ACF INTERNATIONAL

GUIDELINES

FOR THE INTEGRATED MANAGEMENT OF SEVERE ACUTE MALNUTRITION: IN- AND OUT-PATIENT TREATMENT

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Nutrition and Health Department

ACF - International

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ACKNOWLEDGEMENTS

The foundation for these guidelines grew out of the work done at the Tropical Metabolism Research Unit, Jamaica from 1956 to 1991. The work was funded by the University of the West Indies and the Wellcome Trust. The physiological and nutritional knowledge gained formed the basis for the WHO (1999) guidelines for the management of Severe Acute Malnutrition.

The guidelines were first applied by Action Contre Le Faim (ACF) in 1994 in Rwanda and subsequently applied in many Emergency situations. The experience gained showed the shortcomings of the WHO guidelines which were then extensively revised. The revised version formed the basis for many National Protocols which were then evaluated by the authors.

The subsequent evolution of the guidelines depended upon these field evaluations of actual programmes, analysis of the data, identification of problems and situations not adequately addressed by current versions of the guidelines, research undertaken by students of the University of Aberdeen and deliberation by the ACF Scientific Committee. The ACF Scientific committee (M. Golden, A. Briend, Y. Grellety, C. Prudhon and D. Bounie) was instrumental in the formulation, development and initial testing of RUTF. This permitted effective treatment at home and large scale implementation of the treatment of SAM in the community. The subsequent testing of the products was largely undertaken by Andre Briend with collaborators and the implementation in emergency settings spearheaded by Steve Collins of Valid International with Concern Worldwide and Save the Children UK.

We gratefully acknowledge the contribution of the agencies, field staff and students to this latest incarnation (version 6) of the guidelines. In particular, Action Contre la Faim-France and Action Contre la Faim-International contributed to the earlier revisions or the WHO guideline and UNICEF (country and regional offices) MSF-France and the European Community contributed to the later revisions by supporting evaluations of the programmes in the field.

ACF addition: Andrew Tomkins, Carlos Navarro Colorado, André Briend; Sophie Laurence; Beatrice Mounier and Alix Haentjens have also contributed to revise previous version and finalisation of this version.

The Protocol for SAM management is in constant evolution. ACF is following closely the studies and research performed by partners and is active in developing new evidence. Many questions are still pending and ACF will regularly update the protocol following the evolutions.

Some example of ACF studies on-going:
- Studies on anthropometric measurement to better identify the most relevant criteria for detection, admission and discharge in the nutrition programme.
- Systematic antibiotic in SAM children study in 2011-2012 (Central African Republic)
- “Alternative protocol” research (possibility of reducing the amount of RUTF given to the beneficiaries in OTP in the latest phase of treatment).

Any errors or omissions are the responsibility of the Authors.

CONTENTS

ANNEXES ***140***

ACRONYMS

ACT	Artemisinin-based Combination Therapy (WHO recommended treatment for malaria)
ARV	Anti RetroViral (drug combinations used to treat HIV/AIDS)
ART	Anti Retroviral Treatment programmes
BMI	Body Mass Index
BMS	Breast Milk Substitute (Infant formula milk)
CHW	Community Health Worker
CMAM	Community Management of Acute Malnutrition (see IMAM for complete programme)
CMV	Complex of Minerals and Vitamins (mix added to reconstitute F75/F100/ ReSoMal)
CMW	Community Mid-Wife
CTC	Community Therapeutic Care (no longer used – see IMAM)
DOTS	Directly Observed Treatment/Therapy Short Course
ENA	Essential Nutrition Action (a programme by USAID through BASICS and LINKAGES)
EPI	Extended Programme of Immunisation
ER	Emergency Room (normally a hospital facility to receive cases for emergency medical treatment)
F75	Therapeutic milk used in Acute-phase of SAM in-patient treatment
F100	Therapeutic milk used in Transition/Recovery Phases of SAM treatment
F100dil	Diluted F100 used in the treatment severely malnourished infants less than 6 months.
HC	Health Centre
IEC	Information, Education, Communication (programmes and strategies)
IFE	Infant Feeding in Emergency (documents on feeding infants less than 6 months, See ENN – Emergency Nutrition Network)
IMAM	Integrated Management of Acute Malnutrition
IMCI	Integrated Management of Childhood Illness (WHO/UNICEF programme)
IPF	In-Patient Facility (used for treating the severely malnourished: replaces the terms TFC, SC and other acronyms for residential clinical care).
IU	International units
LoS	Length of Stay
MUAC	Mid Upper Arm Circumference
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Health (clinic based programme)
NCHS	National Centre for Health Statistics of USA (old anthropometric standards)
NGT	Naso-Gastric Tube
NRU	Nutrition Rehabilitation Unit (largely redundant, has been replaced by OTP)
OPD	Out-Patient Department (of health facility – normally a hospital)
OTP	Outpatient Therapeutic Programme; the acronym also refers to Distribution Sites for out-patient management of SAM.

PEM	Protein-energy malnutrition (this term is no longer used – replaced by SAM)
PN	Plumpy Nut© (This is a commercial trade name and should not be used in protocols – use RUTF)
RDA	Recommended Dietary Allowances
ReSoMal	Oral REhydration SOlution for severely MALnourished patients
RUTF	Ready-to-Use Therapeutic Food (this acronym is restricted to foods for treatment of SAM which have the same nutritional composition as F100, with added iron, and have been clinically tested in efficacy trials to ensure their therapeutic equivalence to F100)
RWG	Rate of Weight Gain
SAM	Severe Acute Malnutrition
SC	Stabilisation Centre (synonym for TFC – has been replaced by In-patient facility – IPF)
SFP	Supplementary Feeding Programme
TFC	Therapeutic Feeding Centre (synonym for SC, TFC – has been replace by In-patient facility)
VCT	Voluntary Counselling and Testing (programme for HIV/AIDS)
WHO	World Health Organisation
W/H – W/L	Weight-for-Height – Weight-for-Length

GLOSSARY

Under nutrition is a "catch-all" term for a deficiency of any of the essential nutrients (protein, essential fatty acids, electrolytes, minerals and vitamins) or energy. It not only encompasses stunting, wasting (type II deficiency) but also clinical illness brought about by deficiencies of any of the specific essential nutrients which may not be associated with any anthropometric change (and can occur in obese people). Different forms of under nutrition are not necessarily exclusive and often co-exist within the same individual.

Stunting or Chronic malnutrition
Stunting is a retardation of growth and is indicated by a low height-for-age. It can occur when a child suffers from chronic (long-term) nutrient deficiencies.

Wasting: Acute Malnutrition
Wasting occurs when a person has lost weight and become excessively thin; it is indicated by a low weight for height or MUAC. This form of acute malnutrition is either moderate (MAM) or severe (SAM) depending upon how severe the wasting becomes.[1]

Kwashiorkor: Acute malnutrition
This is a clinical syndrome characterised by bilateral oedema. It is often also associated with lesions of the skin, fatty liver, atrophy of the organs and mental changes. The exact cause is unknown but it is thought to be due to deficiency of antioxidant nutrients.

Under weight
This index indicates when a child has a low weight for his/her age. It cannot distinguish between wasting and stunting as it does not indicate whether the child has a low weight-for-age because of a low weight-for-height or a low height-for-age.

Over weight
For a malnourished young child, there can be a quick transition – over a matter of weeks or a few months – from being wasted (low weight for height or MUAC) to being overweight or even obese (excess weight for height). In most cases, these children remain stunted (low height for age), a legacy of their original condition of chronic malnutrition. The diets used in the past, and that the child will return to at home, have sub-optimal levels of some of the essential nutrients, so that the children, although of normal weight-for-height did not return functionally to normal or have catch-up in height. They then became more vulnerable to obesity and diabetes.

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

INTRODUCTION

1. The nature of malnutrition

Malnutrition is primarily due to failure to take and absorb sufficient essential nutrients to grow and develop normally. This is normally due to a poor appetite secondary to nutritional deficiency because of the poor quality of the diet or infection; pathological losses or mal-absorption increase the requirement for increased amounts of a high quality diet. Those that depend upon others for their food are particularly vulnerable (children, the elderly and infirm, mentally deficient, prisoners, the indigent, displaced and refugees).

There are about 40 different nutrients that are essential for health [1]. 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. After an acute illness they will not have the necessary nutrients to convalesce successfully and return to normal. This failure of convalescence is the usual reason why there is an association between infection and nutritional state.

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 not have any anthropometric abnormalities (i.e. they can have grown normally and have a normal body weight, or even be obese and have nutritional deficiency of this class of nutrient). 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, vitamin A, riboflavin, etc. 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, and are, deficient when there has been failure to grow, to repair tissue that is damaged, to replace rapidly turning over cells (intestinal lining and immune cells in particular) or to gain weight after an illness to 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 with generalised physiological adaptation of all systems. Replenishment of all these nutrients, in the correct balance, is essential for recovery from malnutrition and convalescence from acute illness. As there are no body stores of these nutrients they all have to be given in the right balance for the malnourished to regain functional and anthropometric normality.

