of giving oral rehydration, starting antibiotic treatment, continuing breastfeeding, initiating therapeutic feeding, and keeping the child warm. Use oral rehydration solution for malnutrition (ReSoMal).

Box 8. Rehydration solution for malnutrition (ReSoMal)

Because children with SAM are deficient in potassium and have abnormally high levels of sodium in their body (whether or not plasma sodium is normal or low), the recommended oral rehydration solution for malnutrition (ReSoMal) contains less sodium and more potassium than the standard WHO low-osmolarity oral rehydration solution. Magnesium, selenium, zinc and copper have been added in formulation of ReSoMal to start correction of these deficiencies.

(Note: even children SAM with hyponatraemia always have abnormally high levels of sodium in their body because of the high intracellular sodium level, and their renal function is impaired so that they do not excrete excess sodium rapidly even when the extracellular volume is expanded; this makes them particularly vulnerable to fluid overload).

▪ *Rehydration*

- Weigh the child to monitor fluid balance and the progress of rehydration.
- Record the respiratory rate, pulse and liver edge on the critical care chart.
- Give ReSoMal orally or by nasogastric over a maximum of 12 hours:
 - o Starting with: ReSoMal 10 ml/kg per hour for the first 2 hours orally.
 - o Re-weigh the child to determine if the child is gaining or losing weight:
- If the child is gaining weight AND clinically improving, continue.
- If the child's weight is steady (the same), increase the ReSoMal to 15 ml/kg/h.
- If the child is losing weight, increase the ReSoMal to 20 ml/kg/h.

If the child is gaining weight, but clinically deteriorating STOP ALL ATTEMPTS at rehydration – the child is not dehydrated.

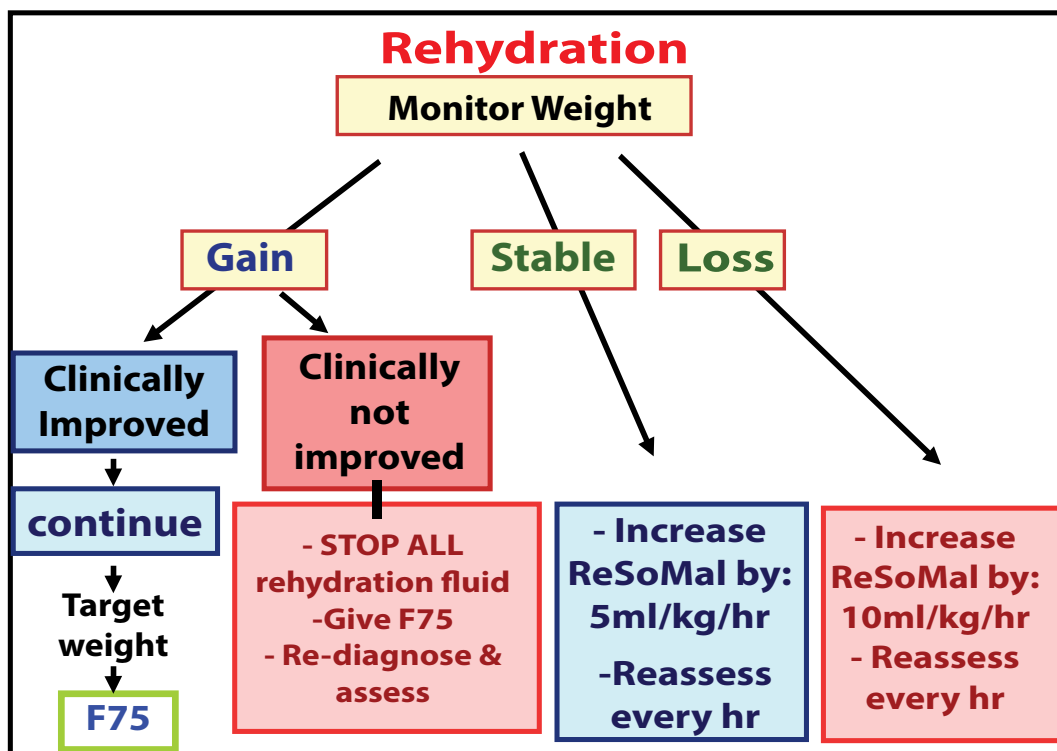
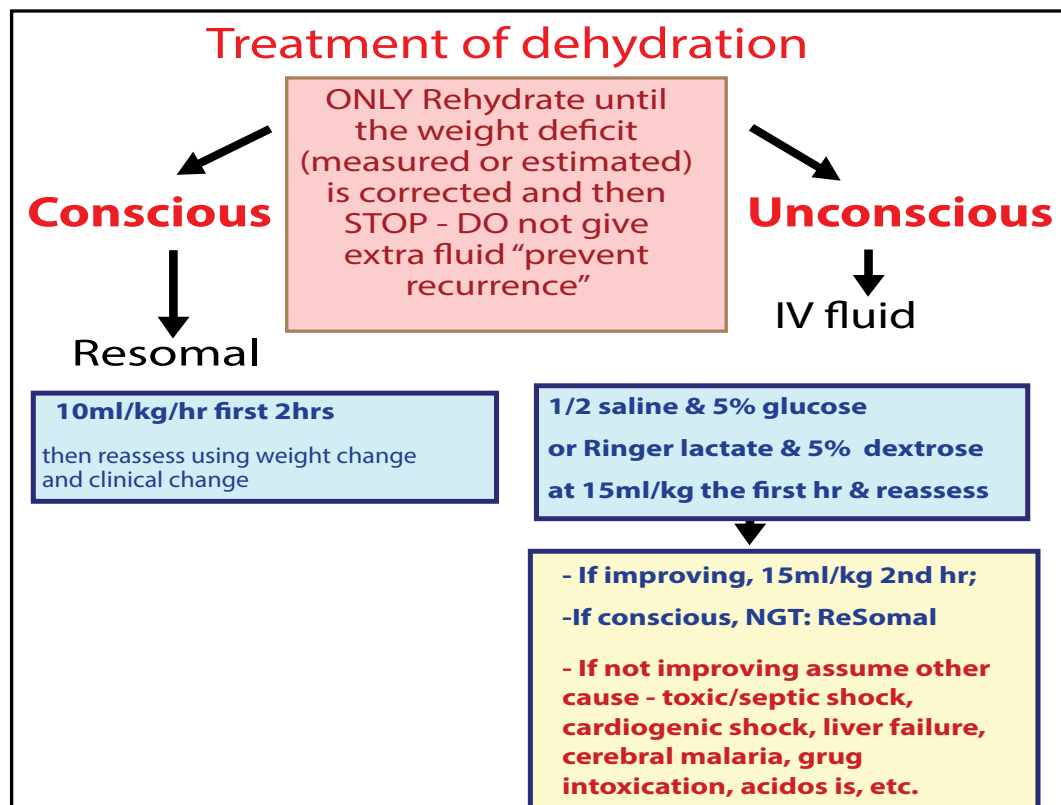
If there is continued weight loss with 20 ml/kg per hour (2% of body weight) then the rate of fluid loss is excessive, start rehydration with either standard WHO oral rehydration solution (ORS) or start an IV infusion of Ringer's-lactate at 20 ml/kg per hour and continue to monitor, as this is now cholera-like fluid-loss and the composition of ReSoMal is not appropriate for cholera-like diarrhoea.

The target weight for “rehydration” is less than in a normal child because of the difficulties of assessing the degree of dehydration. If the diarrhoea has started after admission, use the pre-diarrhoeal weight as the target weight. For conscious children on admission assume that it is 3% of the admission body weight, for unconscious children use a figure of 5% of body weight. Do not give fluids to increase the body weight above this target weight.

- Give the required amount of fluids as sips by cup or spoon every few minutes. Malnourished children are weak and quickly become exhausted. If the child does not continue to take enough fluid voluntarily, give the solution by nasogastric tube at the same rate. Use an nasogastric tube in all weak or exhausted children and in those who vomit or have fast breathing or painful mouth lesions.
- Monitor the progress of rehydration half-hourly for 2 hours, then hourly for the next 4–10 hours. Check respiratory rate, pulse rate, urine frequency, frequency of stools and vomit. Be alert for signs of over-hydration (respiratory distress, facial oedema, hyper hepatomegaly), which is very dangerous and may lead to heart failure.
- Stop ReSoMal immediately if signs of over-hydration appear.
- Rehydration is completed and ReSoMal should be stopped when the target weight is reached – or if the child is no longer thirsty, urine is passed and any other signs of dehydration have disappeared.
- If diarrhoea continues give children 20–30 ml of ReSoMal after each loose stool; do not give more than this.

NOTE: If the child develops diarrhoea after admission and has not lost weight, the child is NOT dehydrated and should NOT be treated with ReSoMal or any other sodium-containing fluids. Recovering children usually develop some loose stools with a change of diet and do not need to be treated.

- Children with oedema have already an excess of sodium and water in the extracellular fluid as well as inside their cells. They are already overhydrated and cannot also be dehydrated, although they are frequently hypovolemic with the fluid in the wrong place. Do not give ReSoMal or ORS to oedematous children.
- The treatment of symptomatic hypovolemia in kwashiorkor is the same as the treatment for septic shock.
- Zinc supplementation is not needed in children with SAM (even for those with diarrhoea and dehydration) who are receiving therapeutic foods that comply with WHO specifications, as the zinc is already incorporated in the fluids and diet.



6.1.4 Hypernatraemic dehydration

Hypernatraemic dehydration is common in areas with a dry atmosphere, particularly if the air temperature is also high.

It is most likely to occur in children who have been carried for long distances to the

IPF/OTP in the sun, without the mother stopping to rest or give the child something to drink. It is important that those arriving at clinics, OTP etc. are given water/sugar-water to drink on arrival and, if they have to wait to be seen, are offered a shady place to sit. Hypernatraemic dehydration also occurs when feeds are over-concentrated. Note that F100 is a concentrated diet that has a high renal-solute load – it should never be given in phase 1 to very sick children, and never to infants less than 3 kg as it will cause hyperosmolar syndrome unless diluted with plain water.

Although hypernatraemia is difficult to treat safely, it is easy to prevent safely. Malnourished children, particularly those in dry and hot environments, should be given continuous access to sufficient plain water.

▪ **Diagnosis**

- The first sign to appear is a change in the texture and feel of the skin.
- The skin develops plasticity similar to the feel of dough (flour and water mixed for bread making).
- The eyes can sink somewhat.
- The abdomen frequently then becomes flat and may progress to become progressively sunken and wrinkled (so called “scaphoid abdomen” or “prune belly”).
- The child may develop fever.
- The child becomes progressively drowsy and then unconscious.
- Convulsions follow and, if treatment for hypernatraemia is not instituted, this leads to death. The convulsions are not responsive to the normal anti-convulsants (phenobarbitone, diazepam etc.).
- Failure to control convulsions with anti-convulsants may be the first indication of the underlying diagnosis.

The diagnosis can be confirmed by finding an elevated serum sodium. Normally hypernatraemia is diagnosed when the serum sodium is more than 150 mmol/L.

▪ **Treatment**

For incipient (starting) hypernatraemic dehydration – an alert child who is only showing changes in the texture and feel of the skin:

- Breastfeed the child or give breast milk. This can be supplemented with up to about 10 ml/kg per hour of 10% sugar-water in sips (little by little) over several hours until the child’s thirst is satisfied. At this early stage treatment is relatively safe.
- Give water but the child should not drink large amounts rapidly – take several hours to correct the mild hypernatraemic dehydration.

For developed hypernatraemic dehydration, treatment must be slow.

If it is possible, measure serum sodium:

- The aim is to reduce the serum sodium concentration by about 12 mmol/L over a 24-hour period. The rapid correct of hypernatraemia can cause death from cerebral oedema.

If it is not possible to measure the serum sodium:

- The aim is to take at least 48 hours to correct hypernatraemic dehydration. The treatment should start slowly and, as the serum sodium approaches normality, the rate of repletion can be increased.

Progress is assessed by serial weighing of the child:

- First, put the child in a relatively humid, thermo-neutral (28-32 °C) environment (mist or spray water into the air if necessary) – this is the most important step and must not be omitted.
- Weigh the child on an accurate balance and record the weight.

The objective of treatment is to put the child into positive water balance of about 60 ml/kg per day over the course of treatment (assessed by weight gain), which is equivalent to a net gain of 2.5 ml/kg per hour of plain water. This amount should not be exceeded until the child is awake and alert.

If the child is conscious or semi-conscious and there is no diarrhoea:

Put down an nasogastric tube and start 2.5 ml/kg per hour of 10% sugar water or breast milk. Do not give F75 at this stage. Never give F100 or infant formula. Expressed breast milk is the best “rehydrating” fluid available.

- Reweigh the child every 2 hours:
 - o If the weight is static or there is continuing weight loss, recheck the immediate environment to try to prevent on-going water losses. Then increase the amount of sugar-water intake to compensate for the on-going weight loss (calculated as g/hour and increase the intake by this amount).
 - o If the weight is increasing, continue treatment until the child is awake and alert.

If there is accompanying diarrhoea:

- Give **one fifth normal saline** in 5% dextrose orally or by nasogastric tube.

If the child is unconscious:

- Then the same volumes of fluid (5% dextrose if there is no diarrhoea and one fifth normal saline in 5% dextrose if there is diarrhoea) can be given by IV infusion. There should be a peristaltic pump or accurate paediatric burette in order to ensure that the correct rate of administration of fluid is not exceeded during treatment.

When the child is awake and alert and the skin quality returns to normal (or, if there are facilities to measure sodium, the serum sodium is normal):

- Then recommence feeding with F75.

6.1.5 Respiratory distress

When a child with SAM presents with respiratory distress, it is important to differentiate between pneumonia and heart failure.

Note: on admission the most likely diagnosis is pneumonia. Heart failure (or inhalation pneumonia) is more likely if the child has developed respiratory distress whilst in the ward after starting F75 (day 2-5), or after an IV infusion, transfusion or ReSoMal or ORS.

6.1.6 Severe pneumonia

■Diagnosis

Children with SAM may have very severe pneumonia if they have a cough or difficult breathing plus at least one of the following: central cyanosis, severe respiratory distress, chest wall indrawing. However those signs may also occur with pulmonary oedema or heart failure.

In SAM, the absence of fast breathing does not exclude severe pneumonia because when muscle wasting is severe there may not be an increase in respiratory rate at all. Chest auscultation signs of pneumonia may also be absent.

The swallowing reflex in SAM children is compromised and oesophageal peristalsis is slow. Inhalation of feeds into the lungs, particularly solid or peanut-containing foods, is particularly dangerous and a common cause of sudden death in children who seem to be recovering well. The children must never be force-fed by mouth and the correct feeding technique must be taught to the mothers.

■Treatment

Follow the Rwanda National protocol for the management of very severe pneumonia. If the child does not show signs of prompt improvement (maximum delay 48 hours) on recommended therapy and staphylococcal pneumonia is suspected (chest X-ray is particularly useful for this condition, as pulmonary abscesses may occur), switch to gentamicin 7.5 mg/kg IM or IV once a day and cloxacillin 50 mg/kg IM or IV every 6 hours.

6.1.7 Congestive heart failure

This is usually a complication of over-hydration (especially when an IV infusion or standard oral rehydration solution has been given), very severe anaemia, blood or plasma transfusion, or giving a diet with a high sodium content. It commonly occurs after the first day or so of admission, as the F75 repairs the cells and the high intracellular sodium reverses by export to the plasma. This causes the plasma volume to increase, the haemoglobin concentration to drop and the liver to enlarge. This does not need any treatment and is normal, but it makes the child particularly vulnerable at this time to a high salt intake. Frequently, the new diet causes some loose stools because some of the diet is mal-absorbed; if this is mistaken for diarrhoea likely to lead to dehydration and treated with ReSoMal then the child can go into heart failure, either congestive heart failure or occasionally sudden death. If there has been no significant weight loss since the onset of diarrhoea, no matter what the amount and frequency of defecation, the child is not dehydrated and must not be treated as if s/he is dehydrated.

▪ *Diagnosis*

Congestive heart failure or cardiogenic shock occurs when the heart is unable to provide sufficient pump action to distribute the blood flow to meet the needs of the body. Heart failure can cause a number of symptoms, but in SAM the first sign of heart failure is fast breathing (increase in respiratory rate of ≥ 5 breaths/minute). Later signs are rapid pulse (increase in pulse rate of ≥ 15 beats/minute), distension of the jugular veins, enlarged liver, cold hands and feet and cyanosis of the fingertips and under the tongue.

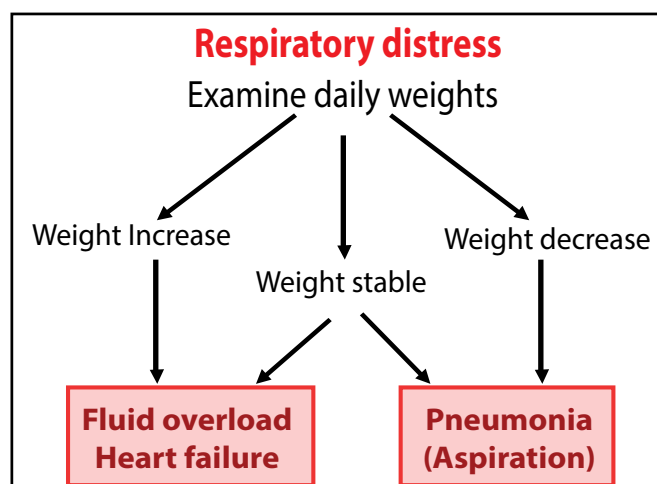
Heart failure must be differentiated from respiratory infection and septic shock, but this differentiation is extremely difficult, and they may occur together to a greater or lesser extent, in which case treating one may lead to worsening of the other. The key to successful management is frequent reassessment.

Pneumonia is usually associated with weight loss. If, after admission, there is **WEIGHT GAIN WITH RESPIRATORY SYMPTOMS** then the diagnosis is heart failure until proved otherwise.

▪ *Treatment*

The objective of treatment is to get the child to lose weight again (negative fluid balance):

- Weigh the child (we expect the child to lose weight during improvement).
- Start a critical care chart.
- Stop all intake of food.
- Stop all IV fluids. Do not give any fluid until the heart failure has improved, even if this takes 24–48 hours.
- Never transfuse a SAM child in heart failure (unless there are facilities for exchange transfusion).
- Give a diuretic IV. The most appropriate is furosemide, 1 mg/kg. Reassess the child after giving furosemide. It is not as effective in the SAM child as in normal children and may not cause a natriuresis.
- Oxygen can be given if the child has a respiratory rate ≥ 70 /min, shows signs of respiratory distress, or has central cyanosis or a low oxygen saturation.
- Try to find if there is a source of sodium intake that has not been accounted for – typical sources are tap-water, carer's food shared with the child, drugs that are formulated as the sodium salts (most antibiotics and antacids).



6.1.8 Anaemia

Nearly all children with SAM have anaemia, which is often associated with bacteraemia, frequent bouts of malaria, hookworm infection, HIV infection and micronutrient deficiencies. But studies show that the children have increased body stores of iron – iron deficiency is rare in SAM children.

▪ Severe anaemia

Diagnosis

Children with SAM that have very severe anaemia require a blood transfusion if their haemoglobin is < 4 g/dl – this MUST be accomplished soon after admission (before F75 has started to cause sodium to come out of the cells and potassium to go in) to expand the circulation. After the first 24–48 hours of F75 feeding, any transfusion of blood or PRBC (unless there has been an exchange transfusion) can result in sudden death. This injunction lasts for about 14 days by which time cell sodium has returned to normal.

The haemoglobin level nearly always falls during initial treatment with F75 – this is dilutional anaemia and is a sign of an expanding blood volume and impending fluid overload. If the fall in haemoglobin is excessive then stop feeding, treat for volume overload and restart feeding at a reduced intake of F75 when the haemoglobin/haematocrit stabilises.

Treatment

Transfusion in a child with SAM must be much slower and of smaller volume than for a well-nourished child. They are unable to cope physiologically with sudden large changes in blood volume, particularly if this is already expanded during initial treatment with F75.

Stop all oral intake of food and liquid, and stop any IV fluids for several hours before starting the transfusion.

Mark the edge of the liver, weigh the child, document the respiratory and pulse rates on the critical care chart and examine carefully for any possible signs of congestive heart failure (such as fast breathing, respiratory distress, rapid pulse, engorgement of the jugular vein, cold hands and feet, cyanosis of the finger tips and under the tongue). Listen with a stethoscope carefully to the heart sounds and the lungs for any sign of

gallop rhythm or crepitation. Feel the apex beat and ensure that it is not displaced.

Transfusion: if there are no signs of heart failure, give PRBC 5 ml/kg over 3 hours by drip or preferably infusion pump. Wait for 6–8 hours to allow adjustment to the new blood volume and then repeat the same amount (5 ml/kg over 3 hours) after the end of the waiting period and the first transfusion. If an infusion pump is not available and a drip cannot be properly controlled then give PRBC 10 ml/kg over a minimum of 4 hours with close monitoring.

Monitor the pulse and breathing rates every 15 minutes during the transfusion. If breathing increases by 5 breaths/min or the pulse increases by 15 beats/min or signs of heart failure develop, STOP the transfusion (transfusing more slowly is not an adequate response).

If the haemoglobin is still below 4 g/dl immediately after the transfusion, do not repeat the transfusion for 14 days.

If the haemoglobin is 2 g/dl or less then this is an emergency that requires specialised treatment – transfer the child to a facility where exchange transfusion can be performed (e.g. a neonatal unit).

Note: IV furosemide can be given prophylactically 1 mg/kg IV (10 mg/ml), but is not usually necessary and may exacerbate the electrolyte derangements that are nearly always present.

Only measure haemoglobin (Hb) on admission. In every child, the haemoglobin falls during the first week of treatment; this is normal and is caused by the plasma expansion during electrolyte re-distribution. A large fall in haemoglobin is another sign of actual or impending heart failure through excess plasma expansion and must never be used as a reason for transfusion after 24–48 hours of treatment.

Iron is never given during the first phase of treatment (F75 is deliberately very low in iron and sodium). RUTF contain iron in sufficient amounts to allow for blood expansion during catch-up weight gain.

DIAGNOSIS AND TREATMENT OF ANAEMIA

Check Hb at admission if any clinical suspicion of anaemia

- Hb \geq 4g/100ml or
- Packed cell vol \geq 12%
- Or between 2 and 14 days after admission

No acute treatment

- Hb < 4g/100ml or
- Packed cell vol < 12%

ONLY during the first 48hrs after admission:

Give 10ml/kg whole or packed cells 4hrs - No food for 3 to 5 hrs after ³⁷

▪ *Non-severe anaemia*

If a child has a good appetite and is gaining weight rapidly to consume the excess body stores by incorporation into the new body tissue, he/she may become iron-deficient. So if he/she is on F100 in the rehabilitation phase, iron can be given at low dose (2-3 mg/kg per day).

There is sufficient iron in RUTF so additional iron is NOT needed in any child who is following this protocol.

The other haematinics are all in plentiful supply in F75, F100 and RUTF. It is not necessary to give any additional nutrients.

6.1.9 Convulsions

▪ *Treatment*

Convulsions are not common in SAM children, even those with a high fever. One common cause is hypernatraemic dehydration, which must always be considered in any SAM child who has convulsions – the serum sodium concentration should be measured in all SAM children that have had a convulsion. Some traditional medicines cause convulsions.

Convulsions are treated similarly in children with or without SAM. BUT, as drugs affecting the brain are all lipid-soluble, in children with low body-fat, the concentration that will occur in the brain with standard doses can be excessive and may even affect vital centres such as the respiratory centre. Nevertheless it is critical to stop the convulsions and to determine the underlying cause.

Turn the child into the left lateral position and manage the airway and breathing.

Gain circulatory access.

If there is hypoglycaemia, give 10% glucose solution 5 ml/kg IV. If it is not possible to measure blood glucose, give empirical treatment with glucose.

If the convulsion does not stop in 2 min give diazepam, 0.2 mg/kg IV or 0.5 mg/kg rectally.

If convulsion continues after 5 min, give a second dose of diazepam IV or rectally.

If convulsion continues after another 5 min, give phenobarbital, 15 mg/kg IV.

If the child has a high fever, sponge with tepid (lukewarm) water to reduce the fever.

Do not give oral medication until the convulsion has been controlled, because of the danger of aspiration. If there is hypocalcaemia, symptoms may settle if the child is given 2 ml/kg of 10% calcium gluconate as a slow IV infusion.

Rule out central nervous system infection (e.g. TB meningitis) and cerebral malaria. Treat if present.

6.1.10 Hypoglycaemia

All severely malnourished children are at risk of developing hypoglycaemia (blood glucose < 3 mmol/L or < 54 mg/dl) if they have not had carbohydrate to eat in the past 10 hours and have an infection. It can easily be prevented by giving ALL children who arrive in the clinic a drink of sugar-water on arrival (volume not critical – about 100 ml is typical). To prevent hypoglycaemia, sick children should be fed every 3 hours night and day with F75. As they start to recover, night feeding is not necessary if they have taken

all their F75, F100 or RUTF during the daytime.

▪ **Diagnosis**

Measure blood glucose if there is any suspicion of hypoglycaemia and where blood glucose results can be obtained quickly (e.g. with dextrostix). Hypoglycaemia is present when the blood glucose is < 3 mmol/L or 54 mg/dl. If blood glucose cannot be measured, assume that all non-alert children with SAM, who have not already had sugar-water during admission, have hypoglycaemia. Signs of hypoglycaemia include low body temperature (< 36.5 °C), lethargy, limpness and loss of consciousness, a staring/frightened expression due to eyelid retraction and sleeping with the eyes open. Sweating and pallor do not usually occur in malnourished children with hypoglycaemia.

▪ **Treatment**

If hypoglycaemia is suspected, give treatment immediately without laboratory confirmation; it can do no harm, even if the diagnosis is incorrect.

If the patient is unconscious give 10% glucose IV 5 ml/kg. If only 50% glucose solution is available DO NOT GIVE UNDILUTED AS IT WILL CAUSE SCLEROSIS OF THE VEIN: dilute one part with four parts of sterile water.

If the patient is conscious or can be roused and is able to drink, give 50 ml of 10% glucose or sucrose, or give F75 diet (whichever is available most quickly).

Stay with the child until he or she is fully alert. If the symptoms are truly due to hypoglycaemia the child will become alert within a few minutes. If this does not occur then there is another reason for the signs and symptoms and it must be found and corrected. Keep the child warm.

Start on appropriate IV or IM antibiotics.

Proceed to complete treatment of other emergency signs of full assessment.

6.1.11 Hypothermia

Hypothermia is usually due to a cool environment – a SAM child is unable to maintain his/her body temperature if the environment is less than 24 °C. Infants aged less than 12 months, children with marasmus and oedematous children with large areas of damaged skin or serious infections are highly likely to develop hypothermia.

▪ **Diagnosis**

The body temperature is below 35.5 °C rectal temperature, or below 35.0 °C axillary temperature.

▪ **Treatment**

- Warm the child, preferably using the “kangaroo” technique, by placing the child on the mother’s bare chest or abdomen (skin-to-skin) and covering both of them or clothing the child well (including the head), covering with a warmed blanket and placing an incandescent lamp near the mother and child. Fluorescent lamps are

- of no use and hot water bottles are dangerous.
- Give oral treatment for hypoglycaemia.
- Examine carefully for all emergency signs (full assessment).
- Monitor the body temperature every 2 hours until it rises to more than 36.5 °C. Be very careful with rapid heating as these children also rapidly become hyperthermic. The axillary temperature is not a reliable guide to body temperature during re-warming (use rectal temperature).
- Ensure that the child is covered at all times, especially at night. Keep the head covered, preferably with a warm bonnet, to reduce heat loss.
- Give appropriate IV or IM antibiotics.
- Do not wash children early in the morning and never wash a hypothermic child.

6.1.12 Eye signs of vitamin A deficiency

■ Diagnosis

Take great care while examining the eyes, as they easily rupture in children with vitamin A deficiency. Children with vitamin A deficient eye disease are usually photophobic, so do NOT force the eyes open. Examine them gently in a low light, with a torch at an angle across the eyes for corneal lesions that are indicative of vitamin A deficiency: xerophthalmia, corneal xerosis and ulceration, cloudiness and keratomalacia.

The earliest sign of vitamin A deficiency is blurring of the “mirror” of the eye. In a normal eye you can easily see the reflection of the room behind you; it should be clear and sharp. If it is slightly blurred then the cells on the surface of the cornea are becoming misaligned and if not corrected this will progress to major corneal pathology. At this early stage the vitamin A in the therapeutic diets should be sufficient to correct the abnormality.

