REPUBLIC OF YEMEN- MINISTRY OF PUBLIC HEALTH AND POPULATION

GUIDELINES FOR THE MANAGEMENT OF THE SEVERELY MALNOURISHED IN YEMEN

Version I
October, 2008

Ministry of Public Health and Population
Primary Health Care Sector
Family health General Directorate
Nutrition Department

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In collaboration with:

DIRECTIVE BY THE MINISTER OF PUBLIC HEALTH AND POPULATION

In response to the prevalence of malnutrition in Yemen and considering its contribution to around half of under five mortality, Ministry of Public Health and Population in collaboration with country offices of United Nations Children's Fund (UNICEF) and World Health Organization has led the finalization and publication of this guidelines that describes the management of severely malnourished children and adults at inpatients wards and outpatients facilities. It is a result of consultancy workshop held in Sana'a on October 2008, attended by local expertises and facilitated by Dr. Michael Henry Nevin Golden, the emeritus professor at Department of Medicine and Therapeutics of University of Aberdeen in Scotland.

Ministry of Public Health and Population hereby approves this document as a national guideline for the treatment of acute severe malnutrition that mandatory should be used by health staff involved in providing care for malnourished patients in Republic of Yemen, which comes under the guidance of political leadership, government and the national health polices. Therefore, this guideline is to be used and practiced at all health facilities in both public and private sectors effectively from January 2009.

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Minister of Public Health and Population

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INTRODUCTION

There are about 40 different nutrients that are essential for health. If any one of these is deficient in the diet the person will not be fully healthy and able to resist the agents of disease.

The nutrients are divided into two classes. Type I nutrients are the functional nutrients that are required for the hormonal, immunological, biochemical and other processes of the body to function normally. Most of the micronutrients fall into this category. Individuals can be very deficient in these nutrients and do not have any anthropometric abnormalities (i.e. they can have grown normally and have a normal body weight). Anthropometric surveys do not give us information about the prevalence of type I nutrient deficiencies. Their deficiency does cause major illness and increased likelihood of death (e.g. iron, iodine and vitamin A deficiency). Deficiency of several of these nutrients, particularly the anti-oxidant nutrients, is the probable cause of oedematous malnutrition (kwashiorkor).

Type II nutrients are the growth nutrients that are required to build new tissue. They have been deficient when there has been failure to grow, to repair tissue that is damaged, to replace rapidly turning over cells (intestine and immune cells) or to gain weight after an illness and have a normal convalescence. Deficiency of these nutrients (nitrogen, essential amino-acids, potassium, magnesium, sulphur, phosphorus, zinc, sodium and chloride) leads to stunting and wasting. Replenishment of all these nutrients, in the correct balance, is essential for recovery from malnutrition and convalescence from acute illness.

More than half of all deaths in children have stunting and wasting as the underlying cause: that is, they are too thin or too short for their age because they have not had sufficient type II nutrients to grow properly and many have lost weight. These children would have recovered from other illnesses if they had not been malnourished, but because they are malnourished they die. To this toll must be added the deaths of children with type I nutrient deficiencies. Thus, most deaths in childhood have some form of malnutrition as the underlying cause.

Acute Malnutrition is classified according to the degree of wasting and the presence of oedema. It is acute severe malnutrition (SAM) * if the wasting is severe (W/H < -3 Z-score WHO standards or a low MUAC) or there is oedema. These guidelines address the treatment of SAM. Malnutrition is defined as moderate acute malnutrition (MAM) if the wasting is less severe (W/H between -2 and -3 Z-score WHO standards); oedematous cases are always classified as severe.

Stunting is due to chronic malnutrition. Although there is some initial response to treatment according to these guidelines, the treatment has to be continued for a sufficiently long time to make it inappropriate to treat stunting according to these guidelines. Other approaches that ensure the long-term improvement in the quality of the family diet are used (e.g. positive deviance programmes and family economic support such as micro-credit) as well as managing the convalescent phase of acute illnesses. The community mobilisation part of these guidelines can usefully provide a starting point for such programmes.

In many health facilities the mortality rate from severe malnutrition is at present over 20%; this is unacceptable. **If these guidelines are carefully followed the mortality rate should be less than 5%**.

With this management the products (F75, F100, RUTF) and other treatment usually lead to very rapid reversal of the clinical features of SAM. Unfortunately, this entails large movements of electrolytes and water between the various compartments of the body. **This temporary electrolyte disequilibrium makes the patients even more vulnerable to misdiagnosis and mismanagement of such conditions as dehydration or severe anaemia that can lead to death from heart failure.** Thus, it is very important that the whole guideline is implemented along with the introduction of the therapeutic products, particularly the diagnosis and management of the complications during in-patient care. It is only appropriate to refer SAM patients to facilities where the proper training in the care of the severely malnourished has been accomplished; **in particular, the staff in emergency wards need to understand that the standard treatment of complications given to non-malnourished children can lead to the death if the patient is severely malnourished.**

* The term "protein-energy malnutrition" is no longer used as it is not thought that protein or energy deficiency, per se, are the usual causes of severe acute malnutrition.

CONTENTS

Section I

Patients from Six Months to Adulthood

Chapter One

Implementation Modalities

The principles of management of severe acute malnutrition, whatever the programme setting, are based on 3 phases.

- **Phase 1.** Patients without an adequate appetite and/or an acute major medical complication are initially admitted to an in-patient facility for phase 1 treatment. The formula used during this phase (F75) promotes recovery of normal metabolic function and nutrition-electrolytic balance. Rapid weight gain at this stage is dangerous, that is why F75 is formulated so that patients do not gain weight during this stage.
- **Transition Phase.** A transition phase has been introduced for in-patients because a sudden change to large amounts of diet, before physiological function is restored, can be dangerous and lead to electrolyte disequilibrium. During this phase the patients start to gain weight as RUTF or F100 is introduced. The quantity of RUTF given increases the energy intake by about 30%, when F100 is used the amount given is the same as the quantity of F75 given in Phase 1. The increase in energy intake should give a weight gain of around 6g/kg/d; this is less than the quantity given, and rate of weight gain expected, in Phase 2 if all that is offered is taken.
- **Phase 2.** Whenever patients have good appetite and no acute major medical complication they enter phase 2. Most patients who present with a moderate or good appetite are admitted directly into phase 2. This can occur in both in-patient and out-patient settings but should usually be as out-patients. In phase 2 they are given RUTF (used in both in-patient and out-patient settings) or F100 (used in in-patient settings only) according to look-up tables. These formulae are designed for patients to rapidly gain weight (more than 8 g/ kg/ day). The look-up tables are scaled so that the same tables can be used to treat patients of all weights and ages.

Whereas the underlying principles of the protocol remain the same, the ways of implementing the programmes can vary considerably depending upon the numbers of patients that require treatment, the severity of the illness and the facilities available.

- **In-patient**: management of severe malnutrition from hospitals and health centres (ideally only for phase 1 and transition phase).
    - Patients that are admitted can be treated on a **24/24 hour** basis (receiving the diet as in-patients with full medical surveillance and treatment of complications (either 5, 6 or 8 meals per 24 hours are given).
    - Patients can equally be treated on a **Day Care** system (receiving the diet in, 5 or 6 meals during the day).
        - Patients who live or are hosted by family or friends in the immediate neighbourhood of the facility come each morning to receive treatment during the day and return home at night.
        - Those from far away should be able to sleep in the facility in a separate room or a separate local structure, on beds or mattresses on the floor[1]. Such treatment is called "residential day care". There is no provision of staff or treatment during the night.

For all in-patients, as soon as they regain their appetites and are ready for Phase 2 they should continue treatment as out-patients wherever the carer agrees and an out-patient programme is in place. In exceptional circumstances they can remain in the in-patient/day-care facility for phase 2.

- **Out-patients.** Out-patient treatment is normally organised from the same facilities that have in-patients. However, out-patient care, in the community, should always also be organised from health centres or even

[1] It is important to avoid cots (small beds like cages) that prevent mothers sleeping with their children and putting children at risk of hypothermia, emotional stress and interruption of breast feeding; this applies to all facilities.

non-clinical facilities that are close to the patients' homes. The patients attend on a weekly basis. Most patients can be managed entirely on an out-patient basis; so that there are normally many more out-patients than in-patients. For each in-patient facility there should be several/many satellite out-patient distribution and assessment sites ("OTP sites") close to the community.

- Patients attending the TB programme should be systematically screened for severe malnutrition and referred to the out-patient programme if they fulfil the admission criteria.
- There needs to be a functioning communication and referral system between the health centre/ OTP site and the hospital in-patient so that patients can be quickly and easily transferred from the in-patient facility to the out-patient programme as they enter phase 2 and those out-patients that fail to respond appropriately or who develop a complication can be transferred (temporarily) to be in-patients.
- Patients who pass the *appetite test* should normally be directly admitted to the OTP, if the caretaker agrees, without passing through phase 1 and transition phase. Patients that have started treatment as an in-patient, continue as out-patients to complete Phase 2. Out-patient programmes are run on a weekly basis. Exceptions can be made for individual patients living in very remote areas where they can be seen on a fortnightly basis after the initial two visits.
- **Mobile clinics:** when mobile health clinics are operating, especially in an emergency situation, the management of severe acute malnutrition should be incorporated. Screening is done using the MUAC tape and checking for oedema. Patients fulfilling the admission criteria are assessed and given a weekly RUTF ration (if they pass appetite test and medical check). As height is not taken, each week, their weight is taken until they reach their target weight (see annex 6). A proper referral system and transport is important for the patients that need in-patient care.

SCREENING AND TRIAGE

Active case finding in the community, and all other opportunities where the community members encounter health services, is a critical part of all programmes to treat SAM. In this way patients are identified and treated before they develop complications, at a stage when treatment is relatively straight forward and can be achieved entirely in the community. This prevents lengthy and costly admission to therapeutic facilities; this is particularly important for the family as it prevents many of the "opportunity" costs for the family (transport, loss of earning ability, food for the caretaker, etc), family disruption and loss of care for the other children at home.

Children are screened in the community using a MUAC tape and checking for oedema. Patients attending health facilities (health centres, OPD, etc) are also screened (MUAC, oedema and weight, height/ length where available). All those fulfilling the criteria for SAM are referred to the closest therapeutic feeding programme (OTP/TFC). Children should also be screened using MUAC during National Immunisation Day. Every opportunity should be taken to identify patients that require therapeutic feeding for severe malnutrition.

During screening the MUAC result for each person screened is recorded on a tally sheet; the results are collated to give a prevalence of SAM and MAM in the community and for those attending health services.

The outreach health worker with the community volunteers, examine each child for bilateral oedema and measure MUAC. They have a stick of 65cm in length. Those with a MUAC <110 mm who are shorter than the stick (< or = 65 cm) and those with a MUAC < 115mm who are longer than the stick (> 65cm) are referred to the nearest OTP centre for admission to the programme.

In the OPD and the Emergency room at hospital level

MUAC and oedema should be assessed by all the doctors and nurses in charge in the OPD and emergency ward and referral should be made for all those identified as severely malnourished. Those suspected of being severely malnourished should also have their weight-for-height measured; older children and adolescents can be severely

malnourished without fulfilling the MUAC criteria for SAM. The training and equipment to take weight-for-height should be put in place in all permanent health structures.

Chapter Two

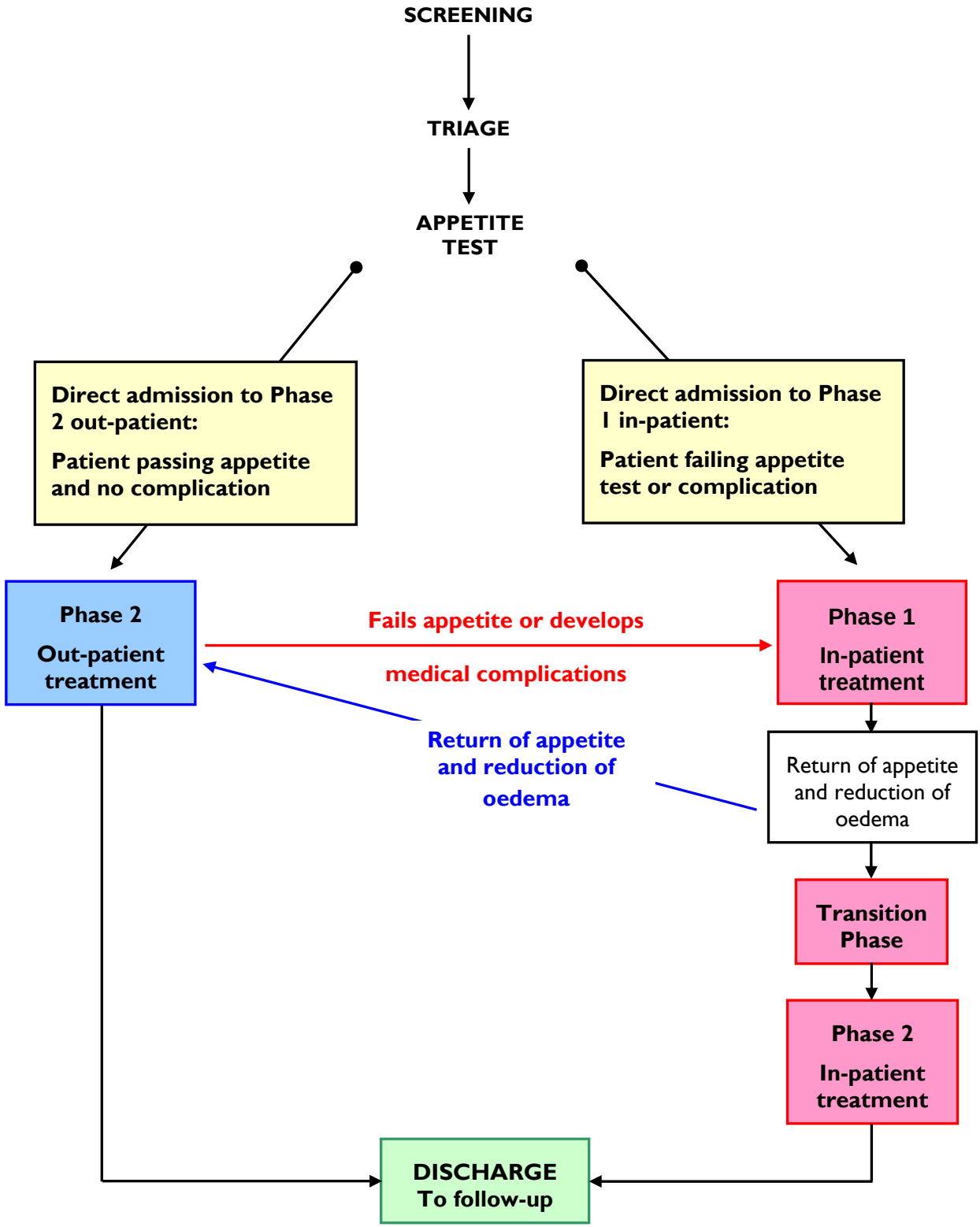
Admission Criteria

All patients that fulfil any of the criteria in the following table have severe acute malnutrition (SAM). They should be offered therapeutic feeding in one of the available settings.

AGE	ADMISSION CRITERIA
6 months to 12 years	➢ W/H or W/L <-3 Z score (WHO-2005 standards) **or** ➢ MUAC <110 mm if Length =<65 cm **or** ➢ MUAC<115 mm if length/height >65cm **or** ➢ Presence of bilateral oedema (+ & ++ admission to OTP; +++ admission to TFC)
12 to 18 years	➢ W/H <70% NCHS or ➢ Presence of bilateral oedema (+ & ++ admission to OTP; +++ admission to TFC)
Adults	➢ MUAC < 180 mm with recent weight loss **or** ➢ BMI < 16 with recent weight loss[2] **or** ➢ Presence of bilateral oedema (unless there is another clear cut cause)

This following shows the schema for the decision making process. First the patient is identified in the community or health structure by anthropometry and looking for oedema. The severely ill are "fast tracked" to treatment by the person doing triage. The appetite test is performed whilst waiting to see the nurse who looks for the presence of medical complications. She discusses with the caretaker and decides upon the appropriate treatment options. Those that need in-patient treatment are referred for admission to a TFC; those that can be treated as out-patients are referred the OTP site nearest to their home. The details are described in the next chapter.

[2] There are some physically active, apparently healthy adults with persistently low BMI values – they do not require treatment with therapeutic products.


SCREENING
TRIAGE
APPETITE TEST
Direct admission to Phase 2 out-patient:
Patient passing appetite and no complication
Direct admission to Phase I in-patient:
Patient failing appetite test or complication
Phase 2
Out-patient treatment
Fails appetite or develops
medical complications
Phase 1
In-patient treatment
Return of appetite and reduction of oedema
Return of appetite and reduction of oedema
Transition Phase
Phase 2
In-patient treatment
DISCHARGE
To follow-up

CHAPTER THREE

ADMISSION PROCEDURES

- At the OTP/TFC, retake the anthropometric measurements (MUAC at OTP/mobile clinics and both MUAC and W/H at health facilities) and check oedema[3]. Errors during screening occur; the referred patients are given some benefit, but are not enrolled in the programme. There has to be feed-back to the community worker and possible retaining.
- On arrival at the therapeutic feeding programme (OTP, TFC, Emergency Ward, Health centre or hospital), obviously ill children and those that will clearly need in-patient or other medical treatment should immediately be given sugar water[4] and "fast tracked" straight to facility based care without having to wait for the rest of the patients to be seen. They have their anthropometry checked, a SAM number given (see section VII) and are then referred directly to the nurse-in-charge or the to the in-patient facility to start treatment[5].
- For those that do not require "fast tracking" and fulfil the criteria for SAM, give a SAM number and perform the Appetite test. This can usefully be done whilst the patients are waiting to see the nurse/medical officer. If the appetite test is to be delayed until after the patient has seen the nurse then given a drink of sugar-water. All patients should have something to drink (water or sugar-water) and/or eat (RUTF for the appetite test) shortly after they come to the centre.

For very sick child, whose mother initially refuses in-patient care, perform the appetite test.

- If appetite test is passed, explain home care to mother and give IMCI treatment for the accompanying illness.
- If appetite test fails, explain to the mother of the dangers of taking the child home and try to persuade her to accept in-patient care at least for a few days: explain that she can take the child home for OTP care at any time. Note that the caretaker's wishes must be respected if she still decides to choose to treat the child at home.

For those who are not critically ill, but in-patient care is considered necessary and the inpatient care does not necessitate prolonged travel, the nurse has to explain carefully the benefits of in-patient care, the risks of out-patient care and that the caretaker can change her mind at any time after admission with the agreement of the staff. The nurse has to accept the final decision of the caretaker.

The appetite test and flow of patient:

[3] Those patients that have been referred by the community worker but who do not fulfill the criteria for SAM should be admitted to the supplementary feeding programme (if it is operational); where there is no SFP they should be given either a "protection ration" or one week's supply of RUTF. It is important that they receive some tangible benefit from attending the OTP/triage site and not sent home without anything. Such refusal will undermine the authority and moral of those screening in the community and bring the programme into disrepute with the community. If a large number of inappropriate referrals attend, then the screening teams should be retrained. There should be regular co-ordination meetings between the OTP staff and the screening teams.

[4] Sugar water is approximately 10% sugar solution – 10g of sugar per 100ml of water

[5] If the in-patient facility is a long way away the transport can lead to serious deterioration of the patient. Admit the patient to OTP, keep the patient quiet and start treatment pending the availability of transport. Fill the transfer form with SAM number and treatment given. Consider not transporting the child if it is thought that the stress of transport will be more detrimental than attempting to resuscitate the child on site or at home.

Why to do the appetite test?

- Malnutrition changes the way infections and other diseases express themselves – children severely affected by the classical IMCI diseases, who are malnourished, frequently show no signs of these diseases. However, the major complications lead to a loss of appetite. Most importantly, the signs of severe malnutrition itself are often interpreted as dehydration in a child that is not actually dehydrated. Misdiagnosis is very common and extremely dangerous. The diagnosis and treatment of dehydration are different in these patients. Giving conventional treatment for dehydration to the severely malnourished is very dangerous.
- Even though the definition and identification of the severely malnourished is by anthropometric measurements, there is not a perfect correlation between anthropometric and metabolic malnutrition. It is mainly metabolic malnutrition that causes death**. Often the only sign of severe metabolic malnutrition is a reduction in appetite**. By far the most important criterion to decide if a patient should be sent to in- or out- patient management is the Appetite Test. A poor appetite means that the child has a significant infection or a major metabolic abnormality such as liver dysfunction, electrolyte imbalance, cell membrane damage or damaged biochemical pathways. These are the patients at immediate risk of death. Furthermore, a child with a poor appetite will not take the diet at home and will continue to deteriorate or die. As the patient does not eat the special therapeutic food (RUTF) the family will take the surplus and become habituated to sharing.

How to do the appetite test?

1. The appetite test should be conducted in a separate quiet area; the children can all be tested together in a group.
2. Explain to the caretaker the purpose of the appetite test and how it will be carried out.
3. The caretaker and child, where possible, should wash their hands.
4. The assistant conducting the test should be cheerful and relaxed; the mother initially allows her child to play with the RUTF packet and get familiar with the environment. This sometimes helps the child become confident. Watching other children take the RUTF also gives confidence.
5. The caretaker should sit comfortably with the child on her lap and either offers the RUTF from the packet or puts a small amount on her finger and gives it to the child. The caretaker must not consume the RUTF herself, although she can pretend to in order to show the child.
6. The caretaker should offer the child the RUTF gently, encouraging the child all the time. If the child refuses then she should continue to quietly encourage the child and take time over the test. The test usually takes a short time but may take up to one hour. The child **must not** be forced to take the RUTF.
7. The child needs to be offered plenty of water to drink from a cup as he/she is taking the RUTF.

The result of the appetite test:

Pass

1. A child that takes at least the amount shown in the "moderate" column of the table 1 below passes the appetite test.
2. The patient is now seen by the nurse to determine if he/she has a major complication (e.g. pneumonia, acute watery diarrhoea, etc.). If s/he has no medical complication, has not got open skin lesions, oedema +++ or both severe wasting and oedema together then he should normally be treated as an out-patient.

3. Explain to the caretaker the choices of treatment option and decide *with the carer* whether the child should be treated as an out-patient or in-patient (nearly all carers will opt for out-patient treatment). If the mother opts for the in-patient treatment, refer to TFC with request of Phase2 protocol.
4. Start the phase 2 treatment appropriate for outpatients (see below)

Fail

1. A child that does not take at least the "moderate" amount of RUTF shown in the tables below should be referred for in-patient care.
2. Explain to the carer the choices of treatment options and the reasons for recommending in-patient care; decide *with the carer* whether the patient will be treated as an in-patient or out-patient. When in-patient care is needed, the nurse has to explain carefully the benefits of in-patient care and risks of out-patient care. The nurse has to accept the final decision of the carer.
3. Refer the patient to the nearest TFC for phase 1 management.
4. At the TFC the nurse has to register the child using his/her SAM number given by the OTP (if the SAM child is referred by other health facilities or the ER, the SAM-number is given by the TFC); the registration book and Multi-chart are filled (see annexes 4 and 10).
5. Start treatment of phase 1(F75), and complications appropriate for in-patients.

- Even if the carer/health worker thinks the child is not taking the RUTF because s/he doesn't like the taste or is frightened, the child still needs to be referred to in-patient care for at least a short time. In that case, while starting the F75, retry the appetite test in better conditions. If it is found that the child actually takes sufficient RUTF to pass the Test then they can be immediately transferred to the out-patient treatment (if no complications); the appetite test is the main criterion for an in-patient to continue treatment as an out-patient.
- At the in-patient facility, sometimes a child will not eat the RUTF because he is frightened, distressed or fearful of the environment or staff. This is particularly likely if there is a crowd, a lot of noise, other distressed children or intimidating health professionals (white coats, awe-inspiring tone). The appetite test should be conducted in a separate quiet area. If a quiet area is not available then the appetite can be tested outside the in-patient facility.

Tables to assess the appetite test results:

If there is a small scale (such as the one used in a domestic kitchen to weight portions of food), the following table (1) should be used.

Table 1: Appetite test with a scale

To pass the appetite test the intake of a test meal has to be <u>at least</u> in the moderate range.			
Body weight	**POOR**	**Moderate**	**GOOD**
Kg	**Gram of RUTF**		
3 - 3.9	**≤ 15**	**15 - 20**	**> 20**
4 - 5.9	**≤ 20**	**20 - 25**	**> 25**
6 - 6.9	**≤ 20**	**20 - 30**	**> 30**
7 - 7.9	**≤ 25**	**25 - 35**	**> 35**
8 - 8.9	**≤ 30**	**30 - 40**	**> 40**
9 - 9.9	**≤ 30**	**30 - 45**	**> 45**
10 - 11.9	**≤ 35**	**35 - 50**	**> 50**
12 - 14.9	**≤ 40**	**40 - 60**	**> 60**
15 - 24.9	**≤ 55**	**55 - 75**	**> 75**
25 - 39	**≤ 65**	**65 - 90**	**> 90**
40 - 60	**≤ 70**	**70 - 100**	**> 100**
If the patient takes the amount shown 5 times each day those with a moderate appetite should maintain their weight; this is approximately 70% of the amount taken in transition phase which is equivalent to a maintenance intake. Those with a good appetite should gain weight and mobilize oedema at home – it is approximately equal to the amount a person would take during transition phase.			

If there is no scale then the following table gives the MINIMUM amount that should be taken. This is less accurate than using a small scale as the amount disappearing from the packet is difficult to judge.

Table 2: Appetite test without a scale

"Poor" is the *<u>minimum</u>* amount that malnourished patients should take to pass the appetite test

Paste in sachets			***Bars of RUTF***		
Body weight (Kg)	**Sachets**		**body weight (Kg)**	**Bars**	
	poor	good		poor	good
Less than 4 kg	≤1/8	>¼	Less than 5 kg	≤¼	>½
4 – 6.9	≤¼	>1/3	5 -9.9	≤½	>¾
7 – 9.9	≤1/3	>½			
10 – 14.9	≤½	>¾	10 – 14.9	≤¾	>1
15 - 29	≤¾	>1	15 -29	≤1	>1 ½
Over 30 kg	≤1		Over 30 kg	≤1 ½	

- The appetite test must be carried out at each visit for out-patients.
- Failure of an appetite test at any time is an indication for full evaluation and probable transfer for in-patient assessment and treatment.
- During the second and subsequent visits the intake should be in the "good" range of table 1or at acceptable intake shown in table 2 (if scale not available) if the patient is to recover reasonably quickly.
- If the appetite is "good" during the appetite test and the rate of weight gain at home is poor then a home visit should be arranged. If the home visit is not possible, it may be necessary to bring a child into residential care to do a simple "trial of feeding", where the intake of the child is directly observed by the staff, to differentiate:
    - i) a metabolic problem with the patient from
    - ii) a difficulty with the home environment;
    - Such a trail-of-feeding, in a structured environment (e.g. day-care, TFC), is also frequently the first step in investigating failure to respond to treatment.