More than half of all deaths in children have stunting and wasting as the underlying cause [2,3]: that is, they are too thin for their height 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) [2] if the wasting is severe (in children, MUAC <115mm or W/H < -3 Z-score WHO growth standards $_{2006}$) or there is bilateral oedema.

These guidelines address the treatment of SAM in persons of all ages[3]. In children, malnutrition is defined as moderate acute malnutrition (MAM) if the wasting is less severe (MUAC from ≥115 to <125 mm or W/H between ≥ -3 and <-2 Z-score WHO_{2006} standards). Oedematous cases are always classified as severe.

[2] 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.

[3] ACF recommendation: more specifically children up to 10 years

Stunting is due to long-standing moderate or mild malnutrition[4]. Although there is gain in height when children are treated according to these guidelines, the numbers of stunted children in many communities and the length of time treatment needs to be continued make it inappropriate to treat stunting according to these guidelines in children over 6 months of age. Other approaches that ensure the long-term improvement in the quality of the family diet are used (e.g. breast-feeding support, positive deviance programmes, family economic support such as micro-credit to enable diet diversification or supplementation with specially formulated diets [4]) as well as managing the convalescent phase of acute illnesses [5]. The community mobilisation part of these guidelines can usefully provide a starting point for such programmes.

In many health facilities the mortality rate from complicated cases of severe malnutrition is over 20% [6,7]; this is unacceptable. If these guidelines are carefully followed the mortality rate should be less than 5%, even in areas with a high prevalence of HIV/AIDS although there is a higher mortality in patients with a low CD4 count.

2. Treatment of disease in the malnourished is different from the normally nourished

"In the past 30 years the way of treating malnourished children has considerably improved.

- **The first revolution** in the management of severe acute malnutrition occurred in the mid-1990s with the introduction of specialised milks (initially F100 and later F75) and improved protocols introduced by the World Health Organisation (WHO). The combination of the specialised milks, the use of antibiotics and better management of fluids reduced mortality substantially, reaching around 5%. These methods were scaled up during the 1990s and were predominantly centre-based and within in-patient facilities.
- **The second revolution** in the management of severe acute malnutrition occurred at the beginning of 2000 with introduction of a decentralised community-based model involving RUTF. The approach involved management of severe acute malnutrition with the community following an initial period of community sensitisation and mobilization and then as a continue process. A primary aim of decentralisation of treatment (not only available in hospital wards) was to improve the coverage of programmes beyond those levels achieved with centre-based programmes. This move becomes possible through the use of RUTF. However, the approach was still mainly dependent upon humanitarian agencies operating in emergency settings.
- **A third revolution** is currently happening, with the aim of managing severe acute malnutrition in the community in non-emergency settings. There is more involvement from governments with management of acute malnutrition that become a public health issue."

With the management in these guidelines the products (F75, F100, and RUTF) and other treatment usually lead to very rapid reversal of the clinical features of SAM. However, in the acute stages the physiological processes of the body and the way that diseases present clinically are completely changed by the malnutrition. This means that commonly there is failure to recognise infection and misdiagnosis of complications. Importantly, the treatments and drugs that are used appropriately in normally nourished patients can be toxic when given to the severely malnourished patient. In particular, the early treatment of SAM[5] entails large movements of electrolytes and water between the various compartments of the body (sodium moves out of the cells and potassium into the cells). This temporary electrolyte disequilibrium makes the patients very vulnerable to misdiagnosis and treatment of dehydration; the management of dehydration and severe anaemia as one would in a normally nourished child often leads to death from fluid overload and heart failure in the severely malnourished

[4] ACF: 'Mild malnutrition' means 'at risk of malnutrition'.

[5] This particularly applies to complicated cases of SAM, but may occur in all cases of physiological malnutrition or where there has been adaptation to a greatly reduced intake for more than several weeks (including, for example, patients undergoing prolonged fasting for treatment of obesity) – see section on re-feeding syndrome.

child. Furthermore liver and kidney function is abnormal so that drugs are not eliminated normally and the blood-brain barrier may be compromised. Drugs that are often given and thought to be very safe, such as paracetamol, metronidazole, ivermectin, anti-emetics (and other drugs that affect the nervous system), must be used with extreme caution in these children or not at all! Drugs that decrease the appetite (many drugs) may delay or prevent recovery.

Thus, it is very important that the whole guideline is understood and 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 institutionalised. 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[6]. It is common practice for patients seen in casualty departments to be treated conventionally overnight by junior staff and transferred to the ward or nutrition facility in the morning – the conventional therapy given overnight can lead to over-treatment from which the child does not recover.

3. Prevention of complicated malnutrition

The majority of children who fulfil the anthropometric criteria for SAM can be managed entirely as out-patients provided that they have sufficient appetite and do not have any other medical complication.

The concept is to identify these wasted children in the community before they develop complications, and then to treat them with RUTF in the community. This involves active screening within the community and full involvement of the community itself in support of the programme. Between 80% and 90% of children identified in the community do not require in-patient management at all. With proper triage procedures and easy referral to an in-patient facility there should be almost no deaths in those treated as out-patients.

Children who first come to hospital generally complain of some other acute illness and most require initial treatment as in-patients because of these complications. Much of the literature on the management of severe malnutrition comes from studies of such children; these patients are at high risk of mortality and particular attention needs to be paid to their management if the overall mortality from SAM is to be reduced. Once the acute phase is over and the patient regains their appetite, the "clinical" part of treatment is complete and the in-patients are transferred to out-patient management in the community for the catch-up, "nutritional" phase of treatment.

[6] Even giving oral rehydration fluid in and emergency ward can complicate subsequent treatment or even lead to death several days later in the malnutrition ward. This is because the additional sodium retained during the emergency-room treatment makes the occurrence of fluid overload more likely when treatment is started with F75 when more sodium starts to efflux from the cells to expand the extracellular and intravascular space or oedema fluid starts to be mobilised.

ORGANISATION of an IMAM programme

The organisation of the IMAM programme is critical to its success. When it is being completely run by an NGO, there is administrative support, adequate dedicated and focused staff without other responsibilities, training and supervision, logistic and transport support, planning and control and normally adequate funds. When the programme is being run in conjunction with or by a national health service, the staff have many other duties to perform and the addition of IMAM services as a separate vertical programme can overburden staff or divert and dilute attention from other important programmes[7], there is often a problem with transport, logistics and supply to outlying sites and control and organisation of the programme can be fragmented.

Please refer to ACF CMAM integration guidelines which describe the organisation of an IMAM in a health system from national level to community level.

[7] And when subsequently other programmes are introduced, divert attention from the IMAM programme.

HIV, TB and SAM

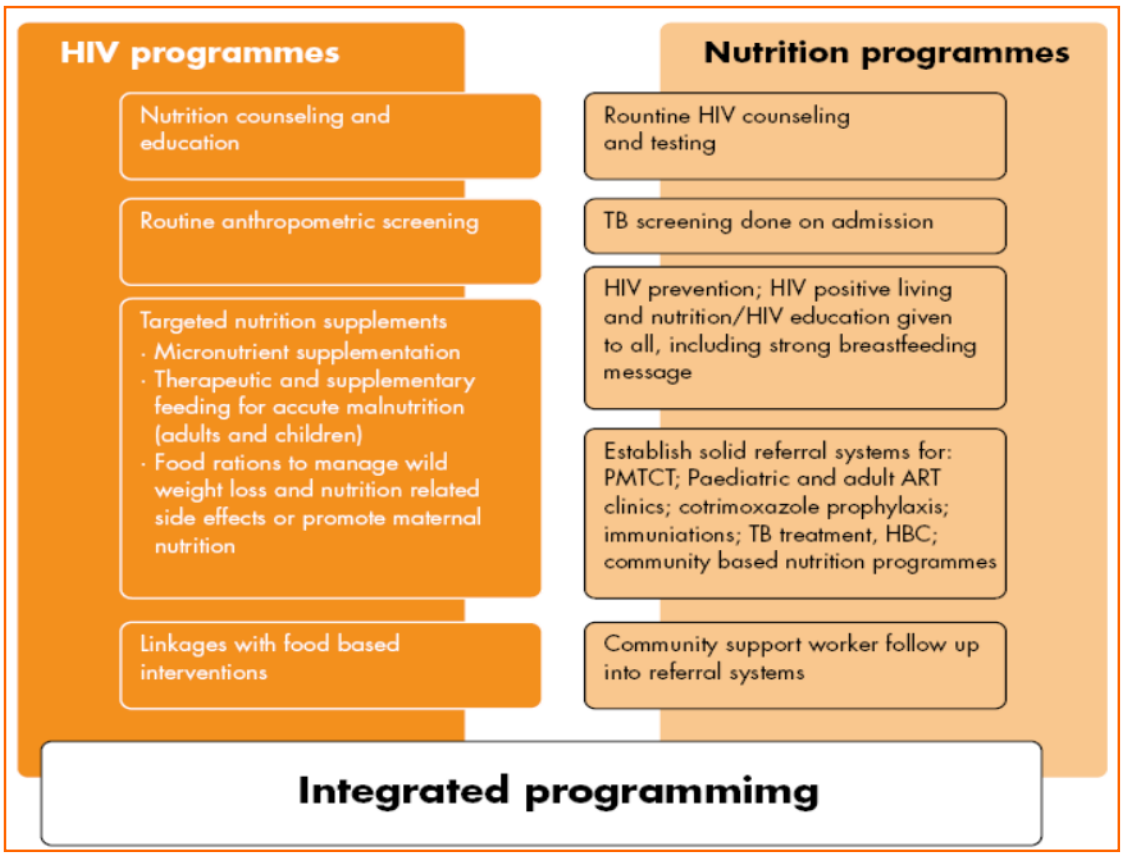
HIV, TB and SAM services in most regions should be considered as components of the health package delivered to any patient. Hence IMAM programmes must include adolescents and adults, particularly in areas with a high HIV prevalence. HIV and TB services that detect malnutrition should be able to refer their patients to the nutrition programme as well as continuing food security support. Synergy between the different services is of great benefit to the patients (one visit to health point for all services) as well as to the various services.