■ Treatment

Give emergency treatment to prevent blindness:

- Instil 1% tetracycline eye drops or apply ointment, every 6 hours until all signs of inflammation or ulceration resolve.
- Apply 0.1% atropine eye drops, 1 drop every 8 hours for 3–5 days, to relax the lens.
- Protect eyes showing ocular inflammation or ulceration with soft cotton pads soaked in 0.9% saline, and bandaged over the affected eye(s). Scratching with a finger can cause rupture of an ulcerated cornea.
- With developed major eye signs give a full therapeutic dose of vitamin A (50,000 IU for infants aged less than 6 months, 100,000 IU for infants aged 6–12 months and 200,000 IU for children aged more than 1 year) on days 1 and 2, and a third dose on day 14 (or at least 2 weeks later), irrespective of the therapeutic food the child is receiving.

6.1.13 Candidiasis

Children with SAM are severely immune-compromised, even when HIV negative, and candidiasis is common. Oral candidiasis causes creamy-white lesions in the mouth

and may be painful, making feeding difficult. The diagnosis of superficial (oral, skin) candidiasis is confirmed by the presence of typical yeast forms on Gram staining of scrapings from the lesion.

- Give 100,000 units/ml of nystatin suspension, 1–2 ml orally every 6 hours for 7 days.
- Apply 2% miconidazole gel each 12 hours to the perineum whilst there are open sores.
- In case of oesophageal, gastric, colonic, rectal and dermal (groin, perineum, axillae) respiratory tract and systemic candidiasis, give:
- Fluconazole, 3–6 mg/kg per day orally once a day for 7 days.
- Note: Never give amphotericin B to SAM children. It is very toxic and always compromises renal function; any drug that affects renal function should be avoided in these particular patients.

6.1.14 Parasitic infections

▪ Dysentery

Dysentery is diarrhoea presenting with loose, frequent stools containing blood. Most episodes of dysentery are due to *Shigella*. Treatment is with an oral antibiotic to which most local strains of *Shigella* are sensitive.

Amoebiasis can cause dysentery, liver abscess and other systemic complications but is rare in children aged less than 5 years. (Note: finding amoebic cysts in the stools is not sufficient for a diagnosis of amoebiasis).

- For *Shigella*: ciprofloxacin, 10–20 mg/kg per day orally every 12 hours for 5 days.
- If there is no improvement and the diagnosis is confirmed as due to *Shigella*, after 2 days give ceftriaxone: 80 mg/kg per day IV once a day over 30 min for 3 days.
- For amoebiasis: metronidazole, 10 mg/kg per day every 12 hours orally for 7 days.

Note: do NOT give the standard dose of metronidazole given to normal children. It becomes cumulative and causes severe hepatic damage with cholestasis – white stools is a sign of severe metronidazole toxicity.

▪ Giardiasis

Intestinal infection with *Giardia* is common.

- Give metronidazole, 10 mg/kg per day every 12 hours orally until the diarrhoea ceases and then stop.

6.1.15 Helminthiasis

Ascariasis, hookworm and trichuriasis infections are treated with the standard protocol. Infection with *Strongyloides stercoralis* is uncommon. The diagnosis is difficult as it requires special laboratory techniques of larval culture. If suspected, repeat the standard doses of albendazole for 3 days instead of giving a single dose (*Note: mebendazole is not*

effective as it is not absorbed).

Note: Tiabendazole is dangerous for malnourished children because it causes severe anorexia. Ivermectin should not be used in patients with bilateral pitting oedema, as they are likely to have a compromised blood–brain barrier.

6.1.16 Persistent diarrhoea

Persistent diarrhoea is defined as three or more loose stools a day for at least 14 days. Weight loss is common with persistent diarrhoea. Possible causes of persistent diarrhoea in children with SAM include causes that give rise to malabsorption (osmotic diarrhoea). The most common cause is nutritional deficiency itself (particularly zinc deficiency) affecting the intestine's absorptive ability rather than an enteric infection. However *Cryptosporidium*, *Giardia*, *Shigella* or *Salmonella* can also cause persistent diarrhoea. Management of persistent diarrhoea in children with SAM involves therapeutic feeding with foods rich in essential nutrients, particularly zinc; and restricting disaccharides.

- Persistent diarrhoea is nearly always cured by the standard treatment given to SAM children. Do not give additional drugs or nutrients unless a specific infective cause is identified.
- NEVER give rehydration therapy for persistent diarrhoea in SAM children – they have adapted over the weeks/months with persistent diarrhoea and do not become dehydrated unless there is also acute watery diarrhoea. Attempts at rehydration can be dangerous.

6.1.17 Osmotic diarrhoea caused by carbohydrate intolerance (re-feeding diarrhoea)

Carbohydrate intolerance is usually the result of intestinal damage (villous atrophy) and small-bowel bacterial overgrowth, which are common in children with SAM. Osmotic diarrhoea caused by carbohydrate intolerance may be suspected if diarrhoea worsens substantially with home-made F75 because it is hyperosmolar. Diarrhoea is rarely a result of lactose intolerance. Treat children for lactose intolerance only if the continuing diarrhoea is associated with weight loss. F75 is a low-lactose feed.

- Ensure that the commercial preparation of F75 is used.
- In exceptional cases, substitute milk feeds with fermented milk such as yoghurt, or with a lactose-free infant formula.
- Most malnourished children also have pancreatic deficiency, especially those with kwashiorkor. If available, commercial pancreatic enzyme supplements can be given.

6.1.18 Cholera or very severe watery diarrhoea

In children with SAM who have profuse watery diarrhoea or suspected or confirmed cholera, sodium losses are usually above 90 mOsm/L and ReSoMal is not adapted to replace the sodium loss. Standard low-osmolarity oral rehydration solutions should be used for oral rehydration.

- Refer urgently to hospital or specialized cholera care sites.
- Treat dehydration with standard low-osmolarity ORS instead of ReSoMal – but follow the protocol for rehydration in SAM children by following weight changes. Ensure that sufficient ORS is given to stop and reverse continuing weight loss.
- Give erythromycin, 12.5 mg/kg/dose orally every 6 hours for 3 days as the first-line antibiotic of choice to speed recovery as soon as vomiting stops. Or give an oral antibiotic to which strains of *Vibrio cholera* in the area are known to be sensitive. For further details of microbial treatment for children with cholera see WHO Cholera guidelines.

7.2

6.1.19 Eye infections

If a child with SAM has sticky eyes and mild conjunctivitis, and no other complications:

- Wash the eyes and apply 1% tetracycline eye ointment, every 6 hours for 5 days.
- Show the mother how to wash the eyes with water and to put eye ointment in the eyes. Advise the mother to wash her hands before and after doing this.
- Review for improvement 48 hours after treatment.
- These children may have underlying vitamin A deficiency: check frequently and if unsure treat as per protocol for vitamin A deficiency.

6.1.20 HIV

Children who are HIV-positive commonly present with moderate malnutrition or SAM. HIV-positive children with SAM have a three times higher risk of dying than those who are HIV-negative if their CD4 count is low; those with a normal CD4 count have the same prognosis as HIV-negative children. In some countries, up to half of the children with SAM are HIV-positive. Testing children who have SAM for their HIV status is important to determine whether they need cotrimoxazole (prophylactic dose) and antiretroviral therapy (ART).

- Routinely test all infants and children with SAM for HIV.

The management of HIV in children with SAM should follow the national guidelines. However, the start of ART in children with SAM is delayed in IPF patients because of the toxicity of these drugs. They are started as soon as possible after phase 1 when metabolic complications and sepsis are resolved. If there is no improvement in the medical complications after 7 days of standard SAM treatment, then ART should be started.

6.1.21 Tuberculosis

The development of TB depends on the competence of the immune system to resist multiplication of the *M. tuberculosis* infection. In children with SAM, TB can develop more easily.

Do not immediately transfer to a TB centre if they have little experience/ are untrained in treating SAM: the treatment of the SAM takes precedence in view of the respective mortality rates. Treatment for TB can also be delayed for at least two weeks, except in the cases of miliary TB, TB meningitis and Pott's disease, when treatment should start

immediately despite the danger of drug toxicity.

For patients with miliary TB, Pott's disease and TB meningitis the treatment should be started immediately.

Refer to the Rwanda national protocol for tuberculosis diagnosis and management, but remember that the diagnosis of TB in children is difficult, especially in those with SAM.

6.1.22 Malaria

- Screen all children with SAM in IPF for malaria, regardless of body temperature.
 - Use insecticide-impregnated bed-nets in the IPF in malaria-prone districts.
 - Refer to the national protocol for treatment of malaria
- DO NOT use quinine in the SAM child because it is toxic.
- Avoid coartem and rifampicin if the patients have SAM and are on ARVs.

6.1.23 Measles

Measles is a highly contagious viral disease with serious complications and high mortality. Because children with severe malnutrition may not present with classical clinical signs of measles, diagnosis may be difficult. As a preventive measure, always:

Give measles vaccine to all children with SAM who are aged 4.5 months^{13 14}, and older who are not vaccinated this is particularly important in areas where HIV is prevalent.¹⁵¹⁶,

- Give a second dose of measles vaccine at the end of treatment or week 4 in OTP.
- Complete the child's immunization following the national immunization schedule before discharge.
- HIV-positive children should have 3 doses of live measles vaccine.
-

There is no specific treatment for measles – the management is symptomatic. Treat any associated infection.

6.1.24 Meningitis

Suspect meningitis in children with signs of serious bacterial infection (drowsiness, lethargy, unconsciousness, stiff neck, anorexia, irritability, a high-pitched cry, petechial or purpuric rash and, in young infants, apnoeic episodes, convulsions or a bulging fontanelle). When meningitis is suspected, and where possible, do a lumbar puncture to confirm infection. All children with meningitis are treated in hospital according to national or WHO guidelines.

13 Aaby, P. et al. 'Non-Specific Effects of Standard Measles Vaccine at 4.5 and 9 Months of Age on Childhood Mortality: Randomised Controlled Trial'. BMJ 2010 341 c6495.

14 Rasmussen, S.M. et al. 'The Effect of Early Measles Vaccination at 4.5 Months of Age on Growth at 9 and 24 Months of Age in a Randomized Trial in Guinea-Bissau'. BMC Pediatrics 2016 16 199.

15 Measles vaccines: WHO position paper. Wkly Epidemiol Rec 2004; 79:130h a

16 Tejiokem. M.C. et al. HIV-Infected Children Living in Central Africa Have Low Persistence of Antibodies to Vaccines Used in the Expanded Program on Immunization. PLoS One 2007 2 e1260

6.1.25 Otitis media

Otitis media occurs frequently in children, often in connection with hospital-acquired upper-respiratory infection. There are no specific clinical signs except when the eardrum has ruptured, causing drainage from the ear. Typical signs of inflammation may not be present. Give the routine antibiotic treatment for SAM

In case of signs of mastoiditis – ear pain, pus draining from ear, and tender swelling behind the ear – the child needs immediate referral and treatment in hospital. Start antibiotic before referral.

6.1.26 Skin infections

▪ Bacterial skin infections

Bacterial skin infections include pustules, impetigo, infected fissures (especially behind the ears) and indolent ulcers.

- Wash the affected area with soap and water and gently remove debris and crusts by soaking in warm saline or clean warm water. Dry the child carefully.
- Apply 10% polyvidone iodine ointment or 5% chlorhexidine lotion to the affected area.
- Widespread superficial and deep-seated infections could be a sign of osteomyelitis that needs to be confirmed by X-ray. Treatment may require an anti-staphylococcal antibiotic: cloxacillin (250 mg capsule), 15 mg/kg orally every 6 hours (or flucloxacillin or oxacillin) as *Staphylococcus aureus* is a common cause of skin infection.
- Drain any abscesses surgically.

▪ Scabies

Scabies is caused by a mite that burrows superficially into the skin and causes intense itching. The scratched lesions often become secondarily infected.

- Make sure that the child's nails are cut and smooth to prevent skin damage due to scratching.
- Apply permethrin cream 5% or lotion 1% on the whole body for 12 hours and wash with soap. Do not apply on face or mucous membrane.
- Alternative: 0.3% lindane lotion to the affected areas, once daily for 2 days.
- Change and boil all clothes.
- Treat family members to prevent infestation or re-infestation.

▪ Kwashiorkor dermatosis

In kwashiorkor there are often open skin lesions where the epidermis has stripped away to leave raw weeping wounds that resemble burns. The lesions can be treated in the same way as burns. Serum may be lost through the lesions. There is also an increased loss of heat by evaporation – hypothermia is common and must be prevented. The lesions usually become overgrown with bacteria and *Candida* under usual IPF conditions.

Normally these patients have not an inflammatory reaction, pus formation or fever due to their deficient inflammatory and immune function; an inflammatory reaction can occur during treatment as the nutritional status of the patient improves.

Treatment

- Put the patient onto second- or third-line systemic antibiotics, including fluconazole.
- Monitor body temperature; do not wash the child unless the environmental temperature is high.
- If possible expose the lesions directly to the atmosphere during the heat of the day so that they dry (form a crust); do not cover with occlusive dressings.
- If available dress with silver sulfadiazine impregnated tulle or cream (1%) once per day; if this is unavailable dress with zinc oxide ointment (10%).
- At night and in cold conditions dress the lesions, preferably with sterile paraffin gauze.
- Gently massage oil (e.g. mustard or soya oil) into the areas of unaffected skin to prevent further breakdown of the skin.
- If the patient has candidiasis, apply miconazole cream to the skin lesions until they are dry.

■ Perineal excoriation

This is normally a chemical dermatitis caused by bacterial decomposition of urine to ammonia. It is very common where plastic pants or bags are used by the mother to cover the perineal area to prevent soiling of her clothes, sheets etc. With exposure to the atmosphere the child's bottom will dry and bacteria and yeasts will not flourish – they thrive in warm damp conditions such as under plastic or occlusive dressings; any ammonia generated will escape to the atmosphere and the mother can observe when the child is dirty and needs to be cleaned.

Prevention

- Ban the use of plastic pants/ polythene etc. to cover the child's bottom.
- Get the mothers to make or give them waterproof aprons to wear to protect their clothing when they are feeding/ nursing/ changing/ playing with the child.
- Leave young children naked as much as possible during the day.
- Regularly massage all the children's skin with oil (use whatever local custom dictates – mustard oil appears to be particularly effective).
- About 20 minutes after finishing a feed, put all the children onto the potty; the mother can support the child on her feet, facing her legs.

Treatment

- The most important measure is to wash and then expose the child's bottom to the atmosphere.
- If severe it can be treated in the same way as kwashiorkor dermatosis.
- Otherwise, continue with second-line antibiotics, give nystatin orally.
- Apply miconazole 2% nitrate cream/ointment until the lesions are dry.

■ Fungal infections of the skin

Ringworm, intertrigo (fungal infections of groins, axillae and other “sweaty places”), athlete’s foot and other local skin infections are common in many areas.

- Local fungal infections of the skin or nails are all treated with miconazole nitrate cream/ointment (2%).
- Apply cream directly to the lesions twice daily.
- Continue for at least 10 days after the lesion has resolved.

6.1.27 Infection after admission

Children with SAM are susceptible to infection, particularly when exposed to other people with transmissible infections. Such children, especially when treated in IPF, have a high incidence of nosocomial infections. However, as the nutritional treatment starts to reconstitute the immune and inflammatory systems, infections that were present but not clinically recognizable start to cause fever, and other classical signs. This is common and usually misinterpreted as a nosocomial infection (in particular, latent tuberculosis). It is common for patients with latent TB to have rapid progress during rehabilitation.

However, for children that deteriorate during rehabilitation there must be a high index of suspicion of tuberculosis

- Put into place a high level of infection control, including hand-washing for health workers, mothers, carers and children, and hygiene measures for bedding and the environment.
- Carefully consider the use of antibiotics that rapidly induce antimicrobial resistance of clinical importance.
- Ensure TB screening for children deteriorating during rehabilitation.

6.1.28 Re-feeding syndrome

“Re-feeding syndrome” refers to malnourished patients (and those who have been fasting for more than one week) who develop any of the following shortly after they have a rapid, large increase in their food intake: acute weakness, “floppiness”, lethargy, delirium, neurological symptoms, acidosis, muscle necrosis, liver and pancreatic failure, cardiac failure or sudden unexpected death. The syndrome is due to rapid consumption of key nutrients during anabolism for metabolism particularly if the diet is unbalanced. There is frequently a large reduction in plasma phosphorus, potassium and magnesium.

Other separate problems during early re-feeding include re-feeding oedema and re-feeding diarrhoea (see Section 6.1.17).

■ Prevention

It is necessary at the start of treatment not to have a sudden jump in the adapted malnourished state to a very high intake – this is the purpose of transition phase. On admission, malnourished patients should never be force-fed in excess of amounts prescribed in the protocol; particular care needs to be taken with those who are being fed by nasogastric tube.

■ Treatment

- Stop feeding for 1 day.
- Restart with 50% recommended intake of F75 until all signs and symptoms disappear and then gradually increase.

6.2 Routine inpatient management of SAM in children aged over 6 months of age

This section covers the routine inpatient management of SAM patients with a poor appetite or medical complications. Management of acutely ill children who have complications on admission, and of children whose complications arise during routine treatment is given in the preceding section. When no critical emergency conditions are present, after their treatment has started successfully and for children without critical complications routine management is started.

6.2.1 Full assessment

Children receive a full assessment.

This is the same as the admission assessment of children in the health clinic. The same history and examinations are performed (see Chapter 4 “Triage at the health facility”).

The standard recording form of the IPF usually needs to be adapted or, preferably, a specific chart used for SAM children (see Annex 12).

A specific pro-forma chart can also be used to record the history and examination (see Annex 16). This is useful as it is clear if any important information is missing from a narrative history and examination record, and critical information on the baseline signs and symptoms can later be retrieved rapidly if any complication arises.

6.2.2 Laboratory and other investigations

Where facilities are present, some of the tests given in Annex 24 can be performed to diagnose specific medical problems and guide treatment. However, the start of initial treatment should not be delayed unless a confirmed diagnosis is required. The interpretation of test results is frequently altered by SAM, and may need to be repeated later. The most important guide to treatment remains frequent careful clinical assessment of the child and monitoring the progress of treatment.

NOTE: On F75, a marasmic child should NOT gain or lose weight, whereas a child with kwashiorkor should lose weight. During this stage s/he is repairing tissues, re-synthesising enzymes and organ function is improving. Weight gain (anabolism) at this stage is an added stress and must not be imposed upon the child's metabolism. Weight gain is expected only in the transition and rehabilitation phases.

6.2.3 Systematic treatment

▪ Prevention of hypoglycaemia

On presentation the children should be given sugar-water routinely.

The sick child is at risk of hypoglycaemia and should be given the treatment outlined in the ETAT section (Section 6.1). After a child recovers s/he needs to be fed every 3 hours during the night and day if s/he has not taken the full amount of the F75 during the day. If the child is taking the diet during the day there is no need to give a night-time feed; this simplifies the protocol, allows the mother and child to sleep and relieves night staff to give more attention to critically ill children.

An early sign of impending hypoglycaemia is the child sleeping with their eyes open. The mother should be told if she sees this to awaken the child and ask the nurse for a feed of F75 – or give the child a drink of sugar-water if F75 is not readily available.

6.2.4 Prevention of hypothermia

Children with SAM have difficulty controlling their body temperature and must be kept warm and fed frequently. Keeping them warm also conserves their energy.

- The ward must be kept warm (room temperature at 28–32 °C to prevent temperature swings). If it is comfortable for the staff it is often too cold for the child – close windows at night.
- Keep the child covered with a blanket and have a hat on the child, as most heat is lost through the head.
- Apply the “kangaroo” technique: put the child and mother skin-to-skin and wrap them together with a blanket. Offer warm drinks and food to the mother.
- Change wet nappies, clothes and bedding to keep the child and the bed dry.
- Do NOT wash children early in the morning. Wash them at midday when it is warm.
- Provide adult beds, do not use baby cots for these children, and ensure that the child sleeps with the mother or carer for warmth. (A mattress on the floor is safer than a baby cot.)

6.2.5 Management of infections and other medical conditions

▪ Presumptive treatment of bacterial infections

Nearly all children with SAM have bacterial infections. Many have several infections caused by different organisms. Although signs of infection should be carefully looked for when the child is evaluated, they are difficult to detect or absent. Unlike well-nourished children, who respond to infection with fever and inflammation, malnourished children with serious infections may only become apathetic or drowsy.

Evidence has shown that early presumptive treatment of bacterial infections with effective antimicrobials improves the nutritional response to feeding, prevents septic shock and reduces mortality. All children with SAM should therefore systematically receive broad-spectrum antimicrobial treatment when first admitted for care.

Antimicrobials are divided into those used for first-line treatment, which are given routinely to all children with SAM, and those used for second- or third-line treatment, which are given when a child is very seriously ill or is not improving or when a specific infection is diagnosed. Although local resistance patterns of important bacterial pathogens and the availability and cost of antimicrobials will determine the exact policy, a suggested scheme is given below.

▪ Routine first-line antibiotic treatment

- Treat all children with SAM **without medical complications** and no apparent signs of infection systematically with:
 - o Amoxicillin, 25 mg/kg/dose orally every 12 hours for 5 days.
- Treat all children with SAM **with any medical complications or anorexia** or who are lethargic systematically with:
 - o Benzylpenicillin (50,000 U/kg/dose) IM or IV every 6 hours or ampicillin, 50 mg/kg/dose IV (or IM) every 6 hours for 2 days, followed by amoxicillin, 25 mg/kg/dose orally every 12 hour for 5 days.
 - o Gentamicin: 5 mg/kg IV (or IM) daily single dose for 7 days.

▪ Second-line antibiotic treatment

- If the child has a serious condition such as hypoglycaemia, hypothermia, skin infections, pneumonia OR If the child fails to improve within 48 hours OR if there is resistance to amoxicillin and ampicillin, add a second-line broad-spectrum antibiotic:
 - o Ceftriaxone, 80 mg/kg per day (or 50 mg/kg per day if infant < 2 kg) IV daily, single dose given over 30 min.
 - o Oral ciprofloxacin (5–15 mg/ kg/dose twice per day)
- In all cases of severe sepsis or septic shock:
 - o IM cefotaxime (for children /infants beyond 1 month: 50 mg / kg/dose every 8 hours)

PLUS

- o Oral ciprofloxacin (5–15 mg/ kg twice per day).
- If there are suspected staphylococcal infections:
 - o Add IV cloxacillin (12.5–50 mg/kg/dose four times a day, depending on the severity of the infection).
- The duration of treatment depends on the response and nutritional status of the child. Continue antimicrobials for at least 5 days. If anorexia persists after 5 days of treatment, give the child another 5-day course. If anorexia persists after 10 days of treatment, reassess the child fully.

▪ *Third-line antibiotic treatment*

Third-line or other additional antibiotic treatment should be guided by clinical examination, chest X-ray, urine dipstick, lumbar puncture, blood, urine or cerebrospinal fluid (CSF) cultures, or other available investigations. If a lung focus is suspected, then specific management for staphylococcal infection, pleural effusion or TB may be appropriate. If the gut or urinary tract is suspected, or if there is no focus of infection, then consider: Ciprofloxacin, 10 mg/kg/dose IV every 12 hours (if ciprofloxacin IV is not available, then use Ciprofloxacin, 15 mg/kg/dose orally every 12 hours) for 5 days.

▪ *Routine prevention of infections*

Immunization schedule update

All children over 4.5 months of age¹⁷ who are sick enough to be admitted to the IPT should be given a measles inoculation on admission or shortly thereafter. This will be repeated during the 4th week of OTP rehabilitation.

Malaria prevention in endemic areas

The use of impregnated bed-nets should be used in all IPFs in areas where malaria is endemic.

6.2.6 *Electrolyte management and micronutrient supplementation*

▪ *Folic acid supplementation*

Children with SAM in inpatient care on F75, F100 or RUTF do not need supplementary folic acid, as it is in the diet in adequate amounts.

▪ *Iron supplementation if on F100*

After stabilization, for children being rehabilitated in the IPF to full recovery on F100 are given iron supplements (ferrous fumarate, 3 mg/kg per day). Iron supplementation should not be given during stabilization or in rehabilitation when on RUTF, as RUTF contains sufficient iron for daily supplementation.

▪ *Preventive dose of vitamin A supplementation in children with SAM (without clinical eye signs of vitamin A deficiency)*

All the recommended diets used to treat SAM have sufficient vitamin A in the diet.

▪ *Fluid and electrolyte imbalance, and other micronutrient supplementations*

Children on therapeutic foods that comply with WHO specifications, in amounts prescribed according to their body weight, receive all the necessary fluids, electrolytes, minerals and vitamins to re-establish their metabolism.

¹⁷ Aaby, P. 'Non-Specific Effects of Standard Measles Vaccine at 4.5 and 9 Months of Age on Childhood Mortality: Randomised Controlled Trial'. BMJ 2010 341 c6495.

6.2.7 Initial re-feeding

Almost all children with SAM have infections, impaired liver and intestinal function, and problems related to imbalance of electrolytes, when admitted to hospital. The potassium deficit, present in all malnourished children, adversely affects cardiac function and gastric emptying. Magnesium is essential for potassium to enter cells and be retained. Because of these problems, children with SAM cannot tolerate the usual amounts of dietary protein, fat and sodium. It is therefore important to begin feeding these children with a diet that is low in protein, fat and sodium and high in carbohydrate with a full and balanced complement of all minerals and vitamins: the diets prescribed for the different phases are all formulated to meet these specific requirements. NO additional nutrients need to be given to children taking the recommended diets. In particular, additional zinc is not given post-diarrhoea, and extra potassium and magnesium or vitamins are not required.

Children should also continue to be breastfed BEFORE giving any therapeutic foods. The therapeutic food F75 is used for the initial phase of treatment of severely malnourished children (75 kcal/ml). Add either one large packet of F75 (410g) to 2 L of water or one small packet of F75 (102.5g) to 500 ml of water. Where small numbers of children are being treated as inpatients, do not order the large packets of F75. These are for use in emergency settings with large numbers of SAM patients. The provision of F75 in tins with a WHITE scoop is being introduced to replace the sachets; follow the instructions on the tin – one white scoop to 25 ml of clean water (do NOT use the old red scoop or any other scoop). This is a special diet for the initial treatment of SAM children, it must NEVER be used for normal children; it is NOT a breast-milk substitute and is insufficient to support growth.

▪ Amounts to give

Give the amounts in the table below to each patient in phase 1.

Table 14. ‘Look up’ table for the Initial Phase (Phase 1)

CLASS OF WEIGHT (KG)	8 FEEDS PER DAY ML FOR EACH FEED	6 FEEDS PER DAY ML FOR EACH FEED	5 FEEDS PER DAY ML FOR EACH FEED
2.0 – 2.1 kg	40 ml per feed	50 ml per feed	65 ml per feed
2.2 – 2.4	45	60	70
2.5 – 2.7	50	65	75
2.8 – 2.9	55	70	80
3.0 – 3.4	60	75	85
3.5 – 3.9	65	80	95
4.0 – 4.4	70	85	110
4.5 – 4.9	80	95	120
5.0 – 5.4	90	110	130
5.5 – 5.9	100	120	150
6.0 – 6.9	110	140	175
7.0 – 7.9	125	160	200

8.0 – 8.9	140	180	225
9.0 – 9.9	155	190	250
10 – 10.9	170	200	275
11 – 11.9	190	230	275
12 – 12.9	205	250	300
13 – 13.9	230	275	350
14 – 14.9	250	290	375
15 – 19.9	260	300	400
20 – 24.9	290	320	450
25 – 29.9	300	350	450
30 – 39.9	320	370	500
40 – 60	350	400	500

- Give F75, 130 ml/kg per day, providing 100 kcal/kg per day during stabilization.
- Do not reduce the amount of the diet for children with oedema (this was an old recommendation based upon faulty data of the usual proportion of oedema¹⁸).
- Give F75 frequently and in small amounts to avoid overloading the intestine's ability to absorb the diet. Give F75 every 3 or 4 hours, day and night, or use the 5 feeds per day regime (i.e. miss out a night feed) if the children do not get re-feeding osmotic diarrhoea (this allows the mothers and children to sleep during the early hours of the morning).
- Continue and/or support breastfeeding before each feed.
- Feed by nasogastric tube only these children who do not consume at least 75% of the prescribed amount.
- If vomiting occurs, reduce both the amount given at each feed and the interval between feeds.
- Use the body weight on admission (or body weight after rehydration in case of dehydration) throughout the initial phase of treatment, to determine the daily amount of the F75 diet.
- Discard any therapeutic milk not taken by the child and never reuse it for the next feed or keep it for later feeding.
- Give the child at least 80 kcal/kg per day, but no more than 100 kcal/kg per day. If the child is given less than 80 kcal/kg per day, the tissues will continue to be broken down and the child will deteriorate. If given more than 100 kcal/kg per day, a serious metabolic imbalance may develop and cause re-feeding syndrome (see Chapter 6 on complications).
- Feed children from a cup; feeding bottles should never be used, even for very young infants, as they are an important source of infection. Children who are very weak should be fed by nasogastric tube. While being fed, children should always be held securely in a sitting position on the attendant's or mother's or carer's lap. The carers should wash her or his hands before feeding the child. Children should never be left alone in bed to feed themselves.