After anthropometry and conducting the appetite test the patients are seen by the nurse to look for complications and determine if the patient is to be treated as an outpatient or in-patient.

If there is a serious medical complication then the patient should be referred for in-patient treatment[6] – these complications include the following:

- Severe vomiting
- Hypothermia < 35°C
- Pneumonia
    - 60 breaths/ min for under 2 months
    - 50 breaths/ minute from 2 to 12 months
    - >40 breaths/minute from 1 to 5 years[7]
    - 30 breaths/minute for over 5 year-olds or
    - Any chest in-drawing
- Extensive infection
- Very weak, apathetic, unconscious
- Fitting/convulsions
- Severe dehydration based on history & change in appearance (clinical signs are unreliable in the malnourished and should NOT be used to diagnose dehydration)
- Any condition that requires an infusion or NG tube feeding.
- Fever > 39°C
- Very pale (severe anaemia)
- Other general signs, the clinician thinks requires transfer to the in-patent facility.

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[6] The same criteria are used for transfer of a child from out-patient treatment to in-patient treatment.

[7] Respiratory rate can be judged with a small home-made pendulum. Such a pendulum can be easily made locally from string and a small weight – it is quicker, easier and much less expensive than a watch. Knots should be tied at 43 and 66 centimetres for 50 and 40 breaths/swings per min respectively. The appropriate knot is held and the pendulum swung in front of the child – if the child is breathing faster than the pendulum then a diagnosis of respiratory distress should be made.

Table 3: Summary of Criteria for admission to in-patient or out-patient care

Factor	In-patient care	Out-patient care
Appetite	Failed or equivocal Appetite test	Passes Appetite test
Oedema	• Bilateral pitting oedema Grade 3 (+++) • Both Marasmus and kwashiorkor (W/H<-3z score and oedema)	• Bilateral pitting oedema Grade 1 to 2 (+ and ++)
Skin	Open skin lesions	No open skin lesions
Medical complications	Any severe illness, using the IMCI criteria – respiratory tract infection, severe anaemia, dehydration, fever, lethargy, etc.	Alert with no medical complications
Candidiasis	Presence of candidiasis or other signs of severe immune-incompetence	Absence of candidiasis
Caretaker	No suitable or willing caretaker.	Reasonable home circumstances and a willing caretaker
Choice of caretaker (at any stage of management – the caretaker is often the best judge of severity)	Caretaker chooses to start, continue or transfer to in-patient treatment. The caretaker's wishes must be respected.	Caretaker chooses to start, continue or transfer to out-patient treatment. The caretaker's wishes **must** be respected.

Chapter Four

Routine Medicines

Vitamin A

Give vitamin A to every SAM patient without oedema on the day of admission to the programme.

For the SAM with oedema (+ or ++) admitted as outpatient, give a vitamin A dose on the 4th week of the treatment.

For the SAM admitted to TFC because of oedema, delay giving a Vitamin A until 4th week in OTP or on discharge[8]

Table 4: Vitamin A systematic treatment

Age	Vitamin A IU orally in day 1
6 to 11 months	One blue capsule (100,000IU = 30,000ug)
12 months and more	Two blue capsules or one red capsule (200,000IU = 60,000ug)

Folic acid

There is sufficient folic acid in F75, F100 and RUTF to treat mild folate deficiency[9]. However, give for all one single dose of folic acid (5mg) on the day of admission.

Other nutrients

The F75 (and F100, F100 diluted, RUTF) already contains all the other nutrients required to treat the malnourished child. Additional potassium, magnesium or zinc should not be given to the patients. Such a "double dose", one coming from the diet and the other prescribed, is potentially toxic. In particular, additional potassium should never be given with these diets. Even for children with diarrhoea it is not advisable to give additional zinc.

Systematic Antibiotics

Antibiotics should be given to every severely malnourished patient, even if they do not have clinical signs of systemic infection. Despite the absence of clinical signs, they are nearly all infected, particularly if they require phase 1 treatment (poor appetite) – these infections are treated blindly.

[8] "Discharge" means discharge from care for severe malnutrition – this is for those children who have completed phase 2 as an in-patient. It does not mean transfer from an in-patient to out-patient facility to continue treatment.

[9] A 10kg child taking maintenance amounts of diet will receive about 400 micrograms of folic acid per day. The RDA (USA) for such a child is 80 micrograms per day.

Note:

Small bowel bacterial overgrowth occurs in ***all*** these children (including those with moderate, and some with good appetites). These enteric bacteria frequently are the source of systemic infection by translocation across the bowel wall. They also cause malabsorption of nutrients, failure to eliminate substances excreted in the bile, fatty liver, intestinal damage and can cause chronic diarrhoea. The antibiotic chosen for routine treatment must be active against small bowel bacterial overgrowth.

Because the children with kwashiorkor have free iron in their blood, bacteria that are not normally invasive, such as *Staphlococcus epidermidis* and "exotic bacteria" can cause systemic infection or septicaemia. If stapholcoccus is suspected then an antibiotic active against staphylococcus should also be used.

The position of antibiotic administration to children who pass their appetite tests and go straight to Phase 2 is less clear. They probably do not have a major systemic infection; however, they usually have small bowel bacterial overgrowth and at least these bacteria should be suppressed for optimal response to treatment. Thus, at the moment these children are usually given antibiotics systematically in a similar fashion to those who require phase 1 treatment initially.

The antibiotic regimen

- First line treatment: without apparent signs of infection give oral amoxicillin[10].
- Second line treatment:
    - any apparent signs of systemic infection:
        - **add** gentamycin (do not stop amoxicillin)
        - OR **add** chloramphenicol
        - OR **change** to third generation Cephalosporin
    - If suspicion of severe sepsis (septicaemia): Third generation Cephalosporin (individual medical decision).
- Third line: individual medical decision
- Frequently a systemic anti-fungal (Fluconazole) is added for any patient who has signs of severe sepsis or systemic candidiasis.

Note

Co-trimoxazole is not active against small bowel bacterial overgrowth. It is inadequate for the severely malnourished child. If it is being given for prophylaxis against pneumocystis pneumonia in HIV positive patients, the other antibiotics should be given in addition to prophylactic (not curative) doses of co-trimoxazole.

[10] This is recommended as first-line antibiotic by IMCI. Amoxycillin is active against small bowel bacterial overgrowth in most patients, thus, where it is used, metronidazole does not need to be given.

Table 5: Dosage of Gentamycin, Amoxycillin, Chloramphenicol

Weight range	Gentamycin[1] Dosage **once** per day	Amoxycillin (50 – 100 mg/kg/d) Dosage – **twice** per day		Chloramphenicol [2] (50mg/kg/d) Dosage - **three times** per day	
Kg	In mg	in mg	Cap/tab	in mg	Cap/tab
<5kg	5 mg/kg give once daily IM	125 mg x 2	½ cap. x 2	62.5 mg x 3	¼ cap. x 3
5 – 10		250 mg x 2	1 cap. x 2	125 mg x 3	½ cap. x 3
10 – 20		500 mg x 2	2 cap x 2	250 mg x 3	1 caps x 3
20 - 35		750 mg x 2	3 cap x 2	500 mg x 3	2 caps x 3
> 35		1000 mg x 2	4 cap x 2	1000 mg x 3	4 caps x 3

1. The 20mg ampule (10mg/ml) should be used. It is difficult to measure small volumes with the stronger gentamycin solutions

2. Chloramphenicol should never be used in babies less than 2 months of age and with caution in infants less than 6 months of age.

Duration of antibiotic treatment:

- In-patient care: every day during Phase 1 + four more days or until transfer to OTP.
- Out-patient care: for 7 days total. For out-patient care antibiotic syrup is preferred. If it is not available the tablets should be used and cut in half by the staff before being given to the caretakers (for children <5kg).

Administration of antibiotics.

- Wherever possible antibiotics should be given orally or by NG tube.
- In cases with complications due very severe infection such as septic shock, parenteral antibiotics should be used (note: many cases of shock are cardiogenic shock in which IV fluids must be strictly limited).
- Infusions containing antibiotics should not be used because of the danger of inducing heart failure. Indwelling cannulae should rarely be used. The disadvantages of indwelling cannulae are:
  - They give access to the circulation for antibiotic-resistant bacteria in these immuno-compromised patients; the dressing quickly becomes dirty.
  - 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, resite and maintain the cannula.
  - 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.

Malaria

Refer to national guideline for malaria treatment (using artesunate/amodioquin)

Do NOT give intravenous infusions of quinine to a severely malnourished case within the first two weeks of treatment.

Impregnated bed nets should always be used in malaria endemic regions.

Measles

In Yemen, high coverage of Measles vaccines was achieved by both routine and campaign approaches. Thus, in most areas Measles vaccines is not given routinely on admission.

For malnourished children coming from areas where high coverage of Measles vaccines was not achieved, where there is an epidemic or a danger of admitting patients incubating measles or if measles coverage vaccine falls:

- In in-patient settings, all children from 9 months without a vaccination card should be given measles vaccine both on admission and discharge after phase 2.[11]
- In out-patient settings, all children from 9 months without a vaccination card should be given measles vaccine on the 4th week of treatment (including those that have been initially treated as in-patients).

[11] The first measles dose often does not give a protective antibody response. It is given because it ameliorates the severity of incubating measles, partially protects from nosocomial measles and has a non-specific immune-stimulatory action. This is usually unnecessary with out-patient treatment. The second dose (week 4 dose) is given to provoke protective antibodies.

Table 6: Summary table of systematic treatment of patients

	Direct admission to in-patient (Phase 1- TFC)	Direct admission to out-patient (Phase 2 - OTP)
Vitamin A	- 1 dose at admission to wasted patients - 1 dose on discharge for oedematous patient - do not give when transferred to OTP management	- 1 dose on the 4th week (4th visit)
Folic Acid	- 1 dose at admission	- 1 dose at admission
Amoxicillin	- Every day in Phase 1 + 4 more days in Transition	- 1 dose at admission + give treatment for 7 days at home
Malaria	- According to national protocol	- According to national protocol
Measles for areas with low coverage (from 9 months old)	- 1 vaccine at admission if no card - 1 vaccine at discharge	- 1 vaccine on the 4th week (4th visit)
Iron	- Add to F100 in Phase 2	- No - iron is already in all RUTF
Albendazole/Mebendazole	- 1 dose on the last day of transition phase	- 1 dose on the 2nd week (2nd visit)

CHAPTER FIVE

PHASE I (IN PATIENTS ONLY)

Phase 1 treatment is always given in an in-patient setting.

Organisation

These children should be admitted directly to the TFC and not treated in an emergency ward or casualty department for the first 24-48 hours, unless the staff of the emergency ward have had specific training in the management of the complications seen in SAM patients. Experience shows that the rapid staff turnover and workload in emergency wards are such that this is the main place where misdiagnosis, mistreatment and iatrogenic death take place.

The children in phase I should be together in a separate room or section of the ward and not mixed with other patients. When they progress to transition phase they physically move to the space where transition patients are treated.

The mother is the primary carer. Assistants/Nurses do most of the actual "nursing". They weight, measure, mix and dispense feed, give the oral drugs, assess the clinical signs and fill the Multichart with all the routine information. The nurse functions as a teacher and supervisor of the assistants to ensure that they are performing these functions correctly and accurately. The nurse also needs to give or supervise any intravenous or unusual treatment. **The doctor's main duty is to support the nurse and to concentrate upon any patients that fail to respond to treatment or present diagnostic difficulty.**

Staff turnover should be minimised and only one staff member should be rotated at any one point of time; the assistants should not be redeployed. Any new staff must be specifically trained in the management of SAM and work for a period under supervision before they are allowed to take charge, work alone or at night with these patients.

The Multi-chart is the primary tool used for in-patient treatment of the malnourished child. Other charts should not be used.

ALL the staff use the same multi-chart to record all the information needed to manage the malnourished patient – separate charts are **not** used by different categories of staff. All records should be taken in the language of the assistant and not in the language of the senior staff to avoid any misunderstanding of instructions.

Diet (F75)

Six or five feeds per day are given for day-care units and where there are few staff at night[12].

Eight feeds per day are given for 24h care units where there are sufficient staff to prepare and distribute the feeds at night.

Where night feeds are problematic then give 6 or 5 feeds during day time only[13].

Eight or more feeds should be given when the larger volume of F75 that is required with a reduced number of feeds provokes osmotic diarrhoea in some children. This is uncommon; as it only applies to a few children the work load for the night staff is greatly reduced when the 8-feeds per day are individually prescribed for those children that really require this regimen. These children need residential care. Very occasionally it is necessary to give the diet continuously by naso-gastric drip.

Breast-fed children should **always** be offered breast-milk before the diet and **always** on demand.

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[12] It is better to organize the service so that 5 or 6 feeds are actually given, than to try to give 8 or more feeds per day and find that the night feeds are not supervised or not given at all. With staff shortages and junior staff at night, the latter strategy can lead to systematic underfeeding of the children and incorrect information recorded on the multichart.

[13] Hypoglycaemia is only a risk if the daytime intake is very low.

Diet to use

F75 (130ml = 100kcal) should be given.

Preparation

Add either one large packet of F75 to 2 litres of water or one small packet to 500 ml of water.

Where very few children are being treated smaller volumes can be mixed using the red scoop[14] (20 ml water per red scoop of F75 powder). If F75 is not available use one of the recipes given in the annex 11.

Amounts to give

Give the amounts in the table (7) to each patient.

Table 7: Amounts of F75 to give during 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 to 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 – 6.9	110	**140**	175
7 – 7.9	125	**160**	200
8 – 8.9	140	**180**	225
9 – 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

[14] The red scoop comes with the box of F75 packets. Do not use any other scoop, or spoon or other measures as this can lead to either over-concentrated diet (vomiting, osmotic diarrhoea or hypernatraemic dehydration), or over-diluted diet (failure to recover).

Naso-gastric feeding

Naso-gastric tube (NGT) feeding is used when a patient is not taking sufficient diet by mouth. This is defined as an intake of less than 75% of the prescribed diet (for children about 75 Kcal/ kg/ day).

The reasons for use of an NG tube are:

- Taking less than 75% of prescribed diet per 24 hours in Phase 1
- Pneumonia with a rapid respiration rate
- Painful lesions of the mouth
- Cleft palate or other physical deformity
- Disturbances of consciousness.

Every day, try patiently to give the F75 by mouth before using the NGT. The use of the NGT should not normally exceed 3 days and should only be used in Phase 1.

Feeding technique

The muscle weakness, slow swallowing and poor peristalsis of these children makes aspiration pneumonia very common. The child should be on the mother's lap against her chest, with one arm behind her back. The mother's arm encircles the child and holds a saucer under the child's chin. The child should be sitting straight (vertical). The F75 is given by cup, any dribbles that fall into the saucer are returned to the cup. The child should never be force fed, have his/her nose pinched or lie back and have the milk poured into the mouth.

Meal times should be sociable. The mothers should sit together in a semi-circle around an assistant who encourages the mothers, talks to them, corrects any faulty feeding technique and observes how the child takes the milk.

The meals for the caretakers should never be taken beside the patient. It is almost impossible to stop the child demanding some of the mother's meal; **sharing of the mother's meal with the child can be dangerous**. If the mother's meal has added salt or condiment it can be sufficient to provoke heart failure in the malnourished child. It does not contain the correct balance of nutrients to treat metabolic malnutrition.

Surveillance

- Weight is measured, entered and plotted on the multi-chart each day.
- The degree of oedema (0 to +++) is assessed each day.
- Body temperature is measured twice per day.
- The standard clinical signs (stool, vomiting, dehydration, cough, respiration and liver size) are assessed and noted in multi-chart each day.
- MUAC is taken each week.
- Length or Height is taken after 21 days (when a new multi-chart sheet is used)

- A record is taken (on the intake part of the multi-chart) if the patient is absent, vomits or refuses a feed, and whether the patient is fed by naso-gastric tube or is given I-V infusion or transfusion. There are appropriate places for these to be recorded each day.
- These observations are normally taken by a trained assistant and not by the nurse herself. The nurse's job is to teach and supervise the assistants and to check the multi-charts to ensure that the clinical data are accurate. If she finds inaccuracies she should patiently retrain the assistants to be her eyes and ears within the center – the assistants must not be chastised or humiliated because of previous shortcomings of the training and supervision given by herself or her predecessor.

Criteria to progress from Phase 1 to Transition Phase

The criteria to progress from Phase I to Transition Phase are **both**:

- return of appetite

  and

- beginning of loss of oedema (this is normally judged by an appropriate and proportionate weight loss as the oedema starts to subside).

Children with gross oedema (+++) should wait in Phase I at least until their oedema has reduced to moderate (++) oedema. These children are particularly vulnerable.

Chapter Six

Treatment of Complications

When a patient develops a complication, **always** transfer him/her to Phase 1 for treatment (in-patients are transferred back to phase 1 and out-patients to facility based treatment).

Dehydration

Diagnosis of dehydration

Misdiagnosis and inappropriate treatment for dehydration is the commonest cause of death in the malnourished patient.

With severe malnutrition the "therapeutic window" is narrow, so that even dehydrated children can quickly go from having a depleted circulation to over-hydration with fluid overload and cardiac failure. IV infusions are rarely used. In malnutrition (both marasmus and, to a greater extent, kwashiorkor) there is a particular renal problem that makes the children sensitive to salt (sodium) overload. The standard protocol for the well-nourished dehydrated child should **not** be used.

A supply (bucket) of modified ORS or ReSoMal should never be freely available for the caretakers to give to their children whenever they have a loose stool. Although common practice, it is very dangerous for these children. This leads directly to heart failure, as well as failure to lose oedema, re-feeding oedema, and failure to report and record significant problems whilst the diet and phase remains unchanged.

If there is no dehydration, diarrhoea is not treated with rehydration fluids to "prevent" the onset of dehydration. This again leads to over-hydration and heart failure.

Diagnosis of dehydration in the marasmic patient

The diagnosis of dehydration in marasmus is not easy. Even very experienced paediatricians frequently make mistakes. For this reason, one should always make a "provisional diagnosis" in these children and be prepared to change the diagnosis.

In marasmus **all** the classical signs of dehydration are unreliable and should **not** be used to make the diagnosis of dehydration. Thus:

- Marasmic skin normally lies in folds and is inelastic so that the "skin pinch" test is usually positive without there being any dehydration![15]

Do NOT use the skin pinch test to diagnose dehydration in severely malnourished children.

- Marasmic eyes are normally sunken[16] without there being any dehydration.

Do NOT assume that malnourished patients with sunken eyes have dehydration

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[15] In dehydration the skin is inelastic because of shrinking of the supporting tissue in the subcutaneous space. In marasmus there is loss of fat (and muscle) from the subcutaneous space so that the skin normally likes in folds. Even over the abdomen and flanks.

[16] The orbit contains an eye, small muscles and nerves, fat, the lachrymal gland and a venous plexus. In marasmus the fat and lachrymal gland atrophy so that the eyes sink. In dehydration there is contraction of the venous plexus forcing blood out of the orbit so that the eyes sink.

Thus, the diagnosis in marasmus is much more uncertain and difficult than in normal children. Incorrect and over-diagnosis is very common and treatment given inappropriately. The consequences of over-hydration are very much more serious.

Do not make a definitive diagnosis of dehydration: if you think the child is dehydrated then make a *provisional* diagnosis and observe the response to treatment before confirming the diagnosis.

The main diagnosis comes from the HISTORY rather than from the examination.

There needs to be:

- A definite history of significant recent fluid loss - usually diarrhoea which is clearly like water (not just soft or mucus) and frequent with a sudden onset within the past few hours or days.
- There should also be a HISTORY of a recent CHANGE in the child's appearance.
- If the eyes are sunken then the mother **must** say that the eyes have changed to become sunken since the diarrhoea started.
- The child must not have any oedema[17].

Children with persistent or chronic diarrhoea (without an acute watery exacerbation) are NOT dehydrated and do not need acute rehydration therapy. They have adapted over the weeks to their altered hydration state and should not be rehydrated over a few hours or days.

Diagnosis of shock with dehydration in the marasmic patient

When there is definite dehydration from both the history and examination and:

- a weak or absent radial or femoral pulse **and**
- cool or cold hands and feet
- and poor capillary refill in the nail beds

Then, the patient is going into shock. When in addition to the above signs there is also:

- decrease in level of consciousness so that the patient is semi-conscious or cannot be roused

Then this is severe shock.

There are other causes of shock in the severely malnourished child.

In particular, 1) toxic shock[18], 2) septic shock, 3) liver failure and 4) cardiogenic shock. Treatment of cardiogenic shock or liver failure as if the patient has shock due to dehydration is very dangerous and the treatment itself may then lead to death.

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[17] Oedema denotes an increase of salt and water in the body. Dehydration is the opposite, a deficit of salt and water in the body. It is impossible to have both a deficit and an excess simultaneously – just as the child cannot be hypothermic and feverish at the same time. It is true that nearly all oedematous patients have hypotension and a poor circulation – this is part of the syndrome and is probably related to excess production of vasodilator substances such as nitric oxide. This should not be treated with ReSoMal or an IV infusion.

[18] Toxic shock may be caused by traditional medicines, self treatment with other medicine such as aspirin, paracetamol, metronidazole, etc.. Septic shock is a specific type of toxic shock where the damage is caused by overwhelming sepsis. These are frequently associated with liver failure.

Treatment of dehydration in the marasmic patient

Whenever possible, a dehydrated patient with severe malnutrition should be re-hydrated orally. Intra-venous infusions are very dangerous and not recommended unless there is 1) severe shock with 2) loss of consciousness from 3) confirmed dehydration.

The management is based upon accurate measurements of weight – this is the best measurement of fluid balance. The weight should be taken on an infant scale or, for older children a hanging scale to which a basin is attached with rope[19]. The basin hangs close to the ground and is easily cleaned (see picture in annex 1). The patients should be weighed naked.

BEFORE starting any rehydration treatment:

- WEIGH the child
- MARK the edge of the liver and the costal margin on the skin with an indelible marker pen.
- RECORD the respiration rate

In addition the following can be recorded if the staff have the necessary skill

- RECORD the heart sounds (presence or absence of gallop rhythm) in the notes
- RECORD the pulse rate in the notes

The malnourished child is managed entirely by

- Weight changes and
- Clinical signs of improvement and
- Clinical signs of over-hydration

FLUID BALANCE is measured at intervals by WEIGHING the child.

- Give re-hydration fluid until the weight deficit (measured or estimated) is corrected.
- Stop as soon as the child is "re-hydrated" to the target rehydrated-weight.
- Additional fluid is not given to the malnourished child with a normal circulatory volume to "prevent" recurrence of dehydration.
- Normally much less ReSoMal is sufficient to restore adequate hydration in malnourished than normally nourished children (e.g. a total of 50ml per kg body weight - 5% body weight).
- Start with 5ml/kg every 30 minutes for the first two hours orally or by naso-gastric tube (2% body weight), and then adjust according the weight changes observed. Weigh the child each hour and assess his/her liver size, respiration rate and pulse.
- After rehydration usually no further treatment is given; however, for malnourished children from 6 to 24 months, 30ml of ReSoMal **can** be given for each watery stool that is lost. The standard instructions to give 50-100ml for each stool should **not** be applied – it is dangerous.
- Under no circumstances should further rehydration fluid be given with the sole purpose of "preventing" further dehydration or of "making sure" that sufficient has been given.

[19] Hanging pants, used for surveys should not be used to weigh sick children or those likely to soil the pants and pass infection to the next child.

- As the child gains weight, during re-hydration there should be definite clinical improvement and the signs of dehydration should disappear; if there is no improvement with weight gain then the initial diagnosis was wrong and rehydration therapy stopped immediately.
- Make a major reassessment at two hours.

If there is continued weight loss *then*:

- Increase the rate of administration of ReSoMal by 10ml/kg/hour
- Formally reassess in one hour

If there is no weight gain then:

- Increase the rate of administration of ReSoMal by 5ml/kg/hour
- Formally reassess in one hour

If there is weight gain and:

- *Deterioration of the child's condition with the re-hydration therapy*,
    - the diagnosis of dehydration was definitely wrong. Even senior clinicians make mistakes in the diagnosis of dehydration in malnutrition – this is one of the reasons why only a "provisional diagnosis" should be made and treatment given slowly and carefully.[20]
    - Stop and start the child on F75 diet.
- *No improvement in the mood and look of the child or reversal of the clinical signs*,
    - then the diagnosis of dehydration was probably wrong
    - either change to F75 or alternate F75 and ReSoMal.
- *Clinical improvement, but there are still signs of dehydration*
    - continue with the treatment until the appropriate weight gain has been achieved.
    - Either continue with ReSoMal alone or F75 and ReSoMal can be alternated.
- *Resolution of the signs of dehydration*,
    - stop re-hydration treatment and start the child on F75 diet.

Target weight for rehydration with watery diarrhoea

1. If the child has been in under treatment for SAM and there is a pre-diarrhoeal weight when the diarrhoea starts:
    - if there has been no weight loss with the diarrhoea, rehydration treatment should not be given.
    - if there has been weight loss, the actual fluid loss is equal to the weight loss, them the target rehydration-weight is the pre-diarrhoeal weight. Treatment should not be given to increase the weight beyond the pre-diarrhoeal weight. "Prophylactic" administration of Resomal to prevent recurrence of dehydration is never given.

[20] Once excess sodium has been given, either because of a mistaken diagnosis or over enthusiastic rehydration, it is very difficult to get the sodium back out of the child. When the F75 diet is given and sodium starts to come out of the cells, there is nearly always an expansion of the circulation, if excess sodium has been given, for example in an emergency department during admission, then the later electrolyte disequilibrium that occurs during early treatment can be very much worse. For this reason errors in the emergency department can lead to later death in the TFC or paediatric ward.

2. If the patient is newly admitted, it is extremely difficult to judge the amount of fluid that has been lost in the child with marasmus. Because of the narrow therapeutic window and the danger of going from under-hydration to over-hydration, the estimated weight deficit should be very conservative. It is better and much less dangerous to slightly under-estimate the amount of weight deficit than to over-estimate the weight deficit.
    - In practice, the weight loss is generally 1% to 3% of body weight in most children and in a few up to 5%.
    - Do not attempt to increase body weight by more than 5% in conscious children.
    - If there is weight gain of up to 5% of body weight with rehydration the truly dehydrated child will show dramatic clinical improvement and be out of immediate danger from death due to dehydration; treatment can then be continued with F75.

During re-hydration breastfeeding should not be interrupted. Begin to give F75 as soon as possible, orally or by naso-gastric tube. ReSoMal and F75 can be given in alternate hours if there is still some dehydration and continuing diarrhoea. Introduction of F75 is usually achieved within 2-3 hours of starting re-hydration.