Where there is a high HIV prevalence[8] and an effective HIV Voluntary Testing and Counselling (VCT) programme then VCT should be offered to all newly admitted patients with severe malnutrition and their caretakers[9] (this may be a policy in national nutrition guidelines). Where anti-retroviral treatment (ART) is available, identification and management of SAM should be associated with VCT to allow referral for ART[10].

Action contre la Faim International aims at integrating HIV and nutrition programmes and has defined a technical strategy towards this goal (called ACFIN HIV Minimum Package) which consists of activities within the nutrition programmes as well as HIV services that allow for integration. This strategy is mandatory for ACF nutrition programmes in missions where HIV prevalence is high.

The diagram below shows the nature of the integration of the two programmes.

Figure 1: ACF-IN Minimum Package for Nutrition programme & HIV services



[8] High HIV prevalence according to WHO level: 5-14,9%, refer to annex 1 to see national prevalence in ACF IN mission

[9] Refer to "ACF IN HIV guidance on HIV counselling and testing"

[10] Refer to "ACF HIV Mainstreaming policy 08" in French and English

COMMUNITY ASPECTS OF IMAM

1. Community involvement

The success of out-patient management of most children with severe malnutrition [8,9] depends to a large extent on identifying children before they develop complications and present at a health facility. This requires screening all children in the community. For this to be successful there needs to be support from the community to identify and treat these children. The key people are the community health workers and outreach workers who need the support and cooperation of the community.

The quality of engagement with the community is an important determinant of the programme's success. Many mothers only come to the health services after the child is severely ill or has a major complication. However, if the cases are found and treated early, before complications set in, then the treatment is straightforward. Thus, early case finding in the community and the quality of service offered are the most important determinants of case fatality rates, programme coverage and the impact of the programme. In this regard, the prevalence of SAM is related to the treatment of moderate acute malnutrition (MAM) and the prevention of deterioration of the moderately malnourished child. Programmes for the prevention and treatment of MAM are all community based and should be part of the overall programme for tackling malnutrition; these programmes are important but not addressed in these guidelines. It is important for the community mobilisation not to focus solely upon identification of the SAM children, but to have a much wider remit so that these SAM and MAM activities are integrated with immunisation, community-IMCI, maternal and child health services, breast feeding support as well as food security, agriculture, micro-credit and income-generating programmes. These features of community mobilisation are beyond the scope of this guideline.

2. Planning the community programme

In general the Ministry of Health and the officers within local government who will be responsible for the programme should be familiar, in general, with the communities under their jurisdiction: their anthropology, beliefs, customs, structure and language. Where the programme is being run by an international organisation, a Government for an ethnic minority group or where those responsible for the programme do not know the livelihood structure and constraints experienced by the community then it is necessary to obtain this information before planning and starting the programme. Those implementing a programme for the management of SAM should endeavour to have personnel who are already familiar with the community, speak the local language and are trusted by the community leaders, on their staff in a sufficiently senior position to influence the programme, veto any inappropriate aspects and negotiate directly with the community.

This is because the community-based aspects of the programme must be tailored to the context in which it operates. It is important that the community leaders, traditional and modern health practitioners, other members of civil society and local organisations are fully informed and understand the nature and purpose of the programme and the nature of their involvement. The organisation of the programme and messages given will depend upon the usual formal and informal communication within the society, the literacy levels, who takes care of children, who determines the use of resources within the household (husband, mother-in-law, etc.), and the beliefs within the society about the causes of malnutrition as well as their usual health seeking behaviour.

During the planning it is imperative that there is close co-operation between the different agencies and programmes[11]. In particular, the type and value of the incentives offered (travel, meal allowance,

[11] During the planning process, it is important to have access to reasonable maps of the area and population statistics. This has normally been completed for other purposes. The planning team should take into account the experience of other programmes and how they have approached and solved the problems associated with outreach activities and logistics. If

clothing, food, money etc.) is standardised so that there is no discrepancy between the programmes. The subsistence and travel allowances for training also need to be standardised. These aspects should be specified nationally (in a National Strategy for Community Development for example). The District Officer for Community Development and the District Medical Officer must both be involved to ensure that the various out-reach programmes do not compete with each other or overburden the village workers.

3. Community awareness and involvement

Before implementation it is necessary for the community members to know about and approve of the programme. They should understand the objectives and the methods that will be used to identify and treat the children, the nature of their involvement, the cost and other inputs to the programme by the community[12], for how long the programme has secure funding[13] and how the programme complements the other health programmes in the area. They should be sufficiently involved to take ownership of the programme once it is established and shown to be effective[14].

The information about the programme must include its aims, methods, organisation and the persons involved; they must be clear about how the programme will affect them and their community in practice: what will it do, who will be eligible to benefit and why they will be selected, who will not benefit or be excluded, where it will operate, who will implement it, how can people access it and what the programme will do for the selected individuals. Any misunderstanding at this stage can lead to frustration and disillusionment[15]. Full acceptance of the programme is not expected until it has already been implemented and the community sees it with their own eyes and assesses its value, therefore there should be a step-by-step approach with continuing dialogue, feedback and exchange between the programme staff and the community leaders. Such a programme should never be "imposed" upon a community.

Simple messages and memorable slogans are designed that give the essence of the programme in a way that is understood by the poorest in the community. This is done by the local community itself (religious leaders, village elders, traditional healers and other authority figures such as teachers, CHW, community midwife, traditional birth attendants and health centre staff) who are then responsible for spreading the information within their communities. Visual aids can be produced after testing and fliers posted in key places, much in the same way that advertising companies operate. These should be developed nationally and be part of the national development strategy.

However, it is often more effective to use informal methods of passing information about the programme. This is at places where people gather normally, particularly the market and where women collect water or wash clothes and men gather to drink and socialise. The use of women's groups,

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possible the activities of the IMAM programme in the community should be integrated and coordinated with the other programmes.

[12] Including the cost of taking over the programme and the nature and level of support that can be expected after control of the programme passes to the community.

[13] Some NGOs, reliant upon external funding, can only make a short term commitment. Many communities have experienced broken promises or unfulfilled expectations. They are cautious about extravagant claims and promises and need to see positive outcomes, without cost to them, before they become fully committed. It is important not to raise expectations (often due to misunderstanding) to a level which may not be achieved and any commitment made must be completed to the satisfaction of the community.

[14] The poor are very conservative: they cannot risk committing family resources (time, travel, goods, labour, and purchases) just because an educated stranger gives a persuasive argument ("education"). If the stranger is mistaken they may starve. It is only the better off, such as those that plan programmes, who can take such risk as a mistake and loss will not devastate their lives.

[15] "Why did you choose this child, and not that child – they look the same to me" if often heard from community members who are sceptical about the programme and its aims.

schools (child-to-child or child-to-parent), football and other sporting and other networks should also be explored. A particularly important group to involve is the religious leaders of the community and passing information at places of worship can be particularly powerful. The information must be passed by the community figures themselves and not by strangers to the community.