¹⁸ Golden, M.H. 'The Clinical Assessment of Oedema: Implications for Feeding the Malnourished Child'. Eur J Clin Nutr 1989 43 581-2.

▪ *Nasogastric feeding*

Despite coaxing and patience, some children will not take sufficient diet by mouth during the first few days of treatment. Such children should be fed using an nasogastric tube but this should be used for as short a time as possible.

The criteria for nasogastric feeding are:

- Anorexia, taking less than 75% of prescribed daily need.
- Being too weak to drink.
- Painful mouth or throat, stomatitis or physical disability.
- Lethargy or unconsciousness

At each feed, offer the child the diet orally. After the child has taken as much as he or she wants, give the remainder by nasogastric tube. Remove the tube when the child is taking three quarters of the day's diet orally or two consecutive feeds fully by mouth. If, over the next 24 hours, the child fails to take 80 kcal, reinsert the tube.

Always aspirate the nasogastric tube before administering fluids. Experienced staff should carry out the nasogastric feeding and ensure the tube is fixed properly so that it is not in the lungs. A child who is still being fed by nasogastric tube is not considered ready to start transition.

▪ *Milk or lactose intolerance*

Clinically significant milk or lactose intolerance is unusual in children with SAM. Intolerance should be diagnosed only if children have copious watery diarrhoea promptly after milk-based feeds are begun and the diarrhoea clearly improves when milk intake is reduced or stopped and recurs when milk is given again. Other signs of milk or lactose intolerance include acidic faeces (pH 5.0) and the presence of increased levels of reducing substances in the faeces. In such cases, partially or totally replace the milk with fermented milk or yoghurt or a commercial lactose-free formula. Before the child is discharged, give milk-based feeds again to determine whether the intolerance has resolved.

▪ *Recording 24-hour therapeutic food intake*

After each feed, record the F75 feed taken on the patient's SAM chart. If the child vomits, estimate the amount lost in relation to the size of the feed (e.g. a whole feed, half a feed) and indicate this on the chart.

Box 9. Summary of the routine treatment during phase 1

1. Antimicrobial treatment for systemic bacterial infections.
2. Anthelmintic treatment for suspected helminthiasis (this should be delayed until the child is improving).
3. Measles vaccination, plus immunization schedule update.
4. Therapeutic feeding complying with WHO specifications.
5. Treatment for other medical conditions based on diagnosis.

An integral part of care during stabilization is to promote, provide and/or support hygiene

(of staff and carers, child, food and the environment), psychosocial support to the mother or carer and child, health and nutrition counselling, and emotional stimulation of child and early childhood development (see the relevant chapters of this guideline).

▪ *Daily care during stabilization*

Monitoring

Each day the nurse records:

- Weight (and graphs the weight to examine gain or loss)
- Oedema
- Respiratory rate
- Presence or absence of cough
- Pulse rate
- Temperature (a.m. and p.m.)
- Stools passed
- Diarrhoea
- Vomit
- Feeding plan
- Antibiotics and other medication prescribed and given
- Nasogastric tube in place, infusions and transfusions and ReSoMail given
- Other abnormalities for specific children that require daily monitoring e.g. liver edge, Candida, skin lesions, etc.

▪ *Improvement during stabilization includes:*

- Medical complications start resolving
- Oedema starts reducing
- Appetite returns
- The child is awake and increasingly alert.

Children should not gain weight in phase 1 and children with oedema should start losing weight as their oedema decreases. Weight and weight gain or loss are critical key signs in the initial treatment and should be closely monitored and recorded.

If the child's appetite improves, then the treatment has been successful and the child is ready to change diet and start recovering lost weight. The stabilization phase ends when the child becomes hungry. This indicates that infections are coming under control, the liver is able to metabolize the diet, and oedema and other metabolic abnormalities are improving.

6.2.8 Transition phase

Transition refers to the introduction of high-protein, high-energy therapeutic food for catch-up growth. It prepares the child for rehabilitation as either an inpatient or outpatient. Children usually regain appetite 2–7 days after initiating treatment. Some children may take longer, whereas others are hungry from the start and can transition faster. The child's appetite, reduction of oedema (if present) and general condition determine the phase of treatment, not the length of time since admission.

▪ Feeding during transition

In inpatient settings where RUTF is available:

The recommended energy intake during this period is between 100 and 135 kcal/kg per day.

Give the child the prescribed amount of RUTF for the transition phase. Let the child drink water freely. If he or she does not take at least half the prescribed amount of RUTF in the first 12 hours, then stop giving the RUTF and give F75 again. Retry the same approach after another 1–2 days until the child takes the appropriate amount of RUTF to meet his or her energy needs.

The amount of RUTF to give daily during transition phase is given in the table below.

Table 15: ‘Look up’ table for feeds in Transition Phase

WEIGHT CATEGORY (KG)	PASTE	PASTE	TOTAL
	IN GRAMS	SACHETS	KCAL
3.0 – 3.4	90	1.00	500
3.5 – 3.9	100	1.00	550
4.0 – 4.9	110	1.25	600
5.0 – 5.9	130	1.50	700
6.0 – 6.9	150	1.75	800
7.0 – 7.9	180	2.00	1,000
8.0 – 8.9	200	2.00	1100
9.0 – 9.9	220	2.50	1200
10 – 11.9	250	3.00	1350
12 – 14.9	300	3.50	1600
> 15	370	4.00	2000

In inpatient settings where F100 is provided as the therapeutic food in the transition phase

For children entering transition phase using F100, exactly the same amount of F100 is give as F75 was given in phase 1. Because the F100 is more energy-dense (but also has a completely different composition) the same volume gives about 30% more energy to the child and allows for weight gain up to about 6g/kg per day. After taking the F100 feeding the children should be offered plain water to drink.

Children who have been admitted with complicated SAM and are achieving rapid weight gain on F100 should be changed to RUTF and observed before transfer to the OTP.

Monitoring progress during transition

The monitoring and recording of clinical signs continue exactly as in phase 1.

▪ *Criteria to move back from transition phase to the acute phase*

Move the child back to acute phase (on F75) if:

- If there is a rapid increase in the size of the liver.
- If any other signs of fluid overload develop (e.g. increased respiratory rate).
- If tense abdominal distension develops (indicates abnormal peristalsis, small bowel overgrowth and perhaps excess carbohydrate intake).
- If the patient gets significant re-feeding diarrhoea so that there is weight loss.
- If a complication arises that necessitates an intravenous infusion.
- If there is any deterioration in the child's condition.
- If there is increasing oedema (look for unexpected sodium intake, particularly from mother's diet or drugs – if an extraneous source of sodium is found then it should be eliminated and children with good appetites can remain in transition-phase).
- If a child who does not have oedema develops oedema.
- It is common for the children to get some change in stool frequency when they change diet. This does not need to be treated unless the children lose weight. Several loose stools without weight loss is not a criterion to move back to acute-phase.

▪ *Criteria to progress from transition phase to OTP*

Transfer the patient to the OTP:

- If s/he has a good appetite - this means taking at least 90% of the food prescribed for the transition phase.
- For oedematous patients, if there is a definite and steady reduction in oedema accompanied by a loss of weight.
- If there is a capable caretaker.
- If the caretaker agrees to OTP.
- If there are reasonable home social circumstances.
- If there is a sustained supply of RUTF in the OTP.
- If an OTP programme is in operation in the area close to the patient's home.

A patient transferring from one to another phase of treatment, one as an inpatient and the other as an outpatient, is still under the care of the programme for this episode of severe malnutrition; this is not a “discharge” from the IPF but an internal transfer. The IPF records this as “successful treatment” in their report forms.

6.2.9 Rehabilitation in the IPF

Rehabilitation in hospital is only necessary if no RUTF or outpatient services are available, or if there are other concerns related to the child's or mother's or carer's condition. The treatment given is then identical to that described under OTP management. Hospitals should also run an OTP with weekly attendance for patients living within the catchment area of the hospital if the health centres are not closer to the patient's home.

Catch-up growth with daily quality care and monitoring of progress and signs of complications should continue. The child and mother or carer will be gradually prepared for discharge from hospital and the end of treatment, and for the child's return to the community with a minimal risk of relapse.

6.3 Failure to respond to treatment in the IPF

The criteria for failure to respond to treatment in the IPF are given in the table below

Table 16 Criteria for failure to respond to treatment

CRITERION	TIME AFTER ADMISSION
Primary failure to respond	
Failure to gain consciousness	
Failure to start resolving medical complication	
Failure to regain appetite	Day 4
Failure to start to resolve oedema	Day 4
Oedema still present	Day 10
Failure to regain appetite	Day 10
Secondary failure to respond	
Failure to gain at least 5 g/kg of body weight per day	During rehabilitation for 3 successive days
Reappearance of danger signs	At any time

When a child fails to respond to treatment, it is essential to review all practices in the treatment unit carefully and to re-evaluate the child thoroughly. The objective is to identify the cause of failure to respond and to correct the problem by making specific changes to care practices or to the child's treatment. The child should undergo a complete and thorough new clinical assessment, to identify newly developed or missed conditions or underlying disease.

The box below lists the most frequent causes of failure to respond.

Box 10. Frequent causes of failure to respond to treatment in inpatient care

Problems with care practices

- Poor environment for malnourished children, including hygiene (e.g. hand-washing by staff and carers, body hygiene of child, bed and ward hygiene)
- Insufficient or inadequately trained staff
- Insufficient junior or trainee staff at night
- Inaccurate anthropometric equipment (such as weighing scales)
- Insufficient essential supplies
- Inadequate detection of medical complications, infections and serious underlying diseases
- Lack of compliance with specific and routine treatment protocols
- Incorrect preparation or provision of therapeutic food
- Insufficient emotional and physical stimulation of the child
- Inadequate counselling and psychosocial support to the mother or carer, or the mother or carer is not engaged in the rationale for the treatments being given
- Inadequate individual case-monitoring, quality-improvement and quality-performance monitoring

Problems with the treatment of the child

- Feeding: insufficient therapeutic food and/or fluid taken
- Insufficient vitamin or mineral supplementation
- Malabsorption of nutrients
- Rumination
- Undetected or untreated infections or serious underlying disease
- Psychological trauma

The child should undergo a full and thorough assessment to identify newly developed or missed conditions, or underlying disease, and receive prompt treatment based on diagnosis.

6.3.1 Problems with care practices in inpatient care

■ Problems with the treatment facility

Environment

Failure to respond is more likely when a malnourished child is treated in a general paediatric ward than in a special nutrition unit. This is because the staff tend to ignore malnourished children AND the children themselves do not demand attention, cry or complain. General ward staff are less likely to have the essential skills and attitudes for management of malnourished children.

Wherever possible, severely malnourished children with no appetite or with medical complications should be managed in a special nutrition unit. If this is not possible, they should be treated in a specially designated area of a paediatric ward, by staff who are specifically trained in the treatment of severe malnutrition. Strict observance of hand-washing by staff and carers must be respected.

The special nutrition unit must be well organized. If essential therapeutic food supplies or medications are not available, weighing scales do not work properly, diagnostic facilities or administrative procedures are inadequate, or staff are insufficiently trained, treatment failure and mortality will be high. An effective management system should ensure careful monitoring of each child and proper training of nurses and auxiliary staff, use of the most experienced staff as supervisors, reliable supplies of drugs and food supplements, and reliable record-keeping.

Staff

Experienced staff (including junior staff) who understand the needs of malnourished children and are familiar with important details of their management are essential for a well-functioning treatment facility. It is important to avoid loss of experienced staff wherever possible. For this reason, staff of the treatment unit should not take part in the routine rotation of staff that is practised in many hospitals. If staff must be changed, this should be done one person at a time, to minimize disruption of routines in the unit and allow the new staff to learn and be mentored.

Night duty is the most common problem. There are often plenty of trained nurses and doctors during the day – at night there may be just one junior nurse to manage on her own. She has many children to look after: some are very sick and require constant monitoring; others also require the nurse to monitor record, treat, manage IV lines, give drugs and feed.

She may be tired herself. It is dark. It is not possible for her to give adequate care, but she will be criticised if she does not complete her work, so she falsifies records to avoid censure and being disciplined. Falsified records are then used to make critical decisions affecting the patients' risk of death/recovery, feeds that are thought to be fully taken are in fact only half what has been prescribed, drugs may not have been given, IV lines are "rushed through" just before the day staff arrive – etc. Senior doctors should do a ward visit at 2 a.m. to see how the ward really works. Every effort has to be made to reduce night work, so the nurse can concentrate on those critical patients that must have close treatment. Everything the doctor or protocol requires means staff time and effort to comply – do not ask for anything that is not essential (such as all children getting night feeds) to the recovery of all the children. Protocols need to be simplified as far as possible and, particularly night staff, protected.

Staff attitudes can determine whether treatment of the child will succeed or fail. If staff believe that a child is beyond help and that mothers are neglectful, they give less attention to the child. Such children often fail to respond to treatment, which seems to confirm the opinion of the staff. This "clinical prejudice" may be difficult to correct, especially when it reflects the views of the most experienced staff. It is essential to remind staff frequently that each child's well being depends on their efforts and that every child must be given their full attention.

Where there is a shortage of doctors and nurses, assistants can play a key role in supporting activities such as taking measurements, feeding, monitoring and calling a doctor or a nurse in case of danger signs. When planning, aim for one assistant for 10 inpatients.

Equipment and supplies

Essential therapeutic equipment and supplies need to be secured for inpatient and

outpatient care. Any dysfunction or interruption of supply will compromise the quality of care and adherence to medical and dietary treatment protocols.

MUAC tapes, a scale with 10 g precision, a UNISCALE and a length/height board must be available.

Machines used for weighing children must be calibrated so they do not give misleading information on the progress of children in the facility. Infant weighing scales must measure weight accurately to within 20 g, preferably 10 g. All weighing machines must be checked and adjusted following a standard procedure. Records of daily checks should be kept. Height boards must be accurate. Weighing machines used for preparing therapeutic food or for measuring the ingredients of the electrolyte and mineral mix should be checked and adjusted weekly.

Medical complications, infections and serious underlying disease

Any failure to diagnose and immediately treat life-threatening and other medical complications, infections or serious underlying diseases can adversely affect treatment outcome, by causing development of a more serious condition, delay in response, non-response, relapse or death.

Adherence to treatment protocols

Treatment facilities should comply with medical treatment and fluid-management protocols in managing medical complications in children with SAM.

6.3.2 Problems with the treatment of the child in inpatient care

•Feeding (preparing or giving therapeutic food and home diet)

The treatment facility kitchen should use standard hygiene practices when storing, preparing and handling therapeutic food. Staff should wash their hands with soap and water after being with each patient, after using the toilet and before handling food. Any prepared solid food that will be stored for more than 2 hours should be refrigerated (after allowing it to cool to room temperature) and reheated until it is thoroughly hot, and then allowed to cool before serving. People with infections on their hands should not handle any food.

All people involved in preparing therapeutic or solid food should be checked to ensure that they are following the correct procedures for weighing, measuring, mixing, cooking and storing the food. They should be observed making the feeds, and recipes should be checked to ensure they are correct and all ingredients are added.

Sufficient time must be allocated to feed each child, and adequate staff (both day and night) should be allocated for this task. Feeding a malnourished child takes more time and patience than feeding a normal child. If it takes about 15 minutes to feed each child and if food is given every 3 hours, one person is needed, day and night, to feed 12 children.

■ *Problems with feeding individual children*

Is enough food being given?

Recalculate the food requirement for the child. Ensure that the correct amount is being offered at the required times, and that the amount taken by the child is measured and recorded accurately. Observe the measuring and giving of food.

Is the child ruminating?

Rumination is a condition that occurs in up to 10% of severely malnourished, emotionally impaired children. It should be suspected when a child eats well, but fails to gain weight. Children with this condition regurgitate food from the stomach into the mouth, and then vomit part of it and swallow the rest. This usually happens when they are ignored, so it may not be observed. Such children are usually thought to have vomiting without diarrhoea because they often smell of vomit, and may have vomit-stained clothes or bedding. They are often unusually alert and suspicious, may make stereotyped chewing movements, and do not appear distressed by vomiting.

Rumination is best treated by staff members who have experience with this problem and can give special attention to the child. They need to show disapproval whenever the child begins to ruminate, without being intimidating, and to encourage other less harmful behaviours.

Infection

Unrecognized infections are a frequent cause of failure to respond. Those most often overlooked include pneumonia, urinary tract infection, otitis media and TB. Others include malaria, dengue and viral hepatitis.

7A. MANAGEMENT OF SAM IN INFANTS AGED LESS THAN 6 MONTHS

Through various health services and initiatives, community-based infant and young child feeding/ nutrition and healthcare support should promote, protect and support exclusive breastfeeding in infants aged less than 6 months. The development of SAM in infants aged less than 6 months reflects difficulties with breastfeeding: this is often related to low birth-weight, recurring infections, persistent diarrhoea, disability or social problems. Risk factors for increased morbidity and mortality include recent weight loss, failure to gain weight, failure to feed effectively, the presence of bilateral oedema and loss of the mother.

Some exclusively breastfed premature and small-for-gestational-age babies gain weight at a satisfactory rate – such infants are thriving and do not need admission to the programme. The best way to distinguish infants who are thriving from those who are becoming malnourished is to weigh them repeatedly over time; this is the value of the growth-monitoring programme.

For infants who are thriving despite being low birth-weight or have a low weight-for-age, follow the documents on Maternal and Infant and Young Child Feeding (MIYCF).

The young infant's organs are relatively immature, so the problems of their functional capacity and the difficulties of diagnosis are similar to those found in older children with SAM who have reductive adaptation. The objective of treatment, however, is different. Young infants need to be returned to exclusive breastfeeding wherever possible. If the treatment for older children is given to young infants they normally wean from the breast and the mother's milk production ceases: this is a disastrous outcome as it deprives the infant of all the advantages of breast-feeding after discharge.

Although many mothers correctly say that they do not produce sufficient milk for their baby, all mothers can produce more than enough milk if adequately stimulated. It should be emphasised that the amount of milk produced is a result of the degree of stimulation given to the mother by the infant (i.e. the infant demands and the mother supplies – the amount is controlled physiologically by the infant and not the mother). Malnourished and feeble infants usually do not adequately stimulate milk production. If the infant does not cry and is not suckling sufficiently strongly there will be insufficient breast milk produced for normal development – the objective of treatment is to get the infant to be strong and hungry so that s/he can properly stimulate an adequate supply of breast milk.

Thus, the objective of treatment of these patients is to return them to full exclusive breastfeeding. This is achieved by simultaneously breastfeeding and supplementing the infant until s/he becomes strong enough to stimulate sufficient breast milk production to allow her/him to catch-up, grow and develop properly without any supplementation.

This is achieved by the supplemental suckling (SS) technique. The SS milk serves to strengthen the infant, cure any nutrient deficiency and make her/him hungry to increase the force with which s/he suckles; simultaneously putting the infant to the breast then provides the stimulation needed to increase breast milk production. It is important to put

the child to the breast as often as possible. The SS technique is time-consuming and requires skill, but is the only technique that works in practice.

7A.1 Structure and organisation

These infants should always be treated in IPF and not in OTP. RUTF is NOT suitable for young infants and milk-based feeds should not be given for home treatment.

There should be a special service/programme to assist mothers who have difficulty breastfeeding. The aim of such a service would be concentrate on all breastfeeding problems, including for the malnourished, to re-establish exclusive breastfeeding and achieve confidence in the mother's ability to produce sufficient milk for her baby to thrive.

- ◇ Its outpatient arm would counsel and provide one-to-one support for all mothers who have difficulty with breastfeeding following MIYCF guidelines.
- ◇ The inpatient arm would be for mothers whose children are not “thriving” and become malnourished.

It is inappropriate to admit young infants to most general paediatric or nutrition wards. If such a service does not exist then the programme should be part of the neonatal service; otherwise there should be a specific section of the IPF devoted to the management of the malnourished young infant.

In most cultures, the ward/room where these infants are managed should be adequately screened and private. Unannounced arrival of males in the section should be forbidden. The mothers must be confident that they will not be disturbed or surprised by men arriving in the ward whilst they are uncovered. There should be a separate visiting room where mothers can meet with their husbands without them being admitted to the service.

The staff should be female and have professional training in breastfeeding support and counselling as well as skills in care of the neonate and the malnourished child. This is a separate cadre of staff that has to be exclusively engaged with the young infant without other duties.

7A.2 Assessment at health-facility level

When infants with their mother or carer are referred to or self-present at the healthcare facility or at the hospital, they are assessed according to the IMCI for infants aged 1–6 months, and to the integrated management of pregnancy and childbirth (IMPAC) for neonates (< 1 month).

Infants with any emergency signs should be referred to the IPF for treatment according to the IMCI/IMPAC protocols.

7A.3 Activities and tools

7A.3.1 Activities

- ◇ Admit the baby: take the anthropometric measurements and examine the baby, check the criteria of admission, register in the registration book and the chart.

- ◇ Explain to the mother the aim of the management.
- ◇ Manage the infants using the supplemental suckling (SS) technique.
- ◇ Prepare the milks, teach and demonstrate the techniques, conduct surveillance and follow the baby and the mother.
- ◇ Discharge the baby and the mother.

7A.3.2 Tools

- o Registration book.
- o Infant SS chart (Annex 18).
- o Material for SS technique: nasogastric tubes size 6 to 8, cups, material to clean the tube, measuring jug (never use a feeding bottle).
- o Scale with a precision of 10 g.
- o Diet expressed breast milk, generic infant formula or F100 dilute; meals for the mother.
- o Drugs for systematic treatment and food/nutrients for the mother.
- o Others: posters to encourage breast-feeding, flip charts to show technique, reference table for the feeds.

7A.4 Admission criteria for SAM/ lactation failure in infants aged less than 6 months

The criteria for admission of young infants are NOT the same as for older children (see Table 17 below).

Table 17: Criteria of admission of young infant with a caretaker

AGE	ADMISSION CRITERIA
INFANT LESS THAN 6 MONTHS OR INFANT < 3 KG WITH A FEMALE CARER CAPABLE OF BREASTFEEDING	➤ The infant is too weak or feeble to suckle effectively (irrespective of his/her weight-for-length (W/L), weight-for-age (W/A) or other anthropometry) or ➤ The infant is not gaining weight at home (by serial measurement of weight during growth monitoring, i.e. change in weight-for-age) or ➤ W/L (weight-for-length) less than < -3 Z-score or ➤ Weight-for-age < -3 Z-score or ➤ Presence of bilateral oedema

Each of these criteria objectively shows a failure of satisfactory breastfeeding so that the child is not gaining weight and developing normally.

Height is very difficult to take in these infants so it is more appropriate to use weight-for-age as an admission criterion for SAM in the < 6 month old. For infants with a length < 45 cm, the weight-for-length has not been established. Thus, from birth to 6 months of age, weight-for-age < -3 Z-score is the most appropriate measure to assess nutritional status. At this age, failure to gain weight can be defined as acute malnutrition.

7A.5 History and examination

This is similar to that for older children using IMCI criteria (for infants < 6 months) with the addition of:

- ◇ Detailed breastfeeding assessment
- ◇ Psychosocial, health and nutrition assessment of the mother and/or carer
- ◇ The infant's weight is re-ordered with a scale of 10 g precision
- ◇ Examine the mother's breasts.

7A.6 Supplemental feeding technique

7A.6.1 At the beginning of the SS technique

- ◇ Use a tube the same size as no. 6 to 8 nasogastric tube (no. 5 tube can be used and is better for the infant, but the milk should not contain any small particles that block the tube).
- ◇ Put the appropriate amount of SS-milk in a cup and hold it.
- ◇ Put the end of the tube in the cup.
- ◇ Put the tip of the tube on the breast at the nipple.

Note: At the beginning the mothers find it better to attach the tube to the breast with some tape, later as she gets experience this is not normally necessary.

- ◇ Tell the mother to offer the breast in the normal way so that the infant latches on properly.
- ◇ When the infant suckles on the breast, with the tube in his mouth, the milk from the cup is sucked up through the tube and taken by the infant. It is like taking a drink through a straw.
- ◇ Help the mother at first by holding the cup and the tube in place.
- ◇ Encourage the mother confidently.
- ◇ Place the cup at first about 5–10 cm below the level of the nipple so the SS-milk can be taken with little effort by a weak infant.
- ◇ NEVER place the cup above the level of the nipple, or it will flow quickly into the infant's mouth by siphonage with a major risk of inhalation.
- ◇ Tell the mother to relax. Excessive or officious instructions about the correct positioning or attachment positions often inhibit the mothers and make her think the technique is much more difficult than it is. Any way in which the mother is comfortable and finds that the technique works is satisfactory.

It may take one or two days for the infant to get used of the tube and the taste of the mixture of milks, but it is important to persevere.

7A.6.2 Later, as the infant becomes stronger

- ◇ Lower the cup progressively to about 30 cm below the breast.
- ◇ Later, when the mothers are more confident, ask if they want to manage to hold the cup and tube without assistance. The mother, instead of the assistant, can hold the tube at the breast with one hand and the other holds the infant and the cup. In this

way she can perform SS feeding without assistance.

- ◇ Use another mother who is using the technique successfully to help.
- ◇ Try to have the mothers together at the same time using the SS technique. Once one mother is using the SS technique successfully the other mothers are greatly encouraged and find it relatively easy to copy her.
- ◇ If the SS-milk formula is changed suddenly then the infant normally takes a few days to become used to the new taste. It is preferable to continue with the same supplementary diet throughout the treatment.

The figure shows an infant being supported during SS feeding

Figure 2. Supplementary suckling technique



This infant is suckling the breast and also getting the SS-milk (135 ml/kg per day) by the supplemental suckling technique. Raising or lowering the cup determines the ease with which the infant gets the supplement: for very weak infants it can be at the level of the infant's mouth. If it is above this level, the feed can go into the child by siphonage when there is a danger of aspiration.

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.

7A.6.3 Diet and amounts to give

Infants with SAM without oedema should be supplemented with expressed breast milk, generic infant formula or F100 diluted. Do not use F75 unless the child has oedema. Young infants with oedema should be supplemented with expressed breast milk or, if this not possible, F75 or a generic infant formula, until the oedema has resolved.

Undiluted F100 should never be given to infants aged less than 6 months with SAM because of the high renal solute load and risk of hypernatraemic dehydration.

■ Preparation

➤ For infant formula:

- ◇ Dilute according to the supplier's instructions.

➤ For F100 dilute:

- ◇ Put one small packet of F100 into 670 ml of water (instead of 500 ml).

- ◇ OR use 100ml of F100 already prepared and add 35 ml of water, then you will get 135 ml of F100 diluted. Discard any excess waste.
- ◇ Don't make smaller quantities.

▪ **Amounts to give by SS technique**

Table 18. Amounts of SS-milk for infants during SS feeding

CLASS OF WEIGHT (KG)	ML PER FEED (FOR 8 FEEDS / DAY) (100%)	50% OF THE REQUIRED QUANTITY	75% OF THE REQUIRED QUANTITY
	F100-dilute		
>=1,2kg	25 ml per feed	12,5	18 ml
1,3 - 1,5	30	15	24 ml
1,6 - 1,7	35	18	27 ml
1,8 - 2,1	40	20	30
2,2 - 2,4	45	23	35
2,5 - 2,7	50	25	40
2,8 - 2,9	55	28	45
3,0 - 3,4	60	30	45
3,5 - 3,9	65	33	50
4,0 - 4,4	70	35	55

7A.6.4 Procedure

- The infant should be weighed daily with a scale graduated to within 10–20 g.
- Breastfeed on demand or offer breast milk at least every 3 hours for at least 20 min.
- Between 30 and 60 minutes after the normal breastfeed, give maintenance amounts of SS milk supplement according to the table above (i.e. 135 ml/kg per day, distributed across eight feeds per day, providing 100 kcal/kg per day).
- The quantity of milk supplementation is not increased during the stay.
 - o If the infant starts gaining weight at 20 g per day, decrease the SS supplement up to 50% of the maintenance intake, so that the infant is stimulated to take more breast milk.
 - o If the weight gain is maintained at 10 g per day, stop the milk supplement.
 - o If the weight gain is not maintained, increase the amount of milk supplement to 75% of the maintenance amount, then decrease the amount again to 50% as the infant gains weight at 10 g per day.
 - o If weight gain is maintained at 20 g per day, stop the SS supplement and ensure that the infant is gaining weight at 10 g per day on exclusive breast milk.