Treatment of shock from dehydration in the marasmic patient

Only if there is definite dehydration (a history of fluid loss, a change in the appearance of the eyes) and the patient has **all** of the following:

- Semi-conscious or unconscious and
- Rapid weak pulse and
- Cold hands & feet and
- Poor capillary refill in the nail beds

Then the patient should be treated with intravenous fluids. The amounts given should be half or less of that used in normally nourished children.

Use one of the following solutions that are used in normally nourished children

- Half strength Darrow's solution
- Half strength Ringer-Lactate with 5% dextrose
- Half strength Saline with 5% dextrose

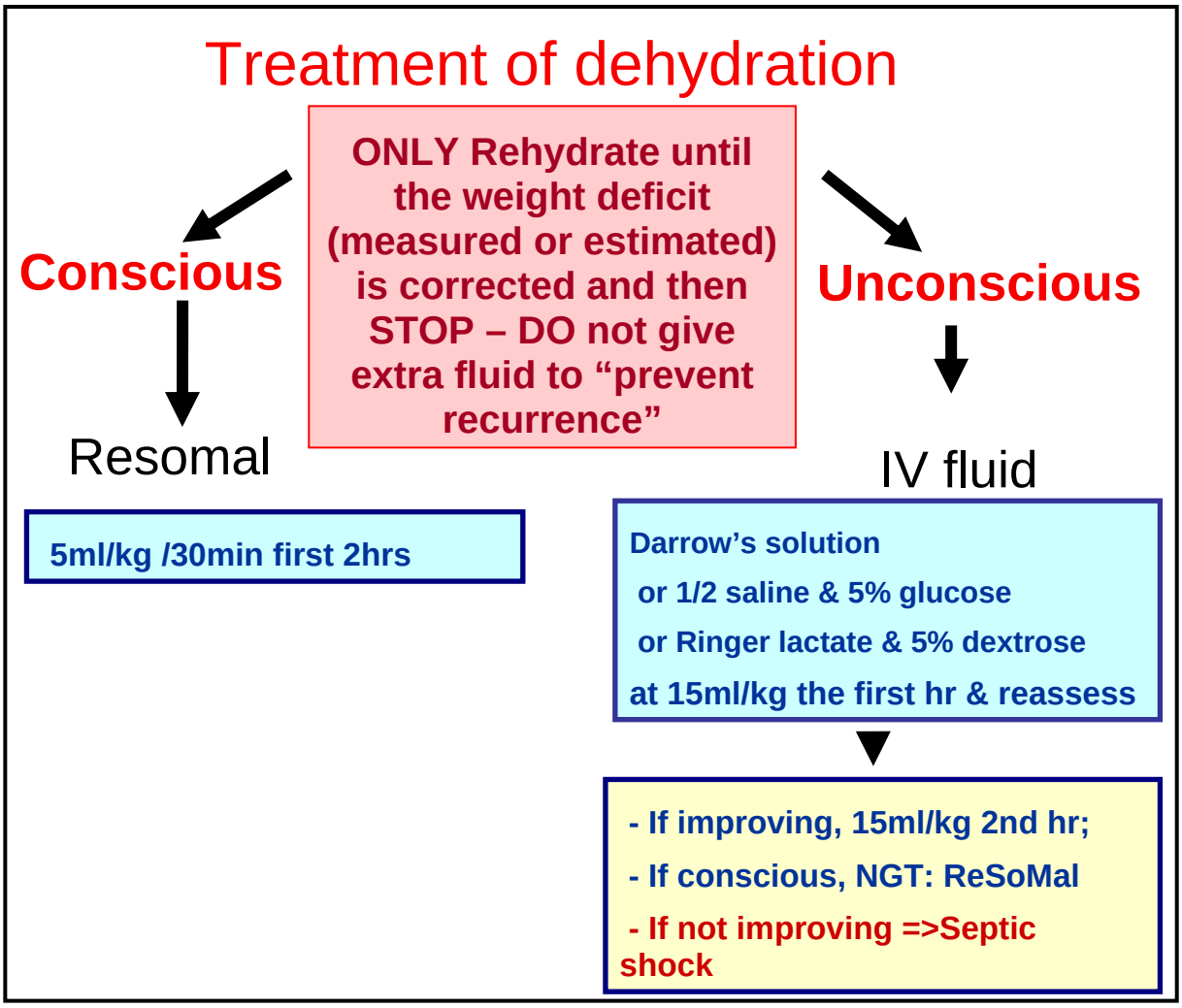
- Give 15 ml/kg IV over the first hour and reassess the child.
- If there is continued weight loss or the weight is stable, repeat the 15ml/kg IV over the next hour. Continue until there is weight gain with the infusion. (15ml/kg is 1.5% of body weight, so the expected weight gain after 2 hours is up to 3% of body weight)
- If there is no improvement and the child has gained weight, then assume that the child has toxic, septic or cardiogenic shock or live failure. Stop rehydration treatment. Search for other causes of loss of consciousness.
- As soon as the child regains consciousness or the pulse rate drops towards a normal level then stop the drip and treat the child orally or by NG-Tube with 10ml/kg/hour of ReSoMal. Continue with the protocol (above) for re-hydration of the child orally using weight change as the main indicator of progress.
- There should never be a drip present in a malnourished child who is able to drink or is absorbing fluid adequately from an NG-tube.

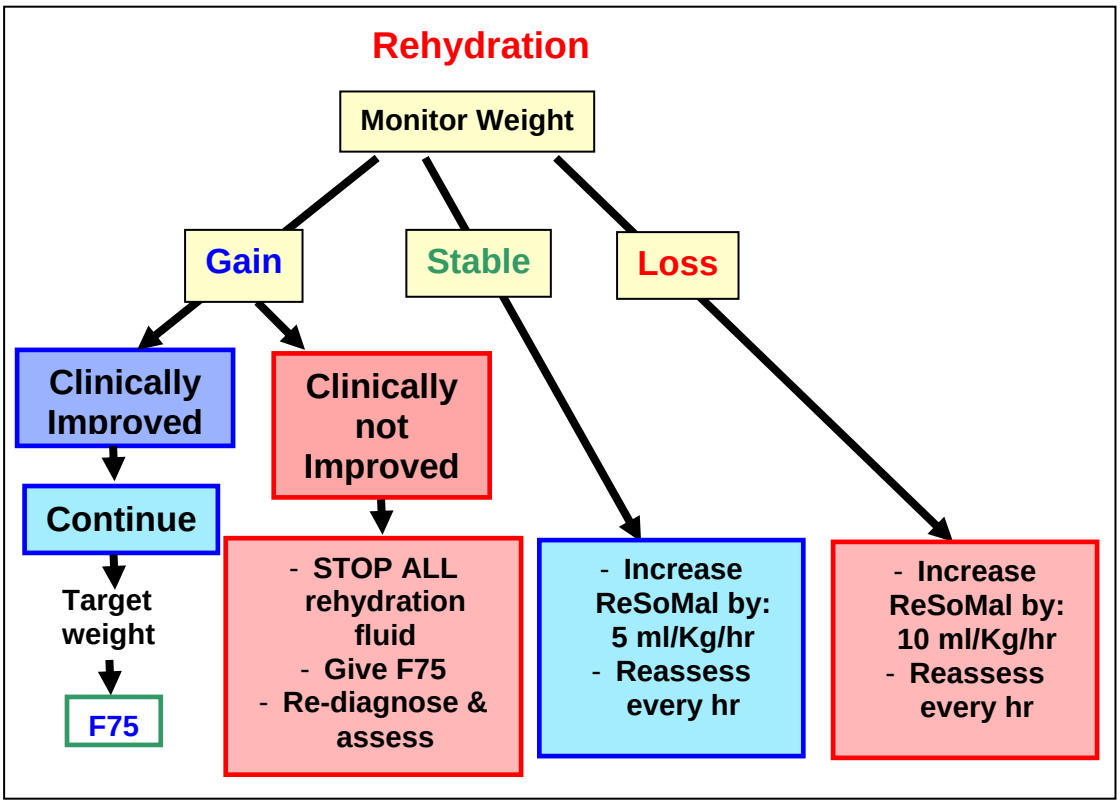
Monitoring of rehydration

All rehydration (oral or intravenous) therapy should be stopped immediately if any of the following are observed:

- The target weight for rehydration has been achieved (go to F75)
- The visible veins become full (go to F75)
- The development of oedema (over-hydration – go to F75)
- The development of prominent neck veins*
- The neck veins engorge when the abdomen (liver) is pressed*.
- An increase in the liver size by more than one centimetre.*
- The development of tenderness over the liver.*
- An increase in the respiration rate by 5 breaths per minute or more*
- The development of a "grunting" respiration (this is a noise on expiration NOT inspiration).*
- The development of râles or crepitations in the lungs*
- The development of a triple rhythm*

* If these signs develop then the child has fluid overload, an over-expanded circulation and is going into heart failure.





Diagnosis of dehydration in the kwashiorkor patient

ALL children with oedema have an increased total body water and sodium -- they are over-hydrated. Oedematous patients cannot be dehydrated although they are frequently hypovolaemic. The hypovolaemia (relatively low circulating blood volume) is due to a dilatation of the blood vessels with a low cardiac output.

If a child with kwashiorkor has definite watery diarrhoea and the child is deteriorating clinically, then the fluid lost **can** be replaced on the basis of 30ml of ReSoMal per watery stool. This is not mandatory and the clinical state of the child after the oral ReSoMal should be carefully assessed.

The treatment of hypovolaemia in kwashiorkor is the same as the treatment for septic shock.

Hypernatraemic dehydration[21]

Hypernatraemic dehydration is common in areas with a low relative humidity (very dry atmosphere) particularly if there is also a high temperature[22]. It is due to loss of water without loss of salt, leading to pure water deficiency. This is because water is lost through the skin and breath at a high rate under these conditions. If solutions high in sodium or other osmolyte that is not metabolised are given then the water is lost leaving the osmotically active solute in the body. In areas where bottle feeding is common, mothers frequently over-

[21] This is the same as "hyper-osmolar syndrome" and other synonyms that denote that the plasma osmolarity is increased above normal. The increased osmoles can be urea if a very high protein diet has been taken or there is inadequate renal function, or patient is with glucose intolerance.

[22] The dry atmosphere is the more important feature. Where the climate is very hot and wet, much less water is lost so that the child presents first with fever because of an inability to excrete the heat generated during metabolism.

concentrate the infant formula[23]; this can lead to hypernatraemic dehydration even in wet or cold climates; it is lethal in hot and dry climates and seasons of the year. The malnourished child is particularly at risk because he has a very low renal concentrating ability and a high surface area relative to the mass of his body.

During development of the high plasma osmolarity, there is a balancing increase in intra-cellular osmolytes to prevent water being drawn out of the cells. During treatment, if the extracellular fluid osmotic pressure is reduced to quickly leaving a high intracellular osmotic pressure, there is sudden cellular swelling that can lead to swelling of the brain to a sufficient degree to give convulsions and death.

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 water, without a high content of ions that require renal excretion, to fulfil their requirements for water.

Diagnosis

The first sign to appear is a change in the texture and feel of the skin. It develops a 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 then develop a low-grade fever if there is insufficient water to evaporate to excrete the heat generated during normal metabolism. The child becomes progressively drowsy and then unconscious. Convulsions follow this stage and if treatment for hypernatraemia is not instituted this leads to death. The convulsions are not responsive to the normal anti-convulsants (phenoparbitone, 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 150mmol/l.

Treatment

For incipient hypernatraemic dehydration – that is a conscious, alert child whose is **only** showing changes in the texture and feel of the skin the best diet to give is breast milk. This can be supplemented with up to about 10ml/kg/h can be given as 10% sugar water in sips over several hours until the thirst of the child is satisfied. At this early stage treatment is relatively safe; it is the stage when impending water deficiency should be recognised and treated.

For developed hypernatraemic dehydration, treatment must be slow. If it is possible to measure serum sodium then the aim is to reduce the serum sodium concentration by about 12 mmol/24h. To correct the hypernatraemia more quickly than this risks death from cerebral oedema. If it is not possible to measure the serum sodium then aim 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 increase.

The text-book treatment of hypernatraemia is to give normal saline, slowly, either orally or intravenously. This is dangerous in the severely malnourished child and should not be used as it is based upon the premise that the excess sodium given can be safely excreted by the kidney; this is not the case in the severely malnourished child.

Treatment progress is assessed by serial weighting of the child.

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[23] All infant formulae have a very much higher renal solute load than breast milk. In very hot and dry climates even correctly made up infant formulae can result in hypernatraemic dehydration. This is a real danger that arises from the failure of breast feeding in such climates. Because of the low renal solute load of human breast milk, exclusive breast feeding is the best way to avoid hypernatraemic dehydration.

- **First**, put the child in a humid, thermoneutral (28˚ to 32˚ C) environment. This is critical to prevent further losses of water from the child and to prevent hyperthermia if the humidity of the air is increased in a hot environment[24].
- 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 60ml/kg/d[25] which is equivalent to 2.5ml/kg/h 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, then put down a nasogastric tube and start 2.5ml/kg/h of 10% sugar water[26]. Do not give F75 at this stage as it gives a renal solute load (mainly as potassium). Never give F100 or infant formulae.
- Reweigh the child every 2 hours.
    - If the weight is static of there is continuing weight loss, recheck the 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/h) and increase the intake by this amount.
    - If the weight is increasing continue treatment until the child is awake and alert
- If there is accompanying diarrhoea then give one fifth normal saline in 5% dextrose orally or by NG-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 intravenous infusion. There should be a peristaltic pump or accurate paediatric burette in order to ensure that that the rate of administration of fluid is not exceeded during treatment.
- When the child is awake and alert, then recommence feeding with F75.

Septic (or toxic) shock

Septic shock presents with some of the signs of true dehydration and also of cardiogenic shock; the differential diagnosis is often very difficult.

Children that appear "very ill", may have septic shock, cardiogenic shock, liver failure, poisoning with traditional medicines, malaria, acute viral infection or other severe conditions. All "very ill" children should not be automatically diagnosed as having septic shock; the true reason for the condition should be sought.

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[24] If the child is small, this can be in an incubator similar to that used for neonates. It can also be achieved with aerosol sprays into the atmosphere or a humidifying tent, such as that used to treat bronchiolitis. If such facilities are not available, hanging wet sheets in the room or spraying the walls with water intermittently will both humidify and cool the atmosphere. Wet clothes should not be placed directly onto the child unless he has a high fever.

In one study in Tchad (daytime climate - 43˚C, 15% humidity) the turnover of water in malnourished children was one third of body water per day (250ml/kg/d). It is critical to prevent this ongoing excessive water loss from the body, otherwise it is very difficult to judge the amount of fluid to give to the child as the amount of fluid needed for slow rehydration, is a relatively small fraction of the requirements for replacing ongoing losses, which are unmeasured and very difficult to assess with any accuracy. The **only** way to judge on-going losses and the rate of rehydration is with serial accurate weights.

[25] The extra-cellular fluid volume is about 250ml/kg, depending upon the level of body fat and the extent of cellular atrophy. If the extra-cellular sodium concentration is about 160mmol/l and this is to be reduced by 12mmol/d then the extracellular fluid should be expanded by about 0.75% per day. But the extra water given will be distributed in both the intra and extracellular compartments so it is necessary to have a positive water balance of 0.75% of body water per day. In malnutrition there is a higher body water percentage than in normal children. Therefore the daily positive water balance should be about 60ml/kg/d = 2.5ml/kg/hour.

[26] Sugar water should be used rather than plain water. It is isotonic and so empties from the stomach and is absorbed more quickly. The treatment will last for about 48h, sugar water prevents hypoglycaemia in these children.

If this develops after admission to the TFC, then the treatment given to the child should be carefully reviewed to determine if the treatment is the cause of the clinical deterioration. Any "unusual" drugs should be stopped.

Diagnosis of septic shock

To make a diagnosis of developed septic shock requires the signs of hypovolaemic shock to be present

- A fast weak pulse with
- Cold peripheries.
- Slow capillary refill in the nail beds
- Disturbed consciousness
- **Absence of signs of heart failure**

Treatment of septic shock

All patients with signs of incipient or developed septic shock should immediately:

1. Give broad-spectrum antibiotics
    a. Second line and first line antibiotics together;
    b. for developed septic shock consider third line antibiotics, antifungal treatment and anti-staphylococcal treatment.
2. Keep warm to prevent or treat hypothermia,
3. Receive sugar-water by mouth or naso-gastric tube as soon as the diagnosis is made (to prevent hypoglycaemia).
4. Be physically disturbed as little as possible (no washing, excess examination, investigations in other departments, etc).
5. Never be transported to another facility – the stress of transport leads to dramatic deterioration and usually death. Even if the admitting facility has few resources and the staff is relatively unskilled, it is much less dangerous to treat the child in the admitting facility according to this protocol than to subject the child to "transport trauma". In this case it is very important to discuss the situation with the caretakers realistically and explain that the outlook is not good, but that the worst thing would be to subject the child to a long journey.

Incipient septic shock: Give the standard F75 diet by NG-tube

Developed septic shock: If the patient is unconscious because of poor brain perfusion then a slow IV infusion of one of the following can be given (do not give if there is a possibility of cardiogenic shock):

- Whole blood of 10ml/kg over at least 3 hours – nothing should be given orally during the blood transfusion or for 3 hours after the transfusion.

Or 10ml/kg/h for 2 hours of one of the following:

- Half-strength Darrow's solution with 5% glucose
- Ringer's lactate solution with 5% glucose
- Half-normal (0.45%) saline with 5% glucose

Monitor every 10 minutes for signs of deterioration, especially over-hydration and heart failure.

- Increasing respiratory rate,
- Development of grunting respiration,
- Increasing liver size,
- Vein engorgement.

As soon as the patient improves (stronger radial pulse, regain of consciousness) stop all IV intake - continue with F75 diet.

Absent bowel sounds, gastric dilatation and intestinal splash with abdominal distension.

The following measures should be taken:

- Give first and second line antibiotic treatment by intra-muscular injection.
- Consider adding third line antibiotics
- Stop all other drugs that may be causing toxicity (such as metronidazole)
- Give a single IM injection of magnesium sulphate (2ml of 50% solution).
- Pass an NG-tube and aspirate the contents of the stomach, then "irrigate" the stomach with isotonic clear fluid (5% dextrose or 10% sucrose –the solution does not need to be sterile). Do this by introducing 50ml of solution into the stomach and then gently aspirating all the fluid back again. This should be repeated until the fluid that returns from the stomach is clear.
- Put 5 ml/kg of sugar-water (10% sucrose solution) into the stomach and leave it there for one hour. Then aspirate the stomach and measure the volume that is retrieved. If the volume is less than the amount that was introduced then either a further dose of sugar-water should be given or the fluid returned to the stomach.
- There is frequently gastric and oesophageal candidiasis: give oral nystatin suspension or fluconazole.
- Keep the child warm.

If the child's level of consciousness is poor, give intravenous glucose

- Do not put up a drip at this stage. Monitor the child carefully for 6 hours, without giving any other treatment
- Improvement is measured first by a change in intestinal function --decrease in the distension of the abdomen, visible peristalsis seen through the abdominal wall, return of bowel sounds, decreasing size of gastric aspirates – and second by improvement in the general condition of the child.

If there is intestinal improvement then start to give small amounts of F75 by NG tube (half the quantities given in the feeding table – subsequently adjust by the volumes of gastric aspirated).

If there is no improvement after 6 hours then:

- Consider putting up an IV drip. It is very important that the fluid given contains adequate amounts of potassium. Sterile Potassium Chloride (20mmol/l) should be added to all solutions that do not contain potassium. If it is available use one-fifth normal saline in 5% dextrose, otherwise use Ringer-Lactate in 5%

dextrose or half-strength saline in 5% dextrose. **The drip should be run VERY SLOWLY – the amount of fluid that is given should be NO MORE THAN 2 to 4 ml/kg/h**.

- Start to give the first and second line antibiotics intravenously.
- When the gastric aspirates decrease so that one half of the fluid given to the stomach is absorbed, discontinue the IV treatment and continue with oral treatment only.

Heart failure

Signs and symptoms

Heart failure should be diagnosed when there is:

- Physical deterioration with a gain in weight
    - this is the most common way of making the diagnosis and does not require any equipment or particular clinical skill
- A sudden increase in liver size (this is why the liver is marked before starting any infusion).
- Tenderness developing over the liver
- An increase in respiration rate
    - an acute increase in respiration rate of more than 5 breaths per minute (particularly during rehydration treatment)
    - > 50 breaths/minute in infants and
    - >40 in children 1-5 years,
- Respiration that has or develops a "grunting" sound during each expiration.
- Crepitations or râles in the lungs
- Prominent superficial and neck veins
- Engorgement of the neck veins when the abdomen (liver) is pressed
- Enlargement of the heart (very difficult to assess in practice).
- Appearance of triple rhythm (very difficult to assess in practice).
- Increasing oedema or reappearance of oedema during treatment;
- An acute fall in haemoglobin concentration[27] (needs laboratory).

At the last stage there is either 1) marked respiratory distress progressing to a rapid pulse, cold hands and feet, oedema and cyanosis or 2) sudden, unexpected death. This is cardiac shock, it commonly occurs in the severely malnourished child after treatment has started. It has to be differentiated from shock due to dehydration or sepsis because the treatment is quite different.

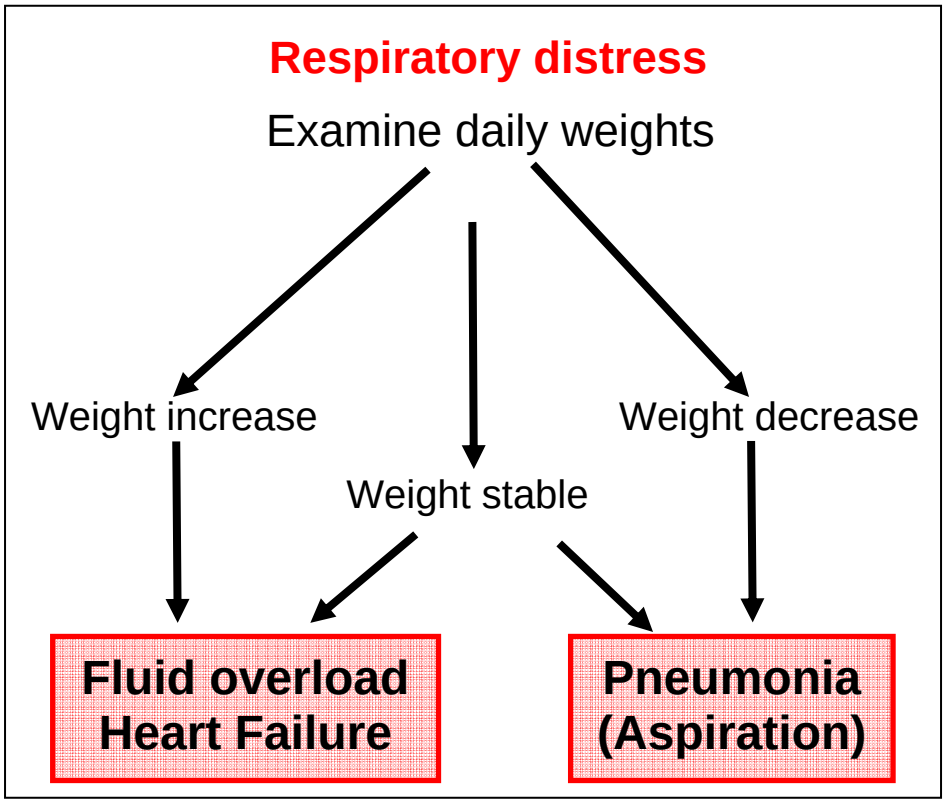
There is usually also weight gain. As heart failure usually starts after treatment, there is nearly always a record of the weight of the patient that was taken before the onset of heart failure.

Heart failure and pneumonia are clinically similar and very difficult to tell apart. If there is an increased respiratory rate AND any gain in weight then heart failure should be the first diagnosis. If there is an increased

[27] All children have a fall in Hb during the early phase of treatment. This "dilutional anaemia" is due to the sodium coming from the cells and mobilization of oedema – it must not be treated.

respiratory rate with a loss of weight then pneumonia can be diagnosed. If there is no change in weight (fluid balance) then the differentiation has to be made using the other signs of heart failure. Pneumonia should NOT be diagnosed if there has been a gain of weight just before the onset of respiratory distress.

Children with oedema can go into heart failure without a gain in weight, if the expanded circulation is due to oedema fluid being mobilised from the tissues to the vascular space.



During the initial treatment of SAM, any sodium containing fluid that has been given will have to be safely excreted later. Initial over-treatment can lead to death several days later from heart failure when intracellular sodium (marasmus and kwashiorkor) and oedema fluid are being mobilised.

As oedema fluid is mobilised (kwashiorkor) and the sodium is coming out of the cells (both kwashiorkor and marasmus), the plasma volume expands and there is a FALL IN HAEMOGLOBIN concentration. This DILUTIONAL anaemia happens to some extent in nearly all children as they recover. A substantial fall in haemoglobin, as a sign of an expanding circulation, is also a sign of impending of actual heart failure. These children should never be transfused.

Treatment

When heart failure is diagnosed,

- Stop all intakes of oral or IV fluids. **No fluid or food** should be given until the heart failure has improved even if this takes 24-48 hours[28]. Small amounts of sugar-water can be given orally to prevent hypoglycaemia.
- Give frusemide (1mg/kg)[29].
- Digoxin can be given in single dose (5 micrograms/kg – note that this is lower than the normal dose of digoxin. A loading dose is not given. Use the paediatric preparation, not small quantities of the adult preparation).

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[28] Do not be concerned about the child becoming temporarily slightly "re-malnourished" because of this. Such re-malnutrition will allow the sodium to re-enter cells and prevent further excess sodium efflux from the cells. The heart failure normally occurs because treatment has been excessively aggressive leading to an electrolyte dysequilibrium occur syndrome. Of course the sodium will need to be extracted from the cells during further treatment, but this should occur much more slowly and cautiously.

[29] Loop and other diuretics do not work in many of the children. Diuretics are given because the work partially in some of the children. However, one should never rely on diuretics to lead to excretion of the excess body sodium and reduce the intravascular volume.

If heart failure is associated with severe anaemia the treatment of the heart failure takes precedence over the treatment of the anaemia. A patient in heart failure should never be transfused (unless there are facilities and experience with exchange-transfusion) – the child with severe malnutrition and heart failure, should be treated in much the same way as a neonate with rhesus incompatability.