4. Staff at community level

Existing health staff

Part of the organisation of programmes to identify and treat malnourished children in the community is to integrate these activities with the other community based health activities (EPI, community IMCI, midwifery, etc.). The staff who undertakes these activities should be taught how to screen using MUAC and oedema assessment and to refer the malnourished for treatment appropriately. Care must be taken not to overload these community workers; if this is the likely then the IMAM programme should employ staff, however, these additional staff should also undertake IMCI and EPI activities as well as IMAM: the terms and conditions of employment for all staff supported by the different programmes should be identical.

Outreach Health workers

Outreach health workers are employed full time to go into the communities. Where there are village volunteers they liaise with the village focal points, oversee their activities and support them; where there is no village focal point they perform the screening, follow-up and other outreach activities. The outreach workers should be literate, numerate and proficient in the local language of the district. The advantage of paying for outreach health workers is that screening is more organised, the work more regular and they are more likely to remain with the programme. The salary is often the main income for the household. The number of outreach workers that can be employed, and hence the number villages and frequency of visits, is determined by the funding of the programme. There should be secured funding for a minimum of two years[16] for each employee.

Volunteers

Volunteer is a person living within the community itself who is willing to spend time providing services to their neighbours without payment.

In most resource poor communities there are insufficient employed staff to implement an effective community based programme where individual households are regularly visited and communal events organised. In such circumstances the community aspects of the programme can be run by volunteers, provided they are adequately supported.

Where there are existing health volunteers, as with the outreach workers, they should be trained in active case-finding and follow-up of the IMAM programme. The pre-existing volunteers have been trained in other aspects of health promotion and usually have standing in the community with villagers willing and accustomed to seek their assistance. However, health volunteers should never be overloaded; the amount of time they can devote to volunteering is always limited. It is often necessary to recruit additional volunteers so that the workload can be shared and they can work together as a small team. Existing village volunteers are best placed to identify new volunteers that they can happily work alongside. CMWs can also be used for recruiting, training and following volunteers.

[16] The sustainability of the programme is critical. It takes a lot of work to organise, implement and integrate a programme, and the expectations of the community are raised to a level where precipitate withdrawal of support leads to great disaffection. When it is implemented there should normally be a commitment to maintain the programme for at least 5 years; where the funds have not been fully secured, there must be a minimum period of "notice" before withdrawal, and orderly hand-over, training and support for local civil society to maintain the programme itself. It is often the case that funding is secured for therapeutic services only; active case finding in the community is an integral part of the programme and should always accompany therapeutic services.

There is no limit to the numbers of volunteers that can be within a village, but they have to be organised[17] and cooperative.

The major difficulties with a volunteer-based programme are:

1. choosing volunteers who are representative of their communities,
2. providing adequate support and
3. maintaining their motivation.

A strength of both the community IMCI and IMAM programmes is the enthusiasm shown by mothers, volunteers, health care workers and the village leaders. With IMAM they actually see severely malnourished children change physically, become active and develop within a few weeks. This is a powerful experience that shows the community that the treatment works and creates demand for the programme. This in turn motivates volunteers and raises their standing within the community as they are seen as the conduit into the programme. Parents, mothers-in-law and traditional practitioners bring children for treatment. Successful treatment of individuals[18] empowers local health workers, enhances their esteem and gives them credibility with the community.

Active case-finding by volunteers has several advantages. Volunteers being from the community itself are familiar with the area, many of the individuals and the society.

Selection of volunteers

Volunteers are usually self-selected. However, it is critical that the community itself selects and approves of the volunteers. The most common problem is for communities to select the community leaders' relatives and males.

The persons selected must be:

1- Honest and trusted by the community
2- Both males and females should be selected (with a bias towards females)
3- With a true desire to benefit the community altruistically
4- Being able to read and write is a distinct advantage, but not absolutely essential.

Where the burden of work is very high and the community is very poor suitable volunteers may not be available.

Once the programme is working, mothers who have successfully treated their own malnourished child and who otherwise fulfil the criteria for selection should be invited to volunteer. These mothers who have been through the programme, and are of the same socio-economic class as the new cases, are particularly credible, are able to relate to and guide new caretakers and will obtain information (for example on reasons for defaulting) that others may not solicit.

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[17] In Bihar, India, there is a focal point within each village who recruits volunteers. The village is mapped and each volunteer is responsible for visiting up to 10 neighbouring households. Each week all the volunteers from the village gather with the focal point for a meeting to discuss together the health and nutrition problems of the whole village. Pregnant women are identified early and followed, breastfeeding is supported, immunisation is ensured, the malnourished identified and referred and then followed up by the volunteer, minor health problems are identified and the district nurse consulted during her next visit. The volunteers assist the village focal point who does not feel isolated as she is part of a village team. Such a grouping within the village leads to solidarity, camaraderie, mutual support and ensures that there is a limited workload for each person. If one person "drops out" the programme does not collapse.

[18] At the start of a programme it is common for an obviously very ill child to be brought by the villagers to "test" the programme and the promises that have been made. It is important that this "test case" is successfully treated. This child who the villagers all see is very ill, usually needs initial in-patient care. It is important that initial cases recover successfully so that what can be achieved is actually experienced by the community; this, more than anything else, establishes the credibility of the programme with the villagers and treatment for less severe cases will be sought. The in-patient facility is very important not only to treat some of the malnourished children, but also to demonstrate that the programme will cater for all the malnourished children and not only those who are relatively healthy and uncomplicated, to provide credibility and to allow the community to know that there is real "back-up" behind what is happening at the village and OTP level. Such successes and failures live long in the memory of communities.

It is difficult to work exclusively with volunteers. Their work load at home (e.g. agricultural work, collecting water, preparation of meals) limit the time they can devote to the programme, which has a low priority compared to maintaining their households. It is important for outreach health workers to be employed to regularly visit and support the volunteer network.

5. Screening, referral for treatment, follow-up and education

An outreach-worker visits the village or group of villages close together periodically within the catchment area of an OTP. S/he also visits whenever there appears to be a problem (excessive defaulting, low rate of weight gain etc.) or when requested during a monthly meetings or when the village person comes in rotation to help with the OTP. During this evaluation visit s/he supervises and helps the village focal point and the community volunteers, collects the tally sheets from screening, observes any screening and does any follow-up, home visits required. S/he also checks with the village elders to maintain their involvement in the programme and to provide feedback about the programme[19].

The primary activities that take place in the community are:

- Screening of children for severe malnutrition (and moderate malnutrition where a programme for moderately malnourished children exists) – this is active case finding.
- Follow up at home of cases that:
- have not attended the distribution points
- have been discharged from in-patient care and have not enrolled at an OTP
- have failed to respond to treatment
- Promoting healthy practices through education and advice.

Screening

Screening at all levels should be part of the national strategy and should be incorporated into all national programmes including “national Days” when vitamin A capsules are distributed or vaccinations given, HIV, IMCI, community development programmes etc.

Active case finding in the community

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 whilst relatively healthy, before they develop complications and at a stage when treatment is straight forward and can be achieved entirely in the community. This prevents admission to in-patient facilities[20].

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[19] An effective outreach worker is critical to limiting the number of defaulters, determining the outcome of patients that do not attend and performing home visits. However, the main function is to maintain a strong link between the health centre/ OTP and the village leaders, village volunteers and CHWs.

[20] This is important as admission to residential care has important implications for the family; this includes costs of transport, loss of earning ability, food for the caretaker, family disruption, failure to complete essential work (admissions can decline during planting season in agricultural communities), reduction in the level of care for the other children at home, preparation of family meals and concerns about separation in times of insecurity. A feature that is not often mentioned is separation of husband and wife; they both become concerned about fidelity of their partner, particularly if the separation is prolonged. On the other hand, admission gives the child the exclusive attention of the mother for several days and can give the mother a respite.

Children are screened in the community using a MUAC tape and checking for oedema. All those fulfilling the criteria for SAM are referred to the closest IMAM programme (OTP or IPF).

During screening the MUAC result for each person screened is recorded on a tally sheet (the normal as well as the malnourished). The recording sheets are collected and the results collated at intervals. This gives a prevalence of SAM and MAM in the screened community at the time of screening. These results can be mapped to identify pockets of malnutrition and with regular screening forms the basis of a nutritional surveillance system.

The outreach health workers or community volunteers examine each child for bilateral oedema and measure MUAC.

Those with a MUAC < 115mm who are longer than the stick (> 65cm) are referred to the nearest OTP centre for direct admission to the programme[21].

It is best to have an individual in each village (or cluster of nearby villages) who functions as a focal point and takes responsibility to identify cases and provides a link between the community and the programme. Such a village focal point is normally a volunteer who is not formally employed by the programme.

Constraints

Travel: Without a focal point in the village, in widely dispersed communities, team members would have to travel long distances to visit villages and individual houses. This is not possible for volunteers and requires a paid outreach worker with transport provided (e.g. a motorbike and fuel).