- Encourage the mother when the infant is gaining weight and tell her that “the recovery is due to her own breast milk”.
- As soon as the baby is gaining weight on breast milk alone with no SS supply, the baby and mother are ready for discharge from hospital (see below).

7A.7 Routine treatment

Systematic treatment is similar to that for children aged 6 months or older.

7A.7.1 Antibiotics

- If there are no medical complications, give amoxicillin 25 mg/kg orally every 12 hours for 5 days, as routine first-line antibiotic.
- If there are medical complications, give benzylpenicillin (50,000 units/kg IV every 6 hours for 5 days) or ampicillin 50 mg/kg IV (or IM) every 6 hours for 2 days, then switch to amoxicillin 25 mg/kg orally twice a day for 5 days, and then gentamicin 3 mg/kg IV (or IM) once a day for 7 days.
- Do not give anthelmintics; measles vaccination can be given from age 4.5 months.

7A.8 Care for the mothers

As the aim is to increase breast milk, the mother’s health and nutritional status are critical for the nutritional repletion of the infant.

- ◇ Check mother’s MUAC and the presence of oedema.
- ◇ Explain to the mother what the aim of treatment is and what is expected of her.
- ◇ Do not make the mother feel guilty for the state of her child or blame her for giving other foods.
- ◇ Introduce her to the other mothers in the centre and introduce her to the staff personally. Make her feel “at home” in a friendly and relaxing atmosphere.
- ◇ Agree with her that she may not have enough milk at present – but strongly reassure the mother that the technique works and that enough milk will “come into” her breasts as her baby recovers. She will then be able, with her own milk, to make her baby better.
- ◇ Tell her and encourage her to drink at least 3 litres per day.
- ◇ Make the necessary arrangement for the mother so she can eat about 2,500 kcal/day of a high quality diet.
- ◇ Give to the mother vitamin A: 1) If the child is below 2 months or the mother is menstruating: 200,000 UI (there should be no risk of pregnancy); 2) If the child is above 2 months: 25,000 UI once a week.
- ◇ Give full micronutrient supplements.

Note: breast milk from malnourished mothers may have inadequate amounts of type I nutrients – the mother MUST be given multivitamin and mineral supplements during SS treatment and counselled about adequate and diverse dietary intake following discharge.

- ◇ Decrease as much as possible the length of stay in the facility.
- ◇ If needed, give drugs which help with lactation (e.g. metoclopramide 10 mg 8 hourly).

Other drugs that increase milk flow (e.g. chlorpromazine) are less effective, cross into breast milk and will potentially affect the mother and child adversely; in some cultures, there are local spices that stimulate breast milk output (e.g. fenugreek) but their safety has not been established.

7A.9 Preparing for discharge from hospital

7A.9.1 Health and nutrition counselling

- Provide health and nutrition counselling and education of the mother, paying special concern to support and counselling on breastfeeding or replacement feeding.
- In situations with no prospect of breastfeeding, mothers or carers should receive support to enable the safe preparation and use of generic infant formula at home. Mothers or carers who are expected to give formula milk to their infants after they are discharged from inpatient care need clear guidance on the safe preparation and use of such replacement feeds.

If the mother or carer cannot afford generic infant formula, she or he should be taught how to prepare a safe and appropriate replacement milk during the treatment period.

7A.9.2 Psychological support to the mother or carer, plus health and nutrition support

- Provide psychological support, health and nutrition counselling and education of the mother or carer.
- Provide health and nutrition support according to the health and nutrition condition.

7A.9.3 Criteria for referral to outpatient infant and young child feeding/ nutrition support

Infants aged less than 6 months can be transferred to outpatient care or infant and young child feeding/ nutrition support, when there is all of the following:

- All clinical complications including oedema are resolved.
- The infant has good appetite and is clinically well and alert.
- Weight and weight gain on either exclusive breastfeeding or replacement feeding is satisfactory (above the median of the WHO weight velocity standards or > 5 g/kg per day) for at least 3 successive days.
- Immunization schedule and other routine interventions are completed.
- Mothers or carers are linked with community-based follow-up and support.

Infants and their mothers or carers should continue community infant and young child nutrition support initiatives and link with community health workers for home visits.

7A.10 Discharge

Decide when to discharge the infant according to the discharge criteria and write in the registration book, the infant SS chart, and on the health card (passport) of the child.

Table 19: Criteria of discharge for infants less than 6 months with a caretaker

AGE	DISCHARGE CRITERIA
Infant less than 6 months or less than 3 kg being breastfed	<ul style="list-style-type: none">➤ It is clear that s/he is gaining weight on breast milk alone after the supplemented suckling technique has been used.➤ There is no medical problem.➤ The mother has been adequately supplemented with vitamins and minerals, so that she has accumulated body stores of type 1 nutrients.➤ The mother has been appropriately counselled.

NOTE: there are no anthropometric criteria for discharge of the fully breastfed infant who is gaining weight.

7B. NUTRITIONAL SUPPORT TO INFANTS WITH NO PROSPECT OF BREASTFEEDING

If there is no realistic prospect of being breastfed, infants with SAM should be given appropriate replacement feeding. Infants with SAM without oedema can be fed with safe expressed breast milk, a generic infant formula, or F100 diluted. Infants with oedema should be fed with expressed breast milk, a generic infant formula, or F75 until the oedema has resolved, after which they should switch to generic infant formula or F100 diluted. The protocol is the same as for older children EXCEPT that the diets are NOT the same.

7B.1 Feeding during stabilization

- Give expressed breast milk, generic infant formula milk, or F100 diluted or F75 (in case of oedema only) at 130 ml/kg per day, distributed across eight feeds per day (3-hourly feeding), providing 100 kcal/kg per day.

Once there is a return of appetite and oedema starts resolving, the infant can enter a transition phase.

7B.2 Feeding during transition

- Give expressed breast milk, infant formula milk or F100 diluted provided at 150–170 ml/kg per day, or increased by one third over the amount given in the stabilization phase, providing 110–130 kcal/kg per day.
The criteria to progress from the transition period to the rehabilitation phase are:

- A good appetite: taking at least 90% of the infant formula milk or F100 diluted prescribed for the transition phase; and
- Complete loss of bilateral pitting oedema; or
- Minimum stay of 2 days in the transition phase; and
- No other medical problem.

7B.3 Feeding during rehabilitation

- Give expressed breast milk, infant formula milk or F100 diluted provided at 200 ml/kg per day, or twice the volume given in the stabilization phase, providing 150 kcal/kg per day.
- When the infant is gaining weight satisfactorily on generic infant formula and there are no outstanding medical problems, the infant is ready for discharge.
Generic infant formula milk can be provided safely in some inpatient settings. Whenever formula milk is provided as part of management of SAM in infants, it should not confuse or compromise the wider public health message concerning exclusive breastfeeding for infants aged less than 6 months.

8. MANAGEMENT OF SAM IN OLDER CHILDREN, ADOLESCENTS AND ADULTS

Severe acute malnutrition occurs as a primary disorder in older children (5–9 years), adolescents (10–18 years) and adults (over 18 years) in conditions of food insecurity. It also occurs in situations of dependency, for example in the elderly, those with mental illnesses and emotional problems, and prisoners. Malnutrition in this age group is commonly associated with other illnesses, such as chronic infections, intestinal malabsorption, alcohol and drug dependence, liver disease, endocrine and autoimmune diseases, cancer, HIV and TB. In such cases, both the malnutrition and the underlying illness must be treated.

8.1 Principles of management

The physiological changes and principles of management of older children, adolescents and adults with SAM are the same as those for children over 6 months and, in general, the same guidelines should be followed. There are, however, differences in the classification of acute malnutrition, the amount of food required and the drug dosages. Except in famine conditions, adolescents and adults rarely associate wasting or oedema with their diet. As a consequence, they do not believe that altering their diet will help them. Even in famine conditions, they are often very reluctant to eat anything except traditional foods, which they view as perfectly satisfactory. Moreover, the foods they are allowed are often restricted by cultural and religious beliefs. They are often reluctant to take therapeutic foods unless they can be persuaded that such feeds are a form of medicine. This problem is one of the most difficult aspects of treating adolescents and adults.

8.2 Assessment and classification of malnutrition

8.2.1 School-aged children (5–9 years)

SAM in older children (5–9 years) is defined by the presence of nutritional oedema, and/or severe muscle wasting. The degree of thinness is assessed by weight-for-height using the tables in Annex 3.

8.2.2 Adolescents (10–18 years)

SAM in adolescents is also defined by the presence of nutritional oedema and/or severe muscle wasting, and recent weight loss in the past 4 weeks. The degree of thinness is assessed using the weight-for-height given in Annex 4.

8.2.3 Adults (over 18 years)

Severe acute malnutrition in adults is defined by the presence of nutritional oedema and/or severe thinness, and recent weight loss in the past 4 weeks. The degree of thinness is assessed using a BMI given in Annex 5: anyone with a BMI below 16.0 (pregnant women excluded) is regarded as severely thin. The causes of oedema in adults include pre-eclampsia (in pregnant women), severe proteinuria (nephrotic syndrome), nephritis, acute filariasis (the limb is hot, painful and does not pit on pressure), heart failure and

wet beriberi. Non-nutritional causes of oedema can readily be identified by the history, physical examination and urine analysis. Adults with SAM with medical complications or poor appetite (appetite test failed), or underlying illness that needs treatment in inpatient care should be admitted to hospital.

When an adult is too ill to stand, that is a reason on its own for admission to hospital and carries the highest mortality rate. To assess BMI, the half arm span can be measured. This is the distance from the middle of the sternal notch to the tip of the middle finger with the arm held out horizontally to the side. Both sides should be measured. If there is a discrepancy, measurements should be repeated and the longest one taken. The height (in metres) can then be calculated as follows: Height = $(0.73 \times (2 \times \text{half arm span})) + 0.43$.

The BMI is then assessed from the table or computed using $\text{weight}/(\text{height} \times \text{height})$

Table 20. Classification of thinness in adults by body mass index

Body mass index	Nutritional status
≥ 18.5	Normal
17.0–18.49	Mild thinness
16.0–16.99	Moderate thinness
< 16.0	Severe thinness

8.3 History and physical examination


A thorough examination should be conducted to exclude conditions that give rise to secondary malnutrition. A careful dietary history should be taken. Blood sugar should be tested to exclude diabetes mellitus.

8.4 Initial management

If possible, older children, adolescents and adults should be given the same therapeutic foods and follow the same protocol as children over 6 months. The initial goal of treatment is to prevent further loss of tissue. The amount of RUTF or formula feed given per kg of body weight is much less than for children aged up to 5 years, and decreases with increasing age, reflecting the lower energy requirements of adults. Recommended amounts for different ages are given in the tables for children in Chapter 7. These amounts will meet all nutrient requirements of children from 5 years of age onwards, adolescents and adults. If older children, adolescents and adults with SAM are anorexic, the formula feed is given by nasogastric tube during the first few days. As soon as appetite returns, RUTF will be offered and family food will be gradually introduced. Adults and adolescents are also susceptible to hypoglycaemia and hypothermia. The latter condition is managed as described for children. Affected individuals should also be given immediate systemic antibiotics and anthelmintics after 1 week of treatment.

8.5 Failure to respond to treatment

Failure to respond to treatment in adolescents and adults is usually due to an unrecognized



underlying illness, a nutrient deficiency, or refusal to follow the treatment regimen. Follow the procedures for children.

8.6 Preparation for discharge from hospital and end of treatment

An improving appetite indicates the beginning of rehabilitation. During rehabilitation, it is usual for adolescents and adults to become very hungry, often refusing the formula feed and demanding enormous amounts of solid food. When this happens, RUTF will be introduced (if not done earlier), supplemented with a diet based on traditional foods, but with added oil, mineral and vitamin mix. As soon as a variety of foods are tolerated, prepare the patient for discharge. Allow the patients to eat as much as they want.

8.7 Criteria for discharge from inpatient care, and end of treatment

Children aged 5–9 years can be discharged from inpatient care when they are eating well and gaining weight. They should continue to receive a supplemented diet as outpatients until their WHZ is ≥ -2 Z-score. Adolescents and adults can be discharged from inpatient care when they are eating well and gaining weight, they have a reliable source of nutritious food outside the hospital, and any other health problems have been diagnosed and treatment begun. Adults should continue to receive a supplemented diet as outpatients until their BMI is ≥ 18.5 ; for adolescents, their diets should be supplemented until their W/H is $\geq 85\%$ of the median NCHS reference value. Experience has shown that the return of sexual function indicates recovery.

9. EMOTIONAL AND PHYSICAL STIMULATION OF CHILDREN

Children with SAM have delayed mental and behavioural development which, if not treated, can become a serious long-term result of malnutrition. Emotional and physical stimulation through play activities that start once the child is alert can substantially reduce the risk of permanent mental and emotional impairment. This stimulation needs to be sustained for a prolonged period, so the most important aspect is to teach the mother/caretaker/ family that it is by play and exploration that the child learns and that they should continue this throughout the child's upbringing.

Combined psychosocial care and nutritional programming is critical in order to address the physical, social, emotional and intellectual developmental needs of the child and to enhance maternal well being. Opportunities should therefore be made in routine nutritional care to incorporate early childhood development activities. This is particularly emphasized in situations of food shortage and emergency, to help increase and sustain the impact on a young child's health and nutritional status.

Psychosocial assessment and treatment also needs to be provided for the mother, father or carer, to assist with childcare, sustained breastfeeding or addressing other problems. Child participation should be encouraged whenever possible. Carers should be encouraged to listen and consult with their infants and children on their engagement in any activities. Creative mediums of art and play might be used as a way for very young children to express their views. Children with HIV or mental and physical disabilities are at higher risk of being neglected, of lacking play opportunities, or of not receiving appropriate nutrition. Every effort should be made to ensure participation of children who are from vulnerable groups.

Singing, use of large pictorial cards and other interactive methods can be used. Inexpensive toys made from cardboard boxes, plastic bottles, tin cans and similar locally available materials are best, because mothers can copy them. Examples of suitable toys are described in Figure 3.

9.1 Outpatient care

Simple early stimulation, learning and play activities can be introduced when mothers come to health facilities for follow-up visits. One-to-one counselling for the mother can be given while weighing or assessing the child or distributing therapeutic food. Ideally, all nutrition and associated volunteer staff who have direct contact with mothers can be trained to provide simple health messages in addition to routine education. For example, messages on the importance of breastfeeding can be combined with messages on how it provides the opportunity to show warmth and love and the advantages of communicating through singing, touch and facial expression.

9.1.1 Child-friendly spaces

Creating safe, clean, baby-friendly spaces within health facilities (or using separate "baby tents" if there is no space and in emergency contexts) is advantageous for both the mother or carer and infant or child. Tents can be equipped with special kits and toys made by parents, and provide space for breastfeeding in private, counselling and play.

The baby tent also provides a safe space for babies to interact with their carers and to be watched; they learn from each other, and this allows for babies to interact and play with one another.

9.1.2 Mother/carer and baby groups

Mother/carer and baby groups can be established on the same day that mothers return to receive follow-up care. This aspect of providing direct and continuing social support is probably one of the key elements in improving maternal mood and fostering resilience.

9.2 Inpatient care

During inpatient care, care must be taken to avoid sensory deprivation. Practices that involve wrapping or tying an undernourished child to prevent movement, or covering the child's face, should be discouraged by explaining that they limit needed contact and therefore limit psychosocial stimulation. The child must be able to see and hear what is happening around him or her and have unrestricted movement. In cultures where traditional practices involve restricting child movement (e.g. swaddling), this issue will need to be dealt with in a sensitive manner so that the carer's confidence and role are not undermined. Where appropriate, education about this issue should be given to all members of the family, including the extended family.

It is essential that the mother or carer is present with her or his child in the hospital or nutrition rehabilitation centre, and that she or he is encouraged to feed, hold, comfort and play with the child as much as possible. The number of other adults who interact with the child should be as few as possible. Each adult should talk, smile and show affection towards the child. Medical procedures, such as venepuncture, should be done by the most skilled person available, preferably out of earshot and sight of the other children. Immediately after any unpleasant procedure, the child should be held and comforted.


9.2.1 The environment

The austerity of a traditional hospital should be avoided when possible in the treatment of malnourished children. Rooms should be as stimulating as possible, with bright colours, decorations and colourful mobiles that interest children. Brightly coloured aprons or use of more informal clothing is encouraged. A radio can provide background music. The atmosphere in the ward should be relaxed, cheerful and welcoming.

Toys should always be available in the child's bed and room, as well as in the play area, and should be safe, washable and appropriate for the child's age and level of development.

9.2.2 Play activities

Malnourished children need interaction with other children during rehabilitation and informal play. After the initial phase of treatment, the child should spend prolonged periods with other children on large play mats, and with the mother or carer or a member of staff who guides the play session. The child can also be fed in the play area. These activities do not increase the risk of cross-infection appreciably and the benefit for the child is substantial.



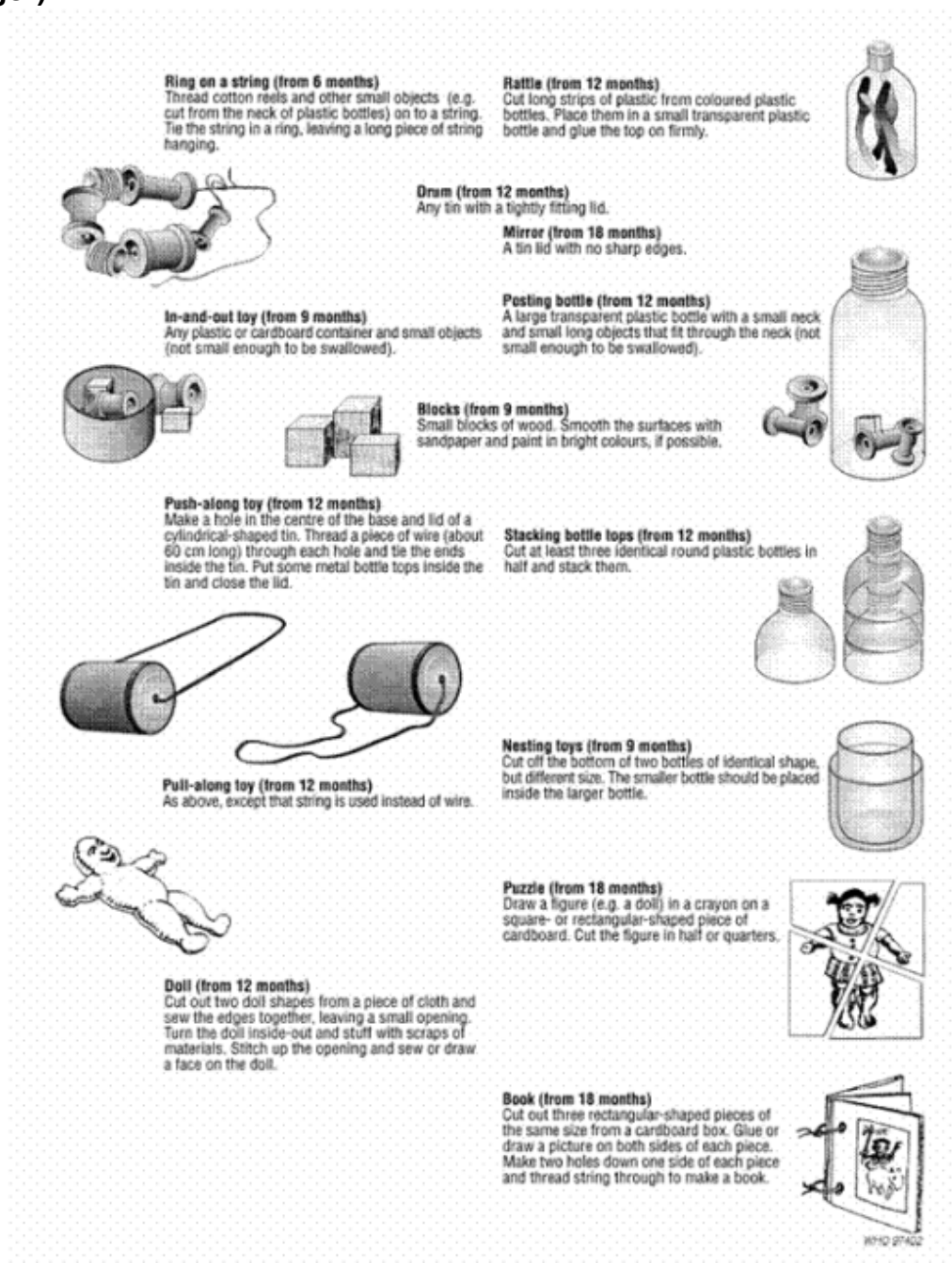
One person, usually a nurse or volunteer, should be responsible for developing a curriculum of play activities and for leading the play sessions. Activities should be selected to develop both motor and language skills, and new activities and materials should be introduced regularly. One aim should be to play with each child, individually, for 15–30 minutes each day, in addition to informal group play. A sample curriculum of play items, arranged by level of development, see figure 3. Mothers can be trained to supervise play sessions.

Learning through play should be fun for children. A child's efforts to perform a task should always be praised and never criticised. When a child is taught a skill, the nurse or volunteer should demonstrate the skill first, then help the child do it, and finally let the child do it alone. This sequence should be repeated until the child has mastered the skill.

9.2.3 Physical activities

Physical activities promote the development of essential motor skills and may also enhance growth during rehabilitation. For those children who are unable to move, passive limb movements and splashing in a warm bath are helpful. For other children, play should include such activities as rolling on a mattress, running after and tossing a ball, climbing stairs and walking. The duration and intensity of physical activities should increase as the child's nutritional status and general condition improve. If there is sufficient space, an outdoor playground should be developed.

Figure 3: Home-made play items (diagram supplied by Professor S. Grantham-McGregor)



10. COUNSELLING ON GROWTH AND FEEDING

It is common for the mothers to know what to do but be unable to follow the advice because they are forced to obey their husbands and mother-in-law. For all education, community health workers should actively seek the whole family for consultation about child growth, development, feeding, nutrition etc.

It is also important to have MALE community health workers who can talk to the husbands and persuade them to ensure that their wives follow the guidance given. It is often of limited use to involve only the mother or carer of the child in education sessions, IYCF counselling and early child development guidance.

Staff must be friendly and treat the mothers, fathers and carers as partners in the care of the children. A carer should never be scolded, blamed for her or his child's problems, humiliated, reprimanded or made to feel unwelcome. Moreover, helping, teaching, counselling and befriending the parent or carer are essential parts of the long-term treatment of the child.

All parents should know how to prevent malnutrition from recurring and understand why their child got sick. Understanding the causes of malnutrition and how to prevent its recurrence, including correct feeding and awareness of the danger signs and when a child should be taken for medical care, should help the child to be treated more promptly. Some mothers can require additional support to continue breastfeeding and staff should be aware of basic lactation skills, including attachment and positioning. Similarly, when and how to introduce appropriate complementary foods should be covered.

The importance of hygiene and clean water should be stressed, including hand-washing, cleaning storage containers for water and food, and the use of latrines.

Continuing to stimulate the child's mental and emotional development at home, through eye contact, touch, play, provision of homemade toys, songs and games should be conveyed to the carer.

Mothers should be aware of appropriate and affordable mixed diets that are obtainable from their environment and the same as those recommended for a healthy child. Animal milk is an important source of energy and protein. Solid foods should include a well-cooked staple cereal, to which vegetable oil should be added (5–10 ml for each 100 g serving), to enrich its energy content. The cereal should be soft and mashed; for infants, use a thick pap or porridge. A variety of well-cooked vegetables, including orange and dark-green leafy ones, should be given. If possible, include fruit, meat, eggs or fish. The mother should be encouraged to give the child extra food between meals. These foods can be gradually introduced as the child reaches the end of rehabilitation and therapeutic foods are reduced. Any breastfeeding should be continued.

11. COUNSELLING AND PSYCHOSOCIAL SUPPORT TO THE MOTHER OR CARER

For children with SAM, parenting interventions promoting mother–infant interactions, including psychosocial stimulation, should be offered to improve child-development outcomes. Such programmes should preferably be delivered within ongoing mother and child health programmes.

A strong maternal–infant (or carer–infant) bond provided through psychosocial stimulation is essential for positive child development. Many carers are unavailable or unable to provide psychosocial stimulation to their children, owing to their own poor physical or mental health. A lack of psychosocial stimulation has adverse consequences for children’s development (cognitive, motor, language) and mental health.

Key public mental health interventions, psychosocial support and nutritional interventions must also be provided for mothers or carers, to facilitate carer–child relations and prevent developmental delay and mental disorders. With appropriate intervention, these problems are largely preventable.

Carers with physical or mental health problems may need extra support to ensure that they are able to give care to their children. Improving maternal mental health (e.g. reducing maternal depression) may be one of the most important interventions, especially in situations of food shortage, for both the mother and child. In addition to enhancing maternal knowledge and practice of early childhood development activities, mother and child groups increase connections between women and break down feelings of isolation.

12. FOLLOW UP AFTER THE END OF TREATMENT

SAM occurs mainly in families that have limited access to nutritious food and are living in unhygienic conditions which increase the risk of repeated infections. They often have limited support from their neighbours and community.

A preventative approach is essential. Once a child is ready for discharge, therefore, it is important to ensure that, wherever possible, they are linked into supportive services in their communities and nearby health facilities. Health staff should be aware of the range of health, nutrition, livelihood and social services available in the context, so that they can inform families of their options and eligibility. Where a child is suffering from a particular chronic disease, it is essential to ensure the parent or carer is aware of and, where possible, directly linked/referred to any relevant follow-up and/or support. See Box 11 for some appropriate services.

Box 11. Infant and young child feeding counselling and support services

- Growth monitoring and promotion clinics/sites
- Mother and child health days/weeks
- Multiple micronutrient supplementation e.g. micronutrient powders, corn-soya blend/fortified blended food, ready-to-use supplementary food
- Early childhood development centres/service
- Social protection schemes for poor families or particular disadvantaged groups
- Support services for HIV-affected households
- Food or livelihood security support services

Note: in an emergency context there may be a wider range of programmes and interventions that the family can be linked to.

Although much improved at the time of discharge, the child usually remains stunted and mental development is delayed. Managing these conditions and preventing the recurrence of SAM requires sustained improvement in feeding of the child and in other parenting skills. Planned follow-up of the child at regular intervals after discharge is essential. This should include an efficient strategy for tracing children who fail to attend follow-up appointments. Such children are at increased risk of recurrence of malnutrition or of developing other serious illnesses.

As the risk of relapse is greatest soon after discharge, the child should be seen after 1 week, 2 weeks, 1 month, 3 months and 6 months. Provided the child's weight-for-height is no less than -2Z-score progress is considered satisfactory. If a problem is found, visits should be more frequent until it is resolved. After 6 months, visits should be twice yearly until the child is at least 3 years old. Children with frequent problems should remain under supervision for longer.

The mother or carer should know the location and regular opening hours of the nearest health facility providing nutrition service and be encouraged to bring the child without an appointment if he or she is ill, or a previous appointment was missed.

At each visit, the mother should be asked about the child's recent health, feeding practices and play activities. The child should be examined, weighed and measured, and the results recorded.

Every effort should be made to get the community to extend the social network of the malnourished child's family. A supportive neighbour can be the most important help to such a family.

13. MODERATE ACUTE MALNUTRITION

This section provides practical guidelines for the identification and management of patients with moderate acute malnutrition (MAM). Moderately malnourished individuals may be treated as outpatients through a supplementary feeding programme (SFP). The children are at heightened risk of death in the medium and long term but, unlike the severely malnourished, do not need immediate emergency treatment.

There are alternatives to direct distribution of food products which may be as successful as (or more successful than) direct food distribution. These alternatives include income generation support, family micro-credit, cash transfer, home-gardening support and the HEARTH programme and positive deviance. Note that several other programmes do not (and are not designed to) address any form of malnutrition in a community,¹⁹ although they do involve food distribution.

13.1 Objectives

- Identify moderately malnourished children in the community.
- Treat MAM and prevent deterioration to severe acute malnutrition
- Support individuals who have recovered from severe malnutrition and been discharged for follow-up to prevent relapse.

13.2 Organisation

13.2.1 Opening and closing a supplementary feeding camp or programme (SFC/SFP)

In an emergency context, where either there are rapidly rising numbers of MAM children or the food security situation is predicted to deteriorate, an SFP should be established **when the numbers of children with MAM exceed the normal health and social services' ability to respond to their needs** and there is a risk that they will deteriorate to develop severe acute malnutrition. This test should be applied in relation to the absolute numbers of MAM children in excess of the usual services capacity to cope and not to the percentage of SAM or MAM assessed from a survey²⁰. The scale and scope of the SFP will depend upon the numbers of anticipated children, the capacity of the health and social services and the presence or absence of other programmes to address the problem of malnutrition in the community. Each of these factors will vary from one situation to another.