Hypothermia

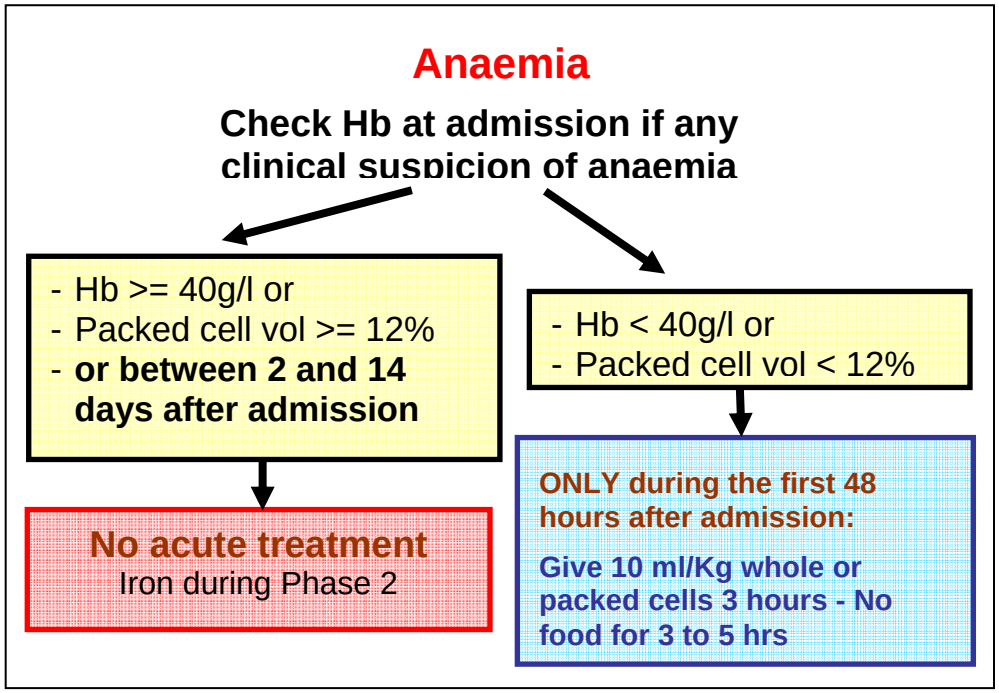
Severely malnourished patients are highly susceptible to hypothermia, (rectal temperature below 35.5°C or under arm temperature below 35°C).

- Use the "kangaroo technique" for children with a caretaker.
- Put a hat on the child and wrap mother and child together
- Give hot drinks to the mother so her skin gets warmer (plain water, tea or any other hot drink).
- Monitor body temperature during re-warming.
- The room should be kept warm, especially at night (between 28°C and 32°C): a maximum-minimum thermometer should be on the wall at least in Phase 1, to monitor the temperature.
- Treat for hypoglycaemia and give second-line antibiotic treatment.

NOTE: the thermo-neutral temperature range for malnourished patients is 28°C to 32°C. This is often uncomfortably warm for the staff and caretakers who may adjust the room to suit themselves. Children should always sleep with their mothers and not in traditional hospital child-cots/cages. There should be adequate blankets and a thick sleeping mat or adult bed. Most heat is lost through the head; hats should be worn by malnourished children. Windows and doors should be kept closed at night.

Severe anaemia

If the haemoglobin concentration is less than 40g/l or the packed –cell volume is less than 12% in the first 24 hours after admission the child has very severe anaemia.



- Give 10ml per kg body weight of packed red cells or whole blood slowly over 3 hours.
- All children should be fasted during, and for at least, 3 hours after a blood transfusion.
- Do not transfuse a child between 48h after the start of treatment with F75 and 14 days later.
- Do not give iron during phase 1 of treatment

- If the facilities and expertise exist (neonatal units) it is preferable to give an exchange transfusion to severely malnourished children with severe anaemia.

If there is heart failure with very severe anaemia transfer the patient to a centre where there are the facilities to do an exchange transfusion. Heart failure due to anaemia is clinically different from "normal" heart failure – with anaemia there is "high output" failure with an over-active circulation.

Increasing anaemia and heart failure or respiratory distress is a sign of fluid overload and an expanding plasma volume – the heart failure is not being "caused" by the anaemia; these patients should never be given a straight transfusion of blood or even packed cells.

Hypoglycaemia

Severely malnourished patients can develop hypoglycaemia but this is very uncommon. However, all children that have travelled for long distances to attend the centre should be given sugar-water as soon as they arrive.

Those that get hypothermia or have septic shock should be given extra sugar whether or not they have a low blood glucose.

One sign of an overactive sympathetic nervous system, which starts before actual hypoglycaemia develops, is eye-lid retraction. If a child sleeps with his eyes slightly open, then he should be woken up and given sugar-water to drink; the staff and the mothers should be taught to look for this sign during the night.

A child who has taken the diet during the day will not develop hypoglycaemia overnight and does not need to be woken for night-time feeding. If the diet has not been taken during the day the mother should give at least one feed during the night.

Clinical signs

There are often no signs at all of hypoglycaemia. One sign that does occur in malnutrition is eye-lid retraction - if a child sleeps with his eyes slightly open, then he should be woken up and given sugar solution or F75 to drink.

Treatment

- Patients who are conscious and able to drink should be given about 50 ml (approximately 5 to 10ml/kg) of sugar-water (about 10% ordinary sugar in potable water), or F75 diet (or F100) by mouth. The actual amount given is not critical.
- Patients losing consciousness should be given 50 ml (or 5 to 10ml/kg) of sugar-water by naso-gastric tube immediately. When consciousness is regained give milk feed frequently.
- Unconscious patients should also be given sugar-water by naso-gastric tube. They should also be given glucose as a single intravenous injection (approximately 5ml/kg of a sterile 10% glucose solution).
- All malnourished patients with suspected hypoglycaemia should be treated with second-line antibiotics.
- The response to treatment is dramatic and rapid. If a very lethargic or unconscious patient does not respond in this way, then there is another cause for the clinical condition that has to be found and treated.

HIV

Most children with HIV infection respond to the treatment of severe malnutrition in the same way as those without HIV infection. Those with a very low CD4 count have a higher mortality while those with a reasonably

high CD4 count appear to have the same mortality risk as non-infected children. The treatment of the malnutrition is the same whether the patient is HIV positive or negative.

The treatment of malnutrition should be started at a minimum one week before the introduction of anti-retroviral drugs to diminish the risk of serious side effects from the anti-retroviral drugs. Preferably anti-retroviral treatment should be delayed until at least phase 2 of treatment.

Children with HIV should be given co-trimoxazole prophylaxis against pneumocystis pneumonia. This is inadequate antibiotic cover for the severely malnourished patient, amoxicillin should be given in ADDITION to prophylactic doses of co-trimoxazole.

Other conditions

Children with many other underlying illnesses can first present with severe malnutrition. Initially, they should all be treated according to the standard protocol for severe malnutrition. Those that fail to respond to this treatment need further investigation for an underlying condition (see failure to respond to treatment).

Great care should be exercised in prescribing drugs to severely malnourished patients. They have abnormal kidney and liver function, changed levels of the enzymes necessary to metabolise and excrete drugs, excess enterohepatic circulation (reabsorption) of drugs that are excreted in the bile, a decreased body fat which increases the effective concentration of fat soluble drugs and, in kwashiorkor, there may be a defective blood-brain barrier. Very few drugs have had their pharmocokinetics, metabolism or side effects examined in severely malnourished patients.

It is strongly advised that either:

- The malnutrition is treated first, before standard doses of drugs are given. Drugs used for HIV and TB can damage the liver and pancreas. These diseases are not usually rapidly fatal (except miliary TB and TB meningitis) so treatment should normally be delayed for up to one week whilst the nutritional treatment returns the metabolism of the patient towards normal.
- If it is critical that the drug be given at the start of treatment for malnutrition then initially reduced doses should be given
- Many drugs should be avoided altogether until there is research to show that they are safe and how the dosage should be adjusted for the malnourished state. Common drugs such as paracetamol do not work in most malnourished children during phase 1 and can cause serious hepatic damage.
- Drugs can usually be given in standard doses to patients that are in phase 2 or being treated as out-patients.

CHAPTER SEVEN

TRANSITION PHASE

During the Transition Phase, a new diet is introduced: F100 or RUTF.

This Phase prepares the patient for Phase 2 treatment either as an in-patient or, **preferably**, as an out-patient. The transition phase should last between 1 and 5 days – usually 2 or 3 days.

Diet

The ONLY change that is made to the treatment on moving from Phase 1 to the Transition Phase is a change in the diet that is given from F75 to RUTF (or F100).

The number of feeds, their timing and the volume of the diet given remains exactly the same in Transition Phase as it was in Phase 1.

- Either use RUTF in the Transition Phase. Those children, who are going to continue treatment as out-patients with take-home treatment, should be changed to RUTF rather than F100 during the transition phase. The table below gives the total amount of RUTF that should be taken during the day. When the patients are taking this amount they should be discharged to continue their treatment at home. The full day's amount of RUTF should be given to the mother and the amount taken checked five times during the day. Children that are not taking sufficient RUTF should be given F100 to make up any deficit in intake. No other food should be given to the patient during this period. They should be offered as much water to drink as they will take during and after they have taken some of the RUTF.

OR

- Use F100 (130ml = 130kcal) in the Transition Phase. It is made up from one large package of F100 diluted into 2 litres of water or one small package diluted into 500 ml of water
- In all cases, breast-fed children should always get the breast-milk **before** F100 and **on demand**.

Even if the child is going to remain in a facility for phase 2, RUTF can be given for transition phase in place of F100. Frequently, particularly at health centre level, F100 is given during the week-day and RUTF at night and during week ends to give a total intake equivalent to the amount in the table.

Some patients initially refuse the RUTF. If this is the case they should be given the F100 diet for one or two days and then the RUTF re-introduced. Other children prefer the RUTF. It is good practice to give the diet that the children prefer – the two diets are nutritionally equivalent.

Warning: F100 should never be given to be used at home. F100 is always prepared and distributed in an in-patient unit. F100 should not be kept in liquid form at room temperature for more than a few hours before it is consumed. If there is a refrigerator and a very clean kitchen/ utensils, then it can be kept (cold) for up to 12 hours. A whole day's amount should never be made up at one time.

RUTF can be used both in in-patient and out-patient programmes.

Transition Phase: amounts of RUTF to give per 24h.

Table 8: Look up table for RUTF in Transition Phase per 24h

Class of Weight	Peanut based Paste		Milk based biscuit	Total calories
Kg	gram	Sachets	Bars	Kcal
3 - 3.4	90	1.00	1.5	**500**
3.5 - 3.9	100	1.00	1.5	**550**
4 - 4.9	110	1.25	2.0	**600**
5 - 5.9	130	1.50	2.5	**700**
6 - 6.9	150	1.75	3.0	**800**
7 - 7.9	180	2.00	3.5	**1000**
8 - 8.9	200	2.00	3.5	**1100**
9 - 9.9	220	2.50	4.0	**1200**
10 - 11.9	250	3.00	4.5	**1350**
12 - 14.9	300	3.50	6.0	**1600**
15 – 24.9	370	4.00	7.0	**2000**
25 - 39	450	5.00	8.0	**2500**
40 - 60	500	6.00	10.0	**2700**

The amounts given in the table are for the full 24h period. The amounts represent an average increase in energy intake of about one third over the amount given during phase 1. However, this varies between an increment of 10% and 50% depending upon the actual weight and the product used.

Each of these products is nutritionally equivalent to F100, with the exception that they have an appropriate amount of iron added during manufacture for children in phase 2 (i.e. children who pass the appetite test).

If both F100 and RUTF are being given they can be substituted on the basis that about 100ml of F100 = 20g of RUTF[30].

[30] This is an acceptable approximation. If tables are to be constructed then 100 ml of F100 = 18.5g of RUTF: 10g of RUTF = 54ml of F100 should be used and the resulting values rounded to the nearest 5 or 10 ml

Table 9: Look up table on the amounts of f100 to give for 8 – 6 – 5 feeds per day

Class of Weight (kg)	8 feeds per day	6 feeds per day	5 feeds per day
Less than 3kg	F100 full strength should not be given – Only F100 diluted should be given		
3.0 to 3.4 kg	60 ml per feed	**75 ml per feed**	85 ml per feed
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 – 6.9	110	**140**	175
7 – 7.9	125	**160**	200
8 – 8.9	140	**180**	225
9 – 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

The table gives the amount of F100 (full strength) that should be offered to the patients in transition phase. They should normally be taking 6 feeds during the day and none at night. The table below gives the amount of RUTF to give per feed if some of the feeds are being given as F100 and others as RUTF.

A common variation is to give 5 or 6 feeds of F100 during the day and then 3 or 2 feeds of RUTF during the night – this gives 8 feeds in total during the day. The volume of F100 is then read off from the previous table and the grams of RUTF from the next table, both using the 8 meals per day column and the appropriate class of weight.

Table 10: Look up table of the amount of RUTF to give when mixed feeding with F100 & RUTF

Amount of RUTF to give for meal substitution when mixed feeding with F100 and RUTF is being used			
	8 meals / day	**6 meals/day**	5 meals / day
3.0 to 3.4 kg	11	**14**	16
3.5 – 3.9	12	**15**	17
4.0 – 4.4	13	**16**	20
4.5 – 4.9	15	**18**	22
5.0 – 5.4	17	**20**	24
5.5 – 5.9	18	**22**	28
6 – 6.9	20	**25**	30
7 – 7.9	25	**30**	35
8 – 8.9	25	**35**	40
9 – 9.9	30	**35**	45
10 – 10.9	30	**35**	50
11 – 11.9	35	**40**	50
12 – 12.9	40	**45**	55
13 – 13.9	40	**50**	65
14 – 14.9	45	**55**	70
15 – 19.9	45	**55**	75
20 – 24.9	55	**60**	80
25 – 29.9	55	**65**	80
30 – 39.9	60	**70**	90
40 – 60	65	**75**	90

Routine medicine

Routine antibiotic should be continued for 4 more days after phase 1 or until transferred to phase 2 as an outpatient (patients entering OTP after having been in a facility do not need to be given antibiotics).

Surveillance

The surveillance of Phase 1 is maintained in Transition Phase.

As the patient is now taking more than maintenance amounts of food, weight gain is expected. Because it takes an average of about 5 kcal to make one gram of new tissue, the expected rate of weight gain, for marasmic patients, during transition phase is about 6g/kg/d, if all the food is taken by the patient and there is not excessive malabsorption.

Criteria to move back from Transition Phase to Phase1

Move the child back to Phase 1:

- If the patient gains weight more rapidly than 10g/kg/d (this indicated excess fluid retention).
- If there is increasing oedema
- If a child who does not have oedema develops oedema
- If there is a rapid increase in the size of the liver
- If any signs of fluid overload develop.
- If tense abdominal distension develops
- If the patient gets significant re-feeding diarrhoea so that there is weight loss.
- If a complication arises that necessitates an intravenous infusion
- If Naso-Gastric Tube is needed.

It is common for the children to get some change is 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 phase 1.

Criteria to progress from Transition Phase to Phase2

- A good appetite. This means taking at least 90% of the RUTF or F100 prescribed for transition phase.
- Oedematous patients (kwashiorkor) should remain in Transition Phase until there is a definite and steady reduction in oedema (now at + level). For those who are going to remain as in-patients they should normally remain in Transition phase until they have lost their oedema entirely. For those who are going to continue as out-patients they can go when their appetite is **good** (taking all the diet in transition phase - not just in the moderate range) and they have reduced their oedema to ++ or +.

CHAPTER EIGHT

PHASE 2 (IN- AND OUT- PATIENTS)

The Phase 2 can be managed in the health facility, using F100 or RUTF, or in the community, using RUTF. It is preferable to treat children in the community. **Never give F100 to be used at home**, only use RUTF

The principles of the treatment in the facility and in the community are exactly the same. The diet, organisation and documentation are different.

There has to be effective communication between the staff running the in-patient and the out-patient services.

A child that is ready to go to phase 2 should **always** be treated at home when there are:

1. A capable caretaker
2. The caretaker agrees to out-patient treatment,
3. There are reasonable home circumstances
4. There is a supply of RUTF.
5. An OTP programme is in operation in the area close to the patient's home.

A child being treated as out-patient that deteriorates or develops a complication should be transferred to in-patient care for a few days before continuing their treatment again as out-patient. The two arms (in-patient and out-patient) of the programme should be integrated so that there is smooth transfer of patients from one to the other mode of treatment. The same registration number is retained throughout the movements (the SAM-Unique-Number). A child transferring from one to another mode of treatment is still under the care of the programme for this episode of severe malnutrition; this is not a **"discharge"** from the in-patient facility but a **"transfer"** to another part of the same programme.

Diet (F100 or RUTF)

In Phase 2, the patients have an **unlimited** intake.

If significant "re-feeding oedema" occurs so that they lose weight, they are put back to the Transition Phase or to Phase 1; outpatients that lose weight are transferred back to the in-patient facility.

If mild "re-feeding diarrhoea" occurs then it should not be treated unless there is also a loss in weight. If there is a loss of weight then return the child to Phase 1.

If a major illness occurs during Phase 2, particularly during the first week, the patient should be put back to Phase 1 and given F75; outpatients are transferred back to the in-patient facility for a short time.

Breast-fed children should **always** get the breast-milk before they are given F100 or RUTF and also **on demand**.

Diet to use

F100 or RUTF are used in Phase 2. Never give F100 to be used at home, use RUTF.

F100 (100ml = 100 kcal): five feeds of F100 are given. One porridge (assida) meal **may** be given for patients who are more than 8kg (approximately 24 months of age); it is not necessary to give porridge unless the patient asks for it. Five feeds of F100 should be given to those who are less than 8kg. Alternative recipes are given in the annex 11.

RUTF: RUTF can be used in both in-patient and out-patient settings.

For out-patients explain to the caretaker how to give the RUTF at home:

- RUTF is a food and a medicine for malnourished children only. **It should not be shared with the other family members even if the child does not consume all the diet offered**. Opened packets of RUTF can be kept safely and eaten at a later time – the other family members should not eat any that is left over at a particular meal.
- Wash with soap child's hand and face before feeding. Keep food clean and covered.
- These children often only have moderate appetites and eat slowly. Give small regular meals of RUTF and encourage the child to eat as often as possible (every 3 to 4 hours). The child can keep the RUTF with him/her and eat it steadily throughout the day – it is not necessary to have set meal times if the food is with the child all the time. Tell the mother how much her child should eat each day (this is given in the look-up table).
- RUTF is the only food the child needs to recover during this time in the programme. It is not necessary to give other foods; a lot of other foods will delay the recovery of your child. If other foods are given, always give RUTF **before** other foods.

For children that have been in a TFC, A transfer form needs to be filled in with the SAM-Number of the child. The child should be transferred with sufficient RUTF to last until the next day of operation of the OTP site closest to the child's home.

For children that are first admitted directly into phase 2 (OTP), the amount of RUTF should be enough for the next visit to the OTP site.

- For breast-fed children, **always** give breast milk before the RUTF
- Always offer plenty of clean water to drink while eating RUTF

For OTP programmes, if there is a problem with food security or in an emergency situation a "protection" ration (usually WSB or UNIMIX) should be given to the family both to assist this family of a malnourished child and prevent sharing of the RUTF with other family members. The caretaker must be told that this ration is not for the patient but for the rest of the family only.

Amounts to give

For in-patients, offer the amount of feed given in the table. Either F100 or RUTF can be given. The children must NEVER be forced fed. After the feed, always propose an additional quantity to the patient if the child takes all the feed quickly and easily. They should be able to take as much as RUTF as they want.

When RUTF is given, as much water must be offered during and after the feed to satisfy the patient's thirst. Because RUTF can be kept safely the amount for several feeds can be given to the patient at one time. This is then eaten at the patient's leisure, in his/her own time. This is used in day-care when feeding is given overnight, at weekends or during staff shortages.

Table 11: Look up table for Phase 2 In-patients of the amount of F100 or RUTF to give at each feed for 5 or 6 feeds per day

Class of weight	6 feeds/ day		5 feeds/day	
(kg)	F100	RUTF	F100	RUTF
	ml/feed	g/feed	ml/feed	g/feed
<3 kg	Full strength F100 and RUTF are not given below 3kg			
3.0 to 3.4	110	20	130	25
3.5 - 3.9	120	22	150	30
4.0 - 4.9	150	28	180	35
5.0 - 5.9	180	35	200	35
6.0 - 6.9	210	40	250	45
7.0 - 7.9	240	45	300	55
8.0 - 8.9	270	50	330	60
9.0 - 9.9	300	55	360	65
10.0 – 11.9	350	65	420	75
12.0 – 14.9	450	80	520	95
15.0 – 19.9	550	100	650	120
20.0 - 24.9	650	120	780	140
25.0 – 29.9	750	140	900	160
30.0 - 39.9	850	160	1000	180
40 - 60	1000	180	1200	220

Table 12: Look up table of Phase 2 out-patients of the amounts of RUTF to give per day and week

Class of weight (kg)	RUTF Peanut based paste		RUTF Peanut based paste		RUTF Milk based biscuit	
	Grams per **day**	Grams per **week**	sachet per **day**	sachet per **week**	bars per **day**	bars per **week**
3.0 - 3.4	105	750	1 ¼	8	2	14
3.5 - 4.9	130	900	1 ½	10	2 ½	17 ½
5.0 – 6.9	200	1400	2	15	4	28
7.0 – 9.9	260	1800	3	20	5	35
10.0 - 14.9	400	2800	4	30	7	49
15.0 – 19.9	450	3200	5	35	9	63
20.0 – 29.9	500	3500	6	40	10	70
30.0 - 39.9	650	4500	7	50	12	84
40 - 60	700	5000	8	55	14	98

Routine medicine

In Patients

*** Iron**: is added only to the F100 in Phase 2. Add 1 crushed tablet of ferrous sulphate (200mg) to each 2 litres to 2.4litres of F100. For lesser volumes of F100, dilute one tab of ferrous sulphate (200mg) in 20ml water and add 1ml of the solution for each 100ml of the F100.

RUTF already contains the necessary iron.

*** De-worming**

Albendazole/mebendazole is given at the start of Phase2 for patients that will remain as in-patients.

For both those transferred from in-patients to phase 2 as out-patients and those admitted directly to OTP de-worming is given at the 2nd outpatient visit (after 7 days).

Worm medicine is only given to children that can walk.

Table 13: De-worming treatment

Age	<1 year	1 to 2 years	>= 2years
Albendazole 400mg	Not given	½ tablet	1 tablet

Medicines for Patients directly admitted to phase 2 (OTP) programme.

See summary table 6 in the Routine Medicine Chapter. Review the paragraph as discussed above

Patients that are admitted **directly** to phase 2 as out-patients are given the routine medicines given to in-patients during phase 1 as follows:

Antibiotics: Amoxicillin for 7 days.

Folic acid: 5 mg once on first visit (optional), there is abundant folic acid in RUTF to treat sub-clinical folate deficiency. If the dose on the first day is missed there is no point in giving it during subsequent visits as the amount in the RUTF will have repleted the body folate store within one week.

Vitamin A: once on 4th visit for all children; at this time there should be sufficient recovery to store the massive dose of vitamin A in the liver. There is sufficient vitamin A in the RUTF to treat sub-clinical vitamin A deficiency.

- *Any child with signs of vitamin A deficiency should initially be treated as an in-patient as the condition of their eyes can deteriorate very rapidly.*
- All children admitted directly to phase 2 as outpatients should also receive vitamin A if there is an active measles epidemic in progress.

Measles vaccine: Out-patients are given measles vaccine during their 4th visit[31]. Patients directly admitted to OTP are unlikely to be incubating measles (they will mostly fail their appetite test) and will not be exposed to nosocomial infection. Measles vaccine on admission to OTP is thus omitted except in the presence of a measles epidemic. The measles vaccine is given at a time when there should be sufficient recovery for the vaccine to produce protective antibodies.

Anti-malarials: malaria prophylaxis or treatment can be given according to the national protocol.

- *Children with active malaria should be admitted for in-patient care.*

In malaria endemic areas the families of malnourished children should all be given insecticide-impregnated bed nets.

[31] Both patients admitted directly to OTP and those that have initially been treated as in-patients

Surveillance in phase 2

Table 14: Surveillance during the In and Out patients treatment

Frequency	In-patient	Out-patient
Weight and oedema	Every day	Every week
Height/Length is measured	As required[32]	As required[33]
W/H z score	The day of admission and discharge	The day of admission and discharge
Body temperature is measured	Every morning	Every week
The standard clinical signs (stool, vomiting, etc)	Every day	Every week
MUAC is taken	The day of admission and discharge	Every week
Appetite test is done	Intake record is kept on chart	Every week

Criteria to move back from Phase 2 (in patient or outpatient) to Phase 1 (in-patient)

- In patients who develop any signs of a complication should be returned to phase 1.
  - Failure of the appetite test
  - Increase/development of oedema
  - Development of re-feeding diarrhoea sufficient to lead to weight loss.
  - Fulfilling any of the criteria of "failure to respond to treatment"
- Outpatients who develop the signs of a serious medical complication (pneumonia, dehydration, etc. - see table (3) in Chapter 3 on Admission Procedures) should be offered transfer to the in-patient facility for management of their condition until they are fit to return to phase 2 as out-patients.
- In addition, if the patient being treated as an outpatient and develops any of the following s/he should be transferred to the in-patient facility:
  - Failure of the appetite test
  - Increase/development of oedema
  - Development of refeeding diarrhoea sufficient to lead to weight loss.
  - Fulfilling any of the criteria of "failure to respond to treatment"
  - Weight loss for 2 consecutive weighing

[32] There is sometimes "child substitution" in order for the family to continue to access services when the index child has recovered, moved away or died. Height should be measured if there is an unexpected change in weight (large increase or decrease) to check if the same child has attended the OTP site. If there has been child substitution then the "new" individual should be fully assessed.

[33] There is sometimes "child substitution" in order for the family to continue to access services when the index child has recovered, moved away or died. Height should be measured if there is an unexpected change in weight (large increase or decrease) to check if the same child has attended the OTP site. If there has been child substitution then the "new" individual should be fully assessed.

- Weight loss of more than 5% of body weight at any visit.
- Static weight for 3 consecutive weighing
- Major illness or death of the main caretaker so that the substitute caretaker requests in-patient care

When transferred back to the in-patient unit, the Phase 1or phase 2 protocol (as needed) is applied (see Chapter 5), however, the routine drugs are individually prescribed depending upon what has already been given and the cause of the transfer.

Chapter Nine

Failure to Respond

It is usually only when children fulfil the criteria for "failure to respond" that they need to have an extensive history and examination or laboratory investigations conducted. Most patients are managed by less highly trained staff (adequately supervised) on a routine basis. Skilled staff (nurses and doctors) time and resources should be mainly directed to those few children who fail to respond to the standard treatment.

Failure to respond to standard treatment is a "diagnosis" in its own right. It should be recorded on the chart as such and the child then seen by more senior and experienced staff. For out-patients this diagnosis usually warrants referral to a centre for full assessment; if inadequate social circumstances are suspected as the main cause in out-patient management a home visit can be performed before transfer to the TFC.