Isolation: It is critical that village volunteers feel supported and can get help whenever they face a problem. They should all be supplied with mobile phones and some credit as part of the programme. The outreach worker should still travel to the village at least monthly. During the visit s/he will, discuss any problems with the village volunteer face-to-face, see the village elders to get feed-back on their attitude towards the programme and the volunteer, see any patients that the volunteer is worried about or who cannot come to the OTP/IPF, provide any incentive that has been agreed, invite the volunteer to a periodic coordination/experience sharing meeting (provide funds for transport to the meeting) and collect the screening tally sheets.

Motivation: Volunteers living within the local community have many of the constraints upon their time as the parents of patients within the same community. It is unreasonable to ask them to spend more than one or two hours per week on the programme. They must not have any out-of-pocket expenses and have to be visited regularly. They should be given tee-shirts and a hat which identify them as being part of the programme mobile phone and a satchel to carry and store their materials in (this should all be part of a *volunteer's kit*). There have to be regular meetings for all the volunteers and out-reach workers so they are given travel money to the place from which the programme is controlled and meetings held. The volunteers must undertake to remain in the programme for a definite length of time.

Once the results of the programme become widely known and there is positive feedback because the community sees ill children rapidly recover, the volunteer village focal point will get status and esteem within the community as the conduit to the programme. At this time, parents will start to bring their

[21] There are recommendations having two cut-off points for MUAC: one for length/height > 65 cm and another one for length ≤65 cm. However this requires further work and validation. In some situations it is complicated to have two different cut-off points for children of different height category. The advantages of having a single cut-off point are that it is simple and younger children have a higher risk of death. The disadvantage is that a great many children of more than 6 months are the size of young infants of a few months old – ideally they should return to exclusive breast feeding – the main disadvantage comes with the discharge criteria for these children which are very difficult to achieve – if they are discharged without reaching the discharge criteria they are likely to be immediately readmitted to the programme during the next screening session. The problem is not solved. For practical reasons, ACF recommend to use only one cut-off point.

children to the programme spontaneously. Nevertheless, it is important to maintain contact with the village volunteer and for her activities to continue (screening, follow-up, education).

Coordination: If there are other programmes in the area then the volunteers may be working alongside volunteers supported by another programme or agency. This happens particularly in emergency situations where many NGOs descend upon the population, often with the same programmes. They all try to employ (usually temporarily) local staff and recruit volunteers. Even in development situations there are often many different programmes being implemented. It is important that there is full coordination between the programmes. Volunteers must not be overloaded, there should not be different NGOs giving conflicting messages or advice; there must never be differences in the incentives given by the different agencies[22].

- ***Tools***

The village focal point/ volunteer needs to have a kit. This should comprise:

- MUAC tapes (including spare tapes)
- Screening tally sheets
- Stick of 65cm
- Referral slips
- Pencils, paper, pencil sharpener, eraser
- Satchel/bag
- Mobile phone and credit, list of key telephone numbers, if possible.
- Written simple guidelines (in the local language)[23]

- ***Data collation***

From the tally sheets and during the visit to the village by the outreach worker, he should collect the following information; it is analysed and entered into a database by the staff controlling the programme.

- Village name (GPS coordinates should have been determined and entered in database)
- Name of informant
- Date of screening
- Total number of children screened
- number with oedema

[22] This leads to competition between the agencies (HIV, health, water, nutrition, protection, etc.) for staff and volunteers, important programmes being stripped of their staff and dissatisfaction within any workforce that is not getting the "top" level of incentives. There can even be escalation of incentives to a level where important programmes are not viable.

[23] These have to be adapted to the level of education of the village focal point. It should be given even if the focal point/volunteer is unable to read – this will avoid humiliation the focal point and s/he will nearly always have someone in the village who can read for them when they are illiterate.

- number <115mm
- number ≥ 115 to < 125mm
- number normal (≥ 125mm)
- Number referred and the site to which they were referred
- Number who refused to go to programme.

Passive screening in health structures, in the OPD and the Emergency room at hospital/health centre level

Every child should be assessed using MUAC and oedema by the doctors and nurses in the casualty, emergency and out-patients departments. All those identified as severely malnourished should be referred to someone who has been trained specifically in the treatment of the severely malnourished. It is critical that the standard treatment given to normally nourished children is not automatically ordered for the severely malnourished, this is why the nutritional assessment should be made ***before*** any other condition is diagnosed and treatment ordered.
Although it is not appropriate to measure height and weight of all children in a busy hospital emergency department they should be examined, have their MUAC taken and be assessed for oedema routinely; those suspected of being severely malnourished can also have their weight-for-height measured. Older children (more than 5 years of age) and adolescents can be severely malnourished; they should have their weight-for-height measured, oedema checked and also need treatment according to this protocol. The training, equipment and tables to take weight-for-height should be put in place in all permanent health structures and services.

Other opportunities for screening

Apart from integration of MUAC measurement and oedema assessment into IMCI consultations (hospital, health centre and community based) screening should always be done along with other programmes. In particular, when there is an immunisation campaign (e.g. National Immunisation Day, campaigns in the face of an epidemic of measles, meningitis etc.), all the children being immunised should also have their MUAC measured and the vaccination teams should have tally sheets and referral slips. Every opportunity should be taken to identify patients that require therapeutic feeding for severe malnutrition.

Follow-up

Children's progress is monitored on a weekly basis at the distribution site. Follow-up at home is not needed for most cases, although where there are village volunteers they can usefully support those that are in the programme. The most common problem with home treatment is sharing of the RUTF with other family members (mainly older children).

Follow-up at home is necessary for:

- Children who are not responding to treatment
- Children whose careers have refused admission to the in-patient facility
- Children who do not return for appointments (to determine if they have moved away, defaulted or died)

The children needing follow-up at home are identified by the staff of the OTP/IPF. The outreach health workers or volunteers are then contacted (by direct contact, mobile phone or sending a message) to arrange a home visit to these high risk patients. Children who are failing to respond to treatment should then be visited at home by a health worker if a reason for failure is not immediately apparent.

All absences from OTP should be followed up by outreach workers, volunteers, focal point persons or key community figures. It is important to gain an understanding of the reason for absence and to encourage return.

It is critical that a defaulter or absentee is never reprimanded or treated disrespectfully. The reasons for absenteeism are many, but the commonest relates to the staff attitude to the caretaker. If a caretaker is treated badly, not only will the child be denied treatment for this episode, but if the child recovers s/he is less likely to come to for treatment of future illness and the caretaker will pass a negative message to her friends and neighbours. The reputation of the programme within the community depends to a large extent upon spread of individual experiences informally. The staff must all treat the parents of the children as those primarily responsible for the health of the child: they are in effect part of the health team as far as that patient is concerned and should be treated as such.

- ***Health Education, Mother-to-mother support with emphasis on breastfeeding***

The parents and caretakers, whose children become malnourished, generally come from the poorest sections of society. They frequently have not attended school and many cannot read or write. They are often unaware of the nutritional needs of children, the importance of play and psychosocial stimulation in child development, the effects of poor hygiene and pollution, the 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 or ignored.

Such caretakers come together during an IMAM programme, either as in-patients or at the distribution sites as outpatients and also at community level. It is important that these opportunities be taken to hold education sessions for the caretakers, each week-day in the in-patient facility and each week at the OTP site. In the community nutrition education should be a major part of the activities of the mother-to-mother support groups and other groups within the community itself.

The In-patient multi-chart and OTP chart have a box for recording whether the caretakers have attended the sessions.

Guidelines on Key Nutrition Information: Many packages and guidelines have been developed to assist in IEC. The following are recommended:

The "Essential Nutrition Actions Package" (ENA) covers the following topics[24]:

1. Optimal breastfeeding;
2. Optimal complementary feeding;
3. Feeding sick and/or malnourished children;
4. Maternal nutrition;
5. Control of anaemia;
6. Control of iodine deficiency; and
7. Vitamin A supplementation

Other packages cover subjects such as growth monitoring, immunization, hygiene and sanitation and de-worming.

For each of the above essential nutrition actions, there are either guidelines, policies or protocols that are used for nutrition counselling at different points of contact with individuals or groups.

The sessions plan 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[25].

[24] http://www.coregroup.org/resources/core-tools - Booklet on Key ENA Messages 2011

These same subjects, defined according to the prevailing problems can be tackled within the community by sensitizing volunteers who will be in charge of diffusing these key messages towards their community members.

[25] Topics to build education session can be found in health and nutrition education folder: "Fact for life" (see http://www.factsforlifeglobal.org/resources/factsforlife-en-full.pdf) presents different themes in simple way; other nutrition related modules are available in care practices and community approach folders. ACF nutrition posters are also available and helpful to spread nutrition key messages.