In an emergency, by definition, the normal services cannot manage the large increase in malnutrition that is caused by the emergency. In some emergencies, particularly when there is population displacement, there is a complete absence of any "normal" services,

19 For example, "food-for-work" programmes distribute food mainly to the healthy well nourished who can work – the malnourished cannot. Food-for-work is a way of securing workers when "food" is an available medium of currency. Likewise, school feeding only targets those that go to school (who are generally the already better off).

20 For example, if there is 15% MAM in a camp with a population of 10,000 of which 20% are children aged 6-59 months, then there will be 300 MAM children. If there are no health services in the camp, provision should be made to treat 300 children. If in a metropolitan area of 10 million people there is 6% MAM, again with 20% children, then there are 120,000 MAM children within that population. It is very unlikely that the health services are able to manage this vast number of children – yet the use of a percentage cut-off would exclude them from receiving any assistance. This is

there is no capacity to respond to the needs of the population and the population has no coping mechanism; in such circumstances urgent establishment of general relief and an SFP is urgent and should not await a nutritional survey to decide whether to open a programme or not.

In some populations there is marked seasonality in the prevalence of acute malnutrition. In such situations it is proper to plan to open an SFP whenever the normal services are overwhelmed and to close it again, in a planned way, whenever the numbers decrease to a level with which the normal services can cope.

In some chronic emergencies, and in stable situations (i.e. in a development context or when moving from emergency to development) other programmes are in place to address the nutritional needs of the most vulnerable. These include cash subsidies of various kinds, microcredit and other income-generating family support mechanisms, positive deviance/ hearth programmes etc. These programmes are not mutually exclusive. If such programmes are established and there is still sufficient MAM to overwhelm the health and social services, an SFP programme could be established within a development context. However, this is not usually necessary.

13.2.2 Structure

The SFC should not be run (if possible) from health centres. The staff workload in the health structures is already burdensome with many programmes to administer, including treatment of the severely malnourished. If the health staff also have large numbers of children attending for supplementary feeding (note there are normally about 10 MAM children for each SAM child), their facilities and staff become swamped so that all the essential health programmes suffer. The SFC can be run from any convenient structure (house, school, community facility) provided that there is a secure, ventilated and pest-free storage facility. Ideally there would be a health centre close by, so programme coordination is easy, the patients are quickly and easily transferred and the staff know each other.

It may be useful to site the SFC close to a market, in which case the SFC can operate on market days as the beneficiaries/caretakers are likely to be visiting the market to buy and sell, and can combine one travel from home for both purposes – in this case the length of time the spent at the SCF should be kept to a minimum and the flow of recipients steady and rapid.

13.2.3 Staffing

There is no need to have clinically trained staff. MAM treatment can be run by nutritionists or social workers.

▪ Supervisor - social worker or nutritionist

Activities

- ◇ S/he manages the food and non-food items (distribution).
- ◇ S/he prepare the monthly reports.

- ◇ S/he manages the human resources.
- ◇ S/he supervises the MAM treatment.
- ◇ S/he organises the health and nutrition education/counselling and cooking demonstrations with the nutritionist.

CHW or volunteers

- ◇ S/he does the anthropometric measurements: weight, MUAC measurements and checks for oedema.
- ◇ S/he finds any defaulters and encourages them to come back.
- ◇ S/he helps prepare the individual ration during individual/home visit (preparing the premix and packaging).

Nutritionist/social worker

- Trained on community IMCI.
- Trained on the measurements technique and admission and discharge criteria for the integrated management of acute malnutrition (IMAM) programme and the MAM treatment and, in particular the procedures to follow for all patients who fail to respond to treatment.

■ Activities

- ◇ S/he admits the child according to the criteria of admission.
- ◇ S/he explains to the mother the management of MAM.
- ◇ S/he checks for any medical problem, the vaccinations and refers to the OTP/ health centre.
- ◇ S/he registers the child in the registration book and applies the criteria of admission, discharge and failure to respond to treatment.
- ◇ S/he identifies the defaulters and any patients who fail to respond to treatment, and informs the CHW/volunteers.
- ◇ S/he organises and supervises the preparation of the ration.
- ◇ S/he distributes the prepared ration to the child or caretakers.
- ◇ S/he gives health/ nutrition education sessions.

■ Materials

- o Scales – length board – MUAC tapes
- o Laminated posters for the admission and discharge criteria – failure to respond
- o Registration book for MAM treatment; follow-up of SAM cure children; key messages about the products (RUSF/porridge) in local languages
- o Ration card for the mother/caretakers
- o Supplemental ration supplies (with secure storage facilities)
- o Buckets/basins
- o Salter scale (25 kg)
- o Calculator
- o Measuring cup/scoop
- o Soap for washing utensils at the feeding centre
- o Products (CSB+, CSB++/FBF and RUSF)
- o Vitamin A capsules

- o Albendazole tablets
- o Mebendazole tablets
- o Iron/folic acid tablets
- o Safe drinking water
- o Cup and glass
- o Posters on nutrition and health education and material for health education sessions.

13.3 Admission

All the children that fulfil any of the admission criteria in the following table should be admitted into the MAM treatment.

AGE GROUP	ADMISSION CRITERIA
MORE THAN 6 MONTHS CHILDREN	<ul style="list-style-type: none"> ➤ W/H - W/L \geq -3 and $<$ -2 Z-score or ➤ MUAC \geq 115 mm and $<$ 125mm
ALL SAM CURED CHILDREN	<ul style="list-style-type: none"> ➤ NO ANTHROPOMETRIC CRITERIA ➤ FOLLOW UP FOR 3 MONTHS

13.3.1 Type of admission

New admission is done according to several criteria:

- ◇ Relapse: a cured MAM child readmitted for a second episode of MAM
- ◇ Follow up of a cured SAM child
- ◇ Readmission of defaulters after less than 2 months absence
- ◇ Internal transfer from another SFC.

13.3.2 Admission procedure

- ◇ Take the anthropometric measurements – MUAC, weight (always using the same scale) and height – examine for oedema.
- ◇ Check the admission criteria.
- ◇ Explain to the mother/caretaker how treatment will be organized and reasons for admission to SFP.
- ◇ Determine if the patient has any sign of a medical problem. If the child has any IMCI complications, refer him/her to the health centre: “fast track” those obviously ill to the nearest hospital; do not keep them waiting.
- ◇ Systematically check for measles vaccination status, in particular for children over 6 months. If necessary refer for vaccination to immunization service.
- ◇ Carefully explain the expectations and way the caretaker should use the supplement and attend the centre.
- ◇ Enter all the children eligible for admission to the programme in the registration book, give a registration number.
- ◇ Enter all the information for admission in the programme in the card and give the card to the caretakers.

13.4 Diet

13.4.1 Type of supplementary feeding

▪ Dry or wet feeding

In general there are two types of supplementary feeding centre:

1. The wet supplementary feeding centre (SFC). The food supplement is prepared daily in the SFC and is eaten by the beneficiary in the centre one two or three times a day. *This option is only used in exceptional circumstances, usually with mass movement of the population or natural disasters, when they do not have stability and access to cooking facilities, fuel etc.*

2. Supplementary feeding through take-home rations. The ingredients of the ration are mixed in the SFC prior to distribution (if this is not already pre-mixed in the product you receive, e.g. CSB+). It is necessary to give larger amounts of food in this ration to compensate for intra-household sharing.

▪ Supplementary rations – strategies

Various types of supplementary food are dispensed for MAM children – the optimum strategy or ration composition has not yet been determined. Nevertheless the rations should always adhere to the following principles.

The food should contain ALL essential nutrients in adequate amounts to allow for the extra nutritional requirements to enable them to have accelerated weight and height gain and full physiological recovery.

The nutrients should be biologically available to children with the altered intestinal function that is associated with MAM. In particular:

- ◇ Dry supplements should be distributed as a mixture rather than as separate ingredients to avoid use for other purposes.
- ◇ Mixed foods can be stored at home up to 2 weeks at a time.
- ◇ The ration supplied should enrich the basic diet of the beneficiary with all essential nutrients to provide the amounts of essential nutrients recommended for the moderately malnourished child.

Escalating strategy

For the escalating strategy, at least two different supplementary foods must be available in the SFC in adequate amounts and available for distribution.

The children are started on a fortified blended food such as CSB+ or FBF and their progress carefully monitored. Any child that fails to gain weight satisfactorily must be identified early and the food supplement changed to a product with a higher nutrient density, whose nutrients are more readily available and which contains lower levels of anti-nutrients. These supplementary foods (lipid-based, ready-to-use-supplementary-

food, RUSF) should always be taken between meals and not mixed with the family food or used to prepare “sauce” to be taken with the staple food.

Table 21: Example of ration required per child per day – strategy 1 initial diet

Food item	Daily quantity* (g)	Quantity (14 days) (kg)
FBF/Super-Cereal (CSB+)	250	3.5

*Provides 1,300 kcal/beneficiary/day. 14% protein, 31% fat

- ◇ Prepare a premix by mixing thoroughly the appropriate quantities of ingredients together in a big basin. The ration should be prepared before distribution in the most hygienic way, to minimise the risk of bacterial contamination.
- ◇ Distribute a fortnightly (2-week) ration (approx. 4.2 kg) to the patients. Each ration should be given in a clean family container.
- ◇ Conduct a cooking demonstration for new caretakers. Explain how to use the porridge.
 - 1 volume of premix to 3 volumes of water
 - Ration is to last for 14 days
 - Ration is for the malnourished patient only.

The second strategy is to commence all children on a higher nutrient dense, ready-to-eat product (e.g. RUSF – this is more effective, but it is also more expensive) and monitor the patients. If the patients fail to respond on this diet then the problem is much less likely to be an unmet nutritional deficiency and may be a social or underlying medical problem. This strategy is particularly suited to the younger MAM child (aged 6–24 months). These children are more likely to deteriorate and develop SAM, have a greater infective burden, are at higher risk of death, have higher nutrient requirements and are much more vulnerable to developing stunting and mental deficiency than older children.

Strategy where there is no food insecurity

Where the prevalence of MAM is quite low, there is no food insecurity at a population level and most families have access to sufficient food, then the likely cause of nutritional deficiency is poor nutritional quality of the diet. However, a higher proportion of the MAM children in this situation will have underlying social or medical problems and will probably not respond to any nutritional supplement for this reason.

Micronutrient powder distribution to the general population to treat anaemia and other conditions associated with type 1 nutrient deficiency is not a strategy for the management of MAM. Micronutrients are very unlikely to increase weight or height gain as they principally contain only type 1 nutrients.

13.5 Routine medicine

13.5.1 Vitamin A supplementation

- ◇ On admission, check on the health card/passport and/or ask the mother if the child has received vitamin A in the last six months. Give standard doses of vitamin A if this has not been taken.

13.5.2 Albendazole/mebendazole

◇ On admission, check on the health card/passport and/or ask the mother if the child has received albendazole in the last six months. If the child is over 12 months then give worm medicine if not previously given.

13.5.3 Iron/folic acid supplementation

Administer iron (60 mg elemental iron)/folic acid (400 ug) fortnightly, as follows:

CHILD'S WEIGHT	TABLETS EVERY 14 DAYS
<10 kg	1 tablet
>10 kg	2 tablets

13. 6 Surveillance

On admission, ensure that there is a record in the register of 1) the target weight for discharge; 2) the weight which would trigger transfer to OTP for SAM; and 3) (for SAM-follow up patients only) the criteria to re-designate the child as having MAM.

- ◇ Take the MUAC measurement at each visit and compare with the discharge criteria.
- ◇ Weigh the children at each distribution and on discharge and compare with the target weight.
- ◇ Diagnose whether the child meets any of the criteria of failure-to-respond to treatment. Check whether the child meets the minimum weight and has now met the SAM criteria ($W/H < -3Z$ -score) for MAM children and if they do, immediately transfer them to the OTP.
- ◇ For the SAM-follow-up children, check whether the child meets the minimum weight to enter the criteria for MAM ($W/H < -2$ and $> -3Z$ -score): the child should then be reclassified as a new MAM admission in the same SFC. This is counted as a new MAM case.
- ◇ Ask the mother/caregiver if the child is ill, and if yes refer to the health centre for medical check-up and treatment; if any acute illness, send him/her rapidly to the health centre for IMCI investigation.
- ◇ Record results in the appropriate SFP Registration Book and on the individual ration cards of the caretaker.
- ◇ Explain the change in the nutritional status to the caregiver.
- ◇ Give and record ration at each visit on the ration card of the caregivers

Table 22: Summary of the surveillance in SFC

MEASURE	FREQUENCY
MUAC is taken	Every 2 weeks
Weight is taken using the same scale	Every 2 weeks
Height/length is measured	At admission
W/H Z-score can be calculated	Day of admission

12.7 13.7 Diagnosis of failure-to-respond to treatment

It is essential to strictly apply the failure-to-respond criteria: children must not languish in the SFP for weeks or months without being identified and the cause of failure investigated and managed. It is for this reason that on admission, not only the discharge weight should

be calculated but also the weight at which a criterion for SAM is reached and action needs to be taken urgently.

13.7.1 Criteria for failure-to-respond to treatment

These are maximum time limits for labelling the patient as failure to respond to treatment – in most circumstances action should be taken before these limits are reached.

1. Either no or trivial weight gain after 5 weeks in the programme or at the 3rd visit
2. Any weight loss by the 3rd week in the programme or at the 2nd visit
3. Weight loss exceeding 5% of body weight at any time (the same scale must be used)
4. Failure to reach discharge criteria after 3 months in the programme
5. Abandonment of the programme (defaulting)

13.7.2 Reasons for failure to respond

1. Problems with the application of the protocol: this should be addressed first
2. Nutritional deficiencies that are not being corrected by the diet supplied in the SFP
3. Home/ social circumstances of the patient
4. An underlying physical condition/ illness
5. Other causes.

13.7.3 Step-by-step procedure to address failure to respond

■ Protocol problems

Where a substantial proportion of children fail to respond to treatment (or abandon the programme), the proper application of the protocol and the training of the staff at field level should be systematically reviewed, if possible by external evaluation. Any deficiencies should be corrected. Failure to treat the caretakers with due respect (rudeness etc.) is, in most situations, the commonest cause of defaulting. If it is suspected that “short rations” are being given or that there is diversion of food, unannounced post-distribution monitoring should be implemented by re-weighing the food of recipients exiting the SFC or visiting a random selection of beneficiaries at home and examining/weighing the food they have recently received.

■ Uncorrected nutritional deficiencies

The total diet often has low concentrations of several essential nutrients (e.g. potassium, magnesium, available phosphorus or zinc etc.). The availability of these nutrients is very low in some diets if there are high concentrations of anti-nutrients.

■ Social problems

Where RUSF is being used and the correct instructions for its use have been given (and the caretaker confirms that they have been followed), the most likely cause of failure are social problems within the household.

To test whether any of these are the cause, an appetite test can be conducted. If the child

is eating well or is hungry and yet fails to gain weight at home then a major social problem is confirmed. This is then investigated with an in-depth interview with the head / main decision-maker in the household (father, mother-in-law) and a home visit is performed

▪ *Underlying medical conditions*

If the child has no appetite then there may be an underlying medical problem. The child should be referred to the health centre.

13.8 Discharge procedure

Discharge the children according to the discharge criteria in the table below.

Table 23. Discharge criteria

AGE GROUP	DISCHARGE CRITERIA
MORE THAN 6 MONTHS CHILDREN	<ul style="list-style-type: none"> ➤ $W/H - W/L \geq -1.5$ Z-score And ➤ $MUAC \geq 125$ mm
ALL SAM CURED CHILDREN	<ul style="list-style-type: none"> ➤ FOLLOW UP FOR 3 MONTHS And ➤ $W/H - W/L \geq -1.5$ Z-score And ➤ $MUAC \geq 125$ mm

▪ *Procedure of discharge*

As soon as the child reaches the criteria for discharge (target weight and target MUAC), s/he can be discharged from the programme.

Record the discharge date, the child's weight, MUAC and the type of discharge in the registration book and in the card, and ensure that all the necessary information is entered in the card.

Check that the immunizations are updated and inform the child that the treatment is over.

14. PREVENTION OF MALNUTRITION

14.1 Introduction

This section provides practical guidelines for the prevention of all forms of malnutrition in vulnerable groups among the Rwandan population, specifically pregnant women and lactating mothers, infants, young children and adolescent girls.

Generally, malnutrition is caused by lack of nutritional components. It can be prevented by having a balanced diet and adequate care through sensitive, nutrition-specific community interventions.

14.2 Objectives

- Improve maternal, infant and young child nutrition and hygiene behaviours
- Increase knowledge and skills of households members and community settlements to improve food security and resilience
- Increase access, availability and utilisation of nutritious foods
- Increase behaviour-change activities at community level
- Increase access and utilisation of health services.

14.3 Key interventions

- PROMOTING NUTRITION-SPECIFIC INTERVENTIONS

Pregnant women, lactating mothers and pregnant/lactating adolescents

- Promotion of early pregnancy test in the community
- Antenatal care (ANC) visits (minimum of four standard visits)
- Need for mothers to learn about their HIV status
- Eat extra meal and diet diversity
- Monitoring of nutritional status: MUAC/BMI as appropriate
- Micronutrients supplementation: iron and folic acid supplements
- Food supplementation to vulnerable pregnant women (CSB/FBF).
- Promotion of behaviour-change communication (nutritional education and counselling)
- Promotion of 1,000-days activities.

Note: These services should be integrated with the obstetric protocols and not with the nutrition protocols to prevent pregnant women having to choose whether to attend food supplement distribution or ANC visits.

0-6 months:

- Early initiation of breastfeeding (within 30 minutes after birth)
- Exclusive breastfeeding
- Growth monitoring and promotion
- Promotion of 1,000-days activities
- Prevention and early treatment of infectious diseases including diarrhoea.

6–23months

- Initiation of complementary feeding from six months
- Adequate complementary feeding (frequency, amount, variety, hygiene)
- Continued breastfeeding
- Immunization as appropriate, deworming, micronutrient supplementation
- Home fortification (micronutrient powders/ongerera intungamubiri)
- Vulnerable children of ubudehe category one (FBF)
- Promotion of behaviour-change communication (nutritional education and counselling)
- Growth monitoring and promotion
- Promotion of 1,000-days activities
- Prevention and early treatment of infectious diseases including diarrhoea
- Promotion of low-cost weaning foods.

24–59 months

- Prevention and early treatment of infectious diseases including diarrhoea
- Nutritional education and counselling
- Growth monitoring and promotion
- Promotion of pre-school and ECD feeding

5–9 years

- Nutritional education and counselling to caregivers/parents
- Promotion of school feeding
- Promotion of behaviour-change communication (nutritional education and counselling) to caregivers/parents
- Prevention and early treatment of infectious diseases including diarrhoea
- Promotion of hand-washing practices.

9-15 years

- Include basic nutrition information in the school curriculum
- Promotion of school feeding
- Promotion of behaviour-change communication (nutritional education and counselling) e.g. WASH (mostly hand-washing for this age group)
- Prevention and early treatment of infectious diseases including diarrhoea
- Prevention of early pregnancies among adolescents.

PROMOTING NUTRITION-SENSITIVE INTERVENTIONS

- Promotion of a household-based food security and resilience to cope with shocks
- Preparedness to natural disasters (droughts, floods, war, earthquake etc.)
- Promotion of bio-fortified foods (iron-rich beans, orange sweet potatoes etc.), kitchen gardens and small livestock
- Home food-processing and preservation/storage
- Social protection services (health insurance)
- Promotion of general hygiene, sanitation and hand-washing and safe water
- Prevention and early treatment of infectious diseases including diarrhoea

- Sleep under treated bed nets
- Immunization as appropriate
- Promotion of school gardening
- Early childhood development (ECD)
- Promotion of family planning and birth spacing
- Men's engagement
- Women's empowerment
- Family environment / strengthening 'Umugoroba w'ababyeyi' (parents' evening forum)
- Home economics and savings and internal lending communities

14.4 Further reading

Maternal, Infant and Young Child Nutrition package adapted to Rwanda (Ministry of Health (MoH)

Essentials Nutrition Actions, Improving maternal, newborn, infant and young child health and nutrition, 2013 (WHO)

National Early Childhood Development Policy Strategic Plan 2016-21 (Ministry of Gender and Family Promotion (MIGEPROF))

15. MONITORING AND EVALUATION

In order to ensure that services for the management of SAM are achieving their objectives of identifying, treating and curing SAM, the activities and outcomes must be monitored. A well designed monitoring and reporting system can identify gaps in implementation, and provide information for ongoing quality improvement (troubleshooting, redesign and accountability).

Monitoring a service for the management of SAM comprises two major components:

- Monitoring the effectiveness of treatment – i.e. the proportion of clients treated effectively
- Monitoring programme coverage – i.e. the proportion of the target group being reached with treatment and appropriateness of the programme for communities.

15.1 Monitoring the effectiveness of treatment

Provision of quality treatment is facilitated by the use of standard individual monitoring and is supported by:

- Supportive supervision
- Regular monitoring, analysis and feedback on treatment performance indicators.

15.1.1 *Supportive supervision*

Supportive supervision for inpatient and outpatient care for SAM aims to improve the quality of care offered by:

- Identifying weaknesses in the performance of activities, taking immediate action and applying shared corrective solutions
- Strengthening the technical capacity of health workers and motivating staff through the encouragement of good practices.

Supervisors and managers at both facility and district level must ensure that the service meets quality standards. Facility-level supervision should be carried out at least once a week for each particular facility and once a month at district level. This can be done alongside existing supervision schedules. Supervision visits are carried out through direct observation of the performance at the health facilities offering management of SAM, review of documentation, and structured discussions with health workers. A supervision checklist can facilitate this.

During supervision, gaps and discrepancies should be identified in consultation with the staff and, as much as possible, with representatives of the community. Immediate feedback should be given to the staff and the communities, to allow joint discussion on possible solutions to any problems identified. Supervisions are also essential for improving staff capacities through the organization of formal or informal refresher training and mentoring (on-the-job training) during the visits.

15.1.2 Performance monitoring

Quantitative data are collected on the outcomes of individuals' treatment and allow the calculation of standard key indicators of performance for children aged 6–59 months. These key indicators can then be compared to international standards such as the Sphere Minimum Standards.

Routine data should be collected on the numbers of:

- New admissions
- Discharges by category: cured, died, defaulted, non-recovered
- Children in treatment (beneficiaries registered).

These three basic elements allow calculation of key indicators:

- Cure rate
- Death rate
- Default rate
- Non-recovery rate.

This information also allows monitoring of performance trends over time and helps to inform programme design and a better allocation of resources.

For the purposes of this manual, a case-fatality rate of inpatients $> 10\%$ is considered unacceptable and requires further investigation; $5\text{--}10\%$ is good and $< 1\%$ is excellent. Case-fatality calculations should take into consideration children treated in outpatient care, as the more complicated cases that are more likely to die will be in inpatient care. If there are excess deaths in OTP then the triage procedures need to be revised so that high-risk children are not sent for home-treatment.

15.2 Monitoring programme coverage

Coverage refers to individuals who need treatment compared against those actually receiving treatment.

Coverage can be affected by the acceptability of the programme, location and accessibility of programme sites. Other contributory factors include the general security situation, frequency of distributions, waiting time, service quality, extent of mobilization, extent of home visiting and screening, and alignment of screening and admission criteria.

Methodologies to measure coverage vary in the level of reliability and type of information generated. The method used must be stated when reporting. Current guidance should be consulted when deciding which method is appropriate in the given context.

Programme sites should be close to the targeted population, in order to reduce the risks and costs associated with travelling long distances with young children and the risk of people being displaced to reach them.

A quantitative and qualitative assessment of coverage highlighting barriers and enhancers to access assessment should be seen as a management tool. Appropriate actions should be taken in situations of low coverage.

16. MANAGEMENT OF SAM IN EMERGENCY SITUATIONS

16.1 General considerations

There must be in place a contingency plan to deal with an emergency. Prior planning and anticipation (prepositioning of supplies etc.) is the key to an adequate emergency response. But the whole key is co-ordination so that all the participants are fully aware of their responsibilities and the command and control structure that swings into place in the face of an emergency. A system of communication to all actors involved is critical. There should be a separate written emergency response document available to be activated as soon as an emergency is declared (refer to Strategy 6 of the National Food and Nutrition Policy - NFNP).

Health workers in emergency situations may have to manage a large number of children with SAM. Although the principles of management are the same as in routine situations, increased resources and support are needed to deal with the capacity gap for managing increased case-loads without jeopardizing the essential features of care. This often requires that temporary field and/or mobile centres are established, or that existing health facilities receive additional support in human resources, supply management, supervision, training and mentoring for scaling up service delivery. In addition, support in community involvement for early identification of cases and referral can assist with finding children early before complications develop, and increasing coverage of services.

Insecurity should be considered when establishing both inpatient and outpatient services, to avoid separating the family for long periods while a child and carer are in inpatient care and to avoid long travel and waiting times for outpatient care. The latter could cause a security risk, especially to female carers.

In the case of population displacement in temporary shelters or camps where all health services will need to be organized, support for infant and young child nutrition should be made available as a core service, as well as a means of monitoring the nutritional status of the population. Management of SAM services should be part of these services if the need has been identified.

16.2 Preparedness/contingency planning

For districts that are prone to disasters or seasonal increase of the incidence of SAM, there should be greater preparedness. Contingency planning for recurrent emergencies should be part of the annual action planning and budgets, for both additional personnel and uninterrupted stocks.

Reinforcing in-service training, mentoring and task-shifting are areas that can help prepare staff. Increasing attention is being particularly given to the use and role of a community-based health workforce that is well trained, equipped and supported to improve access to essential primary health care for hazard-prone communities on a routine basis, and during all phases of an emergency. This includes efforts to promote scale-up of the community-based workforce. Appropriately trained and supervised community health workers, supported with appropriate supplies of medicines and equipment, can be used to identify and correctly treat many childhood illnesses, including screening for SAM.

16.3 Emergency response

16.3.1 Reinforcing health services for receiving a large influx of children

It should be a priority to provide support to existing sites and/or setting up additional and/or mobile sites to ensure that health services remain accessible to the affected population, and are able to manage the increased case-load without compromising service quality. Besides making financial resources available, the following should be considered:

- Human resources support: reinforce existing essential staff or deploy teams of health workers, supervisors, logisticians and community outreach staff; use of volunteers can help reduce waiting times and share the work burden.
- Supply support: provide additional essential medicines, vaccines and therapeutic foods, and provide related logistic management support, including placing orders, transportation, storage and distribution.
- Information support: strengthen monitoring and reporting, and surveillance (case-load estimations for planning), including analysis to demonstrate quality of services.
- Anticipative training of staff: specialized staff at central and decentralized levels (including nutritionists, nurses, doctors, social workers, community health workers) are to be trained to be skilled and able to provide appropriate responses in emergency situations.

16.3.2 Example for strengthening outpatient care

The use of mobile teams or adding activities for managing SAM to community health teams can help improve access to families and improve coverage of services, which may contribute to avoidance of unnecessary population movement and long waiting times. Mobile teams require trained health workers, and drug and supply kits, including RUTF. Clear guidance should be given to the carers and community about the care package, including monitoring of treatment progress. Additional services can be established on a temporary basis, in displacement or refugee camps or affected areas, but care should be taken to ensure adequate services are provided for both host and incoming populations, and to ensure equity for all socioeconomic and age groups accessing services.

Attention is necessary to accommodate additional population movement caused by insecurity or environmental hazards such as flooding, and to ensure there is no loss to follow-up. Active engagement of the community and the use of community-appointed volunteers who know the context can be helpful.

16.3.3 Example for strengthening inpatient care

Either existing health and nutrition services can be reinforced or temporary service-delivery sites may be established to meet need.

▪ *Location and capacity*

The inpatient care site should be in a ward or in a temporary structure in the compound of a hospital. One site can serve up to 50 children. If there are more than 50–100 children, a second site should be established. Each site should include a unit for intensive care

cases, to provide round-the-clock specialized care for initial treatment to stabilize children with complications, and either an area for recovering cases or a strong system for referral to outpatient care.

▪ **Equipment and supplies**

The site should be well equipped and receive appropriate medical supplies and therapeutic foods, based on the estimated number of infants and children with SAM. Food should be made available for mothers or carers.

▪ **Water supply and sanitation**

A minimum of 30 L of water should be available per child per day. If less than 10 L of water are available per child per day, the site will be unable to function. A latrine and a bathing area are required for every 20 persons. Hand-washing facilities for health workers and carers are essential, to help reduce the risk of cross-infection.

▪ **Cooking and storage facilities**

A collective kitchen should be organized and a reliable supply of fuel for cooking ensured. Secure storage facilities are required for therapeutic food and medical supplies.