Table 15: Failure to respond for Inpatients

Criteria for failure to respond	Time after admission
Primary failure to respond (phase 1)	
Failure to regain appetite	Day 4
Failure to start to loose oedema	Day 4
Oedema still present	Day 10
Failure to enter phase 2 and gain more than 5g/kg/d	Day 10
Secondary failure to respond	
Failure to gain more than 5g/kg/d for 3 successive days	During Phase 2

Note that the day of admission is counted as day 0.

Table 16: Failure to respond for Outpatients

Criteria for failure to respond	Time after admission
Primary failure to respond (phase 1)	
Failure to gain any weight (non-oedematous children)	21 days
Failure to start to loose oedema	14 days
Oedema still present	21 days
Weight loss since admission to programme (non-oedematous children)	14 days
Secondary failure to respond	
Failure of Appetite test	At any visit
Weight loss of 5% of body weight	At any visit
Weight loss for two successive visits	During OTP care
Failure to gain more than 2.5g/kg/d for 21days (after loss of oedema (kwashiorkor) or after day 14 (marasmus))	During OTP care

Usual causes of failure to respond

Problems with the treatment facility:

In –patients

- Poor environment for malnourished children
- Failure to treat the children in a separate area
- Failure to complete the multichart correctly
- Insufficient staff (particularly at night)
- poorly trained staff
- Inaccurate weighing machines
- Food prepared or given incorrectly

Out – patients

- Inappropriate selection of patients to go directly to OTP
- Poorly conducted appetite test
- Inadequate instructions given to caretakers
- Wrong amounts of RUTF dispensed to children
- Excessive time between OTP distributions (e.g. two weekly gives significantly worse results than weekly visits)

Problems of individual children:

In –patients

- Insufficient food given
- Food taken by siblings or caretaker
- Sharing of caretaker's food
- Vitamin or mineral deficiency
- Malabsorption
- Psychological trauma (particularly in refugee situations and families living with HIV/AIDS)
- Rumination
- Infection, especially: Diarrhoea, dysentery, pneumonia, tuberculosis, urinary infection/ Otitis media, malaria, HIV/AIDS, Schistosomiasis/ Leishmaniasis, Hepatitis/ cirrhosis,
- Other serious underlying disease: congenital abnormalities (eg Down's syndrome), neurological damage (eg cerebral palsy), inborn errors of metabolism.

Out – patients(In addition to all of the above)

- Sharing within the family
- Sibling rivalry (other children taking the diet)
- All eating from the same plate (the malnourished child should always have his/her own portion of food).
- Unwilling caretaker
- Caretaker overwhelmed with other work and responsibilities

When a child fails to respond then the common causes must be investigated and treated appropriately according to the manual.

Every child with unexplained **primary failure** to respond should have a detailed history and examination performed. In particular, they should be checked carefully for infection as follows:

(1) Examine the child carefully. Measure the temperature, pulse rate and respiration rate

(2) Where appropriate, examine urine for pus cells and culture blood. Examine and culture sputum or tracheal aspirate for **TB**; examine the fundi for retinal tuberculosis; do a chest x-ray.[32] Examine stool for blood, look for trophozoites or cysts of Giardia; culture stool for bacterial pathogens. Test for HIV, hepatitis and malaria. Examine and culture CSF.

Secondary failure to respond (deterioration/regression after having progressed satisfactorily to Phase 2 with a good appetite and weight gain in Transition Phase for in-patients and deterioration after an initial response in out-patients), is usually due to:

- Inhalation of diet into the lungs. There is poor neuro-muscular coordination between the muscles of the throat and the oesophagus in malnutrition. It is quite common for children to inhale food into their lungs during recovery if they are: 1) force fed, particularly with a spoon or pinching of the nose; 2) laid down on their back to eat, and 3) given liquid diets. Inhalation of part of the diet is a common cause of pneumonia in all malnourished patients. Patients should be closely observed whilst they are being fed by the caretaker to ensure that the correct technique is being used. One of the advantages of RUTF is that it is much less likely to be force fed and inhaled.
- An acute infection that has been contracted in the centre from another patient (called a "nosocomial" infection) or at home from a visitor/ sibling/ household member.
- Sometimes as the immune and inflammatory system recovers there appears to be "reactivation" of infection during recovery; acute onset of malaria and tuberculosis (for example sudden enlargement of a cervical abscess or development of a sinus) may arise several days or weeks after starting a therapeutic diet.
- A limiting nutrient in the body that has been "consumed" by the rapid growth and is not being supplied in adequate amounts by the diet. This is very uncommon with modern diets (F100 and RUTF) but may well occur with home-made diets or with the introduction of "other foods". Frequently, introduction of "family plate", UNIMIX or WSB slows the rate of recovery of a malnourished child. The same can occur at home when the child is given the family food (the same food that the child was taking when malnutrition developed) or traditional "weaning" foods.
- With out-patients, traditional medicines, other treatments and a change in home-circumstances can significantly affect the recovery of the malnourished child.

Action required when failure to respond is commonly seen in a programme

- The common causes listed in the box should be systematically examined to determine and rectify the problems.
- If this is not immediately successful then an external evaluation by someone with experience of running a programme for the treatment of severe malnutrition should be conducted into the organisation and application of the protocol.
- Review of the supervision of staff with refresher training if necessary
- Re-calibration of scales (and length-boards).

[32] Gastric aspirates are very rarely positive in the malnourished child with active TB – particularly if there is overnight feeding; this test should not be relied on, is difficult to perform well and is traumatic for the child. If it is used, overnight feeds should not be given.

For out-patient programmes (OTP)

- Follow-up through *home visits* by outreach workers/volunteers to check whether a child should be referred back to the clinic between visits
- Discuss with carer on aspects of the home environment that may be affecting the child's progress in the programme
- At health facility carry out medical check and Appetite test
- A follow-up home visit is essential when:
    - carer has refused admission to in-patient care despite advice
    - failure to attend appointments at the out-patient programme

Chapter Ten

Discharge Criteria from the Programme

AGE	DISCHARGE CRITERIA
6 months to 12 years ***Option 1**** ***Option 2*****	➢ **W/H or W/L** >=-1.5z score on more than one occasion if adequate arrangements for follow up have been made. (Two days for inpatients, two weeks for outpatients). ➢ W/L or W/HW/L or W/H >-1.0 z-score if there are inadequate follow up programmes **And** ➢ MUAC>115mm **And** ➢ No oedema for 14 days ➢ Target weight gain reached (see annex 6); there are two criteria, one for those with good follow up facilities and one for those where there are inadequate follow up facilities **and** ➢ No oedema for 14 days
12 to 18 years	➢ W/H>=85% NCHS **and** ➢ No oedema for 14 days
Adults	➢ **BMI>=17.5** **And** ➢ **MUAC>=18.5** **And** ➢ No oedema for 14 days

*Option 1 is the preferred option. It is used where the facility has the capacity to measure the height of the children.

**Option 2 is used particularly for children being treated by mobile teams and for children admitted on MUAC criteria to peripheral OTP sites without the facilities or staff skills to measure height.

All the patients should be discharged to supplementary feeding programme (SFP) for follow up where this is available. Where this is not available the criteria for discharge should be more conservative (see tables).

Follow-up after discharge

The patients should be enrolled in a Supplementary Feeding Programme and given nutritional support for another 4 months. For the first two months they attend every 15 days and then once per month for a further two months if progress is satisfactory. The ration should be the same as the standard SFP ration. There should be a separate category in the SFP registration book for these patients for their follow up. The registration book should always record the SAM number of the patients that have been severely malnourished.

If there is no SFP near to the beneficiaries' home, then the follow up should be organized at the nearest MCH or health centre.

Where the outreach services are operational, linkages can be made so that children discharged from the programme can be followed up by the outreach workers.

Section II

Patients less than Six Months Old (or less than 3 Kilograms)

Chapter Eleven

Infant with a Female Caretaker

These children should always be treated in an in-patient unit and should not be admitted to out-patient treatment. RUTF **is not** suitable for infants.

Infants who are malnourished are weak and do not suckle strongly enough to stimulate an adequate production of breast milk. The mother often thinks that she herself has insufficient milk and is apprehensive about her ability to adequately feed her child. The low output of milk is due to inadequate stimulation by the feeble infant. The whole objective of treatment of these patients is to return them to full exclusive breast feeding.

The main admission criterion is failure of effective breast feeding and the main discharge criterion is gaining weight on breast milk alone.

Criteria of admission

AGE	ADMISSION CRITERIA
Infant less than 6 months or less than 3 kg being breast-fed	➢ The infant is too weak or feeble to suckle effectively independently of his/her weight-for-length (if this is due to acute illness, the acute illness should be treated first) **or** ➢ The infant is not gaining weight at home(by serial measurement of weight during growth monitoring) **or** ➢ W/L (Weight-for-Length) less than -3 Z scores. **or** ➢ Presence of bilateral oedema.

Phase 1 – Transition – Phase 2

The aim is to stimulate breast-feeding and to supplement the child until breast milk is sufficient to allow the child to grow properly. Breast milk output is stimulated by the Supplemental Suckling (SS) technique; it is important to put the child to the breast as often as possible.

- Breast-feed every 3 hours for at least 20 minutes, more often if the child cries or seems to want more.
- Between half to one hour after a normal breast-feed give maintenance amounts of F100 diluted using the supplementary suckling technique:
- F100diluted: 130ml/kg/day (100kcal/kg/day), divided in 8 meals.
- Young infants should be nursed in a separate space from the older malnourished children. This can be a "breast-feeding corner".

There are not separate phases in the treatment of infants with the SS technique. There is no need to start with F75 and then switch to F100diluted unless the infant has oedema.

Preparation of F100 DILUTED

- Dilute F100 one packet into 2.7l of water instead of 2l to make F100 diluted.

- To make small quantities of F100 diluted,

- Use 100ml of F100 already prepared and add 35ml of water, then you will get 135ml of F100diluted. Discard any excess waste. Don't make smaller quantities.
- If you need more than 135ml, use 200ml of F100 and add 70ml of water, to make 270ml of F100 diluted and discard any excess waste.

If F100 diluted is not readily available these infants can be fed with the same quantities of commercial infant formula diluted according to the instructions on the tin.

If there is a choice, use a formula designed for premature infants. However, infant formula is not designed to promote rapid catch up growth. Unmodified powdered whole milk should not be used.

Table 17: Look up table of the Amounts of F100 diluted (or infant formula) to give for infants during Supplementary suckling

Class of Weight (kg)	ml of F100 diluted per feed (8 feeds/day)
	Diluted F100 or Infant formula
≤1.2 kg	25 ml per feed
1.3 to 1.5 kg	30
1.6 – 1.7	35
1.8 – 2.1	40
2.2 - 2.4	45
2.5 - 2.7	50
2.8 – 2.9	55
3.0 - 3.4	60
3.5 – 3.9	65
4.0 – 4.4	70

Children less than 6 months, with oedema, should be started on F75 and not on F100diluted. When the oedema has resolved and they are suckling strongly they should be changed to F100 diluted or infant formula

Note: F100 undiluted is never used for small infants (less than 3kg)

The quantity is NOT increased as the infant starts to gain weight.

Surveillance

The progress of the child is monitored by the daily weight.

- If the child loses weight over 3 consecutive days yet seems hungry and is taking all his F100 dilute/infant formula, add 5mls to each feed[33].
- The supplementation is not increased during the stay in the centre. If the child grows regularly with the same quantity of milk, it means the quantity of breast milk is increasing.
- If after some days, the child does not finish all the supplemental food, but continues to gain weight, it means that the breast milk is increasing and that the child has enough.

[33] The Supplemental Suckling feed is giving maintenance amounts. If it is being taken and there is weight loss, either the maintenance requirement is higher than calculated or there is significant mal-absorption.

- Weigh the child daily with a scale graduated to within 10g (or 20g).
- When a baby is gaining weight at 20g per day for 3 consecutive days (what ever his weight), then decrease the quantity of F100diluted/ infant formula to one half of the maintenance intake.
- If the weight gain is maintained for 3 consecutive days (10g per day whatever his weight) then stop supplement suckling completely.
- If the weight gain is not maintained then increase the amount given to 75% of the maintenance amount for 2 to 3 days and then reduce it again if weight gain is maintained.
- If the mother is agreeable, it is advisable to keep the child in the centre for a further few days on breast milk alone to make sure that he continues to gain weight. If the mother wishes to go home as soon as the child is taking the breast milk greedily then they should be discharged.
- When it is certain that the child is gaining weight on breast milk alone he should be discharged, no matter what his current weight or weight-for-length.

Supplementary Suckling Technique

The supplementation is given using a tube the same size as n°8 NGT (a size n°5 tube can be used, but the milk should be strained through cotton wool to remove any small particles that would block the tube).

- F100 diluted/ infant formula is put in a cup. The mother holds it.
- The end of the tube is put in the cup.
- The tip of the tube is put on the breast at the nipple and the infant is offered the breast in the normal way so that the infant attaches properly. Sometimes at the beginning the mothers find it better to attach the tube to the breast with some tape.
- 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.
- At first an assistant needs to help the mother by holding the cup and the tube in place. She encourages the mother confidently. Later the mothers nearly always manage to hold the cup and tube without assistance.
- At first, the cup should be placed at about 5 to 10cm below the level of the nipple so the milk does not flow too quickly and distress the infant. And the weak infant does not have to suckle excessively to take the milk. As the infant becomes stronger the cup should be lowered progressively to about 30cm below the breast.
- The mother holds the tube at the breast with one hand and uses the other for holding the cup. Some mothers find it more convenient if the tube is held in place with a strip of tape, but this is not normally necessary.
- 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.
- By far the best person to show the mother the technique is another mother who is using the technique successfully. Once one mother is using the SS technique successfully the other mothers find it quite easy to copy her.
- The mother should be relaxed. Excessive or officious instructions about the correct positioning or attachment positions often inhibit the mother 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.
- If the formula diet is changed 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.

This infant is suckling the breast and also getting the F100diluted (130ml/kg/d) 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.

Cleaning the tube

After feeding 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.

Routine medicine

These children have to be seen by a nurse everyday because they are vulnerable.

- **Vitamin A**: 50,000UI at admission only except child with oedema, give on discharge
- **Folic acid**: 2.5mg (1tab) in one single dose
- **Ferrous sulphate**: when the child suckles well and starts to grow. Use the F100, which has been enriched with ferrous sulphate (phase II). Dilute this with 1/3 water to obtain the correct dilution. Children below 6 months are relatively few and it is much easier and safer to use the F100 prepared for the older patients than to calculate and add ferrous sulphate to very small amounts of diet.
- **Antibiotics**: Amoxycillin (from 2kg): 30mg/kg 2 times a day (60mg/day) in association with Gentamycin 5mg/kg 1 times/ day (do not use Chloramphenicol in young infants)

The surveillance is the same for infants as for older patients in Phase 1

Care for the mothers

As the aim is to increase breast milk, the mothers learn from each other and the treatment is different from older patients, the babies should be together in a specific room that can be monitored and kept quiet.

- 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.
- Strongly reassure the mother that the technique works and that she will get enough milk herself to make her baby better. Tell her that as her baby becomes stronger more milk will come into her breasts.
- Be attentive to her and introduce her to the other mothers in the phase.

- She should drink at least 2 litres per day
- She must eat enough - about 2500kcal/day (1 porridge in the morning, 1 or 2 family meals, 1 porridge in the afternoon)
- The mother who is admitted in the centre with her child should receive Vitamin A: 1) If the child is below 2 months: 200.000UI (there should be no risk of pregnancy), 2) If the child is above 2 months: 25.000UI once a week
- Micronutrients' supplementation must also be given to the mother. The quality of the milk with respect to many type I nutrients depends upon the mother's nutritional status. It is critical that the mother is properly fed during this procedure and any deficiency in the infant is corrected by giving good nutrition to the mother.
- The length of stay in the TFC should be as short as possible.

Discharge criteria

AGE	DISCHARGE CRITERIA
Infant less than 6 months or less than 3 kg being breast-fed	➢ it is clear that he/she is gaining weight on breast milk alone after the Supplemented Suckling technique has been ceased, ➢ there is no medical problem ➢ the mother has been adequately supplemented with vitamins and minerals, so that she has accumulated body stores of the type I nutrients.

Note: there are no anthropometric criteria for discharge of the fully breast-fed infant who is gaining weight.

Chapter Twelve

Infant without any Prospect of Being Breast-fed

Criteria of admission[34]

AGE	ADMISSION CRITERIA
Infant less than 6 months or less than 3 kg with no prospect of being breast-fed	➢ W/L (weight-for-length) < -3 Z scores **or** ➢ Presence of bilateral oedema.

Phase 1 - Transition – Phase 2

When there is no prospect of being given breast milk then severely malnourished, less than 6 month' old infants, should be treated according to the standard protocol with the following modifications.

Phase 1

Wasted, marasmic infants of less than 6 months can be given F100 diluted in Phase 1. Oedematous infants of less than 6 months should always be given F75 during phase one.

Table 18: Look up table of the amounts of F100 diluted or F75 to give for infants not breast-fed in Phase 1

Class of Weight (kg)	ml of F100 per feed in Phase 1 (8 feeds/day) Diluted F100
=< 1.5 kg	30 ml per feed
1.6 to 1.8 kg	35
1.9 – 2.1	40
2.2 - 2.4	45
2.5 - 2.7	50
2.8 – 2.9	55
3.0 - 3.4	60
3.5 – 3.9	65
4.0 – 4.4	70

Children less than 6 months, with oedema, should be on F75 and not on F100 diluted.

Transition Phase

During Transition Phase, only F100 diluted should be used. The volume of the diet is increased by on third. These small infants should not be treated with full strength F100.

[34] There are no standards for infants below 49cm and the increments to judge nutritional status require precise scales that are not generally available. The in-patient therapeutic unit is not appropriate for treating premature and low-birth-weight non-breast-fed infants below 49cm in length. These infants should be referred to the nursery and given infant formula.

Phase 2

During Phase 2, twice the volume of F100 diluted that has been given during Phase 1 should be offered to the infants.

Table 19: Look up table of the Amounts of F100 diluted for infants not breast-fed in Phase 2

Class of Weight (kg)	ml of F100 per feed in Phase 2 (6 to 8 feeds/day)
	Diluted F100
=< 1.5 kg	60 ml
1.6 to 1.8 kg	70
1.9 – 2.1	80
2.2 - 2.4	90
2.5 - 2.7	100
2.8 – 2.9	110
3.0 - 3.4	120
3.5 – 3.9	130
4.0 – 4.4	140

Criteria of discharged

AGE	DISCHARGE CRITERIA
Infant less than 6 months or less than 3 kg with no prospect of being breast-fed	➢ When they reach -1 Z-score weight for length they can be switched to infant formula.

Follow-up for these children is very important.

Section III

Community Mobilisation

The success of out-patient management of most children with severe malnutrition depends to a large extent on identifying these children before they become complicated and present at a health facility because of the complication. This requires screening of children in the community. The object is to achieve as high a coverage as possible by identifying all those that could benefit from treatment and enrolling them in the programme as outpatients. There needs to be strong support from the community to identify these children and support for the treatment within the community. This is achieved with community health workers and outreach volunteers. This requires community mobilisation in support of the whole programme.

The quality of engagement with the community is an important determinant of the programme's success. This is crucial for effective early case-finding. Early case finding and the quality of service offered are the most important determinants of case fatality rates, programme coverage and the impact of the programme.

Community mobilisation: the term 'community mobilisation' is used here to refer to a range of activities that help implementers understand the affected communities, build relationships with them and foster their participation in programme activities.

Objective: to enhance the immediate programme impact whilst creating a platform for comprehensive community mobilisation over the longer term. Fostering community participation at the beginning of the programme also facilitates integration with other programmes in other sectors such as health, food security, agriculture etc.

Although community mobilisation is a continuous process, it is usefully conceptualised as being divided into 5 areas as follows:

Stages in community mobilisation

Planning Phase **Implementation Phases**

Assessing community capacity → ***Community sensitisation*** → ***Case-finding*** → ***Follow up*** → ***Ongoing sensitisation***

Assessing community capacity

To be effective community-based programmes must be tailored to the *context* in which they operate and this requires mechanisms to ensure that information gathered during the assessment of the affected community guides programme design and planning. It is particularly important to have information on community structures (both formal and informal), key stakeholders (traditional authorities, traditional and modern health practitioners, civil society etc), literacy levels, terms used to define malnutrition, who is responsible for children, who makes key decision on household resource allocation, attitudes to health and malnutrition (traditional malpractices towards malnourished cases), health seeking behaviour, and formal and informal means of communication used.

Community Sensitisation

Community sensitisation aims to raise awareness of the programme, promote understanding of its methods and lay the foundations for community ownership in the future. Sensitisation messages should provide essential information about the programme's aims, methods and actors. In particular people must know what the programme will mean to them in practice: what will it do, where it will operate, who will implement it, how can people access it and what the programme will do for individuals.

Messages are designed and advertised with the active involvement of the stakeholders in a language that local people understand. Messages should be as brief as possible and must be tailored to the target population, using

local concepts and understandings of malnutrition, and terms to describe it. Visual aids and "fliers" that are posted in key places and disseminated to key stakeholders (traditional leaders, teachers, CHW, community volunteers, CMWs etc.) should also be widely distributed.

The messages should be passed through the channels of communication that the community usually uses. These might be formal or informal, traditional or modern. Informal channels tend to be more useful. It is also important to consult and involve key community figures, community organisations and groups such as volunteer networks and women's associations. In particular, experiences indicate that it is crucial to involve traditional health practitioners. Decisions on the channels of communication and on engagement with different actors can therefore, only be made based upon an understanding on the local community dynamics.

Community sensitisation is an ongoing process. Much of the activity takes place early in the programme but it should be continually reinforced throughout the programme in order to be effective. The process should be seen as a constant dialogue in which communities can periodically voice their views and suggest alternative courses of action.

Case finding - The identification of acute severely malnourished children in the community

In order to be able to provide the largest possible proportion of the acutely malnourished with access to care, a programme needs effective ways of identifying those in need of care and admitting them to the programme. To reduce the barriers to access, screening must take place in the community, using MUAC, and checking for nutritional oedema.

Active case finding:

If the community is aware of the programme and it gets a reputation for offering high quality treatment satisfactorily, self-referrals will gradually become the main source of patients. However, in order to maximise coverage, it is important to maintain active case-finding until very few malnourished children are identified in the community.

Volunteers:

Volunteer is a person from the community itself who is willing to offer a part of his time in providing services to her community without waiting to any payment.

The major challenges facing volunteer-based systems are 1) choosing volunteers who are representative of their communities and 2) maintaining their motivation.

A unique strength of Therapeutic Feeding Programmes is its high potential to motivate mothers, volunteers and health care workers. The positive feedback when a child is rapidly cured from severe acute malnutrition is a powerful experience that stimulates demand and motivates volunteers. This encourages mothers and traditional practitioners to refer children for treatment. Successful treatment of individuals empowers local health workers, enhances their esteem and credibility in the community.

Active case-finding by volunteers has several advantages. Volunteers being from the community itself are familiar with the area, its population and customs and known by the community members. Crucially, designing outreach strategies around volunteers motivated by the positive reinforcement associated with a successful programme requires very few inputs.

Selection of volunteers:

Facilitating the community to select volunteers is a participatory approach. However this can have drawbacks. The most common problem is the tendency for communities to select young, literate women and who have relation to community leaders. Criteria for selection are:

1- Honest and influential person

2- Trustful person.

3- High credibility in the community.

4- Has the desire / believe in the voluntarily work.

5- At least read and write

Positive carers:

It is important to complement this approach by identifying 'positive carers' from within the programme's clients. In most therapeutic programmes the energy and commitment of these mothers has proved invaluable in assisting with active case-finding and on occasion with following-up and supporting other carers.

Existing health volunteers:

It is also recommended to integrate health volunteers (for example: community volunteers, CMWs) in active case-finding if they are familiar with the area, people and customs. These pre-existing volunteers have knowledge of health issues and usually have standing in the community with villagers willing and accustomed to seek their assistance. However, health volunteers should not be overloaded unrealistically. It is important to maintain realistic expectation from volunteers. CMWs can be used for recruiting, training and following volunteers.

Outreach Health workers:

In Yemen, there are no special outreach health workers. For out reach activities, microplanning is made at the district level to reach population living in the 3rd catchments level and those living in areas located in between 2nd and 3rd levels. Existed health workers working in the health facilities at the district are complied in teams called "mobile teams" to deliver services of immunization for children and women, child health services including treatment as per IMCI guidelines, reproductive health, health education services, and recently the screening and referral for severely acute malnutrition among children as shown in chapter (1) in the part of "Screening and Triage". For such activities, health workers are paid as incentive. The advantage of paying incentives for them is that case-finding tends to be more organized.

Challenges common in case-finding are:

Travel requirement: In widely dispersed communities, outreach workers may have to travel long distances on foot each week to visit villages and individual houses. This needs careful consideration when the case-finding strategy is developed.

Coordination: In situations where many NGOs are working in an area, volunteers may be working alongside volunteers supported by a different agency. This is particularly common in large emergency responses. Approaches to active case-finding should be coordinated to avoid counter-productive activity, conflicting messages and differences in incentives paid.

Follow-up

Children's progress is monitored on a weekly basis at the distribution site. Follow-up is not mandatory for all cases. It is necessary for:

- Children who are losing weight or whose medical condition is deteriorating.
- Children who are not responding to treatment
- Children whose carers have refused admission to the TFC
- Children under treatment and the defaulters

The need for follow-up is identified by the health worker after discussion with the career. The health worker liaises in the TFC/OTP with outreach health workers or volunteers (by direct contact or by sending a message) to arrange a home visit to these high risk patients.

All absences in OTP should be followed up by outreach health teams, volunteers, or key community figures. It is important to gain an understanding of the reason for absence and to encourage return. The absentee should not be reprimanded as this can discourage return.

Section IV

Emotional and Physical Stimulation

As children become malnourished they gradually reduce their activity. When fully malnourished they do not play, cry, smile, complain or show normal emotions – they become lethargic and feeble. Because they do not cry when they are hungry, thirsty or distressed, a busy mother thinks that her child does not need more attention than she is giving him/her. Nurses also neglect children in hospital for the same reason. Adults respond to the demands of children, if the child does not demand then it is ignored. This is the main reason why these children should be treated together and separately from children with other conditions.

Because they do not do not play, they do not learn. With time this leads to delayed mental and behavioural development. If this is not treated, it is the most serious long-term result of malnutrition. Emotional and physical stimulation through play programmes that start during rehabilitation and continue after discharge can substantially reduce the risk of permanent mental and emotional damage.

Many children have witnessed events that are very traumatic emotionally. Orphans are particularly vulnerable. In emergency situations they may have witnessed extreme violence to loved ones. Such psychological trauma frequently leads to post-traumatic stress disorder and, particularly in older children, can be a major impediment to recovery.