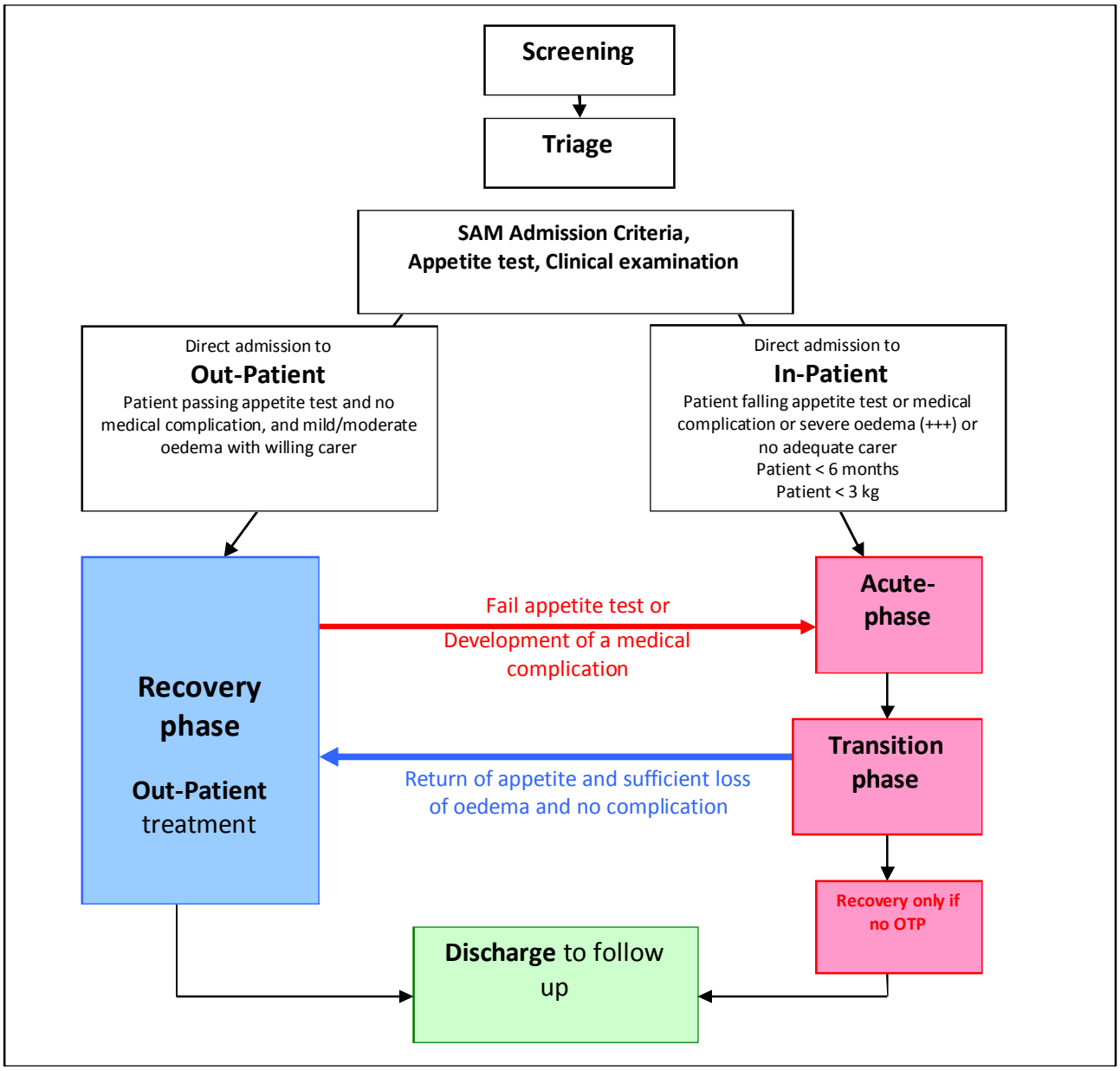
TRIAGE PROCEDURE

This following shows the schema for decision making and the flow of patients. First the patient is identified in the community by MUAC and/or oedema assessment or in the health structure by MUAC, weight-for-height and looking for oedema. Those obviously severely ill are “fast tracked” to in-patient treatment by the person doing triage, they are not kept waiting – the triage person should regularly look at any waiting area.

In all the structures which receive malnourished children, the welcoming procedure should be a priority[26]. This makes the treatment more understandable for the caretaker who will be then proactive in the treatment and increase the chance for the child to make a quick and better recovery. This includes organisation of the structure to look friendly (decoration, colours, toys available…) so that the children and caretaker to feel comfortable and also an explanation of how the centre is run to give the caretaker a good understanding of the treatment and organisation. (See ‘plan for an OTP opening’ in annex 2)

The appetite test is performed whilst the referrals are waiting to see the nurse; the nurse looks for medical complications and has the result of the appetite test. She discusses with the caretaker and decides upon the appropriate treatment options. Those that need in-patient treatment are referred for admission to an IPF; those that can be treated as out-patients are admitted to the OTP programme immediately or referred the OTP site nearest to their home. The details are described in the next section.

[26] Refer to “Manual for the integration of child care practices and mental health within nutrition programmes” page 14 **the welcome**



1. Definition of SAM – Criteria for admission to IMAM programme

All patients that fulfil **any** of the criteria[27] in the following table have severe acute malnutrition (SAM).

[27] Since the late 1970s, the NCHS reference has been the anthropometric reference throughout the world. It is based on data from several samples of children from the USA, providing a description of the attained growth of American children (see table in annex 5).

In 1993, the WHO undertook a comprehensive review of uses and interpretation of child growth references. The review concluded that new standards had to be developed that show how children across different countries should grow.
WHO undertook the Multicentre Growth Reference Study (MGRS) between 1997 and 2003. Primary growth data and related information were gathered from 8,440 healthy breastfed infants and young children from diverse ethnic backgrounds and cultural settings. These child growth standards also support the notion that given the same environmental conditions, growth potential is independent of ethnic origin; therefore, these standards can apply in any country.
Concerning MUAC cut-off, in WHO statement, recommendation follows the release of WHO standards for MUAC-for-age, which showed that in a well-nourished population there are very few children aged 6-59 months with a MUAC < 115 mm. Children with a MUAC < 115 mm also have a highly elevated risk of death compared to those who are above.

They should be offered therapeutic feeding in the appropriate setting.

AGE	ADMISSION CRITERIA
Less than 6 months	See separate section for these infants.
6 months to 59 months	• W/H - W/L <-3 Z score (WHO growth standards$_{2006}$)* **or** • MUAC<115 mm if length/height >65cm **or** • Presence of bilateral pitting oedema** (+ & ++ admission to OTP; +++ admission in in-patients care
5 to 10 years	• W/H <70% NCHS (annexe 6) **or** • Presence of bilateral pitting oedema (+ & ++ admission to OTP; +++ admission in in-patients care)
Adults	• Refer to adults guidelines
Other age groups	• Refer to ACF nutrition advisor for specific cases

* Following WHO recommendations valid up to 2012 revision and the table proposed by Mike Golden with 0.5 z-score highlighted.
**For definition of the different grades of oedema see annex 3.

For patients that have been referred from the community, at the OTP/IPF, retake the anthropometric measurements (both MUAC and W/H at health facilities and mobile clinics) and check oedema. Errors during screening occur; the referred patients who travel to the centre and are found not to meet any of the admission criteria must not be rejected and turned away. They should in any case receive education and moderately malnourished children should be referred to that programme.

- On arrival at the health facility (OTP, IPF, 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[28] and "fast tracked" straight to facility based care without having to wait for the rest of the patients to be seen. They can have their anthropometry checked (or this can be delayed until after they are admitted to the IPF), a SAM number given (see p.121 in the 'Monitoring and evaluation' part) and then referred directly to the nurse-in-charge of the in-patient facility to start treatment if the distance is not excessive and transport is available[29].
- 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 give 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 with severe malnutrition.

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

These new growth standards criteria are now used since 2009 in nutrition programmes. Weight for Height is expressed in Z-Score (see Table in annex 4).

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

[29] 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 at the health centre, keep him/her quiet and start the treatment for in-patients according to this manual, pending the availability of appropriate 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 (see section on transport of sick patients).

- If appetite test is passed, explain home care to mother and give IMCI treatment for the accompanying illness. Passing the appetite test is the main criterion for out-patient management.
- If appetite test is failed, explain to the mother of the dangers of taking the child home and try to persuade her to accept in-patient care for at least a few days. Explain that she can take the child home for OTP care at any time. Also explain that if she changes her mind she can bring the child straight to the IPF. 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 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 and arrange appropriate care at home[30]. Similarly, if the patient passes the appetite test, but the mother wants several days of in-patient care, then the mother and child should be admitted to the IPF.