▪ **Staff**

Each inpatient care site should have, as a minimum, one part-time doctor, three nurses and ten aides, one nutritionist, one social worker and one psychologist. Mothers or carers of the children may also provide some assistance.

16.4 Principles of management


The principles of management are the same as in a routine service setting. A qualified health worker should evaluate each child and be trained to do emergency triage; assessment and treatment; and diagnosis, including deciding whether treatment should be in outpatient or inpatient care. Treatment should include routine drug and dietary treatment with therapeutic foods that comply with WHO specifications, and cover other medical conditions that have been diagnosed, as outlined in previous sections. Referral to outpatient care, after stabilization of SAM with medical complications, can be organized in the outpatient department of the hospital and in decentralized health services.

16.5 Other considerations

Adapting admission or discharge criteria after full recovery may be considered at certain times of an emergency response, depending on the availability of resources.

16.5.1 Community participation

Given the high number of cases that can arise in an emergency, emphasis on case-finding and community mobilization can help find children before complications set in, and facilitate management on an outpatient basis rather than an inpatient basis with limited



bed capacity. Additional support can be provided through home visits. Communities should always be engaged in the discussing, planning, decision-making, implementation, monitoring and evaluation of programmes and can be an important means of both alerting about problem areas (disease outbreaks, high levels of acute malnutrition) and informing the community about changes in service delivery in response to the emergency.

16.5.2 Early childhood development activities

WHO now advocates combined psychosocial and nutritional programming in situations of food shortage, in order to address the physical, social, emotional and intellectual developmental needs of the child and to enhance maternal well-being. During food-shortage emergencies, integrating simple early stimulation, learning and play activities with nutritional support is crucially important, to increase and sustain the impact on a young child's health and nutritional status. The various points of emergency feeding programmes can provide access to a large group of vulnerable children and carers. Children's needs should be addressed through the provision of child-friendly spaces and early childhood development centres, which often incorporate nutritional programmes. Child participation is important, especially of those from vulnerable groups, including those who are HIV-positive or who have mental or physical disabilities. Key activities are discussed in Chapter 9. Ideally, an emergency nutrition programme should include an early childhood development specialist as part of the team, who is responsible for helping train nutrition and psychosocial staff and volunteers in ECD activities.

16.5.3 Infant and young child nutrition

Impeded breastfeeding practices or separation of an infant from the mother or carer can give rise to greater problems in the population of infants aged under 6 months. Provision should be made to ensure adequate screening, support and management of this age group, including establishing safe areas for infant and young child feeding support if required. Provision of infant formula might be required, while taking care that this does not interfere with infant feeding.

16.5.4 Expanding associated health activities

Additional attention to expanded measles immunization, distribution of micronutrients, cholera kits and cooking kits, shelters kits and others kits, mosquito nets and hygiene promotion might be required. In an outbreak of acute watery diarrhoea or cholera, it is essential that clear instructions are given about where a child with both SAM and acute watery diarrhoea should be treated, to ensure both that the child is adequately hydrated and that there is no cross-infection with other immune-compromised children being treated in the same facility.

ANNEXES

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Annex 1: Anthropometric measurement techniques

▪ *Checking for bilateral oedema*

Bilateral oedema is the sign of kwashiorkor. Kwashiorkor is always a severe form of malnourishment. Children with bilateral oedema are directly identified to be severely acutely malnourished. These children are at high risk of mortality and need to be treated in a therapeutic feeding programme urgently.

In order to determine the presence of oedema:

- Normal thumb pressure is applied to the both feet for at least three seconds.
- If a shallow print persists on the both feet, then the child has oedema.

Only children with bilateral oedema are recorded as having nutritional oedema.

You must formally test for oedema with finger pressure, You cannot tell by just looking



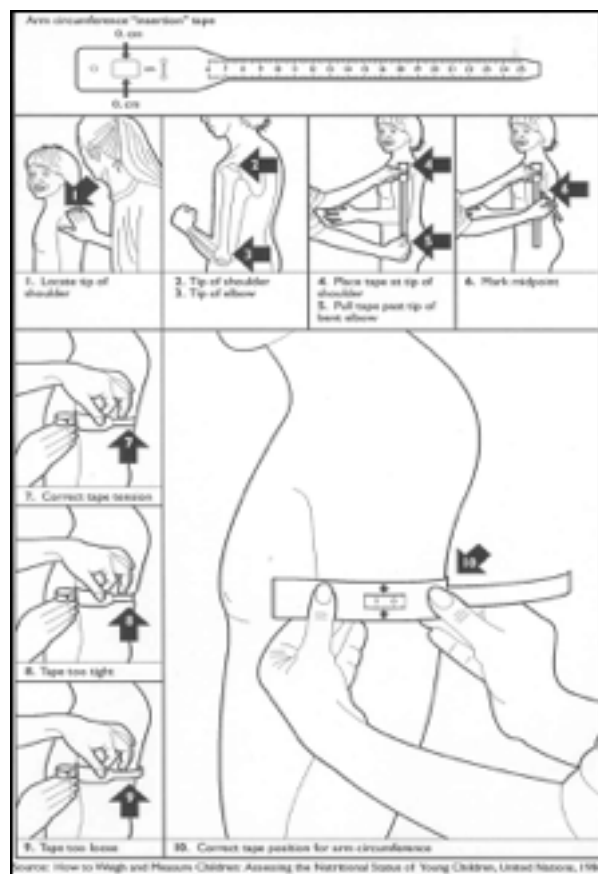
Severity of the oedema	Recording
Mild: both feet	+
Moderate: both feet, plus lower legs, hands or lower arms	++
Intermediate between mild and severe	
Severe: generalised oedema including both feet, legs, hands, arms and face	+++

▪ Taking MUAC

MUAC is used as an alternative measure of “thinness” to weight-for-height. It is particularly used in children from one to five years: however, its use has been extended to include children starting at 6 months of age.

- Ask the mother to remove clothing that may cover the child’s left arm.
- Calculate the midpoint of the child’s left upper arm. This can be done by taking a piece of string (or the tape itself), place one end on the tip of the child’s shoulder (arrow 1) and the other on the elbow (arrow 2), now bend the string up in a loop to double it so the point at the elbow is placed together with the point on the shoulder with a loop hanging down – the end of the straightened loop indicates the mid-point.

- As an alternative, place the tape at zero, which is indicated by two arrows, on the tip of the shoulder (arrow 4) and pull the tape straight down past the tip of the elbow (arrow 5). Read the number at the tip of the elbow to the nearest centimetre.
- Divide this number by two to estimate the midpoint. Mark the midpoint with a pen on the arm (arrow 6).
- Straighten the child's arm and wrap the tape around the arm at the midpoint. Make sure the numbers are right side up. Make sure the tape is flat around the skin (arrow 7).
- Inspect the tension of the tape on the child's arm. Make sure the tape has the proper tension (arrow 7) and is not too tight so that the skin is compressed or too loose so that the tape does not contact the skin all the way round the arm (arrows 8 and 9).
- Repeat any step as necessary.
- When the tape is in the correct position on the arm with correct tension, read and call out the measurement to the nearest 0.1cm (arrow 10).
- Immediately record the measurement.



■ Taking the weight

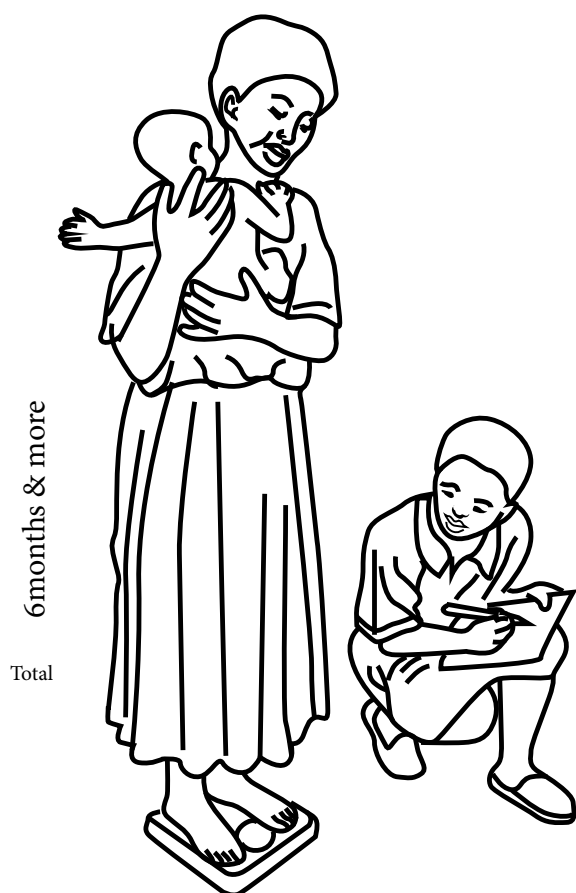
Children may be weighed by using a 25 kg hanging spring scale graduated to 0.1 kg or an electronic balance (e.g. UNISCALE).

- Do not forget to re-adjust the scale to zero before each weighing.
- A plastic washing-basin should be attached by 4 ropes that go underneath the basin. The basin needs to be close to the ground in case the child falls out, and to

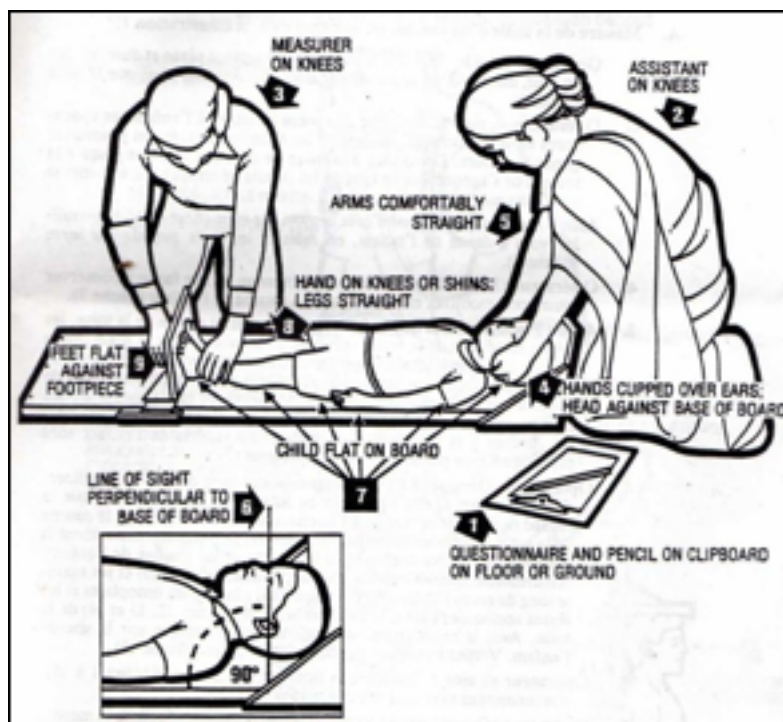
make the child feel secure during weighing.

- If the basin is dirtied then it should be cleaned with disinfectant. This is much more comfortable and familiar for the child, can be used for ill children and is easily cleaned. Weighing pants that are used during surveys should not be used; they are uncomfortable, difficult to use, inappropriate for sick children and quickly get soiled to pass an infection to the next patient.
- When the child is steady, read the measurement to the nearest 100 g, with the frame of the scale at eye level. Each day, the scales must be checked by using a known weight.

Mother and child scale 100 g precision and hanging spring scale for children



▪ Taking the length/height

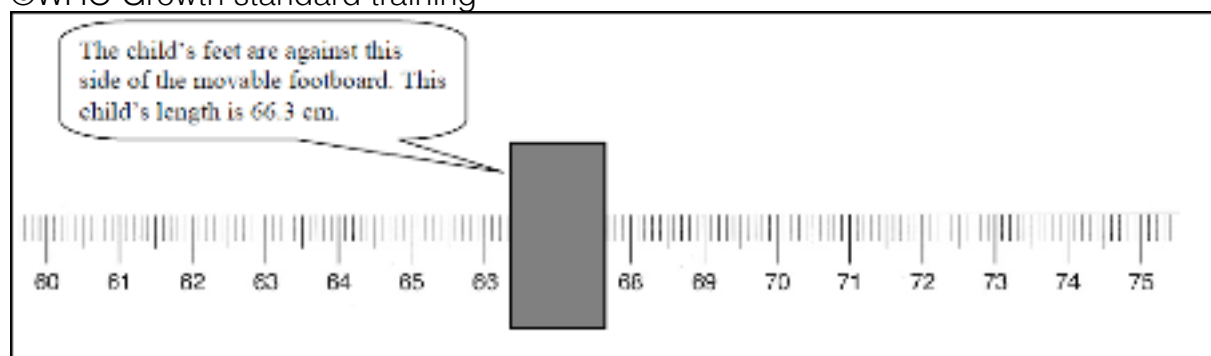


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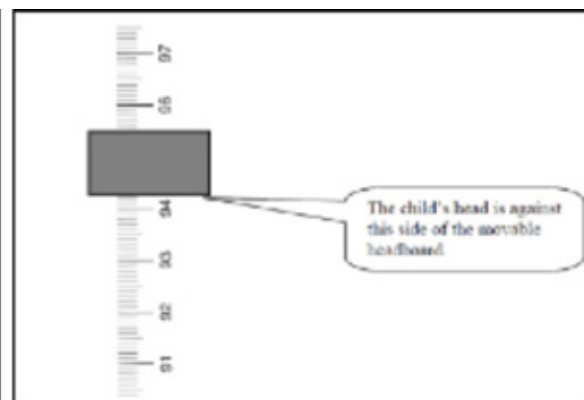
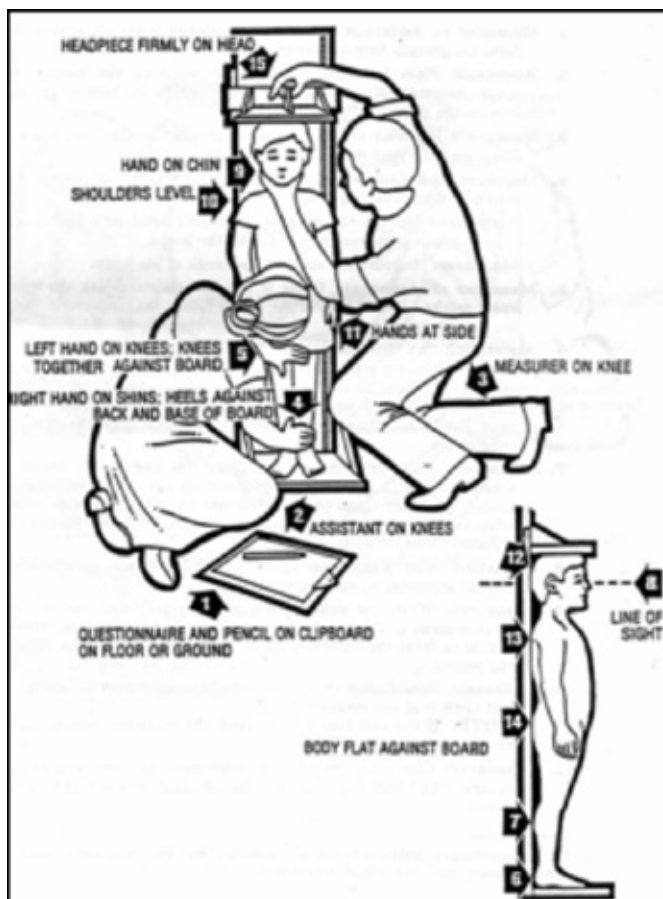
For children less than 87 cm, the measuring board is placed on the ground. The child is placed lying along the middle of the board. The assistant holds the sides of the child's head and positions the head until it firmly touches the fixed headboard with the hair compressed. The measurer places her hands on the child's legs, gently stretches the child and then keeps one hand on the thighs to prevent flexion. While positioning the child's legs, the sliding foot-plate is pushed firmly against the bottom of the child's feet. To read the measure, the foot-plate must be perpendicular to the axis of the board and vertical. The height is read to the nearest 0.1 cm

The longer lines indicate centimetre marking; the shorter lines indicate millimetre.

©WHO Growth standard training



For children more than 87 cm, the measuring board is fixed upright on level ground. The child stands upright in the middle, against the measuring board. The child's head, shoulders, buttocks, knees, heels are held against the board by the assistant, while the measurer positions the head and the cursor. The height is read to the nearest 0.1 cm.



[illegible]

Annex 3. Weight-for-height table (WHO, 2006)

Use for both boys and girls														
Length	Weight Kg – Z-score							Length	Weight Kg – Z-score					
	very severe	severe SAM	moderate MAM	discharge IMAM		median			very severe	severe SAM	moderate MAM	discharge IMAM		median
cm	-4.0	-3	-2	-1.5	-1	0		cm	-4.0	-3	-2	-1.5	-1	0
Use Length for less than 87 cm														
45	1.73	1.88	2.04	2.13	2.23	2.44		66	5.5	5.9	6.4	6.7	6.9	7.5
45.5	1.79	1.94	2.11	2.21	2.31	2.52		66.5	5.6	6	6.5	6.8	7	7.6
46	1.85	2.01	2.18	2.28	2.38	2.61		67	5.7	6.1	6.6	6.9	7.1	7.7
46.5	1.91	2.07	2.26	2.36	2.46	2.69		67.5	5.8	6.2	6.7	7	7.2	7.9
47	1.97	2.14	2.33	2.43	2.54	2.78		68	5.8	6.3	6.8	7.1	7.3	8
47.5	2.04	2.21	2.40	2.51	2.62	2.86		68.5	5.9	6.4	6.9	7.2	7.5	8.1
48	2.10	2.28	2.48	2.58	2.70	2.95		69	6.0	6.5	7	7.3	7.6	8.2
48.5	2.17	2.35	2.55	2.66	2.78	3.04		69.5	6.1	6.6	7.1	7.4	7.7	8.3
49	2.23	2.42	2.63	2.75	2.87	3.13		70	6.2	6.6	7.2	7.5	7.8	8.4
49.5	2.31	2.50	2.71	2.83	2.96	3.23		70.5	6.3	6.7	7.3	7.6	7.9	8.5
50	2.38	2.58	2.80	2.92	3.05	3.33		71	6.3	6.8	7.4	7.7	8	8.6
50.5	2.46	2.66	2.89	3.01	3.14	3.43		71.5	6.4	6.9	7.5	7.8	8.1	8.8
51	2.54	2.75	2.98	3.11	3.24	3.54		72	6.5	7	7.6	7.9	8.2	8.9
51.5	2.62	2.83	3.08	3.21	3.34	3.65		72.5	6.6	7.1	7.6	8	8.3	9
52	2.70	2.93	3.17	3.31	3.45	3.76		73	6.6	7.2	7.7	8	8.4	9.1
52.5	2.79	3.02	3.28	3.41	3.56	3.88		73.5	6.7	7.2	7.8	8.1	8.5	9.2
53	2.88	3.12	3.38	3.53	3.68	4.01		74	6.8	7.3	7.9	8.2	8.6	9.3
53.5	2.98	3.22	3.49	3.64	3.80	4.14		74.5	6.9	7.4	8	8.3	8.7	9.4
54	3.08	3.33	3.61	3.76	3.92	4.27		75	6.9	7.5	8.1	8.4	8.8	9.5
54.5	3.18	3.55	3.85	4.01	4.18	4.55		75.5	7.0	7.6	8.2	8.5	8.8	9.6
55	3.29	3.67	3.97	4.14	4.31	4.69		76	7.1	7.6	8.3	8.6	8.9	9.7
55.5	3.39	3.78	4.10	4.26	4.44	4.83		76.5	7.2	7.7	8.3	8.7	9	9.8
56	3.50	3.90	4.22	4.40	4.58	4.98		77	7.2	7.8	8.4	8.8	9.1	9.9
56.5	3.61	4.02	4.35	4.53	4.71	5.13		77.5	7.3	7.9	8.5	8.8	9.2	10
57	3.7	4	4.3	4.5	4.7	5.1		78	7.4	7.9	8.6	8.9	9.3	10.1
57.5	3.8	4.1	4.5	4.7	4.9	5.3		78.5	7.4	8	8.7	9	9.4	10.2
58	3.9	4.3	4.6	4.8	5	5.4		79	7.5	8.1	8.7	9.1	9.5	10.3
58.5	4.0	4.4	4.7	4.9	5.1	5.6		79.5	7.6	8.2	8.8	9.2	9.5	10.4
59	4.2	4.5	4.8	5	5.3	5.7		80	7.6	8.2	8.9	9.2	9.6	10.4
59.5	4.3	4.6	5	5.2	5.4	5.9		80.5	7.7	8.3	9	9.3	9.7	10.5
60	4.4	4.7	5.1	5.3	5.5	6		81	7.8	8.4	9.1	9.4	9.8	10.6
60.5	4.5	4.8	5.2	5.4	5.6	6.1		81.5	7.8	8.5	9.1	9.5	9.9	10.7
61	4.6	4.9	5.3	5.5	5.8	6.3		82	7.9	8.5	9.2	9.6	10	10.8
61.5	4.7	5	5.4	5.7	5.9	6.4		82.5	8.0	8.6	9.3	9.7	10.1	10.9
62	4.8	5.1	5.6	5.8	6	6.5		83	8.1	8.7	9.4	9.8	10.2	11
62.5	4.9	5.2	5.7	5.9	6.1	6.7		83.5	8.2	8.8	9.5	9.9	10.3	11.2
63	5.0	5.3	5.8	6	6.2	6.8		84	8.3	8.9	9.6	10	10.4	11.3
63.5	5.1	5.4	5.9	6.1	6.4	6.9		84.5	8.3	9	9.7	10.1	10.5	11.4
64	5.1	5.5	6	6.2	6.5	7		85	8.4	9.1	9.8	10.2	10.6	11.5
64.5	5.2	5.6	6.1	6.3	6.6	7.1		85.5	8.5	9.2	9.9	10.3	10.7	11.6
65	5.3	5.7	6.2	6.4	6.7	7.3		86	8.6	9.3	10	10.4	10.8	11.7
65.5	5.4	5.8	6.3	6.5	6.8	7.4		86.5	8.7	9.4	10.1	10.5	11	11.9

Use for both boys and girls														
Height	Weight Kg – Z-score							Height	Weight Kg – Z-score					
	very sever e	severe SAM	moderate MAM	discharge IMAM	median				very severe	severe SAM	moderate MAM	discharge IMAM	median	
cm	-4.0	-3	-2	-1.5	-1	0		cm	-4.0	-3	-2	-1.5	-1	0
Use Height for more than or equal to 87 cm														
87	9.0	9.6	10.4	10.8	11.2	12.2		104	12.0	13	14	14.6	15.2	16.5
87.5	9.0	9.7	10.5	10.9	11.3	12.3		104.5	12.1	13.1	14.2	14.7	15.4	16.7
88	9.1	9.8	10.6	11	11.5	12.4		105	12.2	13.2	14.3	14.9	15.5	16.8
88.5	9.2	9.9	10.7	11.1	11.6	12.5		105.5	12.3	13.3	14.4	15	15.6	17
89	9.3	10	10.8	11.2	11.7	12.6		106	12.4	13.4	14.5	15.1	15.8	17.2
89.5	9.4	10.1	10.9	11.3	11.8	12.8		106.5	12.5	13.5	14.7	15.3	15.9	17.3
90	9.5	10.2	11	11.5	11.9	12.9		107	12.6	13.7	14.8	15.4	16.1	17.5
90.5	9.6	10.3	11.1	11.6	12	13		107.5	12.7	13.8	14.9	15.6	16.2	17.7
91	9.7	10.4	11.2	11.7	12.1	13.1		108	12.8	13.9	15.1	15.7	16.4	17.8
91.5	9.8	10.5	11.3	11.8	12.2	13.2		108.5	13.0	14	15.2	15.8	16.5	18
92	9.9	10.6	11.4	11.9	12.3	13.4		109	13.1	14.1	15.3	16	16.7	18.2
92.5	9.9	10.7	11.5	12	12.4	13.5		109.5	13.2	14.3	15.5	16.1	16.8	18.3
93	10.0	10.8	11.6	12.1	12.6	13.6		110	13.3	14.4	15.6	16.3	17	18.5
93.5	10.1	10.9	11.7	12.2	12.7	13.7		110.5	13.4	14.5	15.8	16.4	17.1	18.7
94	10.2	11	11.8	12.3	12.8	13.8		111	13.5	14.6	15.9	16.6	17.3	18.9
94.5	10.3	11.1	11.9	12.4	12.9	13.9		111.5	13.6	14.8	16	16.7	17.5	19.1
95	10.4	11.1	12	12.5	13	14.1		112	13.7	14.9	16.2	16.9	17.6	19.2
95.5	10.4	11.2	12.1	12.6	13.1	14.2		112.5	13.9	15	16.3	17	17.8	19.4
96	10.5	11.3	12.2	12.7	13.2	14.3		113	14.0	15.2	16.5	17.2	18	19.6
96.5	10.6	11.4	12.3	12.8	13.3	14.4		113.5	14.1	15.3	16.6	17.4	18.1	19.8
97	10.7	11.5	12.4	12.9	13.4	14.6		114	14.2	15.4	16.8	17.5	18.3	20
97.5	10.8	11.6	12.5	13	13.6	14.7		114.5	14.3	15.6	16.9	17.7	18.5	20.2
98	10.9	11.7	12.6	13.1	13.7	14.8		115	14.5	15.7	17.1	17.8	18.6	20.4
98.5	11.0	11.8	12.8	13.3	13.8	14.9		115.5	14.6	15.8	17.2	18	18.8	20.6
99	11.1	11.9	12.9	13.4	13.9	15.1		116	14.7	16	17.4	18.2	19	20.8
99.5	11.2	12	13	13.5	14	15.2		116.5	14.8	16.1	17.5	18.3	19.2	21
100	11.2	12.1	13.1	13.6	14.2	15.4		117	15.0	16.2	17.7	18.5	19.3	21.2
100.5	11.3	12.2	13.2	13.7	14.3	15.5		117.5	15.1	16.4	17.9	18.7	19.5	21.4
101	11.4	12.3	13.3	13.9	14.4	15.6		118	15.2	16.5	18	18.8	19.7	21.6
101.5	11.5	12.4	13.4	14	14.5	15.8		118.5	15.3	16.7	18.2	19	19.9	21.8
102	11.6	12.5	13.6	14.1	14.7	15.9		119	15.4	16.8	18.3	19.1	20	22
102.5	11.7	12.6	13.7	14.2	14.8	16.1		119.5	15.6	16.9	18.5	19.3	20.2	22.2
103	11.8	12.8	13.8	14.4	14.9	16.2		120	15.7	17.1	18.6	19.5	20.4	22.4
103.5	11.9	12.9	13.9	14.5	15.1	16.4								

Note: These tables are derived from the WHO 2006 standards for boys. Because using separate tables for boys and girls may lead to many more boys being admitted to therapeutic programmes than girls, the use of the boys' table for both sexes is recommended to avoid discrimination against female children. It is recommended that the discharge criteria should be -1.5 Z-score where there are adequate follow-up arrangements and/or a supplementary feeding programme to which the children can be referred. © Michael Golden

Annex 4. Weight-for-height: adolescents

Height (cm)	100% Median	85% (target)	<80% mod	<70% Severe	sex
120.5	22.1	18.8	17.7	15.5	mf
121	22.3	19	17.8	15.6	mf
121.5	22.5	19.1	18	15.8	mf
122	22.7	19.3	18.2	15.9	mf
122.5	23	19.5	18.4	16.1	mf
123	23.2	19.7	18.6	16.2	mf
123.5	23.5	19.9	18.8	16.4	mf
124	23.7	20.1	19	16.6	mf
124.5	24	20.4	19.2	16.8	mf
125	24.2	20.6	19.4	16.9	mf
125.5	24.5	20.8	19.6	17.1	mf
126	24.7	21	19.8	17.3	mf
126.5	25	21.2	20	17.5	mf
127	25.3	21.5	20.2	17.7	mf
127.5	25.5	21.7	20.4	17.9	mf
128	25.8	21.9	20.7	18.1	mf
128.5	26.1	22.2	20.9	18.3	mf
129	26.4	22.4	21.1	18.5	mf
129.5	26.7	22.7	21.3	18.7	mf
130	27	22.9	21.6	18.9	mf
130.5	27.3	23.2	21.8	19.1	mf
131	27.6	23.4	22.1	19.3	mf
131.5	27.9	23.7	22.3	19.5	mf
132	28.2	24	22.5	19.7	mf
132.5	28.5	24.2	22.8	19.9	mf
133	28.8	24.5	23	20.2	mf
133.5	29.1	24.7	23.3	20.4	mf
134	29.4	25	23.5	20.6	mf
134.5	29.7	25.3	23.8	20.8	mf
135	30.1	25.6	24.1	21.1	mf
135.5	30.4	25.8	24.3	21.3	mf
136	30.7	26.1	24.6	21.5	mf
136.5	31	26.4	24.8	21.7	mf
137	31.4	26.7	25.1	22	mf
137.5	31.7	27	25.4	22.2	mf
138	32.1	27.2	25.6	22.4	mf
138.5	32.4	27.5	25.9	22.7	mf
139	32.7	27.8	26.2	22.9	mf
139.5	33.1	28.1	26.4	23.1	mf
140	33.4	28.4	26.7	23.4	mf
140.5	33.7	28.7	27	23.6	mf
141	34.1	29	27.3	23.9	mf
141.5	34.4	29.2	27.5	24.1	mf
142	34.8	29.5	27.8	24.3	mf
142.5	35.1	29.8	28.1	24.6	mf
143	35.4	30.1	28.3	24.8	mf
143.5	35.8	30.4	28.6	25	mf

Height (cm)	100% Median	85% (target)	<80% mod	<70% Severe	sex
168.5	56.2	47.7	44.9	39.3	m
169	56.7	48.2	45.4	39.7	m
169.5	57.3	48.7	45.8	40.1	m
170	57.8	49.2	46.3	40.5	m
170.5	58.4	49.6	46.7	40.9	m
171	59	50.1	47.2	41.3	m

This table has been constructed using the NCHS standards. The height-for-age and weight-for-age standards were amalgamated to determine the median weight for height. The sexes were combined when the unisex standard is within 1.5% of the body weight of the standard for either sex.