It is essential that the staff understand the emotional needs of these children and create a friendly supportive atmosphere. Caretakers must never be chastised and the staff should never shout or become angry. Unsmiling children need to be picked up, cuddled and kissed. There must be an educational session that teaches the mothers the importance of play and exploration as part of the emotional, physical and mental stimulation that the children need. This is an integral part of treatment. In out-patient settings it is critical that the mothers understand the importance of this aspect of treatment.

It is essential that the mother be with her child in hospital and at the TFC, and that she be encouraged to feed, hold, comfort and play with her child as much as possible. Toys should be available in the child's cot and room, as well as the play area. Inexpensive and safe toys are made from cardboard boxes, plastic bottles, tin cans, old clothes, blocks of wood and similar materials. They are best because mothers are taught to make them themselves and continue to make toys for their children after discharge.

Emotional stimulation and play

Care must be taken to avoid sensory deprivation. The child's face must not be covered; the child must be able to see and hear what is happening around him or her. The child should never be wrapped or tied. The malnourished child needs interaction with other children during rehabilitation. After the first few days of treatment, the child should spend prolonged periods with other children on large play mats, and with the mother or a play guide. There is no evidence that this increases nosocomial infections[35]

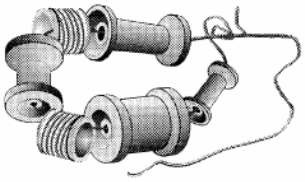
Physical activity

Physical activity itself promotes the development of essential motor skills and may also enhance growth during rehabilitation. For immobile children, passive limb movements and splashing in a warm bath are helpful. For mobile children, play should include such activities as rolling or tumbling on a mattress, kicking and tossing a ball, climbing stairs, and walking uphill and down. The duration and intensity of physical activities should increase as the child's condition improves. There should be a member of staff nominated who has overall responsibility for all these aspects of care of the malnourished.

[35] Most nosocomial infection comes from the staff moving from patient to patient without their washing hands, from the caretakers, from contamination of the diets and storage of feeds before they are given to the child and from inadequate facilities for washing, and the disposal of excreta. Putting children together to play does not represent an important additional danger.

The toys shown in the diagram below should be made and used in both the in-patient units and the homes of the malnourished children.

Ring on a string (from 6 months)
Thread cotton reels and other small objects (e.g. cut from the neck of plastic bottles) on to a string. Tie the string in a ring, leaving a long piece of string hanging.

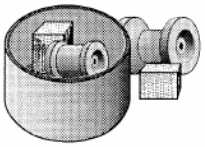


Rattle (from 12 months)
Cut long strips of plastic from coloured plastic bottles. Place them in a small transparent plastic bottle and glue the top on firmly.

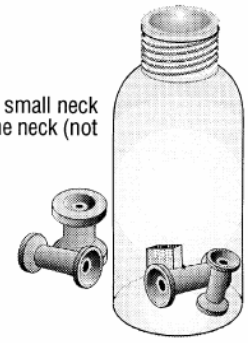
Drum (from 12 months)
Any tin with a tightly fitting lid.

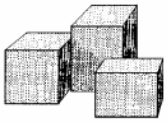
Mirror (from 18 months)
A tin lid with no sharp edges.

In-and-out toy (from 9 months)
Any plastic or cardboard container and small objects (not small enough to be swallowed).



Posting bottle (from 12 months)
A large transparent plastic bottle with a small neck and small long objects that fit through the neck (not small enough to be swallowed).

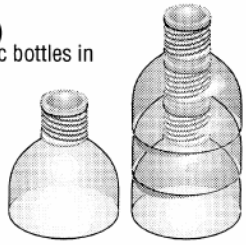


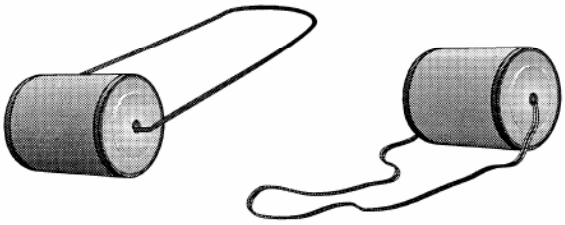


Blocks (from 9 months)
Small blocks of wood. Smooth the surfaces with sandpaper and paint in bright colours, if possible.

Push-along toy (from 12 months)
Make a hole in the centre of the base and lid of a cylindrical-shaped tin. Thread a piece of wire (about 60 cm long) through each hole and tie the ends inside the tin. Put some metal bottle tops inside the tin and close the lid.

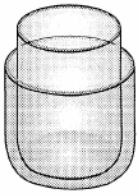
Stacking bottle tops (from 12 months)
Cut at least three identical round plastic bottles in half and stack them.

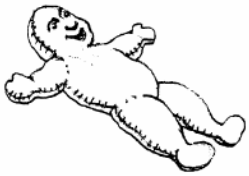




Pull-along toy (from 12 months)
As above, except that string is used instead of wire.

Nesting toys (from 9 months)
Cut off the bottom of two bottles of identical shape, but different size. The smaller bottle should be placed inside the larger bottle.





Doll (from 12 months)
Cut out two doll shapes from a piece of cloth and sew the edges together, leaving a small opening. Turn the doll inside-out and stuff with scraps of materials. Stitch up the opening and sew or draw a face on the doll.

Puzzle (from 18 months)
Draw a figure (e.g. a doll) in a crayon on a square- or rectangular-shaped piece of cardboard. Cut the figure in half or quarters.

Book (from 18 months)
Cut out three rectangular-shaped pieces of the same size from a cardboard box. Glue or draw a picture on both sides of each piece. Make two holes down one side of each piece and thread string through to make a book.

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Section V

Health Education

The parents and carers, whose children become malnourished, generally come from the poorest sections of society. They frequently have not attended school, or have only had basic education. Many cannot read of write. They are often unaware of the nutritional needs of children, the importance of play and psychosocial stimulation in child development, the critical effect of hygiene and pollution in disease causation, the basic measures to take when children become ill and the signs and symptoms of serious disorders. Basic facts about breastfeeding, sexually transmitted disease and HIV, reproductive health and the ill effects of some traditional practices are not known.

Such carers come together during a therapeutic feeding programme, either in the TFC as in-patients or at the distribution sites of OTP. It is important that these opportunities be taken to hold education sessions for the carers, each week-day in the in-patient facility and each week at the OTP site.

The Multichart and OTP chart have a box for recording whether the caretakers have indeed attended the sessions.

The lesson plans can be generated or modified locally to suit the prevailing problems of a region; however there are basic health and nutrition messages that should be common to all programmes. Some booklets and brochures on infant and child feeding and maternal nutrition will be available that can be used for this purpose.

Section VI

Severe Malnutrition, HIV/AIDS and Tuberculosis

The HIV epidemic is affecting most societies in the Developing world. It affects mainly sexually active young adults. These adults are the carers and parents of children and the providers for, and protectors of, their families. A sick parent cannot work and earn to provide for the children and without treatment will die. HIV affected communities are becoming poorer. The prevalence of severe malnutrition is increasing in both HIV negative as well as HIV positive children.

Where there is an effective Voluntary Testing and Counselling (VCT) programme and, at least, prophylaxis and treatment for opportunistic infections is available, VCT should be offered to all patients with severe malnutrition and their caretakers. Where anti-retroviral treatment is available there should always be VCT associated with the identification and management of SAM.

There is a need for there to be a willing and capable carer for the SAM patient. Where the parent has HIV/AIDS, additional support needs to be available as the parent will have recurrent illness. During these illnesses she may not be able to care for her children. Indeed, OTP may not be feasible. Where one grandmother has to care for many of her grandchildren without obvious means of support it may not be possible to expect that grandmother to give special care to the malnourished child. Community mobilisation and support, as well as local NGOs, can be invaluable in these circumstances. Many of these children have to be treated in a facility (not necessarily a hospital) using the OTP protocol for phase 2.

All societies have traditional mechanisms and social networks that care for orphans. However, in many regions the large numbers of orphans have stretched these cultural responses for orphans beyond their capacity to absorb any more children. Orphanages and similar institutions frequently admit large numbers of severely malnourished children. The residents should always be screened for severe malnutrition and appropriate treatment given. The staff of such institutions should be trained in the basic care of the severely malnourished, and should be able to give OTP care. They can even be the base for an OTP site.

Exactly the same protocol is used in HIV positive and negative patients. They respond well to the treatment regimen, usually regaining their appetites and gaining weight at the same rate as HIV negative patients.

They should be particularly screened for TB at the time of HIV testing, as co-infection is particularly common. TB, HIV and SAM are linked and frequently appear in the same patients.

The drugs that are used for TB and HIV are quite toxic to the liver and pancreas. These organs are particularly affected by SAM. If treatment with anti-TB drugs or ARVs is started in the severely malnourished patient they are likely to develop very severe side effects from the drugs. This leads to withdrawal of many of the patients from the treatment programmes. Neither TB nor HIV is rapidly fatal illnesses.

The natural history of untreated TB in adults is: after 2 years one third are dead, one third have self-cured and one third progress to chronic extra-pulmonary TB. As 33% die in 24 months this is about 1.5% chance of death each month. A delay of one week or so in starting treatment will have little effect upon the overall mortality rate (unless the patient has tuberculosis meningitis or miliary TB). Similarly, if opportunistic infections are prevented or controlled HIV is not a rapidly fatal condition. On the other hand the mortality from the severe malnutrition with modern treatment less than 5%, but with conventional treatments rises to 20% or higher within a the first week to treatment. Children with SAM and TB should not be transferred to a TB centre where they have little experience in treating SAM as soon as the diagnosis is made. The treatment of the SAM takes precedence; the treatment of TB can be carried out in the TFC more easily and efficiently than the treatment of SAM at the TB centre.

It is better to first start the treatment of severe malnutrition in all patients and to delay introduction of ARVs for one or two weeks until the liver, pancreas and intestine have recovered sufficiently to metabolise the drugs safely. Once started the treatment of the HIV and TB should follow the national guidelines.

There are major interactions between ARV drugs and some of the drugs used for in severe malnutrition. For example co-artem, albendazole and rifampicin should be avoided at the same time as some of the ARVs. These interactions are likely to be even more serious in the malnourished patient who already has a compromised hepatic function. This is another cogent reason why the treatment of HIV with ARVs should be delayed until

the drugs used in malnutrition have been administered. In areas where there is a high prevalence of HIV, and a danger of patients being enrolled in both programmes then alternative antimalarial, anti-helminthic (mebendazole) and TB drugs may be indicated.

Some of the drugs used in HIV/AIDS patients with opportunistic infections are particularly toxic to the malnourished patient (e.g. Amphotericin B). Great care should be exercised when such drugs are used.

There are major opportunity costs for families to attend clinics, particularly if the clinic is distant from their home. This is one of the main reasons for promoting out-patient management of severe malnutrition. If the child has HIV then it is extremely likely that the mother also is infected. The clinic that looks after the mother should also care for the child; the parent should not have to make two visits to the clinic, one for herself and the other for her child.

The care and treatment centres that have been established for HIV should not only see both the mother and child together, they should also be able to provide treatment for severe malnutrition, on an out-patient basis according to this protocol. There should be access to in-patient facilities where the complicated cases and those without appetite can undergo phase 1 in association with the HIV care and treatment centre. Similarly, TB programmes should always also screen for nutritional status and offer treatment along with the DOTS and other TB programmes. Indeed, HIV, TB and SAM services in most regions should be integrated administratively and operationally.

Note: Children with chronic diseases (CHD, NTD, CP, BPD, CRF, etc.) should be admitted in the appropriate paediatric word and followed by nutritionists.

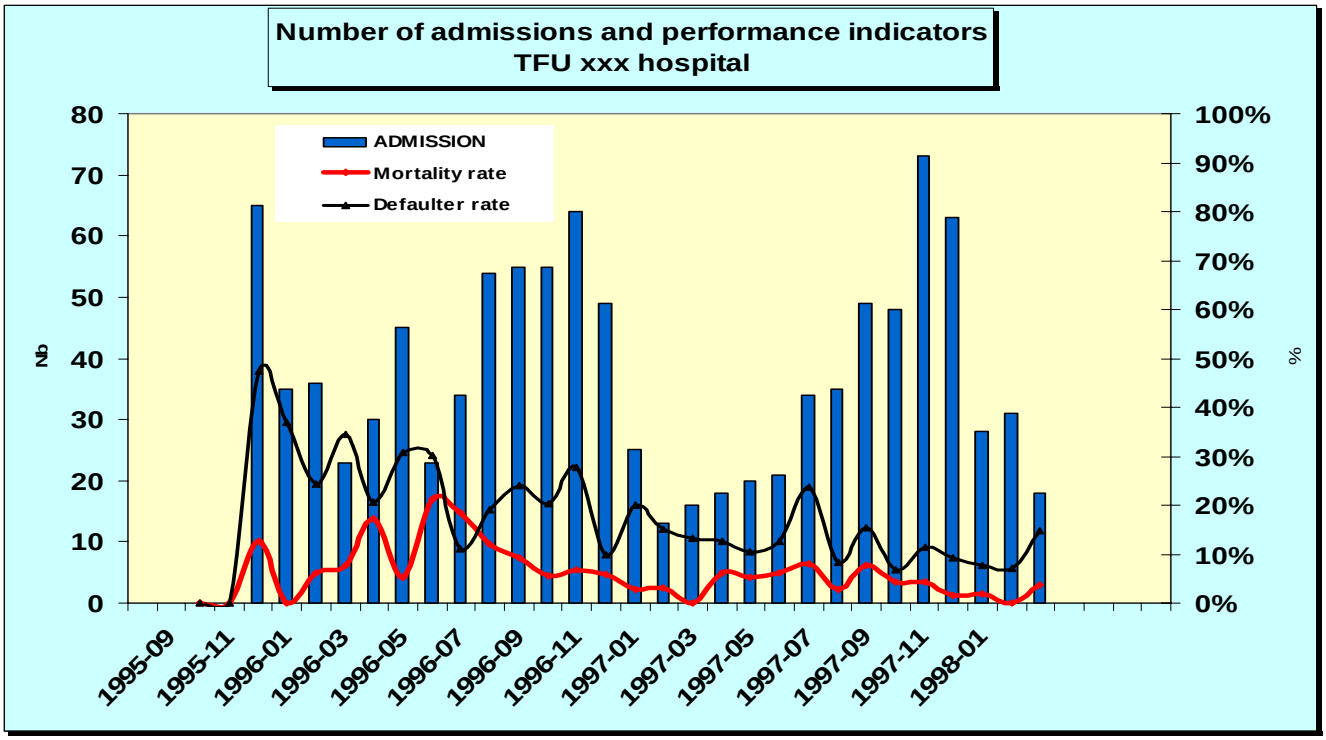
Unless you treat the underlying conditions, they are less likely to benefit from nutritional rehabilitation.

Section VII

Monitoring and Evaluation

Monitoring and evaluation is an integral part of all feeding programmes. Watching and plotting the indicators on a graph can quickly highlight problems. This allows appropriate and prompt investigation and action to be undertaken, and the effects of these changes to be evaluated in turn. If a programme is like the motor half of the nervous system; the ongoing analysis of the results is the sensory half of the nervous system, it allows continuous adjustment and improvement of the programme to the prevailing circumstances. Without such monitoring, evaluation and adjustment the whole programme is incomplete and will be ineffective. Indicators should be graphed to help in interpreting trends as the programme proceeds. Quite sophisticated methods have been developed for examining the data from programmes and determining where the problems lie. If the data are poor and the reasons are not easily determined from the data reported then there should be a visit from someone highly experienced in these programmes.

Example of monitoring graph



Recording and referral system

A good registration and recording system is critical to the management. It allows both close monitoring and successful management of the individual patient and also provides easily accessible information that can be compiled to give the appropriate indicators and statistics to monitor the functioning of the feeding programme.

The importance of registration and being able to follow a patient as they are transferred from one component of the programme to another is critical. With patients being referred from the community to OTP sites to TFCs and then back to the OTP for out-patient treatment it is has become very difficult to follow an individual's progress and ensure that the person is not lost from the system. On the other hand if each institution and site record each arrival as a new admission (for them) then many patients will be registered twice, or even more often, as new cases. To overcome these problems each case is given a **UNIQUE SAM number** by the **first site that starts treatment** of the person. The patient then keeps this same number during all transfers. The individual site can also give a registration number to the patient for their own internal use and filing – a site

specific number – but they must also use the SAM-Unique Number on all transfer forms and documents related to that patient.

Sometimes a patient has a third number, for example if there is a TFC attached to a governorate hospital and the patient has been transferred from OTP having started treatment in phase 2 as an outpatient, then the patient will have a) a Unique SAM number assigned by the OTP site, b) a TFC sequential registration number and c) a hospital number. These registration numbers must be kept distinct and marked in different places on the charts and transfer forms. The critical number is the UNIQUE SAM number.

This Unique SAM number is assigned where the patient is first treated, whether this is an OTP site or in the TFC. This Unique number should always be reported as the SAM Unique No. in all the documents of the patient, e.g. for in-patient care, on the Multi charts and registration book and transfer form; for Out patient care, in the individual chart, registration book and transfer forms.

1. **SAM No**.- The number will be a multi component number made up of the following components: Region number/district/code for facility where first treated/patient assigned sequential 5 digit number. The first patient to start the treatment in the facility will be given 000001.

   For example, if a patient is first treated from **Governorate of Ibb, district of Al-Sebrah in an OTP named "Najid Al-Jumai health centre"**. That patient may have the UNIQUE SAM number of < **Sebrah/OTPNaj/000001**>.

   Codes of governorates, districts and different health facilities will be provided based on the recommendation by the concerned department in Ministry of Public Health and Population.

2. The **FACILITY Registration No**. is assigned for in- and out- patient care by the facility (5 digit number followed by year) **such as 00001/2008**. This number is used for internal filing only and is not used for transfer of patients or for constructing a database of patients.

BOTH these numbers should be recorded on the Multi charts and in the registration book for in-patient care and in the individual chart registration book and OTP chart for Out patient care.

"Multi-chart" is the term used for the single folded A3 sheet which contains all the charts and other information for the management of the patients (it is a multi-chart as seen in annex 4). Each sheet lasts a patient for three weeks.

It should be filled for each patient. It is the primary tool for managing malnutrition in in-patients and is recommended for all facilities looking after these patients. Other documents and local hospital records should not be used for these patients; there is no place for spending time making duplicate records. Experience has shown that where two sets of records are kept the mortality rate is higher and quality of care lower. The multichart is designed so that it:

1) allows proper control of all aspects of the care of the patient (from admission to follow-up and throughout his/her stay in the TFC);

2) Gives detailed information for each individual case's progression (changes in health and nutritional status, treatment phase and diet, medical treatments, clinical signs, temperature, etc.).

3) as all the staff use the same chart, each has ready access to the information collected by other grades of staff, and all the essential information is recorded systematically in the same predetermined part of the chart. The information can thus be found easily and quickly for each patient.

4) Inspection of the Charts allows the clinician in charge to quickly see if a patient needs special attention and allows all supervisors to control the quality of work of their staff.

5) The charts and registration book contain all the information needed to analyse and report the results of the centre in a standard way.

TFC registration book

It gives general information on each patient.

IDENTIFICATION

- Date of admission
- Unique SAM No
- Facility Registration No
- Type of admission:
  - Transfer in from another component or Re-admission defaulter <2mo
  - New admission: Wasted – Oedema - Relapse
- Name
- Age
- Sex
- Address. The address needs to be sufficiently detailed for a home-visitor to find the actual house – if there is no address then there should be directions and a description of the house.

ANTHROPOMETRIC measurements on admission and discharge:

- Weight
- Height
- WFH Z scores for children and WHF% of median for adults
- Oedema
- MUAC
- Date of discharge

In order to enter data conveniently into a computer to calculate mortality risk (expected mortality rate) and rates of weight gain from the data in the registration book, without having to re-examine each chart, it is useful to also record the:

- The minimum weight.
- Date of minimum weight

DIAGNOSIS: Type of malnutrition and any other medical condition

OUTCOME: defaulters, discharge cured, death, medical transfer, transfer out to continue the treatment of severe malnutrition in another component of the programme (OTP, TFC).

OTP registration book

It gives general information for the Out Patient care.

IDENTIFICATION

- Date of admission
- Unique SAM No
- OTP Site Registration No
- Type of admission:
  - Transfer in from TFC or Re-admission defaulter <2mo
  - New admission: Wasted – Oedema - Relapse
- Name
- Age
- Sex
- Address. The address needs to be sufficiently detailed for a home-visitor to find the actual house – if there is no address then there should be directions and a description of the house.

ANTHROPOMETRIC measurements on admission and discharge:

- Weight
- Height
- WFH Z scores for children and WHF% of median for adults
- Oedema
- MUAC
- Date of discharge

OUTCOME: defaulters, discharge cured, death, medical transfer, transfer out to Out Patient Care or transfer out to In Patient care, non-responder. In the case of OTP programmes there is an additional category of outcome – UNKNOWN. This is used for patients that fail to attend the OTP programme and a home visit has not yet determined if they have defaulted, moved away or if they are dead.

Quantitative indicators

Statistics can be obtained directly from the registration books (or, alternatively, from individual multi-charts).

Monthly statistic report

Indicators should be calculated for infants less than 6 months, children below 5 and those above 5 years of age separately as well as for any other groups included in the programme i.e. adolescents and adults.

ADMISSIONS:

New admission (B)

Patients that are directly admitted to the programme to start the nutritional treatment are new admissions. They are recorded into 3 different columns:

1- "Wasted patients" (B1)

2- "Oedematous patients" (B2)

3- "Relapses" (B3)

Note: "Relapses": A case is considered to be a relapse if that patient has ever been severely malnourished before and cured. The same "SAM Unique ID No" should be used with a hyphen after the main number. So that case number Dist/Facility/01245-2 would be the second admission for case Dist/Facility/01245. If the original "SAM Unique ID No" cannot be found a new SAM Unique ID No" can be given but it should always have xxxxx-2 to denote a second admission to the programme. Children that have relapsed are particularly vulnerable and the fact that they are relapses should be noted in the Major problem section of their charts – relapses should normally start treatment as in-patients.

Transfer In (B5)

Patients that have started the nutritional therapeutic treatment in a different OTP site or TFU or other facility and is referred to your programme to continue the treatment that has already started.

Readmission after defaulting for <2mo (B4)

If the patient previously absconded before reaching the discharge criteria, it is considered to be the same episode of malnutrition if the patient is readmitted within 2 months. If the patient presents after that time it is a separate episode of malnutrition. **He/she should be given new SAM Unique ID No.**

DISCHARGE

Cured (D1)

Patient that has reached the discharge criteria

Death (D2)

Patient that has died while he was in the programme at your facility or in transit to another component of the programme but has not yet been admitted to that facility. For the out-patient programme, the death has to be confirmed by a home visit.

Defaulter (D3)

Patient that is absent for 2 consecutive weighing (2 days in in-patient and 14 days in out-patient), confirmed by a home visit for out-patient component of the programme

Unknown (D4)

Patient that has not come to an OTP site on the due date but his outcome (actual defaulting or death) is not confirmed/ verified by a home visit. **Unknown also used for those who have been transferred out with undetermined outcome.**

Non-responder (D5) - <u>after investigation of failure to treatment</u>

Patient that has not reached the discharge criteria after 40 days in the in-patient programme or 2 months in the out-patient programme. Non-responders from the OTP programme should be transferred to the TFU for detailed investigation – the TFU will determine the outcome the patient.

Medical transfer (D6)

Patient that is referred to a health facility/ hospital for medical reasons and this health facility will not continue the nutritional treatment or transfer the patient back to the programme.

Transfer Out (E) – this is not a discharge:

Patient that has started the nutritional therapeutic treatment in your TFU/OTP and is referred to another site to continue the treatment

"Transfer Out to OTP" (E1): patient referred to OTP.

"Transfer Out to In-patient care" (E2): patient referred to In-patient care.

TOTAL END OF THE MONTH (G)

= Total beginning of the month (A) + Total admissions (C) - Total discharges (F)

Recovery rate[36]

The definition of successful recovery is of a patient that achieves the discharge criteria used by the programme. This is usually the standard criteria outlined in this document:

Recovery rate = No of patient discharged for recovery / Total No of exits

Death rate

Death rate = No of patient died in the programme / Total No of exits

Defaulter rate

The normal definition of a defaulter is a patient who is absent from the programme for 2 consecutive weighing (without the agreement of the staff).

Defaulter rate = No of true defaulters / Total No of exits

Medical transfer rate

A patient that is transferred is one that is sent to another health facility for more specialist treatment. The proportion of transferred patients is usually very small if the programme is functioning appropriately[37].

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[36] These are not « rates » in the sense of the number of events occurring in a set period of time, although the reporting period is standardised to one month. Rather they are proportions or percentages over that period. However, the term « rate » is retained because it has traditionally been used in this context, although it is an incorrect usage

[37] A programme can appear to have a low mortality if the staff transfers all the « sick » children to another facility. Therefore, in some analyses the death rate is increased by a proportion of the children transferred, using an estimate of

Medical transfer rate = No of patient transferred for medical reason /Total No of exits

Transfer out rate

Transfer Out rate = No of patient transferred to another nutrition programme /Total No of exits

Mean length of stay for wasted cured children

This indicator should be calculated for ONLY the recovered patients[38] for each category.

Mean length of stay =

sum of (Number of days for each recovered patient) / number of recovered patients

Mean rate of weight gain for wasted cured children

This indicator is particularly useful to show the quality of feeding. The average weight gain is calculated for all RECOVERED patients for each patient category.

The rate of weight gain for an individual is calculated as the discharge weight minus the minimum weight multiplied by 1000 to convert the weight gain to grams. This is then divided by the minimum weight to give grams of weight gained per kilo body weight. Lastly, this total weight gain is divided by the number of days from the day of minimum weight to the day of discharge, to give g/kg/d. The Average rate of weight gain is then:

Average weight gain (g/kg/day) = Total individual weight gains/Total No of individuals

To facilitate the calculation and speed up data processing a simple programme can be written in Excel. If the following data are entered into the computer then it is simple to calculate the length of stay and rate of weight gain (you can also calculate additional information such as the risk of death according to the Prudhon index, weight loss during loss of oedema). Date of Admission (DoA), Date of Minimum weight (Dmin), Date of discharge (DoD), Admission weight (WtAdm), Minimum weight (WtMin) discharge weight (WtDis), height (HtAdm) and outcome (to analyse only the recovered patients). The data can also be taken directly into programmes that calculate anthropometric indices automatically. These data should all be recorded in the admission book to make data entry easy.

Consolidated report for whole programme

The reports for the individual components of the programme operating within an area are examined and collated to produce a CONSOLIDATED report for the programme as a whole. The transfer-out for one component should match the transfer in for another component. When the reports are compiled the transfers from one component to another are not reported or calculated as "exits" from the programme. The sum of the deaths (most should occur for the in-patient facility), default, unknown outcome, medical transfer and cured from all components of the programme is related to the total exits from the programme (most of these will be recorded with the OTP component reports). It is useful to report the average length of stay of patients in the TFU separately to ensure that the majority of patients are not being kept in the TFU for phase 2 but are being

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their risk of death if they had remained in the programme. Such adjustments vary from 30% to 60% of the transferred children.