2. The appetite test and flow of patient

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, all the major complications lead to a loss of appetite. **Reasonably accurate assessment of the appetite is often the only way to differentiate a complicated from an uncomplicated case of SAM.**
- 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 metabolic malnutrition that causes death**. By far the best sign of severe metabolic-malnutrition is a reduction in appetite, and the Appetite test is** the most important criterion to decide if a patient should be sent for in- or out- patient management. A poor appetite means that the child has a significant infection or a major metabolic abnormality such as liver dysfunction, electrolyte imbalance, and cell membrane damage or damaged biochemical pathways. These are the patients at immediate risk of death. Furthermore, a child with a poor appetite will not take sufficient amounts of the diet at home to prevent deterioration and death. As the patient does not eat the special therapeutic food (RUTF) dispensed, 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 are all tested together in a group before they see the nurse/ person in charge of the OTP/IPF. Children that have travelled a long distance should be given water and allowed to rest quietly before the appetite test is conducted.
2. Explain to the caretakers the purpose of the appetite test and how it will be carried out.
3. The caretaker and child should wash their hands.

[30] There are many reasons why the mother may not want the child admitted to in-patient facilities. She knows her circumstances better than the staff. Her other children, husband's wishes, distance, expense, work load, security situation and the attitude of the staff can all influence her decision. If she is forced to in-patients she is likely to abandon treatment and not return to the programme to the detriment of the child for this episode and the reputation of the programme within the community; the mother is also likely to refuse care for any future episodes.

4. The assistant conducting the test should be cheerful and relaxed. The mother initially allows her child to play with an RUTF packet or pot and become familiar with the environment. This sometimes helps the child become confident. Watching other children take the RUTF also gives confidence.
5. The caretaker should sit comfortably with the child on her lap and offer the RUTF to the child. The RUTF can be given from the packet itself or it can be dispensed into small pots or cups[31]. The mother either gives the RUTF directly or puts a small amount on her finger and gives it to the child. The caretaker must not actually consume any of the RUTF herself, although it usually helps if she pretends to take some as this is the best way to encourage 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, about fifteen minutes, but can take up to one hour in a shy or upset child or one with a marginal appetite. The child **must not** be forced to take the RUTF.
7. The child MUST to be offered plenty of water to drink from a cup during the test.

The appetite test needs a particular follow up. *It is helpful if the person conducting the appetite test has been* trained on care practices component, specifically on mother and child interactions, observation techniques, child development, and communication skills[32]. During the appetite test a deeper observation of mother and child relationship must be done to avoid difficulties at home to follow the treatment. A special support at home by the home visitor team can sometimes be proposed or, when it is available a follow up in the centre. **This observation will determine if there is a need for the beneficiary to be referred to in patient.**

- ***The result of the appetite test***

- Pass

1. A child that takes at least the amount shown in the moderate/good column of the table below passes the appetite test.
2. The patient is now seen by the nurse to determine if s/he has a complication using IMCI criteria (e.g. pneumonia, acute watery diarrhoea, etc.). If s/he has no medical complication, has not got open skin lesions, oedema +++ or severe wasting and oedema together then s/he should be treated at home.
3. Explain to the caretaker the choices of treatment options and decide *with the caretaker* whether the child should be treated as an out-patient or in-patient (nearly all caretakers will opt for out-patient treatment). If the mother opts for the in-patient treatment, refer to IPF with request of treatment to start in transition phase.
4. Start the treatment appropriate for outpatients (see below)

[31] Graduated 20 or 25ml medicine cups are the most convenient. The packet of RUTF normally holds almost 100g of the paste. If the child has a poor appetite giving a whole packet to each child can lead to waste, and is difficult for the staff to judge the amount taken. With small cups one package can be used for about 4 tests and it is much easier to judge the amount taken from a small cup than from the packet itself. The cups should be pre-prepared before the start of the OTP; this is so that the mothers do not see the food being dispensed from the sachets and think that the RUTF should be emptied from the packet to be given at home.

[32] Refer to "Manual for the integration of child care practices and mental health within nutrition programmes" for details on how to do this observation page 120

- Fail

1. A child that does not take at least the "moderate" amount of RUTF shown in the table should be referred for in-patient care if there is no danger from transport trauma (see section on transport).
2. Explain to the caretaker the choices of treatment options and the reasons for recommending in-patient care; decide *with the caretaker* 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 must accept the decision of the caretaker and not "pressure" the mother into a decision one way or the other.
3. Refer the patient to the nearest in-patient facility for acute (acute-phase) management.
4. At the in-patient facility 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 facility); the details are entered into the registration book (see annex 7) and Multi-chart (see annexes 8, 9 and 10).
5. Start treatment of the acute-phase using F75 and treat the complications appropriate for in-patients.

- Even if the caretaker/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 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.

The following table gives the MINIMUM amount that should be taken[33].

[33] Where there is a small scale a more accurate appetite test can be performed. The sachet/cup is weighed before and after the test and the amount taken compared with the weight given in the table in the appendix. This test can be performed in facilities where there are adequate staff and an appropriate scale. It has been noted that the amount taken in the first 20mins is usually at more than 90% of the total amount that will be taken if the test is prolonged. There is a close correlation between the rate at which the child starts to take the RUTF and the total amount taken.

Table 1: The amount of RUTF that should be taken to assess the appetite of severely malnourished children

APPETITE TEST						
To pass the appetite test, malnourished patients should eat at minimum an amount above "poor".						
Body weight	***Paste in sachets***			***Paste in cups***		
	(Proportion of whole sachet 96g)			***(ml or grams)***		
	poor	moderate	good	poor	moderate	good
Less than 4 kg	<⅛	⅛ -- ¼	>¼	<15	15 -- 25	>25
4 – 6.9	<¼	¼ -- ⅓	>⅓	<25	25 -- 30	>35
7 – 9.9	<⅓	⅓ -- ½	>½	<35	35 -- 50	>50
10 – 14.9	<½	½ --¾	>¾	<50	50 -- 75	>75
15 - 29	<¾	¾ --1	>1	<100	100 -- 150	>150
Over 30 kg	<1	>1		<150	>150	
Note: if cups are used then a new table should be constructed, depending on the size of the cup (often 25ml). The table should be in the number of cups the child should take for his category of weight. The majority of children will be from 4 to 6.9kg so the minimum test to differentiate a poor appetite would then be one level cup (of 25ml).						

- The appetite test should be carried out at each visit for out-patients (particularly those who do not gain weight steadily).
- 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 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 because this indicates a social problem at household level or extensive sharing of the RUTF. 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:
  - a difficulty with the home environment
  - a metabolic problem with the patient;

Such a trail-of-feeding, in a structured environment (e.g. day-care, IPF), is also used to investigate failure to respond to treatment.

3. Medical complications (IMCI)

After anthropometry and conducting the appetite test the patients are seen by the nurse to look for complications that need to have treatment started before transfer to the in-patient facility.

If there is a serious medical complication then the patient should be referred for in-patient treatment[34] – these complications include the following[35]:

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

[35] If the patients have any of these conditions they will almost certainly have failed the appetite test.

- Severe vomiting
- Hypothermia < 35℃
- Pneumonia
    - >60 breaths/ min for under 2 months
    - >50 breaths/ minute from 2 to 12 months
    - >40 breaths/minute from 1 to 5 years[36]
    - >30 breaths/minute for over 5 year-olds or
    - Any chest in-drawing
- Extensive infection
- Weak, apathetic or 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℃
- Very pale (severe anaemia)
- Other general signs, the clinician thinks requires transfer to the in-patent facility

The first consultation at admission is the best time to investigate the possible underline causes of malnutrition and to have opportunity to discuss history with the caretaker. Decision in type of treatment in or out patient should meet the child's best interest.

Medical consultation is good opportunity for TB[37] and/or HIV suspicious patient to be referred to adequate centre to be diagnosed and to receive adequate treatment.

In high HIV prevalence context and where there is an effective Voluntary Testing and Counselling (VCT) programme then VCT should be systematically offered to all newly admitted patients with severe malnutrition and their caretakers.

Specificity for HIV/TB patient

The treatment of the malnutrition is the same whether the patient is HIV positive or negative[38]. They can be treated in "in" or "out" patient setting, following the same nutrition protocol than other malnourished children in combination with referrals for VCT, ART and any other relevant HIV service to address the child situation. However, we can expect in the programme higher mortality rate and

[36] 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.

[37] "Malnutrition and TB" ACF November 2004, different **diagnosis approach of the TB in malnourished children and clinical signs**

[38] Refer to "ACFIN HIV SAM research summary report" for conclusion and recommendations

outcomes like gain of weight and length of stay, are poorer than HIV negative malnourished children.