Annex 5 BMI Chart: Adult

BODY MASS INDEX (ADULTS) (=W/H²) Wt in kg and height in metres.

Height (cm)	BMI					
	18,5	18	17,5	17	16,5	16
	Weight in Kg					
140	36,3	35,3	34,3	33,3	32,3	31,4
141	36,8	35,8	34,8	33,8	32,8	31,8
142	37,3	36,3	35,3	34,3	33,3	32,3
143	37,8	36,8	35,8	34,8	33,7	32,7
144	38,4	37,3	36,3	35,3	34,2	33,2
145	38,9	37,8	36,8	35,7	34,7	33,6
146	39,4	38,4	37,3	36,2	35,2	34,1
147	40,0	38,9	37,8	36,7	35,7	34,6
148	40,5	39,4	38,3	37,2	36,1	35,0
149	41,1	40,0	38,9	37,7	36,6	35,5
150	41,6	40,5	39,4	38,3	37,1	36,0
151	42,2	41,0	39,9	38,8	37,6	36,5
152	42,7	41,6	40,4	39,3	38,1	37,0
153	43,3	42,1	41,0	39,8	38,6	37,5
154	43,9	42,7	41,5	40,3	39,1	37,9
155	44,4	43,2	42,0	40,8	39,6	38,4
156	45,0	43,8	42,6	41,4	40,2	38,9
157	45,6	44,4	43,1	41,9	40,7	39,4
158	46,2	44,9	43,7	42,4	41,2	39,9
159	46,8	45,5	44,2	43,0	41,7	40,4
160	47,4	46,1	44,8	43,5	42,2	41,0
161	48,0	46,7	45,4	44,1	42,8	41,5
162	48,6	47,2	45,9	44,6	43,3	42,0
163	49,2	47,8	46,5	45,2	43,8	42,5
164	49,8	48,4	47,1	45,7	44,4	43,0

Height (cm)	BMI					
	18,5	18	17,5	17	16,5	16
	Weight in Kg					
165	50,4	49,0	47,6	46,3	44,9	43,6
166	51,0	49,6	48,2	46,8	45,5	44,1
167	51,6	50,2	48,8	47,4	46,0	44,6
168	52,2	50,8	49,4	48,0	46,6	45,2
169	52,8	51,4	50,0	48,6	47,1	45,7
170	53,5	52,0	50,6	49,1	47,7	46,2
171	54,1	52,6	51,2	49,7	48,2	46,8
172	54,7	53,3	51,8	50,3	48,8	47,3
173	55,4	53,9	52,4	50,9	49,4	47,9
174	56,0	54,5	53,0	51,5	50,0	48,4
175	56,7	55,1	53,6	52,1	50,5	49,0
176	57,3	55,8	54,2	52,7	51,1	49,6
177	58,0	56,4	54,8	53,3	51,7	50,1
178	58,6	57,0	55,4	53,9	52,3	50,7
179	59,3	57,7	56,1	54,5	52,9	51,3
180	59,9	58,3	56,7	55,1	53,5	51,8
181	60,6	59,0	57,3	55,7	54,1	52,4
182	61,3	59,6	58,0	56,3	54,7	53,0
183	62,0	60,3	58,6	56,9	55,3	53,6
184	62,6	60,9	59,2	57,6	55,9	54,2
185	63,3	61,6	59,9	58,2	56,5	54,8
186	64,0	62,3	60,5	58,8	57,1	55,4
187	64,7	62,9	61,2	59,4	57,7	56,0
188	65,4	63,6	61,9	60,1	58,3	56,6
189	66,1	64,3	62,5	60,7	58,9	57,2
190	66,8	65,0	63,2	61,4	59,6	57,8

BMI	INTERPRETATION
< 16.0	severe thinness
16.0 - 16.9	moderate thinness
17.0 - 18.4	marginal thinness
18.5 - 24.9	normal

Source : WHO (1995) Physical status : the use and interpretation of anthropometry,
Report of a WHO expert committee, WHO

12.25 Annex 6. Registration book for OTP and IPF Pages 1 and 2

	1226	Exit from facility					Type of Exit		Date of Minimum Weight	Minimum Weight	Observation
		Date	Wt kg.g	W/LorH	Oed 0,1,2,3	MUAC mm	Type	Int. Transfer out			
								Name of IPF/OTP			
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Annex 7. OTP chart page 1 and 2

OTP Chart			
ID NO of the patient..... Reg NO of the facility..... Admission date.....			
OTP name District.....			
Reason of Admission MUACmm W/H.....Z-score OR Œdema Yes <input type="checkbox"/> No <input type="checkbox"/>			
Patient Name.....	Breast feeding Yes <input type="checkbox"/> No <input type="checkbox"/>	Major Problem.....	
Family Name.....	Twins Yes <input type="checkbox"/> No <input type="checkbox"/>	
Age (mo)..... Sex	Parents alive Yes <input type="checkbox"/> No <input type="checkbox"/>	Update Immunisation Yes <input type="checkbox"/> No <input type="checkbox"/>	
Address.....	Caretaker:	Immunisation card Yes <input type="checkbox"/> No <input type="checkbox"/>	
.....	Name.....	Measles 1.....	
Phone #	Health of caretaker.....	2.....	
Admission Information			
Before beginning treatment (circle the answer)		TYPE of ADMISSION	
Referral BY: Spontaneous / Active screening / HC /(circle answer)		<input type="checkbox"/> New admission	
During the treatment		<input type="checkbox"/> Internal Transfer-IN	
INTERNAL TRANSFER- IN: Yes <input type="checkbox"/> No <input type="checkbox"/>		<input type="checkbox"/> Relapse	
if Yes, IPF / Other OTP / District hospital (circle the answer)		<input type="checkbox"/> Readmission after defaulting <2months	
Name of..... Registration NO			
Date of IMAM admission..... Date of transfer.....			
Examination		Education given	
Circle the answer	Theme	Date	Signature
Condition of Patient: Normal / Sick / Very sick	Causes of malnutrition		
Handicap: Yes <input type="checkbox"/> No <input type="checkbox"/> If yes,	Diarrhoea, fever, ARI		
Respiration: Normal / Fast	Infection (skin, eyes, ear)		
Eyes: Normal / Vitamin A deficit / photophobia	Play & stimulation		
Skin lesions	Nutrition – child care		
Oedema (0, +, ++, +++).	Hygiene		
Home Visit (HV)			
DATE	REASON(S)	DATE HV	CONCLUSION
Internal Transfer-TO-IPF during treatment in OTP			
DATE	REASON(S)	WHERE	RESULT (RETURN-DATE/NOT RETURN/DEATH)
Discharge			
Date of discharge/...../.....			
Cured <input type="checkbox"/> Defaulter Confirmed <input type="checkbox"/> cause.....			
Defaulter Unconfirmed <input type="checkbox"/> Dead <input type="checkbox"/> cause.....			
Internal Transfer-TO <input type="checkbox"/> cause.....			
Non Response <input type="checkbox"/> cause.....			
Follow up in SFC			

Admission Length / Height.....cm Target Weightkg.g Target MUAC.....mm																		
Date	Adm	2	3	4	5	6	7	8	9	10	11	12						
Date (dd/mo)																		
Weight (kg.g)																		
Oedema (0,+,++,+++)																		
MUAC (mm)																		
Diarrhoea (0 to #d)																		
Vomiting (0 to #d)																		
Fever (0 to # d)																		
Cough (0 to #d)																		
Pale Conj (0 to ++)																		
Respir.rate /min																		
Temp. C° (Axi/Rect)																		
Malaria test result (0 / - / +)																		
App.test (Good/Mod/Poor)																		
Appetite test (g/ sachet/ bar)																		
Trt carer choice (IPF/OTP)																		
RUTF (# sachets given back)																		
RUTF (# sachets to caretaker)																		
Transfer TO / Absent/Refused transfer																		
Need HomeVisit (Y / N)																		
Routine Medicine																		
Drugs	<i>Date (dd/mm)</i>	<i>Dose</i>			Drugs	<i>Date (dd/mm)</i>	<i>Dose</i>											
Amoxycillin					Deworming													
Vitamin A					Measles vaccine													
Antimalaria drugs					Other													
Specific treatment																		
<i>Date (dd/mm)</i>	<i>Observation</i>						<i>Treatment</i>											
	o																	

Annex 8. Transfer form

INTERNAL TRANSFER FORM during SAM TREATMENT							
ID-Number of Patient 							
Circle the information below and fill in codes							
Transfer FROM	<div style="border: 1px solid black; padding: 2px;">OTP IPF</div>		Facility Name	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></div>		Reg No	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></div>
Transfer -TO	<div style="border: 1px solid black; padding: 2px;">OTP IPF</div>		Facility Name	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></div>			
Phone call	<div style="border: 1px solid black; padding: 2px;">Made Y / N</div>		If returning patient reg no in receiving facility <div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; vertical-align: middle;"></div>				
Fill the administrative information							
Patient's Name	<div style="border: 1px solid black; display: inline-block; width: 300px; height: 1.2em; vertical-align: middle;"></div>			Date of Transfer	<div style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></div>		
Family Name	<div style="border: 1px solid black; display: inline-block; width: 300px; height: 1.2em; vertical-align: middle;"></div>			Sex	<div style="border: 1px solid black; padding: 2px;">M / F</div>	Age (mo.)	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>
Address	<div style="border: 1px solid black; display: inline-block; width: 300px; height: 1.2em; vertical-align: middle;"></div>			Name of the caretaker	<div style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></div>		
Phone No	<div style="border: 1px solid black; display: inline-block; width: 400px; height: 1.2em; vertical-align: middle;"></div>						
Time & condition of transport	<div style="border: 1px solid black; display: inline-block; width: 600px; height: 1.2em; vertical-align: middle;"></div>						
Fill the information of the follow up of the patient							
	Date	Weight	Height / Length	WH Z	MUAC	Oedema	Result of Appetite Test
Admission	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>
Minimum Weight	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>
Day of Transfer	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>
Complete the information of the diet and medical treatment already given							
	Acute Phase	Transition	Rehab				
F75	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
F100	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
F100 dilute	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
RUTF	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
Date at beginning	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
	Drugs		Date				
Routine treatment	Amoxycillin	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
	Mebendazole	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
	Measles vac.	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
	other	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
	other	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>	<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
Other Specific treatment given			Date				
<div style="border: 1px solid black; display: inline-block; width: 250px; height: 1.2em; vertical-align: middle;"></div>			<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
<div style="border: 1px solid black; display: inline-block; width: 250px; height: 1.2em; vertical-align: middle;"></div>			<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
<div style="border: 1px solid black; display: inline-block; width: 250px; height: 1.2em; vertical-align: middle;"></div>			<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
<div style="border: 1px solid black; display: inline-block; width: 250px; height: 1.2em; vertical-align: middle;"></div>			<div style="border: 1px solid black; display: inline-block; width: 50px; height: 1.2em; vertical-align: middle;"></div>				
Reason for Transfer to IPF (In Patient Facility)							
Failure of appetite test Y / N Complications Y / N if Y Oedema Y / N Failure-to-Responses in OTP Y/N							
SPECIFY:							
<div style="border: 1px solid black; display: inline-block; width: 600px; height: 1.2em; vertical-align: middle;"></div>							
Reason for Transfer to OTP							
Good appetite Y / N No complications Y / N Ready for recovery phase Y / N Return to OTP Y / N Other							
<div style="border: 1px solid black; display: inline-block; width: 600px; height: 1.2em; vertical-align: middle;"></div>							
Any Specific treatment Given or other important items							
<div style="border: 1px solid black; display: inline-block; width: 600px; height: 1.2em; vertical-align: middle;"></div>							
Laboratory test results							
<div style="border: 1px solid black; display: inline-block; width: 600px; height: 1.2em; vertical-align: middle;"></div>							
Name and function of the staff				Date and signature			

Annex 9: Variable RUTF in OTP

week of treatment	RUTF Paste - grams per week				RUTF Sachets (96g)			
	CRITICAL stock shortage	Absolute Minimum (week one)	Intermediate (week two)	STANDARD ration	CRITICAL stock shortage	Absolute Minimum (week one)	Intermediate (week two)	STANDARD ration
Class of weight (kg)	100 kcal/kg/d	135 kcal/kg/d	150 kcal/kg/d	170 kcal/kg/d	100 kcal/kg/d	135 kcal/kg/d	150 kcal/kg/d	170 kcal/kg/d
3.0 - 3.4	440	600	660	750	5	6	7	8
3.5 - 4.9	530	720	800	900	6	8	9	10
5.0 - 6.9	830	1100	1250	1400	9	12	13	15
7.0 - 9.9	1060	1430	1600	1800	12	15	17	20

NOTE: This table can be used if there is a limited supply of RUTF **due to a pipeline break (not planned)**, or if the children have marginal appetites at the start of treatment and the OTP wants to discourage sharing because of a large surplus before the child regains a full appetite. The amount given should NEVER fall below 135 kcal/kg/week. If the amount falls below 100 kcal/kg/d the children will lose weight and deteriorate. NOTE the relatively small difference between the Critical and standard amounts to be dispensed! It is the "little" extra which gives the impetus for growth - this is why sharing in the family can lead to low recovery rates and this needs to be explained to the caretaker and her family.

Annex 10. 5% weight loss and weight gain table

How to diagnose 5% W loss in failure in OTP

5% weight loss (for failure-to-respond in OTP)					
1st week	loss	2nd week	1st week	loss	2nd week
4,0	0,2	3,8	8,0	0,4	7,6
4,1	0,2	3,9	8,1	0,4	7,7
4,2	0,2	4,0	8,2	0,4	7,8
4,3	0,2	4,1	8,3	0,4	7,9
4,4	0,2	4,2	8,4	0,4	8,0
4,5	0,2	4,3	8,5	0,4	8,1
4,6	0,2	4,4	8,6	0,4	8,2
4,7	0,2	4,5	8,7	0,4	8,3
4,8	0,2	4,6	8,8	0,4	8,4
4,9	0,2	4,7	8,9	0,4	8,5
5,0	0,3	4,8	9,0	0,5	8,6
5,1	0,3	4,8	9,1	0,5	8,6
5,2	0,3	4,9	9,2	0,5	8,7
5,3	0,3	5,0	9,3	0,5	8,8
5,4	0,3	5,1	9,4	0,5	8,9
5,5	0,3	5,2	9,5	0,5	9,0
5,6	0,3	5,3	9,6	0,5	9,1
5,7	0,3	5,4	9,7	0,5	9,2
5,8	0,3	5,5	9,8	0,5	9,3
5,9	0,3	5,6	9,9	0,5	9,4
6,0	0,3	5,7	10,0	0,5	9,5
6,1	0,3	5,8	10,1	0,5	9,6
6,2	0,3	5,9	10,2	0,5	9,7
6,3	0,3	6,0	10,3	0,5	9,8
6,4	0,3	6,1	10,4	0,5	9,9
6,5	0,3	6,2	10,5	0,5	10,0
6,6	0,3	6,3	10,6	0,5	10,1
6,7	0,3	6,4	10,7	0,5	10,2
6,8	0,3	6,5	10,8	0,5	10,3
6,9	0,3	6,6	10,9	0,5	10,4
7,0	0,3	6,6	11,0	0,5	10,5
7,1	0,4	6,7	11,1	0,6	10,5
7,2	0,4	6,8	11,2	0,6	10,6
7,3	0,4	6,9	11,3	0,6	10,7
7,4	0,4	7,0	11,4	0,6	10,8
7,5	0,4	7,1	11,5	0,6	10,9
7,6	0,4	7,2	11,6	0,6	11,0
7,7	0,4	7,3	11,7	0,6	11,1
7,8	0,4	7,4	11,8	0,6	11,2
7,9	0,4	7,5	11,9	0,6	11,3
8,0	0,4	7,6	12,0	0,6	11,4

How to diagnose 5% W gain during the treatment of dehydration

5% weight gain (for treatment of dehydration)					
initial	gain	final	initial	gain	final
4,0	0,2	4,2	8,0	0,4	8,4
4,1	0,2	4,3	8,1	0,4	8,5
4,2	0,2	4,4	8,2	0,4	8,6
4,3	0,2	4,5	8,3	0,4	8,7
4,4	0,2	4,6	8,4	0,4	8,8
4,5	0,2	4,7	8,5	0,4	8,9
4,6	0,2	4,8	8,6	0,4	9,0
4,7	0,2	4,9	8,7	0,4	9,1
4,8	0,2	5,0	8,8	0,4	9,2
4,9	0,2	5,1	8,9	0,4	9,3
5,0	0,3	5,3	9,0	0,5	9,5
5,1	0,3	5,4	9,1	0,5	9,6
5,2	0,3	5,5	9,2	0,5	9,7
5,3	0,3	5,6	9,3	0,5	9,8
5,4	0,3	5,7	9,4	0,5	9,9
5,5	0,3	5,8	9,5	0,5	10,0
5,6	0,3	5,9	9,6	0,5	10,1
5,7	0,3	6,0	9,7	0,5	10,2
5,8	0,3	6,1	9,8	0,5	10,3
5,9	0,3	6,2	9,9	0,5	10,4
6,0	0,3	6,3	10,0	0,5	10,5
6,1	0,3	6,4	10,1	0,5	10,6
6,2	0,3	6,5	10,2	0,5	10,7
6,3	0,3	6,6	10,3	0,5	10,8
6,4	0,3	6,7	10,4	0,5	10,9
6,5	0,3	6,8	10,5	0,5	11,0
6,6	0,3	6,9	10,6	0,5	11,1
6,7	0,3	7,0	10,7	0,5	11,2
6,8	0,3	7,1	10,8	0,5	11,3
6,9	0,3	7,2	10,9	0,5	11,4
7,0	0,3	7,3	11,0	0,5	11,6
7,1	0,4	7,5	11,1	0,6	11,7
7,2	0,4	7,6	11,2	0,6	11,8
7,3	0,4	7,7	11,3	0,6	11,9
7,4	0,4	7,8	11,4	0,6	12,0
7,5	0,4	7,9	11,5	0,6	12,1
7,6	0,4	8,0	11,6	0,6	12,2
7,7	0,4	8,1	11,7	0,6	12,3
7,8	0,4	8,2	11,8	0,6	12,4
7,9	0,4	8,3	11,9	0,6	12,5
8,0	0,4	8,4	12,0	0,6	12,6

Annex 11: Weight gain (g/kg per day) after 14 days interval

Gain of Weight (gr/kg/day) for a length of stay of 14 days To be start at Day 14 of the OTP visit											
		Gain of weight (g/kg/day) over 14 days						Gain of weight (g/kg/day) over 14 days			
		2,5	5	10	15			2,5	5	10	15
Weight 14 days before	4,0	4,1	4,3	4,6	4,8	Weight 14 days before	7,0	7,2	7,5	8,0	8,5
	4,1	4,2	4,4	4,7	5,0		7,1	7,3	7,6	8,1	8,6
	4,2	4,3	4,5	4,8	5,1		7,2	7,5	7,7	8,2	8,7
	4,3	4,5	4,6	4,9	5,2		7,3	7,6	7,8	8,3	8,8
	4,4	4,6	4,7	5,0	5,3		7,4	7,7	7,9	8,4	9,0
	4,5	4,7	4,8	5,1	5,4		7,5	7,8	8,0	8,6	9,1
	4,6	4,8	4,9	5,2	5,6		7,6	7,9	8,1	8,7	9,2
	4,7	4,9	5,0	5,4	5,7		7,7	8,0	8,2	8,8	9,3
	4,8	5,0	5,1	5,5	5,8		7,8	8,1	8,3	8,9	9,4
	4,9	5,1	5,2	5,6	5,9		7,9	8,2	8,5	9,0	9,6
	5,0	5,2	5,4	5,7	6,1		8,0	8,3	8,6	9,1	9,7
	5,1	5,3	5,5	5,8	6,2		8,1	8,4	8,7	9,2	9,8
	5,2	5,4	5,6	5,9	6,3		8,2	8,5	8,8	9,3	9,9
	5,3	5,5	5,7	6,0	6,4		8,3	8,6	8,9	9,5	10,0
	5,4	5,6	5,8	6,2	6,5		8,4	8,7	9,0	9,6	10,2
	5,5	5,7	5,9	6,3	6,7		8,5	8,8	9,1	9,7	10,3
	5,6	5,8	6,0	6,4	6,8		8,6	8,9	9,2	9,8	10,4
	5,7	5,9	6,1	6,5	6,9		8,7	9,0	9,3	9,9	10,5
	5,8	6,0	6,2	6,6	7,0		8,8	9,1	9,4	10,0	10,6
	5,9	6,1	6,3	6,7	7,1		8,9	9,2	9,5	10,1	10,8
	6,0	6,2	6,4	6,8	7,3		9,0	9,3	9,6	10,3	10,9
	6,1	6,3	6,5	7,0	7,4		9,1	9,4	9,7	10,4	11,0
	6,2	6,4	6,6	7,1	7,5		9,2	9,5	9,8	10,5	11,1
	6,3	6,5	6,7	7,2	7,6		9,3	9,6	10,0	10,6	11,3
	6,4	6,6	6,8	7,3	7,7		9,4	9,7	10,1	10,7	11,4
	6,5	6,7	7,0	7,4	7,9		9,5	9,8	10,2	10,8	11,5
	6,6	6,8	7,1	7,5	8,0		9,6	9,9	10,3	10,9	11,6
	6,7	6,9	7,2	7,6	8,1		9,7	10,0	10,4	11,1	11,7
	6,8	7,0	7,3	7,8	8,2		9,8	10,1	10,5	11,2	11,9
	6,9	7,1	7,4	7,9	8,3		9,9	10,2	10,6	11,3	12,0
	7,0	7,2	7,5	8,0	8,5		10,0	10,4	10,7	11,4	12,1

Annex 12. IPF charts for patient and infant less than 6 months of age without any carer

Patient N0.....		IPF Multi-Chart		Date of Admission		Date of Discharge	
Major Problem		Hr.....		New Admission		Successfully Treated	
IPF Name.....		Relapse		Inter. Transfer to OTP		Death Cause.....	
IPF 24h/Day Care /Ped. Ward		Readm Abandon <2months		Inter. Transfer from OTP		If Yes, OTP	
Age.....mo / yr		(dd/mm/yy)		If Yes, OTP		Medical Referral	
Birth Date		Sex		Complementary food		Defaulter Cause.....	
HC/Hosp		PPN		- 3) Edema Y / N - 4)		Non-Response in OTP Y / N	
Season admission		1) Fail Appetite test: Y / N - if Y		2) If Complication		3) If Complication	
Date		1		2		3	
Height/Length (cm)		1		2		3	
Weight (Kg)		1		2		3	
Wt for Ht (Z / %)		1		2		3	
MUAC (mm)		1		2		3	
Edema (0 to +++)		1		2		3	
Target weight		1		2		3	
.....kg.....g		1		2		3	
Target Muac		1		2		3	
.....mm		1		2		3	

[illegible]

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Annex 13. Critical care chart

CRITICAL CARE CHART													
Patient's Name		Reg. No		Sheet No		Diagnosis: Check the vital signs that are to be monitored in the "check" column and write in the times in the time row (only check those that are needed) - attach graph for graphing critical signs if necessary							
emergency ward/ casualty/ paediatr ward/ other		ID-No		Oedema: 0 + ++ +++									
Nurse in charge		Dr in Charge											
Time started.....AM/PM		check		Initial Eval.									
HOUR		min/hour											
minution													
Level of Consciousness													
Weight - Kg.g													
Pupillary refill (nail bed) - secs													
Extremities Yes No													
Respiration rate - per min													
Temperature - per min													
Pulse (cm below costal margin)													
Blood pressure (liquid/semi/solid) number													
Capillary refill - number													
Urine Yes No													
Temperature (axilla / rectal)													
Lids retract/sleep eyes open													
Treatment given													
Sodium..... ml													
Fluid..... ml													
D/pack cells..... ml													
Sugar water..... ml													
Ducose 10%..... ml													
Drogen													
Dcloths													
Djaroo - rewarming													
Dg													
Dg													
Dg													

Annex 14. How to insert a nasogastric tube

- Choose the appropriate size tube (range is 6, 8 or 10 FG). Lie infant on her back, swaddled in a small blanket as a mild restraint.
- Measure the tube from the child's ear to the tip of the nose and then to just below the tip of the sternum (for pre-term and neonates from the bridge of the nose to just beyond the tip of the sternum). Hold or mark this position so that you know how far to insert the tube.
- Lubricate the catheter with a jelly-type lubricant, vaseline or at least water and insert through the nose, bending the tube slightly upwards to follow the nasal passage.
- Bend the head slightly backwards to extend the neck. Insert the catheter smoothly and quickly at first pushing upwards (not just backwards) so that the catheter bends in one loop downwards along the back of the throat. Do not push against resistance (if you cannot pass the tube through the nose, pass it through the mouth instead). Take care that the tube does not enter the airway. If the child coughs, fights or becomes cyanotic, remove the tube immediately and allow the patient to rest before trying again. It is vital to check that the tube is in the stomach before anything is put down the tube. This should be re-checked before each feed is given in case the tube has been dislodged from the stomach. Note that sick, apathetic children and those with decreased consciousness can have the tube passed directly into their lungs without coughing. It is not a guarantee that the tube is in the right place just because it has passed smoothly without complaint from the child.
- - The best way to test that the tube is fully in the stomach is to aspirate some of the stomach contents and test for acid with litmus paper. The stomach contents in normal children are acid and turn blue litmus paper red. However, the malnourished frequently have "achlorhydria" (lack of gastric acid). In the absence of litmus paper and in the malnourished child, check that there is the characteristic appearance and smell of stomach contents ("sour" or like vomit).
- - Also check the position by injecting 0.5 – 1 ml of air into the tube whilst listening to over the stomach with a stethoscope. A "gurgling" or bubbling sound can be heard as air enters the stomach.
- - It is always best to ask someone else to check if you are not sure the tube is in the right place, to avoid the risk of milk going onto the lungs. Before each feed, aspirate the tube to check that the previous feed has left the stomach; this may be slow and gentle in very sick children as strong suction can damage the stomach lining. It is important not to cause gastric distension by giving a new feed on top of an old one. The flow of the feed should be slow.
- Attach the reservoir (10 or 20 ml syringe) and elevate it 15 – 20 cm above the patient's head. The diet should always be allowed to flow into the stomach by gravity and not pushed in with the plunger. When the feed is complete, irrigate the nasogastric tube with a few ml of plain water and stopper the tube (or clamp it). Place the child on her side to minimise regurgitation and aspiration. Observe the child after feeding for vomiting, regurgitation or abdominal distension.
- In an IPF the tube should be changed every 3-5 days.

Annex 15. The disadvantages of indwelling cannulae

- They give access to the circulation for antibiotic-resistant bacteria in these immuno-compromised patients
- The dressings quickly become dirty in conventional hospital settings.
- They often become colonised with *Candida* and can give rise to fungal septicaemia.
- They require fluid or anticoagulants to keep the vein open – but these children have impaired liver function (bleeding tendency) and are very sensitive to fluid overload.
- They require skilled health persons to insert, re-site and maintain the cannula: staff time is the limiting factor in most resource-poor settings.
- The administration of IV drugs takes more time, from higher grades of staff, than giving oral drugs.
- IV preparations are much more expensive than oral preparations and the cannula itself is expensive.
- Insertion of the cannula is painful and distressing for the child and they frequently need to be re-inserted.
- The cannula restricts the movements of the child and impairs feeding, washing, play and care.
- Extravasations into the tissue can cause skin necrosis and other complications.