[38] The mean length of stay for other patients can be useful information: thus the average time that the dead patients were in the programme before death and the average time of defaulting can give an indication of where effort needs to be focused to lower these rates. However, as there is usually considerable variation and the data are highly skewed, this information is more usefully collected for individual children and analysed separately.

appropriately transferred to the OTP programme. The individual or consolidated reports from the different programmes are compiled centrally.

Minimum standards

Reference values have been developed by the Sphere project. They provide benchmarks against which to interpret the functioning of individual programmes. They give an indication of what might be considered "acceptable" and "bad" functioning under average conditions where the other programmes are also functioning. They are out of date, but have not been replaced. With the treatment outlined in this manual experience has shown that the mortality rate can be consistently below 5% in "good" centres although the death rate of the sphere standard cites 10% as acceptable, this is no longer the case with best practice management.

Table 20: Reference values for the main indicators ©Sphere project

	Acceptable	**Alarming**
Recovery rate	> 75%	< 50%
Death rate	5% (< 10%)?	10% (> 15%)
Defaulter rate	< 15%	> 25%
Weight gain	(>= 8 g/kg/day)	(< 8 g/kg/day)
Length of stay	(< 4 weeks)	(> 6 weeks)
Coverage	> 50-70%	< 40%

The values in parentheses need revision.

The rate of weight gain in OTP programmes is frequently less than 8g/kg/d and the length of stay more than 6 weeks. This is not alarming in terms of the individual patient's probable outcome, as the patients are at home. However, an OTP programme with low rate of weight gain and prolonged stay should be evaluated as this leads to excessive numbers of children in the programme at any one time and increases the cost of the programme in terms of staff time and consumption of RUTF considerably,

Fill out every month the statistical report (annex 9) and send it to your supervisor

Annexes

ANNEX I

ANTHROPOMETRIC MEASUREMENT

1.1. CHECKING FOR BILATERAL OEDEMA

Bilateral oedema is the sign of Kwashiorkor. Kwashiorkor is *always* a severe form of malnutrition. Children with bilateral oedema are directly identified to be 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 three seconds. If a shallow print persists on the both feet, then the child presents oedema. Only children with bilateral oedema are recorded as having nutritional oedema.

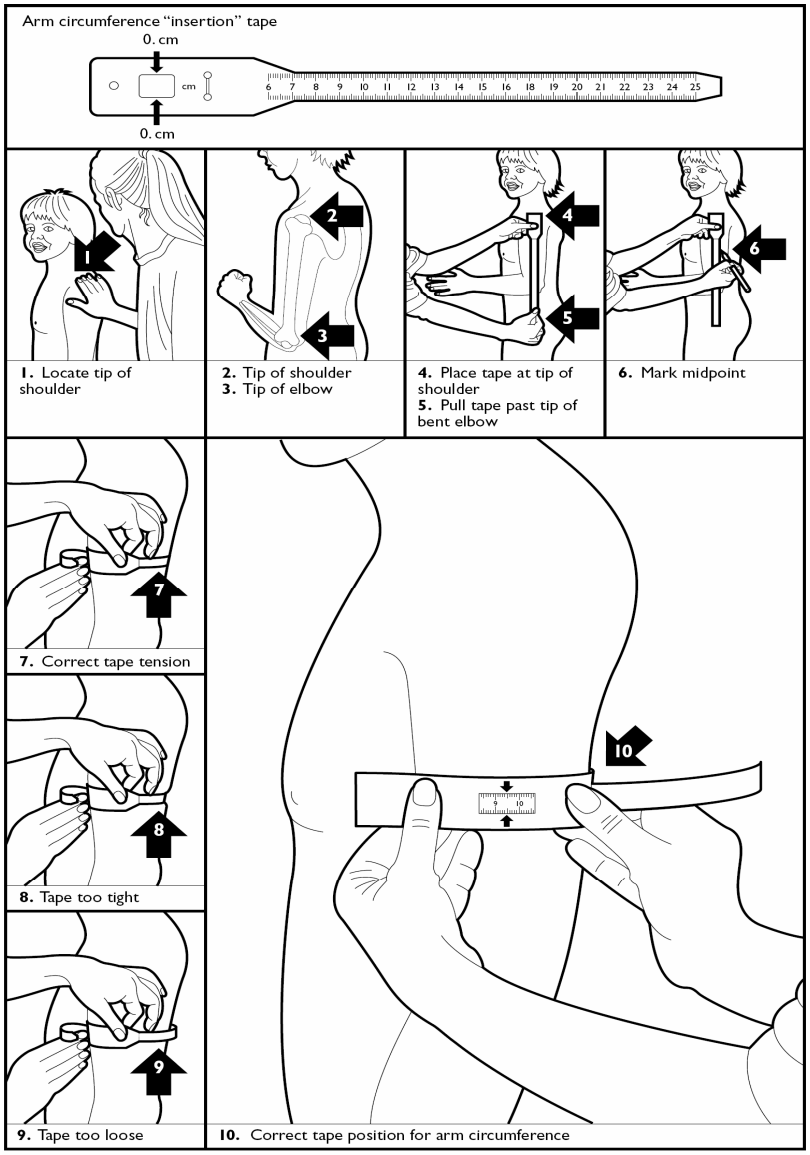
You must formally test for oedema with finger pressure on both feet at the same time and count three seconds or say: (101 – 102 – 103)

you cannot tell by just looking

1.2. TAKING THE MUAC

MUAC is used as an alternative measure of "thinness" to weight-for-height. It is particularly used in children from the age of six months to five years:

1. Ask the mother to remove clothing that may cover the child's left arm.
2. Calculate the midpoint of the child's left upper arm by first locating the tip of the child's shoulder (arrows 1 and 2) with your finger tips. Bend the child's elbow to make the right angle (arrow 3). 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. As an alternative, bend the tape up to the middle length to estimate the midpoint. A piece of string can also be used for this purpose; it is more convenient and avoids damage to the tape. Mark the midpoint with a pen on the arm (arrow 6).
3. 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).
4. 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 or too loose (arrows 8 and 9). Repeat any step as necessary.



How to weigh and measure children: assessing the nutritional status of young children in UN (1986)

5. 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).
6. Immediately record the measurement.

1.3. TAKING THE WEIGHT

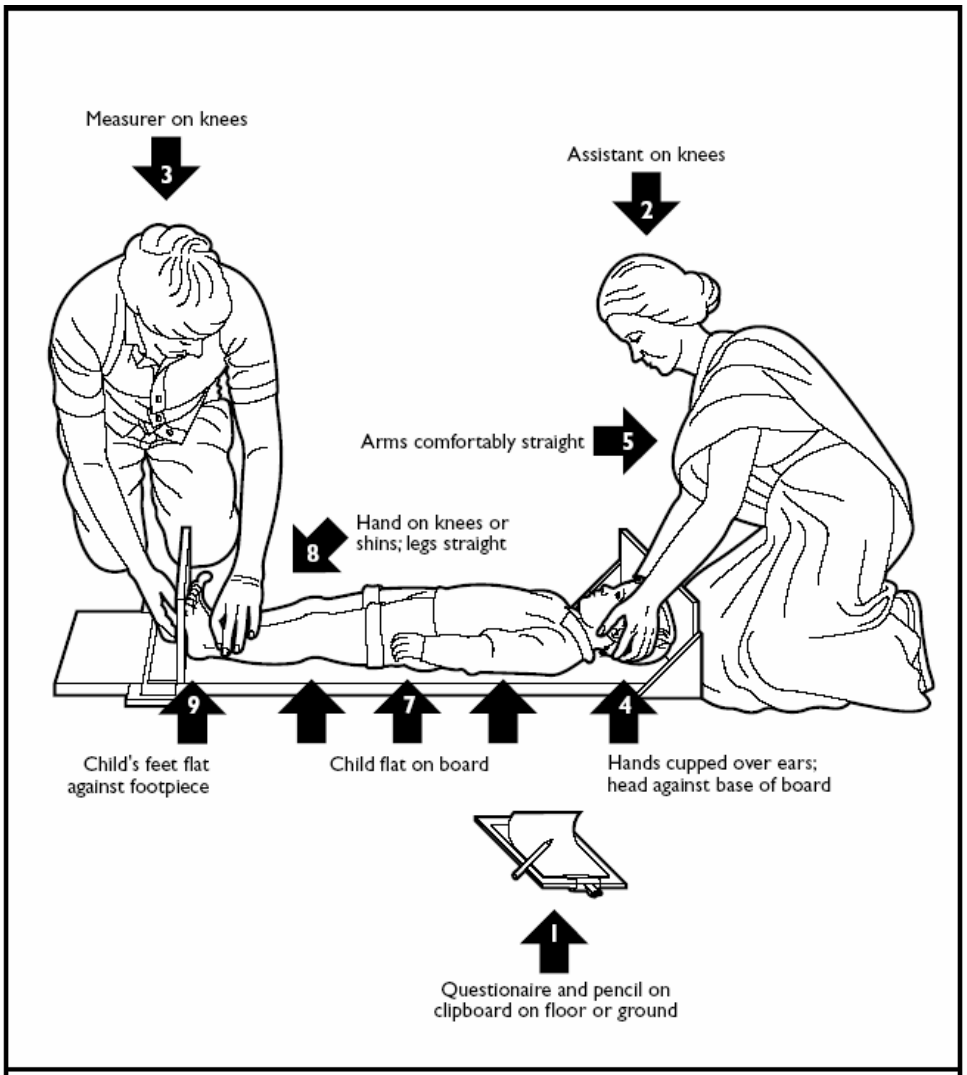
Children are weighed by using a 25 kg hanging spring scale graduated to 0.100 kg. Do not forget to re-adjust the scale to zero before each weighing

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, record the measurement to the nearest 100 grams, the frame of the scale being at eyes level. Each day, the scales must be checked by using a known weight.

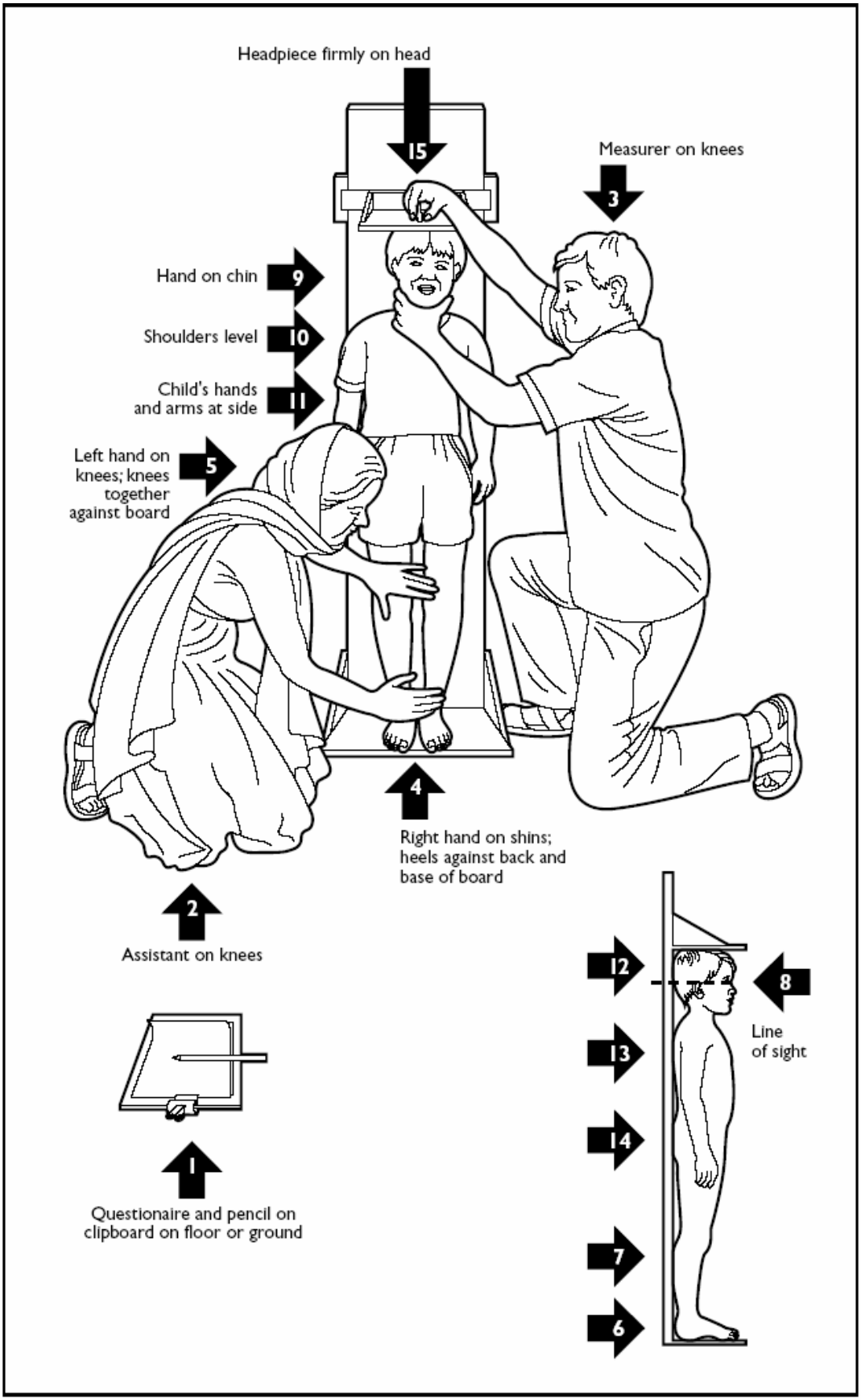
1.4. TAKING THE LENGTH/HEIGHT

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 lenght is read to the nearest 0.1 centimetre.



Source: How to Weigh and Measure Children: Assessing the Nutritional Status of Young Children, UN 1986.

For children more than 87 cm, the measuring board is fixed upright where the ground is level. 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 centimetre.



Source: How to Weigh and Measure Children: Assessing the Nutritional Status of Young Children, UN 1986.

1.5. CALCULATING THE TARGET WEIGHT

How to use the weight/height ratio tables?

Example: a child is 63 cm tall and weighs 6.5 kg

- Take the table, look in the 1st column and look for the figure 63 (=height).
- Take a ruler or a piece of card place it under the figure 63 and the other figures on the same line.
- On this line find the figure corresponding to the weight of the child, in this case 6.5.
- Look to see what column this figure is in. In this case, the WEIGHT is between the 0 and -1 column.

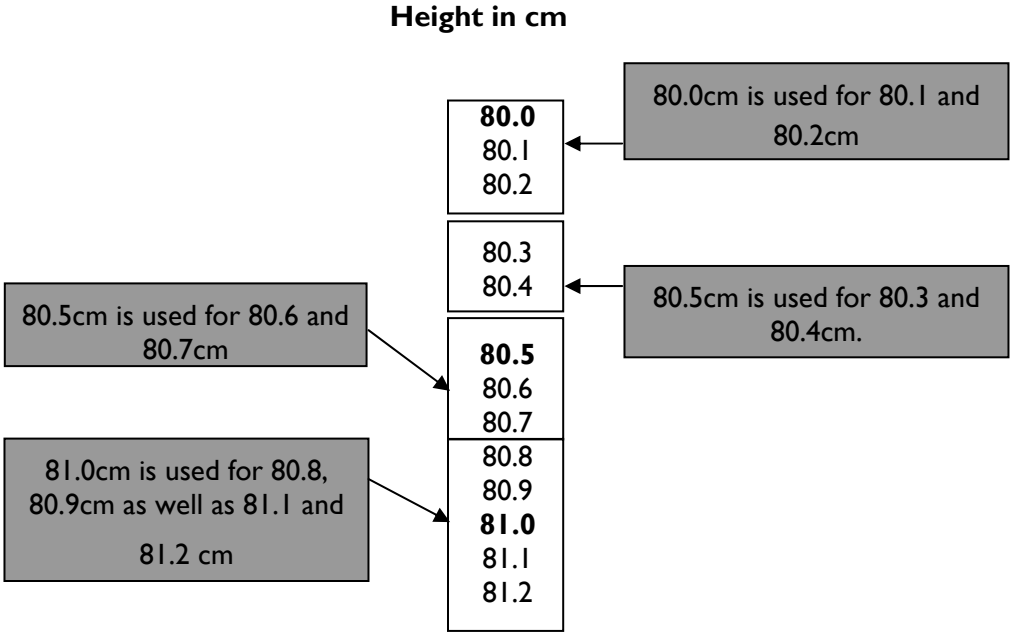
Example: a child is 78 cm tall and weighs 8.3 kg

This child is in between the column -3Z and -2Z. He is moderately wasted.

NOTE: It may be that the weight or the height is not a whole number.

Example: height 80.4 cm and weight 7.9 kg. These 2 figures are not in the table.

For the height: The height measurement has to be rounded to the nearest 0.5cm, as it is in the following example.



For the weight: Looking at the table, for a height of 80.5 cm the weight is 7.9 kg. His weight for height is less than -3Z-score. He is severely wasted.

ANNEX 2

WEIGHT FOR LENGTH/HEIGHT FOR CHILDREN

Note: Tables in this annex is used for both boys and girls

2.1. WEIGHT FOR LENGTH

Length	*Weight Kg – Z-score*					Length	*Weight Kg – Z-score*				
cm	*-3*	*-2*	*-1.5*	*-1*	*0*	cm	*-3*	*-2*	*-1.5*	*-1*	*0*
Use Length for less than 87 cm											
45	1.9	2.0	2.1	2.2	2.4	66	5.9	6.4	6.7	6.9	7.5
45.5	1.9	2.1	2.2	2.3	2.5	66.5	6.0	6.5	6.8	7.0	7.6
46	2.0	2.2	2.3	2.4	2.6	67	6.1	6.6	6.9	7.1	7.7
46.5	2.1	2.3	2.4	2.5	2.7	67.5	6.2	6.7	7.0	7.2	7.9
47	2.1	2.3	2.4	2.5	2.8	68	6.3	6.8	7.1	7.3	8.0
47.5	2.2	2.4	2.5	2.6	2.9	68.5	6.4	6.9	7.2	7.5	8.1
48	2.3	2.5	2.6	2.7	2.9	69	6.5	7.0	7.3	7.6	8.2
48.5	2.3	2.6	2.7	2.8	3.0	69.5	6.6	7.1	7.4	7.7	8.3
49	2.4	2.6	2.7	2.9	3.1	70	6.6	7.2	7.5	7.8	8.4
49.5	2.5	2.7	2.8	3.0	3.2	70.5	6.7	7.3	7.6	7.9	8.5
50	2.6	2.8	2.9	3.0	3.3	71	6.8	7.4	7.7	8.0	8.6
50.5	2.7	2.9	3.0	3.1	3.4	71.5	6.9	7.5	7.8	8.1	8.8
51	2.7	3.0	3.1	3.2	3.5	72	7.0	7.6	7.9	8.2	8.9
51.5	2.8	3.1	3.2	3.3	3.6	72.5	7.1	7.6	8.0	8.3	9.0
52	2.9	3.2	3.3	3.5	3.8	73	7.2	7.7	8.0	8.4	9.1
52.5	3.0	3.3	3.4	3.6	3.9	73.5	7.2	7.8	8.1	8.5	9.2
53	3.1	3.4	3.5	3.7	4.0	74	7.3	7.9	8.2	8.6	9.3
53.5	3.2	3.5	3.6	3.8	4.1	74.5	7.4	8.0	8.3	8.7	9.4
54	3.3	3.6	3.8	3.9	4.3	75	7.5	8.1	8.4	8.8	9.5
54.5	3.4	3.7	3.9	4.0	4.4	75.5	7.6	8.2	8.5	8.8	9.6
55	3.6	3.8	4.0	4.2	4.5	76	7.6	8.3	8.6	8.9	9.7
55.5	3.7	4.0	4.1	4.3	4.7	76.5	7.7	8.3	8.7	9.0	9.8
56	3.8	4.1	4.3	4.4	4.8	77	7.8	8.4	8.8	9.1	9.9
56.5	3.9	4.2	4.4	4.6	5.0	77.5	7.9	8.5	8.8	9.2	10.0
57	4.0	4.3	4.5	4.7	5.1	78	7.9	8.6	8.9	9.3	10.1
57.5	4.1	4.5	4.7	4.9	5.3	78.5	8.0	8.7	9.0	9.4	10.2
58	4.3	4.6	4.8	5.0	5.4	79	8.1	8.7	9.1	9.5	10.3
58.5	4.4	4.7	4.9	5.1	5.6	79.5	8.2	8.8	9.2	9.5	10.4
59	4.5	4.8	5.0	5.3	5.7	80	8.2	8.9	9.2	9.6	10.4
59.5	4.6	5.0	5.2	5.4	5.9	80.5	8.3	9.0	9.3	9.7	10.5
60	4.7	5.1	5.3	5.5	6.0	81	8.4	9.1	9.4	9.8	10.6
60.5	4.8	5.2	5.4	5.6	6.1	81.5	8.5	9.1	9.5	9.9	10.7
61	4.9	5.3	5.5	5.8	6.3	82	8.5	9.2	9.6	10.0	10.8
61.5	5.0	5.4	5.7	5.9	6.4	82.5	8.6	9.3	9.7	10.1	10.9
62	5.1	5.6	5.8	6.0	6.5	83	8.7	9.4	9.8	10.2	11.0
62.5	5.2	5.7	5.9	6.1	6.7	83.5	8.8	9.5	9.9	10.3	11.2

Length	*Weight Kg – Z-score*					Length	*Weight Kg – Z-score*				
cm	*-3*	*-2*	*-1.5*	*-1*	*0*	cm	*-3*	*-2*	*-1.5*	*-1*	*0*
Use Length for less than 87 cm											
63	**5.3**	5.8	**6.0**	6.2	6.8	**84**	**8.9**	9.6	**10.0**	10.4	11.3
63.5	**5.4**	5.9	**6.1**	6.4	6.9	**84.5**	**9.0**	9.7	**10.1**	10.5	11.4
64	**5.5**	6.0	**6.2**	6.5	7.0	**85**	**9.1**	9.8	**10.2**	10.6	11.5
64.5	**5.6**	6.1	**6.3**	6.6	7.1	**85.5**	**9.2**	9.9	**10.3**	10.7	11.6
65	**5.7**	6.2	**6.4**	6.7	7.3	**86**	**9.3**	10.0	**10.4**	10.8	11.7
65.5	**5.8**	6.3	**6.5**	6.8	7.4	**86.5**	**9.4**	10.1	**10.5**	11.0	11.9

2.2. WEIGHT FOR HEIGHT

Height	*Weight Kg – Z-score*					Height	*Weight Kg – Z-score*				
cm	*-3*	*-2*	*-1.5*	*-1*	*0*	cm	*-3*	*-2*	*-1.5*	*-1*	*0*
Use Height for more than or equal to 87 cm											
87	**9.6**	10.4	**10.8**	11.2	12.2	104	**13.0**	14.0	**14.6**	15.2	16.5
87.5	**9.7**	10.5	**10.9**	11.3	12.3	104.5	**13.1**	14.2	**14.7**	15.4	16.7
88	**9.8**	10.6	**11.0**	11.5	12.4	105	**13.2**	14.3	**14.9**	15.5	16.8
88.5	**9.9**	10.7	**11.1**	11.6	12.5	105.5	**13.3**	14.4	**15.0**	15.6	17.0
89	**10.0**	10.8	**11.2**	11.7	12.6	106	**13.4**	14.5	**15.1**	15.8	17.2
89.5	**10.1**	10.9	**11.3**	11.8	12.8	106.5	**13.5**	14.7	**15.3**	15.9	17.3
90	**10.2**	11.0	**11.5**	11.9	12.9	107	**13.7**	14.8	**15.4**	16.1	17.5
90.5	**10.3**	11.1	**11.6**	12.0	13.0	107.5	**13.8**	14.9	**15.6**	16.2	17.7
91	**10.4**	11.2	**11.7**	12.1	13.1	108	**13.9**	15.1	**15.7**	16.4	17.8
91.5	**10.5**	11.3	**11.8**	12.2	13.2	108.5	**14.0**	15.2	**15.8**	16.5	18.0
92	**10.6**	11.4	**11.9**	12.3	13.4	109	**14.1**	15.3	**16.0**	16.7	18.2
92.5	**10.7**	11.5	**12.0**	12.4	13.5	109.5	**14.3**	15.5	**16.1**	16.8	18.3
93	**10.8**	11.6	**12.1**	12.6	13.6	110	**14.4**	15.6	**16.3**	17.0	18.5
93.5	**10.9**	11.7	**12.2**	12.7	13.7	110.5	**14.5**	15.8	**16.4**	17.1	18.7
94	**11.0**	11.8	**12.3**	12.8	13.8	111	**14.6**	15.9	**16.6**	17.3	18.9
94.5	**11.1**	11.9	**12.4**	12.9	13.9	111.5	**14.8**	16.0	**16.7**	17.5	19.1
95	**11.1**	12.0	**12.5**	13.0	14.1	112	**14.9**	16.2	**16.9**	17.6	19.2
95.5	**11.2**	12.1	**12.6**	13.1	14.2	112.5	**15.0**	16.3	**17.0**	17.8	19.4
96	**11.3**	12.2	**12.7**	13.2	14.3	113	**15.2**	16.5	**17.2**	18.0	19.6
96.5	**11.4**	12.3	**12.8**	13.3	14.4	113.5	**15.3**	16.6	**17.4**	18.1	19.8

Height	***Weight Kg – Z-score***						**Height**	***Weight Kg – Z-score***				
cm	***-3***	***-2***	***-1.5***	***-1***	***0***		**cm**	***-3***	***-2***	***-1.5***	***-1***	***0***
Use Height for more than or equal to 87 cm												
97	**11.5**	12.4	**12.9**	13.4	14.6		114	**15.4**	16.8	**17.5**	18.3	20.0
97.5	**11.6**	12.5	**13.0**	13.6	14.7		114.5	**15.6**	16.9	**17.7**	18.5	20.2
98	**11.7**	12.6	**13.1**	13.7	14.8		115	**15.7**	17.1	**17.8**	18.6	20.4
98.5	**11.8**	12.8	**13.3**	13.8	14.9		115.5	**15.8**	17.2	**18.0**	18.8	20.6
99	**11.9**	12.9	**13.4**	13.9	15.1		116	**16.0**	17.4	**18.2**	19.0	20.8
99.5	**12.0**	13.0	**13.5**	14.0	15.2		116.5	**16.1**	17.5	**18.3**	19.2	21.0
100	**12.1**	13.1	**13.6**	14.2	15.4		117	**16.2**	17.7	**18.5**	19.3	21.2
100.5	**12.2**	13.2	**13.7**	14.3	15.5		117.5	**16.4**	17.9	**18.7**	19.5	21.4
101	**12.3**	13.3	**13.9**	14.4	15.6		118	**16.5**	18.0	**18.8**	19.7	21.6
101.5	**12.4**	13.4	**14.0**	14.5	15.8		118.5	**16.7**	18.2	**19.0**	19.9	21.8
102	**12.5**	13.6	**14.1**	14.7	15.9		119	**16.8**	18.3	**19.1**	20.0	22.0
102.5	**12.6**	13.7	**14.2**	14.8	16.1		119.5	**16.9**	18.5	**19.3**	20.2	22.2
103	**12.8**	13.8	**14.4**	14.9	16.2		120	**17.1**	18.6	**19.5**	20.4	22.4
103.5	**12.9**	13.9	**14.5**	15.1	16.4							

ANNEX 3

WEIGHT FOR HEIGHT FOR ADOLESCENTS

Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe	sex
110.0	18.4	15.6	14.7	12.9	mf
110.5	18.6	15.8	14.8	13.0	mf
111.0	18.7	15.9	15.0	13.1	mf
111.5	18.9	16.0	15.1	13.2	mf
112.0	19.0	16.2	15.2	13.3	mf
112.5	19.2	16.3	15.3	13.4	mf
113.0	19.3	16.4	15.5	13.5	mf
113.5	19.5	16.6	15.6	13.6	mf
114.0	19.6	16.7	15.7	13.8	mf
114.5	19.8	16.8	15.8	13.9	mf
115.0	20.0	17.0	16.0	14.0	mf
115.5	20.2	17.1	16.1	14.1	mf
116.0	20.3	17.3	16.3	14.2	mf
116.5	20.5	17.4	16.4	14.4	mf
117.0	20.7	17.6	16.6	14.5	mf
117.5	20.9	17.7	16.7	14.6	mf
118.0	21.1	17.9	16.9	14.7	mf
118.5	21.3	18.1	17.0	14.9	mf
119.0	21.5	18.2	17.2	15.0	mf
119.5	21.7	18.4	17.3	15.2	mf
120.0	21.9	18.6	17.5	15.3	mf
120.5	22.1	18.8	17.7	15.5	mf
121.0	22.3	19.0	17.8	15.6	mf
121.5	22.5	19.1	18.0	15.8	mf
122.0	22.7	19.3	18.2	15.9	mf
122.5	23.0	19.5	18.4	16.1	mf
123.0	23.2	19.7	18.6	16.2	mf
123.5	23.5	19.9	18.8	16.4	mf
124.0	23.7	20.1	19.0	16.6	mf
124.5	24.0	20.4	19.2	16.8	mf
125.0	24.2	20.6	19.4	16.9	mf
125.5	24.5	20.8	19.6	17.1	mf
126.0	24.7	21.0	19.8	17.3	mf
126.5	25.0	21.2	20.0	17.5	mf
127.0	25.3	21.5	20.2	17.7	mf

Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe	sex
141.0	34.1	29.0	27.3	23.9	mf
141.5	34.4	29.2	27.5	24.1	mf
142.0	34.8	29.5	27.8	24.3	mf
142.5	35.1	29.8	28.1	24.6	mf
143.0	35.4	30.1	28.3	24.8	mf
143.5	35.8	30.4	28.6	25.0	mf
144.0	36.1	30.7	28.9	25.3	mf
144.5	36.5	31.0	29.2	25.5	mf
145.0	36.8	31.3	29.4	25.8	mf
145.5	37.1	31.6	29.7	26.0	mf
146.0	37.5	31.9	30.0	26.2	mf
146.5	37.8	32.2	30.3	26.5	mf
147.0	38.2	32.4	30.5	26.7	mf
147.5	38.5	32.7	30.8	27.0	mf
148.0	38.9	33.0	31.1	27.2	mf
148.5	39.2	33.3	31.4	27.4	mf
149.0	39.5	33.6	31.6	27.7	mf
149.5	39.9	33.9	31.9	27.9	mf
150.0	40.3	34.2	32.2	28.2	mf
150.5	40.6	34.5	32.5	28.4	mf
151.0	41.0	34.8	32.8	28.7	mf
151.5	41.3	35.1	33.1	28.9	mf
152.0	41.7	35.4	33.4	29.2	mf
152.5	42.1	35.8	33.7	29.4	mf
153.0	42.4	36.1	34.0	29.7	mf
153.5	42.8	36.4	34.3	30.0	mf
154.0	43.2	36.7	34.6	30.2	mf
154.5	43.6	37.1	34.9	30.5	mf
155.0	44.0	37.4	35.2	30.8	mf
155.5	44.2	37.6	35.4	30.9	m
156.0	44.6	37.9	35.7	31.2	m
156.5	45.0	38.2	36.0	31.5	m
157.0	45.4	38.6	36.3	31.8	m
157.5	45.8	38.9	36.7	32.1	m
158.0	46.2	39.3	37.0	32.4	m

Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe	sex	Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe	sex
127.5	25.5	21.7	20.4	17.9	mf	**158.5**	46.6	39.6	37.3	32.7	m
128.0	25.8	21.9	20.7	18.1	mf	**159.0**	47.1	40.0	37.7	33.0	m
128.5	26.1	22.2	20.9	18.3	mf	**159.5**	47.5	40.4	38.0	33.3	m
129.0	26.4	22.4	21.1	18.5	mf	**160.0**	48.0	40.8	38.4	33.6	m
129.5	26.7	22.7	21.3	18.7	mf	**160.5**	48.4	41.1	38.7	33.9	m
130.0	27.0	22.9	21.6	18.9	mf	**161.0**	48.8	41.5	39.1	34.2	m
130.5	27.3	23.2	21.8	19.1	mf	**161.5**	49.3	41.9	39.4	34.5	m
131.0	27.6	23.4	22.1	19.3	mf	**162.0**	49.8	42.3	39.8	34.8	m
131.5	27.9	23.7	22.3	19.5	mf	**162.5**	50.2	42.7	40.2	35.1	m
132.0	28.2	24.0	22.5	19.7	mf	**163.0**	50.7	43.1	40.5	35.5	m
132.5	28.5	24.2	22.8	19.9	mf	**163.5**	51.1	43.5	40.9	35.8	m
133.0	28.8	24.5	23.0	20.2	mf	**164.0**	51.6	43.9	41.3	36.1	m
133.5	29.1	24.7	23.3	20.4	mf	**164.5**	52.1	44.3	41.7	36.5	m
134.0	29.4	25.0	23.5	20.6	mf	**165.0**	52.6	44.7	42.1	36.8	m
134.5	29.7	25.3	23.8	20.8	mf	**165.5**	53.1	45.1	42.5	37.2	m
135.0	30.1	25.6	24.1	21.1	mf	**166.0**	53.6	45.6	42.9	37.5	m
135.5	30.4	25.8	24.3	21.3	mf	**166.5**	54.1	46.0	43.3	37.9	m
136.0	30.7	26.1	24.6	21.5	mf	**167.0**	54.6	46.4	43.7	38.2	m
136.5	31.0	26.4	24.8	21.7	mf	**167.5**	55.1	46.9	44.1	38.6	m
137.0	31.4	26.7	25.1	22.0	mf	**168.0**	55.6	47.3	44.5	38.9	m
137.5	31.7	27.0	25.4	22.2	mf	**168.5**	56.2	47.7	44.9	39.3	m
138.0	32.1	27.2	25.6	22.4	mf	**169.0**	56.7	48.2	45.4	39.7	m
138.5	32.4	27.5	25.9	22.7	mf	**169.5**	57.3	48.7	45.8	40.1	m
139.0	32.7	27.8	26.2	22.9	mf	**170.0**	57.8	49.2	46.3	40.5	m
139.5	33.1	28.1	26.4	23.1	mf	**170.5**	58.4	49.6	46.7	40.9	m
140.0	33.4	28.4	26.7	23.4	mf	**171.0**	59.0	50.1	47.2	41.3	m
140.5	33.7	28.7	27.0	23.6	mf	**171.5**	59.6	50.6	47.6	41.7	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 uni-sex standard is within 1.5% of the body weight of the standard for either sex.

ANNEX 4

IN PATIENT MULTI CHART

ANNEX 4: IN PATIENT MULTI CHART

SAM N0.....

Register N0.....**District**.....

Sheet No.....**Block**.....

Patient's name.....**TFC Name**.....

Father Name..... TFC 24h/TFC Day Care /**Ped.**

Address..... **Age** (dd/mm/yy)

..... **Birth Date** _____/_____/_____ **Sex**.....

Referral : Spontaneous □ **Community** □ **OTP** □ **TFC** □ **Breastfeeding** Y / N

Reason of : Referral □ **/ Transfer IN** □: **1) Fail Appetite test** : Y / N if Y PPN .....gr - **2) Complications** Y / N if Y ..... - **3) Oedema** Y /N - **4) Non response OTP** Y/N

TFC SAM CHART

Major Problem

Date of Admission___/___/___

Hr.....

New Adm □

Relapse □

Readm Abandon <2months □

Transfer from OTP □

If Yes, Reg. OTP.....

Complementary food..... OTP Name .....

Date of Discharge___/___/___

Cured

Death □

Transfer to (□

Medical Transfer □

Abandon □

Anthropometry

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Height/Lenght (cm)															
Weight (Kg)															
W/H (Z score)															
MUAC (mm)															
Oedema (0 to +++)															

Target weight

.....kg.....g

Weight Chart

Routine treatment

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Vit A.....Iu	*														
Folic Acid mg (po)	*														
Amoxicillin															
Anti-malaria															
Deworming II															

Specific Treatment

Resomal ml															
IV Inf/Transf															
NGT															

Labo

Hb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Malaria test															
TB Test															

OBSERVATION:

Diet

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Phase															
F75/F100/F100D															
# feeds/day															
ml/feeds															
ml/day															
Iron added....															
RUTF															
# feeds/day															
gr/feeds															
sachet/day															
Appetite test															

A=Absent
V=vomiting
R=refused
NGT=Naso gastric tube
IV=IV infusion

Volume taken

100% ⊞
3/4 ⊞
1/2 ⊞
1/4 ⊞
....ml=extra

Feeds hrs															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Other Food															

Surveillance

Alert / **L**ethargic	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Stools IIII															
Vomiting IIII															
Dehydrated - to +++															
Cough - to +++															
Septic shock - to +++															
Resp/min >40/mn >50/mn															
Pale conjunctiva - to +++															
Temp. AM .Ax/Rec															
Temp PM Ax/Rec															
Liver **s**ize cm															
Candidosis															

Card Y □ N □	Immunisation date At Birth	1	2	3	4
BCG					
POLIO					
Pentavalent vaccin					
Measles			Extra	Extra	

DISCHARGE

HEALTH EDUCATION GIVEN	DATES	SIG.
Causes of malnutrition		
Diarrhoea, ARI, Fever		
Sexual transmitted diseases		
Pay and stimulation		
Nutrition for children		
Care of the children		
Hygiene		
Breastfeeding		
Family Planning		
Qat chewing...		

Vitamin A given	Y	N
Updated Immunisation	Y	N
Breastfeeding at discharge	Y	N

Version 2008/1.0

ANNEX 5

OUT PATIENT RECORD CHART

5.1. FRONT OF CARD

OTP Chart

Unique SAM N0…….. Admission date……..

Governorate……. District …….. HC/Hospital ……..Reg#……..

REASON OF ADMISSION MUAC mm…… W/H……..Z/% Œdema Yes □ No □

Patient Name……	**Breast feeding Yes □ No □**	**Other Unusual or social problems……..**
Father Name……	**Parents alive Yes □ No □**	**……**
Age (mo)…….. Sex ….	**Caretaker:**	**..**
Address……	Name……	**Update Vaccine Yes □ No□**
……	……..	**Vaccine card Yes □ No□**
……	Health of caretaker……	**Measles 1……..**
		2……

ADMISSION INFORMATION

Before beginning treatment **(circle the answer)**	**TYPE of ADMISSION**
Referral BY: Spontaneous / Volunteer/ HC /…….	**□ New admission**
During the treatment	**□ Transfer-IN**
TRANSFER- IN: Y / N	**□ New admission relapse**
if Yes: TFC/Other OTP/ Hospital (circle the answer)	**□ Readmission after defaulting less 2months**
Name of Facility……..Registration # ……	
Admission Date…… Discharge date……	

EXAMINATION

Circle the answer

Condition of Patient: normal /sick/very sick

Handicap: No □ Yes □……

Respiration: normal / fast

Eyes: normal/Vit A deficit/ photophobia

Skin lesions: No Yes □ Yes □ if yes……

HEALTH EDUCATION GIVEN

Theme topics:	Date	Signature
Causes of malnutrition……		
Diarrhoea, fever, ARI……		
Infection (skin, eyes, ear)……		
Play & stimulation……		
Nutrition – child care……		
Hygiene……		
Qat Chewing & Smoking …		

HOME VISIT (HV)

DATE	REASON(S)	CONCLUSION

TRANSFER-TO DURING TREATMENT

DATE	REASON(S)	WHERE	RESULT (RETURN-DATE/NOT RETURN/DEATH)

DISCHARGE DATE OF DISCHARGE ……/……/……..

Cured □ Defaulter □ Cause……

Unknown □ Dead □ Cause……

Not return from transfer □ Cause……

Non Response □ Cause……

5.2. BACK OF CARD

Target Weight .....kg.....			Target MUAC.....mm			Admission Height/Lenght.....cm						
Visit per ....days	Adm	2	3	4	5	6	7	8	9	10	11	12
Date (dd/mo)												
Weight (kg.g)												
Height (cm) every 21 days												
Weight/Height (Z-Score)												
Oedema (0, +, ++)												
MUAC (mm)												
Diarrhoea (0 to #d)												
Stools/d (0, 1-3, 3-5, 5+)												
Vomiting (0 to #d)*												
Fever (0 to # d)*												
Cough (0 to #d)*												
Appetite (Yes/No)												
Pale Conjunctiva (0 to ++)												
Respir.rate /min												
Temp. C°												
Candidosis												
Appetite test (Pass:2/3 or Fail:1/3)												
Caretaker choice (In_trt/Out_trt)												
RUTF (# sachets to caretaker)												
RUTF (# sachets given back)												
Other foods												
Transfer TO / Absent												
Need HomeVisit (Y/N)												

Routine Medicine					
Drugs	*Date (dd/mm)*	*Dose*	***Drugs***	*Date (dd/mm)*	*Dose*
Amoxicillin .....mg			Mebendazol Deworming		
4th week visit Vitamin A			Antimalaria drugs		
Folic Acid 5mg tab			**Measles vaccine		

Specific treatment		
Date (dd/mm)	*Observation*	*Treatment*

* 0-# Days = Number of days with symptoms (cough- fever-..)

** All children from 9 months without a vaccination card or those from areas with low vaccination coverage should be given measles vaccine on the 4th week of treatment (including those that have been initially treated as in-patients).

ANNEX 6

TARGET WEIGHT FOR DISCHARGE

THIS TABLE GIVES THE TARGET WEIGHT FOR DISCHARGE FOR PATIENTS ADMITTED WITH VARIOUS ADMISSION WEIGHTS[39] WHEN NO HEIGHT IS AVAILABLE.

Admission weight	Discharge weight	Admission weight	Discharge weight	Admission weight	Discharge weight
3.0	3.6	8.1	9.8	18.5	22.5
3.1	3.8	8.2	10.0	19	23
3.2	3.9	8.3	10.1	19.5	23.5
3.3	4.0	8.4	10.2	20	24
3.4	4.1	8.5	10.3	21	26
3.5	4.3	8.6	10.4	22	27
3.6	4.4	8.7	10.6	23	28
3.7	4.5	8.8	10.7	24	29
3.8	4.6	8.9	10.8	25	30
3.9	4.7	9.0	10.9	26	32
4.0	4.9	9.1	11.1	27	33
4.1	5.0	9.2	11.2	28	34
4.2	5.1	9.3	11.3	29	35
4.3	5.2	9.4	11.4	30	36
4.4	5.3	9.5	11.5	31	38
4.5	5.5	9.6	11.7	32	39
4.6	5.6	9.7	11.8	33	40
4.7	5.7	9.8	11.9	34	41
4.8	5.8	9.9	12.0	35	43
4.9	6.0	10.0	12.1	36	44
5.0	6.1	10.2	12.4	37	45
5.1	6.2	10.4	12.6	38	46
5.2	6.3	10.6	12.9	39	47
5.3	6.4	10.8	13.1	40	49
5.4	6.6	11.0	13.4	41	50
5.5	6.7	11.2	13.6	42	51

[39] The table is constructed so that a person admitted with a weight-for-height of 70% (NCHS median) will be discharged when they reach 85% weight-for-height (NCHS Median). Those admitted at 65% weight-for-height will reach 79%weight-for-height at the target weight. Most patients below 65% will be treated as in-patients and will have their height measured and an individual target weight calculated.

Admission weight	Discharge weight
5.6	6.8
5.7	6.9
5.8	7.0
5.9	7.2
6.0	7.3
6.1	7.4
6.2	7.5
6.3	7.7
6.4	7.8
6.5	7.9
6.6	8.0
6.7	8.1
6.8	8.3
6.9	8.4
7.0	8.5
7.1	8.6
7.2	8.7
7.3	8.9
7.4	9.0
7.5	9.1
7.6	9.2
7.7	9.4
7.8	9.5
7.9	9.6
8.0	9.7

Admission weight	Discharge weight
11.4	13.8
11.6	14.1
11.8	14.3
12.0	14.6
12.2	14.8
12.4	15.1
12.6	15.3
12.8	15.5
13.0	15.8
13.2	16.0
13.4	16.3
13.6	16.5
13.8	16.8
14.0	17.0
14.2	17.2
14.4	17.5
14.6	17.7
14.8	18.0
15.0	18.2
15.5	19.0
16.0	19.5
16.5	20.0
17.0	20.5
17.5	21.5
18.0	22.0

Admission weight	Discharge weight
43	52
44	53
45	55
46	56
47	57
48	58
49	60
50	61
51	62
52	63
53	64
54	66
55	67
56	68
57	69
58	70
59	72
60	73

ANNEX 7

TRANSFER FROM TFC TO OTP AND FROM OTP TO TFC

Transfer Form *during the treatment of SAM*

SAM Unique #

Circle the information below

Transfer FROM OTP TFC Other ..... Name

Transfer -TO OTP TFC Other ..... Name

Fill the administrative information

Patient's Name

Date of Transfer TO .....

Father's Name

Sex M / F

Address

Name of the caretaker

Fill the information of the follow up of the patient

	Date	Weight	Height	Target weight	MUAC	Oedema	Result of Appetite Test
Admission							
Minimum Weight							
Transfer-TO							

Complete the information of the diet and medical treatment during follow up

	Phase 1	Transition	Phase 2
F75			
F100			
F100 diluted			
RUTF			
Date at beginning			

	Drugs		Date
Routine treatment	Vit A		
	Folic acid		
	Measles vaccination		
	Mebendazole		
	Amoxicilline		

Specific treatment given	Date

Reason for Transfer-TO TFC

Failure of appetite test Y / N Complications Y / N if Y ..... Oedema Y / N Non responses at OTP Y/N

Other .....

Reason for Transfer-TO OTP

Good appetite Y / N No complications Y / N Cured for Follow up Y / N Other .....

Any Specific treatment Given

Laboratory tests done

Name and function of the staff:

Date and signature:

....

ANNEX 8

REFERRAL TO TFC

Referral of the patient to TFC (patients non admitted in OTP)

Sam Unique Number:

Name & Location of the Village_____PHC _____District/Govt.

Patient's name _____ Age ____ Sex _____

Father's name _____ Caretaker's name _____

Address _____

Referral from the village: Spontaneous □ Volunteer □ HC □ Other □

Date	Weight	Height	W/H	MUAC	Oedema	Appetite Test	Complications

Reasons Appetite test: Failure Y / N Complications Y / N if Y ..... Oedema Y / N

Other **remarks**

Seen in the PHC/OTP by ..... Function : .....

Name Signature_____

ANNEX 9

MONTHLY REPORT FORM

MONTHLY STATISTICS REPORT - MANAGEMENT OF SEVERE ACUTE MALNUTRITION - THERAPEUTIC PROGRAMMES

NAME OF THE CENTRE		Implementing agency/ Health facility	
GOVERNORATE		Report prepared by	
DISTRICT		MONTH / YEAR of reporting	
TFC/OTP		TYPE OF PROGRAMME	*In-patient TFC* / ….. *TFC* — *Out-patient OTP* / ….. *OTP* — *Mobile clinic*
OPENING DATE			

		ENTRY						EXIT									
		ADMISSIONS						DISCHARGE									
Group age	Total beginning of the month (A)	New admissions (B)			Re-admission (B4) after defaulting (<2mo)	Transfer-IN (B5) from another therapeutic unit	Total admissions (C)	CURED (D1)	DEATH (D2)	DEFAULTER (D3)	UNKNOWN (D4)	NON-RESPONDER (D5)	MEDICAL TRANSFER (D6)	Transfer-OUT to OTP(E1)	Transfer-OUT to TFC (E2)	Total Discharges (F)	Total end of the month (G)
		MUAC<110 or MUAC<115 or WHZ<-3Z (B1)	OEDEMA (B2)	Relapse (B3)													
< 6 months																	
6-59 months																	
Others																	
TOTAL																	
Total end month (G) = Total beginning month (A) + Total admissions (C) - Total discharges (F)								%	%	%	%	%	%	%	%		

New admission (B) = Patient directly admitted to your programme to start the nutritional treatment (new admission to Phase 1 or direct new admission to Phase 2). Marasmic (**B1**), Kwashiorkor (**B2**) or Relapse (**B3**) admissions are recorded in 3 different columns

Re-admission after defaulting (B4) = Patient that has defaulted from a nutritional therapeutic treatment and he is re-admitted in your unit within a period of less than 2 weeks (in-patient) or less than 2 months (out-patient).

If the defaulter is coming back after 2 weeks (in-patient) or after 2 months (out-patient), then he is recorded as a new admission.

Transfer In (B5) = Patient that has started the nutritional therapeutic treatment in a different site and is referred to your programme to continue the treatment . This can be transfers from in-patient to out-patient OR from out-patient to in-patient.

Cured (D1) = Patient that has reached the discharge criteria

Death (D2) = Patient that has died while he was in the programme. For out-patient programme, the death has to be confirmed by a home visit

Defaulter (D3) = Patient that is absent for 2 consecutive weighing (2 days in in-patient and 2 weeks in out-patient), confirmed by a home visit

Unknown (D4) = Patient that has left the programme but his outcome (true defaulting or death) is not confirmed/ verified by a home visit

Non-responder (D5) = Patient that has not reached the discharge criteria after 40 days in the in-patient programme or if OTP patient refused to be transferred as in-patient if failure to respond in OTP

Medical transfer (D6) = Patient that is referred to a health facility / hospital for medical reasons and this health facility will not continue the nutritional treatment

Transfer Out (E) = Patient that has started the nutritional therapeutic treatment in your programme and is referred to another site to continue the treatment

Transfer from inpatient to out-patient (E1): when a patient was initially admitted in your in-patient programme (Phase 1) and is referred to another Phase 2/ out-patient programme

Transfer from out-patient to in-patient (E2): when a patient was initially admitted in your out-patient programme (Phase 2) and is referred back to in-patient programme for closer follow-up

ANNEX 10

REGISTRATION BOOK

Serial #	Reg. #	SAM #	Patient's name	Father Name	Address	Admissions		Age mo.	Sex F / M	Serial #	Admission						Discharge								Date of Min. Weight	Min. Weight kg.g	Remarks
						Type (New, T-IN, Relapse, Readm)	If T-IN (during treatment) Name of TFC				Date	Weight kg.g	Lenght/ Height	WHZ	MUAC mm	Oed 0, ++ +++	Date	Weight kg.g	Lenght/ Height	WHZ	MUAC mm	Oed 0, ++ +++	Type Cured, Death, Unknown, Default, T-TO, N-Resp	If T-TO Name of TFC			
1										1																	
2										2																	
3										3																	
4										4																	
5										5																	
6										6																	
7										7																	
8										8																	
9										9																	
10										10																	
11										11																	
12										12																	
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17										17																	
18										18																	
19										19																	
20										20																	

ANNEX 11

RECIPES FOR F75, F100 AND RESOMAL USING CMV

ANNEX 12

READY TO USE THERAPEUTIC FOOD (RUTF) SPECIFICATION

Severely malnourished children or adults require specialised therapeutic food to recover, such as Formula 100 (F100) and Formula 75 (F75), according to the World Health Organisation protocol recommendations. Ready to use therapeutic food (RUTF) is an integral part of outpatient programmes as it allows children/adults to be treated at home rather than by milks in a feeding centre. RUTF is an energy dense mineral/vitamin enriched food, which is equivalent to Formula 100 (F100).

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 proteins contained in the product should come from milk products.

NUTRITIONAL COMPOSITION:

Moisture content	2.5% maximum
Energy	520-550 Kcal/100g
Proteins	10 to 12 % total energy
Lipids	45 to 60 % total energy
Sodium	290 mg/100g maximum
Potassium	1100 to 1400 mg/100g
Calcium	300 to 600 mg/100g
Phosphorus (excluding phytate)	300 to 600 mg/100g
Magnesium	80 to 140 mg/100g
Iron	10 to 14 mg/100g
Zinc	11 to 14 mg/100g
Copper	1.4 to 1.8 mg/100g
Selenium	20 to 40 µg
Iodine	70 to 140 µg/100g
Vitamin A	0.8 to 1.1 mg/100g
Vitamin D	15 to 20 µg/100g
Vitamin E	20 mg/100g minimum
Vitamin K	15 to 30 µg/100g
Vitamin B1	0.5 mg/100g minimum
Vitamin B2	1.6 mg/100g minimum
Vitamin C	50 mg/100g minimum
Vitamin B6	0.6 mg/100g minimum
Vitamin B12	1.6 µg/100g minimum
Folic acid	200 µg/100g minimum
Niacin	5 mg/100g minimum
Pantothenic acid	3 mg/100g minimum
Biotin	60 µg/100g minimum
n-6 fatty acids	3% to 10% of total energy
n-3 fatty acids	0.3 to 2.5% of total energy

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 in contrast to F100.

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 like antinutritional 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 minerals should be water soluble and should not form insoluble components when mixed together. This mineral mix should have a positive nonmetabolizable base sufficient to eliminate the risk of metabolic acidosis or alkalosis. [40]

Information on how to produce RUTF in countries is available at: http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/CBSM/tbp_4.pdf

[40] The nonmetabolizable base can be approximated by the formula: estimated absorbed mmoles (sodium + potassium + calcium + magnesium) - (phosphorus+chloride). The mineral mix recommended for F100 by WHO is an example of mineral mix with suitable positive nonmetabolizable base.

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