Example of fluid extravasation with scalp necrosis and resiting of cannula several times

Annex 16. History and examination sheet

History sheet for severe complicated malnutrition/Failure to respond - page 1

ID NO..... Reg NO.....Parent's name:..... First name:..... Age.....d/m/y Sex

Date of examination:/...../..... Examiner's name..... Status

Who is giving the history? *patient/mother/father/sister/grandmother/aunt/other*.....

Is this person the main **caretaker** for the patient at home? *yes/no* If not, who is the **caretaker**?.....

History of present illness

How long has the patient been ill?h/ d/ wk/ mo/ yr

What are the **complaints** - in the patient's own words - and how long has each been present?

1.....h/ d/ wk/ mo/ yr

2.....h/ d/ wk/ mo/ yr

3.....h/ d/ wk/ mo/ yr

4.....h/ d/ wk/ mo/ yr

Describe the details of the complaints, how they have progressed, and the factors associated with each one

.....

.....

.....

.....

.....

.....

.....

.....

.....

Systematic questions (give additional details of abnormal findings above)

Appetite *hungry/ normal/ poor/ very poor* **Weight is** *decreasing/ steady/ increasing*d/ wk/ mo

Swelling: *none/ feet/ legs/ face/ all over*.....d/ wk/ mo **Eyes sunken** *no/ recent/ longstanding*

Diarrhoea *N Y*h/d/wk/mo stools per day *Normal/ watery/ soft/ blood/ mucus/ green/ pale*

Vomiting *N Y* ..h/d/wk/mo. No per day..... Repeated episodes of Diarrhoea *N Y*

Breathing: *normal/ fast/ noisy/ difficult* forh/d/wk **Cough:** *N Y* - for.....d/wk/mo

Fever *N Y* **Convulsions** *N Y* **Unconsciousness** *N Y*

Treatment: Patient has already seen *Dr/ Clinic/ Hospital/ Traditional healer*times for this illness.

Treatment given

Past and social history

Past diseases: describe.....

Mother / father absent *N Y* reason..... wk/mo/yr **Patient:** *twin/ fostered/ adopted/ orphan*

Gestation: *early/ normal* or.....wk/ mo **Birth weight:** *large/ normal/ small* orKg

Mother's ageyr **n° live births** **n° Living children**

Family eating together: *n° adults*..... *n° children*.....

Resources (food income crops livestock).....

Diet history

breast feed alone forwk/ mo age stopped breast feeding.....wk/mo

Food before ill *breast/ milk/ porridge/ family plate/ fruit/ leaves/ drinks/ other*

Food since ill *breast/ milk/ porridge/ family plate/ fruit/ leaves/ drinks/ other*

Examination sheet for severe complicated malnutrition/Failure to respond - page 2 - Examination

SAM NY..... Parent's name..... First name..... Age.....d/m/y Sex.....

General: does the patient look: *not-ill/ ill/ very ill/ comatose*
 Mood and behaviour *normal/apathetic/ inactive/ irritable/repeated movements*
 Development / regression Patient can: *sit/ crawl/ stand/ walk*

Ear Nose & Throat

Eyes *normal/ conjunctivitis/ xerosis/ keratomalacia mild/ mod/ severe*
 Mouth *normal/sore/red/smooth tongue/candida/herpes/angular stomatitis*
 Membrane Colour: *normal/pale/jaundiced/cyanosed* Gums *normal/ bleeding*
 Ears *normal/ discharging* Teeth number *—/— normal/ caries/ plaque*

Respiratory system & Chest

Breathing *normal/ noisy/ asymmetrical/ laboured/ wheeze/in drawing*
 Rate/min or more /less than 50/60 Chest *normal/ asymmetric/ pigeon/ sulcus*

Cardiovascular system & Hydration

Oedema *none/+/++/+++/uncertain* feet/ pretibial/ hands/ face/ generalised
 Hydration *normal/ dehydrated/ shock/ uncertain* Passing urine *N / Y*
 Eyes *normal/ sunken/staring* Peripheries *normal/ warm/ cold*
 Capillary refill *quick/ slow/ very slow*secs Visible veins *full/ normal/ empty*
 Pulse rate...../min *normal/ strong/ weak* Heart sounds *normal/ gallop/ murmur*

Gastro-Intestinal

Stool *not seen/ normal/ soft/ watery/ green/ pale/ mucus/ blood*
 Abdomen: *normal/ distended/tender/ visible peristalsis /ascites*
 Bowel sounds: *normal/ active/ quiet/ absent* Splash *N / Y*
 Livercm below costal margin *normal/ firm/hard/smooth/irregular*
 Spleen *not felt/ felt/ large - normal/ firm/ hard - tender/ painless*

Nervous system

Tone *normal/ stiff/ floppy*
 Meninges *normal /stiff neck /Brudzinski /fontanelle bulging*
 Reflexes *normal/ symmetrical/ asymmetrical/increased/ decreased/ absent*

Skin Hair Bone Lymph Nodes

Skin change *none/mild/mod/severe peeling/ raw / ulcers infection/ cuts/ bruises*
 Perineum *normal/rash/raw /candida* Purpura *N / Y*
 Hair *black/ brown/ red/ blond* normal/easily plucked/ balding
 Scabies *none/ local/generalised* Eyelash *normal/ long*
 Lymph nodes *none/ groin/ axilla/ neck* Tender/ painless *Soft/ firm/ hard/ fixed*
 Ribs' ends *normal/ swollen/ displaced* Gynecomastia *N / Y*

Describe abnormalities below and draw on diagram

.....

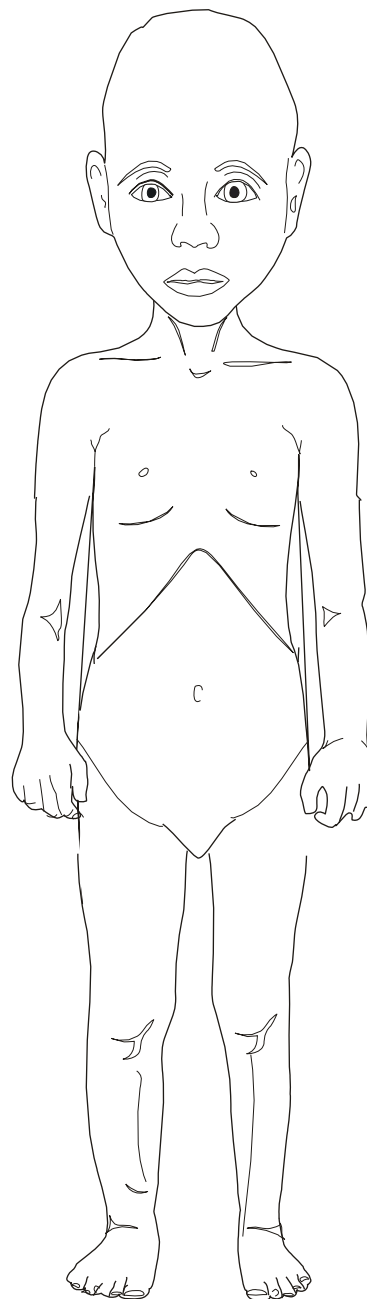
.....

.....

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.....

.....



Diagnoses 1: 2: 3:

Annex 17. SS chart with SS feeding for infants less than 6 months or 3kg

SS-Chart for Infants with SS feeding (less than 6 months or 3kg)									
ID No.		Registration No.		Major Problems		Admission Date/..../..		Discharge Date/..../..	
Sheet No.		PF Name		Time		Time		Time	
Family Name		Day care/Pediatric W/Other		1		New Admission		Dead <input type="checkbox"/> Time	
Patient's Name		Age (day or mo.)		2		Relapse		Cause of death	
Address		Birthdate/..../..		3		Readmission Y/N		Defaulter <input type="checkbox"/>	
Sex		Breadfed		Y/N		If Y, Type		Med. Referral <input type="checkbox"/> To	
Phone No.		Receiving other feed		Y/N		Reg No.		Non Response to treatment <input type="checkbox"/>	
Reason admission: 1) Growth Monitoring static Y/N-2) Weight/Length Y/N 3) Weight/Age Y/N 4) Complication Y/N if Y,									
Anthropometry	Date								
	Length (cm)								
	Weight (kg.g)								
	Wt for Ht (Z%)								
	Edema (0 to +++)								
Weight Chart									
Therapeutic Diet	Date								
	# feeds/day								
	Infant Formula/F100DI								
	SS ml / feed								
	A=Absent V=Vomit R=Retard NG=NG P=IV Fluid								
	Amount taken								
	100% <input type="checkbox"/>								
	3/4 <input type="checkbox"/>								
	1/2 <input type="checkbox"/>								
	1/4 <input type="checkbox"/>								
Surveillance	Alert/Lethargic (A/L)								
	Stool (0 to III)								
	Vomit (0 to III)								
	Dehydrated (0 to +++)								
	Cough (0 to +++)								
	Shock (0 to +++)								
	Resp. rate/min								
	Pale Conjunct. (0 to +++)								
	Temp. AM (Ax/Rect)								
	Temp. PM (Ax/Rect)								
Routine Medicines	Date								
	Antibiotic 1								
	Antibiotic 2								
	Malaria Rx								
	Antibiotic 3								
	Special Medicines								
	Enter Name, dose and route of administration (oral-po, intramuscular-IM or intravenous-IV) for each drug. Enter an X in the upper left corner if prescribed - the nurse signs the box when the drug is given.								
	Multivitamin								
	Vitamin A								
	Malaria Rx								
Test Results	HB/Pcv								
	Malaria smear								
	Glucose								
	OBSERVATION								
<div>Card</div> <div> <input type="checkbox"/> BCG <input type="checkbox"/> Polio <input type="checkbox"/> DPT </div> <div> DATES Birth 1 </div>									
<div>DISCHARGE</div> <div> Education Given On Causes of malnutrition Diarrhoea, RTI, Fever Skin, eye and ear infection Play and stimulation Child nutrition Child care Hygiene Sexually Transmitted Disease Family Planning Other </div> <div> Dates Sig. </div>									

Annex 18. RUTF specifications

Ready-to-use therapeutic food (RUTF)

Severely malnourished patients have specific nutrient requirements that differ from those of normal children. These are best supplied using specialised therapeutic foods, such as F75, F100 and RUTF. Ready-to-use therapeutic food (RUTF) is an essential component of OTP as it allows patients to be treated at home. RUTF is a complete food for the severely malnourished, with a specific nutrient composition equivalent to F100.

There are currently several commercial types of RUTF: lipid-based pastes and bars. Several countries produce their own RUTF using the standard recipe: these products are nutritionally equivalent to F100, and have been shown to be physiologically similar to both F100 and the commercial RUTFs. An important difference between F100 and RUTF is that RUTF contains iron (in the correct amount for the recovering severely malnourished patient) whereas F100 used in the recovery phase requires iron supplementation.

RUTF paste is a ready-to-eat spread usually presented in individual sachets or pots. It is composed of vegetable fat, peanut butter, skimmed milk powder, lactoserum, maltodextrin, sugar and a mineral and vitamin complex.

Instructions for use: Clean drinking water must be made available to children during consumption of RUTF. The product should only be given to children who can express their thirst. It is contra-indicated for children who are allergic to cow's milk, proteins or peanuts and those with asthma or other allergic disease.

Recommendations for use: It is recommended that the product is used in phase 2 in the dietetic management of severe acute malnutrition. In IPFs for phase 1, use milk-based diet F75.

Storage of RUTF: Some commercial RUTFs (such as Plumpy'nut®) have a shelf life of 24 months from manufacturing date. Locally produced RUTFs that are not packed under nitrogen in a sealed container have a shelf life of 3–6 months. Store in a cool dry place.

Mean nutritional value of RUTFs (based upon plumpy'nut®)

NUTRIENT	PER 100 G	PER 92 G SACHET	NUTRIENT	PER 100 G	PER 92 G SACHET
Energy	545 kcal	500 kcal	Vitamin A	910 µg	840 µg
Protein	13.6 g	12.5 g	Vitamin D	16 µg	15 µg
Lipid	35.7 g	32.86 g	Vitamin E	20 mg	18.4 mg
Calcium	300 mg	276 mg	Vitamin C	53 mg	49 mg
Phosphorus	300 mg	276 mg	Vitamin B1	0.6 mg	0.55 mg
Potassium	1,111 mg	1,022 mg	Vitamin B2	1.8 mg	1.66 mg
Magnesium	92 mg	84.6 mg	Vitamin B6	0.6 mg	0.55 mg
Zinc	14 mg	12.9 mg	Vitamin B12	1.8 µg	1.7 µg
Copper	1.8 mg	1.6 mg	Vitamin K	21 µg	19.3 µg
Iron	11.5 mg	10.6 mg	Biotin	65 µg	60 µg
Iodine	100 mcg	92 µg	Folic acid	210 µg	193 µg
Selenium	30 mcg	27.6 µg	Pantothenic acid	3.1 mg	2.85 mg
Sodium	< 290 mg	< 267 mg	Niacin	5.3 mg	4.88 mg

RUTF bars (based upon BP-100®)

RUTF bars are a compressed food product for use in the rehabilitation phase (Phase 2) of severely malnourished children and adults. The nutritional specifications are similar to therapeutic milk F100. As with the paste the RUTF bars also contain iron.

Who to give RUTF bars to: Children from 12 months old, adolescents and adults who are severely malnourished in the rehabilitation phase (Phase 2) of the treatment. RUTF-bars should never be used for patients below 6 months old.

How to use RUTF bars: they can be eaten as a biscuit directly from the pack together with sufficient drinking water (250–300ml per bar), or crumbled into water and eaten as porridge. For children 12–24 months of age, the bars should always be given as porridge due to their problems demanding water when thirsty.

Storage of RUTF bars: BP100® has a shelf life of 2 years in an unopened package. After breaking the aluminium foil bag the product should be used within 1–2 weeks depending on the storage conditions. Porridge made of BP100 and water should be used within 3 hours.

Packaging: BP100 is compressed into tablets of 28.4 g. Each package of BP100 (510 g net) contains 18 tablets packed into 9 bars in greaseproof paper (1 bar = 2 tablets = 300 Kcal).

Local production of RUTF

The minimum required ingredients for RUTF are as follows:

Four basic ingredients: sugar; dried skimmed milk; oil; and a vitamin and mineral supplement. In addition, up to 25% of the weight of the product can come from vegetable sources such as oil-seeds, groundnuts or cereals such as oats provided that the nutrient

density is the same as that found in F100.

In addition to good nutritional quality (protein, energy and micronutrients), RUTF should have the following attributes:

- o taste and texture suitable for young children
- o does not need additional processing (such as cooking) before consumption
- o resistant to contamination by microorganisms and a long shelf life without sophisticated packaging
- o ingredients are low-cost and readily available in developing countries.

HO/UNICEF/World Food Programme/UN Standing Committee on Nutrition produced draft specifications for RUTF (Community-based management of severe acute malnutrition, A Joint Statement by the World Health Organization, the World Food Programme, the United Nations System Standing Committee on Nutrition and the United Nations Children's Fund, 2007). They are as follows:

High-energy fortified ready-to-eat food suitable for the treatment of severely malnourished children. This food should be soft or crushable, palatable and should be easy for young children to eat without any preparation. At least half of the protein contained in the product should come from milk products.

Nutritional composition	
Moisture content	2.5% maximum
Energy	520–550 Kcal/100 g
Proteins	10%–12% total energy
Lipids	45%–60% total energy
Sodium	290 mg/100 g maximum
Potassium	1,100–1,400 mg/100 g
Calcium	300–600 mg/100 g
Phosphorus (excluding phytate)	300–600 mg/100 g
Magnesium	80–140 mg/100 g
Iron	10–14 mg/100 g
Zinc	11–14 mg/100 g
Copper	1.4–1.8 mg/100 g
Selenium	20–40 µg
Iodine	70–140 µg/100 g
Vitamin A	0.8–1.1 mg/100 g
Vitamin D	15–20 µg/100 g
Vitamin E	20 mg/100 g minimum
Vitamin K	15–30 µg/100 g
Vitamin B1	0.5 mg/100 g minimum
Vitamin B2	1.6 mg/100 g minimum
Vitamin C	50 mg/100 g minimum
Vitamin B6	0.6 mg/100 g minimum
Vitamin B12	1.6 µg/100 g minimum
Folic acid	200 µg/100 g minimum
Niacin	5 mg/100 g minimum
Pantothenic acid	3 mg/100 g minimum
Biotin	60 µg/100 g minimum
n-6 fatty acids	3%–10% of total energy
n-3 fatty acids	0.3%–2.5% of total energy

Nutritional composition:

Reference document for F100 composition: *Management of severe malnutrition - a manual for physicians and other senior health workers*. WHO Geneva, 1999. Available at: http://www.who.int/nutrition/publications/en/manage_severe_malnutrition_eng.pdf

Note: iron is added to RUTF whereas F11 does not have added iron

Safety: The food shall be free from objectionable matter; it shall not contain any substance originating from micro-organism or any other poisonous or deleterious substances such as anti-nutritional factors, heavy metals or pesticides in amounts that may represent a hazard to health of severely malnourished patients.

- Aflatoxin level: 5 ppb maximum.
- Micro-organism content: 10,000/g maximum
- Coliform test: negative in 1 g
- Clostridium perfringens: negative in 1 g
- Yeast: maximum 10 in 1 g
- Moulds: maximum 50 in 1g
- Pathogenic staphylococci: negative in 1 g
- Salmonella: negative in 125g
- Listeria: negative in 25g

The product should comply with the International Code of Hygienic Practice for Foods for Infants and Children of the Codex Alimentarius Standard CAC/RCP 21-1979. All added mineral and vitamins should be on the Advisory List of Mineral Salts and Vitamin compounds for Use in Foods for Infants and Children of the Codex Alimentarius Standard CAC/GL 10-1979.

The added mineral salts should be water-soluble and readily absorbed - they should not form insoluble components when mixed together. This mineral mix should have a positive non-metabolizable base sufficient to eliminate the risk of metabolic acidosis or alkalosis. Information on how to produce RUTF is available at: http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/CBSM/tbp_4.pdf

Annex 19. Drug doses in the severely malnourished

ANTIBACTERIALS

- o Amoxicillin PO: 50-100 mg/kg/day divided in 2 doses
- o Ampicillin IV/ IM: 100 mg/kg/day in divided in 3-4 doses

Note: Give by perfusion over at least 30 mins, reduce dose with renal impairment. DO NOT give alongside gentamicin (separate IV by at least one hour) or give gentamicin IM as it inactivates the gentamicin.

- o Gentamicin IV: 5 mg/kg/day in 1 dose
- o Cefotaxime IV: 100 mg/kg/day divided in 3 doses

Note: Do not give in same infusion as gentamicin - separate by at least one hour; cefotaxime can inactivate the gentamicin.

- o Ceftriaxone IV: 50-100 mg/kg/day in 1 or 2 doses
- o Ciprofloxacin PO/IV: 20-30 mg/kg/day divided in 2 doses
- o Cloxacillin PO: 50-100mg/kg/day divided in 3 doses
IV: 100-200mg/kg/day divided in 3-4 doses
- o Metronidazole PO: 10mg/kg/day in 1 or 2 doses

Note: WHO recommends reduction of standard dose (30 mg/kg/d) to 1/3 with hepatic impairment - in SAM the maximum dose is 10-12 mg/kg/d by pharmacodynamics studies. Do not give for more than 7 days.

- o Amoxicillin + Clavulanic acid (Augmentin) PO/IV: 25-75/kg/day divide in 2-3 doses

ANTIFUNGALS

- o Nystatin PO: 100,000 IU/dose 4 times a day
- o Fluconazole PO/IV: 3-6 mg/kg/day in 1 dose

Note: IV preparation give by SLOW infusion over at least one hour. A double dose can be given on the first day of treatment. Avoid giving it with lumefantrine-artemether. Young infants: give same dose but on alternate days.

Miconidazole cream or ointment: application 2 times a day

ANTI-MALARIALS

Artemether + Lumefantrine (Coartem) Oral Malaria treatment						
ADMINISTER	INITIALLY	8H	24H	48HR	TOTAL TABLETS	
3 – 5 kg	1/2 tab	1/2 tab	1/2 tab x 2	1/2 tab x 2	3	<ol style="list-style-type: none"> 1. Dispersible tablets 20 mg/120 mg per tablet 2. 6-dose regimen = initial dose followed at 8, 24, 36, 48 and 60 hrs by further doses. 3. Avoid giving with ciprofloxacin, fluconazole, erythromycin. 4. Tablets can be crushed. 5. If dose is vomited within 1 hour repeat the dose 6. If coartem not available, use artemether-amodiaquine tablets at the same dose (not recommended because of hepatotoxicity).
5 – 10 kg	1 tab	1 tab	1 tab x 2	1 tab x 2	6	
10 – 20 kg	2 tab	2 tab	2 tab x 2	2 tab x 2	12	
20 – 35 kg	3 tab	3 tab	3 tab x 2	3 tab x 2	18	

o Artesunate IV/IM: 2.4 mg/kg/dose at 0, 12, 24 hr and then daily until oral treatment can be given.

Note: Always follow with a full 6-dose course of lumefantrine-artémether

SCABICIDE

o Permethrin cream 5% or permethrin lotion 1%: Apply over whole body, wash off after 12 hours.

HEART FAILURE

o Furosemide PO/IV/IM: 0.5-1 mg/kg/dose 2-3 times per day.

Drugs that should be avoided in severe acute malnutrition inpatients (serious danger of exacerbating hepatic, renal or cerebral function.) See WHO Model formulary for children 2010.

o Anti-histamines (serious depression of level of consciousness)

o Anti vomiting drugs (serious depression of level of consciousness and extra-pyramidal effects – WHO formulary states: “Antiemetic medications should only be used when the cause of the vomiting is known. Anti-emetics are unnecessary and sometimes harmful”)

o Anti-diarrhoeal preparations (e.g. bismuth, kaolin, lomotil)

o Paracetamol (do not use in acute phase – hepatic damage)

o Amphotericin B (do not use in acute phase – nephrotoxic to some extent in ALL patients, also commonly causes hypokalaemia, hypomagnesaemia, diarrhoea, anaemia, severe anorexia and, uncommonly, anaphylaxis).

o Potassium permanganate (potent pro-oxidant, causes skin burns).

o Fat-soluble drugs. DOSES of all FAT soluble drugs must be reduced in all cases of marasmus. Body fat is severely reduced, as the majority of lipid is in the BRAIN in these children standard doses can cause severe cerebral depression including respiratory arrest – thus, doses of barbiturates, diazepam, metaclopramide etc. should be used with caution and should be halved in SAM.

[illegible]

Annex 23. Nutrient density of RUSP

[illegible]

Annex 22. Advantages and disadvantages of dry and wet feeding

▪ WET FEEDING

Advantages

- Useful when firewood and cooking utensils are so difficult to find that the household has difficulties in preparing meals.
- The security situation is so bad that the beneficiaries are put at risk when carrying supplies of food home or storing food at home.
- It is easier to ensure that the beneficiary receives the food s/he requires (less sharing of the food).
- It is easier to ensure that the ration is prepared correctly and that the hygiene is good.
- It is possible to use the mothers' time in the centre to do nutrition and hygiene education with them.

Disadvantages

- As the presence of the mother/caretaker and beneficiary is required at the centre every day for most of the day, this causes problems in the daily tasks of the household.
- There is an increased risk of transmission of diseases when malnourished children are concentrated together all day.
- The centre requires many more staff than a dry centre.
- The centre requires more infrastructure than a dry centre.
- The capacity for rapid reaction to changes in the situation is lower.
- There is a possibility that the food in the centre will be used to substitute for the beneficiaries' share of food in the household, defeating the purpose of the supplementary ration.

▪ DRY FEEDING

Advantages

- Dry feeding requires fewer resources (personnel, structure) than wet feeding and there is no evidence to show that wet feeding is more effective than dry feeding.
- A greater number of beneficiaries can be supported.
- Less disruption of the families' rhythm, as the distribution requires that the mother or caretaker are away from home for a shorter time, leading to better coverage and lower defaulter rates.
- It keeps responsibility for preparation and feeding within the home.
- It is more appropriate for dispersed populations.
- Less risk of cross-infections.
- It is quicker to put in place a dry feeding centre.

Disadvantages

- There is no guarantee that the beneficiary will receive the ration.
- Monitoring of the nutritional status of the beneficiary is less frequent.

- More difficult to do educational activities.
- Requires more food per beneficiary.

Annex 23. Nutrient density of RUSP

		PER 100 G		PER 1,000 KCAL	
NUTRIENT	UNIT	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
Energy	Kcal	350	400	1000	1000
Protein	g	8	12	23	35
Fat	g	14	18	40	52
Carbohydrate	g	any	any	any	any
Sodium (Na)	mg		<300		<860
Potassium (K)	mg	630	700	1,800	2,000
Magnesium (Mg)	mg	120	150	340	430
Phosphorus (P)	mg	370	500	1,000	1,500
Zinc (Zn)	mg	9.5	13	27	37
Calcium (Ca)	mg	400	500	1,140	1,430
Copper (Cu)	mg	1	1.2	2.8	3.4
Iron (Fe)	mg	8.5	13	24	37
Iodine (I)	µg	100	140	290	400
Selenium (Se)	µg	25	35	70	100
Manganese (Mn)	mg	0.4	0.45	1.1	1.3
Thiamin (B1)	mg	>0.50		>1.4	
Riboflavin (B2)	mg	>1.50		>4.3	
Pyridoxine (B6)	mg	>1.10		>3.0	
Cabalamine (B12)	µg	>2.30		>6.6	
Folate	µg	>240		>680	
Niacin	mg	>15		>40	
Ascorbate (Vit C)	mg	>50		>140	
Pantothenic acid	mg	>2.3		>6.6	
Biotin	µg	>11		>30	
Retinol (Vit A)	µg	950	1,100	>2,700	3,140
Cholecalciferiol (D)	µg	10	20	30	60
Tocopherol (E)	mg	>13		>35	
Phytomenadione (K)	µg	>30		>85	
n-6 fatty acid	% energy	3	10	3	10
n-3 fatty acid	% energy	0.3	2.5	0.3	2.5
The ratios of nutrients should always be within these limits					
Ca/P ratio	mol/mol	0.8	1.2	0.8	1.2
Zn/Cu ratio	mol/mol	5	15	5	15
Zn/Fe ratio	mol/mol	0.8	3	0.8	3
Total Fat	% energy	30	45	30	45
Protein	% energy	7	18	7	18

Annex 24. Laboratory tests

Where facilities permit, the tests presented below may help to diagnose specific problems. However, they are **not** needed to guide or monitor treatment. **The interpretation of test results is frequently altered by malnutrition. For this reason, laboratory tests may misguide inexperienced workers.** The most important guide to treatment is frequent careful assessment of the child.

TEST	RESULT AND SIGNIFICANCE
Haemoglobin or packed-cell volume	Haemoglobin 4 g/dl (or packed-cell volume 12%) indicates very severe anaemia – see chapter on complications.
Haemoglobin or packed-cell volume	Preparation in case blood transfusion is needed (blood must be screened for HIV, Hepatitis B and C, syphilis, malarial parasites).
Blood glucose	Glucose concentration 54 mg/dl or 3 mmol/l indicates hypoglycaemia.
Rapid diagnostic test (RDT) or blood smear by microscopy for malaria	A positive RDT or blood smear with presence of malaria parasites indicates infection.
Dipstick test or culture of urine specimen	A positive dipstick test indicates infection. The presence of bacteria on microscopy (Note: >10 leukocytes per high-power field indicates infection, but is usually negative in children with SAM with a urinary tract infection – i.e. not reliable in SAM).
RDT or polymerase chain reaction (PCR) test for HIV	A positive RDT or PCR indicates infection in children aged 18 months and older. A positive RDT for infants aged less than 18 months must be repeated with a PCR or interpreted with the mother's status. A negative RDT is useful and confirms the absence of infection.
Skin test for TB	Not reliable in SAM. This test is often negative in TB associated with SAM or false positive in children previously vaccinated with BCG vaccine. It takes 48 hours before it can be read.
Examination of faeces by microscopy	The presence of blood indicates dysentery. The presence of giardia cysts or trophozoites indicates infection.
Chest X-ray	Pneumonia causes less shadowing of the lungs in malnourished children than in well-nourished children: children with SAM and severe bronchopneumonia are often reported as normal by radiologists not familiar with SAM. Useful if staphylococcal abscesses are suspected and for TB pneumonia (but shadowing may be very slight). Vascular engorgement indicates heart failure. Bones are usually osteoporotic, they may also show signs of rickets or fractures of the ribs – examine spine carefully for Pott's disease.