Drugs that are used for TB and HIV are quite toxic to the liver, intestine and pancreas. These organs are also the ones particularly affected by SAM. If treatment with anti-TB drugs or ARVs is started in the severely malnourished patient, very severe side effects from the drugs are expected. The treatment already difficult to follow for a non-malnourished patient because of side effects is worse for a SAM patient and leads to withdrawal of many of them from the HIV /TB treatment programmes. This is why it is acceptable to delay the start of TB /HIV drugs and first stabilize the nutritional condition of the patient.

The treatment of malnutrition should start at first, before the introduction of anti-retroviral drugs (minimum of one week and it is better to wait the child is stabilized for malnutrition). It will diminish the risk of serious side effects from the anti-retroviral drugs, until organs have recovered sufficiently to metabolise the drugs safely.

4. To summarise

First the patient is identified in the community or health structure and referred to the programme where anthropometric measurements and bilateral oedema are checked. The severely ill are "fast tracked" to treatment by the person doing the triage. The appetite test is performed while waiting to see the doctor or nurse who looks for the presence of medical complications. S/he discusses with the caretaker and decides upon the appropriate treatment options. Those that need in-patient treatment are referred for admission to the appropriate structure; those that can be treated as out-patients are referred the OTP site nearest to their home.

⇘ **See table below**

Table 2: Summary of Criteria for admission to in-patient or out-patient care

Factor	In-patient care	Out-patient care
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.
Appetite	Failed or equivocal Appetite test	Passes Appetite test
Oedema	• Bilateral pitting oedema Grade 3 (+++) • Both marasmus and Kwashiorkor (W/H<-3z score and bilateral	• In most countries: bilateral pitting oedema Grade 1 to 2 (+ and ++)[39]

[39] The degree of oedema is not a good measure of the severity of the illness in children with oedematous malnutrition. In some countries/regions, children with + or ++ oedema can be managed safely as out-patients, in other countries even minor degrees of oedema indicate a high risk of death. This criterion should be adjusted for according to local experience. Nevertheless, if the appetite test is properly and accurately conducted it should differentiate those oedematous children who should and those who should not be treated as out- or in-patients. Under no circumstances should all children with ++ oedema be treated as out-patients if the appetite test is being conducted in a perfunctory manner of simply by the impression of the assistant/nurse/

	oedema)	
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

TRANSPORT OF SICK PATIENTS

Very ill malnourished children may be brought to an OTP distribution site or health centre and the protocol requires them to be "referred" to an in-patient facility (see the referral form annex 11).

Transport of these patients to an in-patient facility that is a long distance away, over poorly maintained roads is a major problem; not only because of the time delay in starting treatment and the expense to the parents but also because of the damage that the transport itself does to the child. Nurses are very reluctant to take responsibility for the care of very ill children in the periphery and readily "refer" them to a secondary or tertiary institution; frequently they do not arrive.

"Transport trauma" is a real phenomenon[40]. Very ill children who are transported deteriorate dramatically when they travel crowded together in a vehicle and physically agitated. It is commonly found that malnourished children who are relatively well before transport, deteriorate and die soon after arrival after a long or difficult journey.

If patients are to be transported then:

- The vehicle must drive slowly
- the vehicle must not be crowded
- The vehicle should stop for 5 min ever 20-30 min during the drive to lessen the effects of motion sickness on the sick child.
- There must be water available to drink
- The child should be nursed by the mother.

This is rarely possible by public transport.

In view of the deterioration and death of ill malnourished children that are transported in an inappropriately manner, it is often less dangerous for the child to be managed *in situ* rather than be transported, even if the staff are relatively inexperienced and the facilities are sub-optimum or even very poor. The sicker the child and the more that child requires good in-patient care, the more dangerous it is to transport the child over long distances; it is not possible to resolve this dilemma. For very sick children even taking them to another department (e.g. for x-ray), excessive manipulation or washing the child can cause serious deterioration; vehicular transport is a much greater trauma.

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

The medical staff in the referral centre should be contacted by telephone. They should take responsibility and "cover" the nurse in the field, reassure the nurse that it is the correct course of action not to transport the child and give advice. The nurse must explain to the caretaker that the child is critically ill and may die, but that the danger of transporting the child to the hospital is greater than trying to stabilise the child at the health centre[41]. Again the mother's choice should be followed[42].

If this situation is common then an in-patient capability should be established in a nearly health centre.

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[40] Even healthy animals that are crowded together into a vehicle and transported can experience a substantial mortality with major changes in their metabolism found at autopsy. It is common for parents to have motion sickness when travelling.

[41] In developed countries there are specialised intensive care teams and ambulances or aircraft to transport such patients: even with these facilities the transport itself increases mortality in most studies.

[42] It the child is kept at the health centre against the parent's wishes, and the child dies, the nurse could be blamed for the death by the community.

It is desirable to de-centralise in-patient care as far as possible (as well as out-patient care). Referral hospitals and paediatric expertise is not needed for most cases of malnutrition –their role is mainly for diagnosis and management of those children who fail to respond to treatment.

Payment of transport is a major problem for most parents and **it should be the task of the focal point of the district to support** (lend money, subsidise or pay for) essential medical transport (with verification) from the village to the IPF. The other problems are the bad roads, vehicle break-down, the distance involved and seasonally impassable roads (flooding etc. during the rainy season)[43].

The nutrition Focal Point should regularly evaluate the outcome of patients that have been transported under difficult circumstances. Detailed analysis of death during and for 48h after transport should be undertaken by the District Nutrition Officer and actions taken. Solutions include using local or international NGOs, establishing a community fund, having an ambulance, establishing a phone consultation to treat patients without transport, establishing a local IPF to manage acute complicated malnutrition in situ, etc.

[43] Even a mobile team may not be able to reach the village at some times of the year – this should be anticipated and provision made (stocks of RUTF and training of villagers).

OUT-PATIENT TREATMENT PROGRAMME

Admission

There are two kinds of admission to the OTP

- New admissions
- From active and passive screening[44] or self-referral. Most admissions to OTP will be of this sort.
- Relapse
- Admissions of patients already under treatment for SAM (not to be registered as new admissions)
- **Transfer**-In from another OTP that has already started treatment and the patient already has a SAM Number
- **Transfer**-In from an In-patient facility (transfer form with a SAM Number and the treatment given)
- **Return** from an In-Patient facility back to the OTP (transfer form with a SAM number and treatment given and s/he already has a chart and is already registered)
-

- The IPF normally runs an out-patient treatment programme from its own facilities. This is insufficient. Out-patient care, in the community, should always be organised from health centres, health posts or even non-clinical facilities that are as close as possible to the patients' homes. Patients that have been admitted to the IPF should not be transferred to the associated OTP if there is another OTP closer to the patient's home. The distance and time the patients have to travel is a major determinant of coverage, defaulting rate and reputation of the whole programme. The OTP can function each day where it is within a health centre or health post and there are sufficient staff to allow a nurse health worker to visit the community. Where the OTP is in a non-clinical facility, the OTP team travels to OTP site once each week. There should be many satellite OTP sites close to or within the community – they should be within walking distance (5km is the normal catchment area - at most 10 km) of places where malnutrition is commonly found (from screening results)[45].
- 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.
- Patients attending the TB and ART programmes should be systematically screened for severe malnutrition and referred to the out-patient programme if they fulfil the admission criteria. If there are many such patients an OTP should be opened in conjunction with the TB or ART programmes.
- There needs to be a functioning communication and referral system between the health post/ OTP site and in-patient facility so that patients can be quickly and easily transferred from the in-patient facility to the out-patient programme as they enter the recovery phase (recovery-phase) and those

[44] Includes referral from Health structures where no nutritional therapeutic treatment is implemented.

[45] Although the prevalence of SAM may be lower where there is a dense population (urban areas) than in sparsely populated rural areas, the absolute number of SAM children needing treatment is often higher in densely populated areas. The prevalence of malnutrition should NOT be the main criteria for opening a centre – the absolute number and need should be matched with the existing provision of services.

out-patients that fail to respond appropriately or who develop a complication can be transferred (temporarily) to be in-patients. Such transfers are not "discharges" from the programme.

- Patients who pass the *appetite test* should be directly admitted to the OTP, if the caretaker agrees, without passing through the acute-phase and transition phase of treatment. Patients that have started treatment as an in-patient, continue as out-patients to complete the recovery-phase. Although 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[46].
- For remote villages weekly to two-weekly outreach activities is ideal if it can be arranged. This maintains contact between the community and the health team and greatly increases compliance with the treatment. This service is limited by transport and logistic constraints that need to be resolved at national and district level; it is often only possible for NGOs[47]. The worst cases of malnutrition are usually found in the most remote villages, mainly because the difficulty the community has to access health services leads to delayed diagnosis. These villages should be a priority to be mapped and screened and there should be regular contact with the community volunteers. Provision of petrol (and help with acquiring motorbikes) to ensure regular contact is important.
- There must be clear advertisement of the days and time that each OTP is open, with all the phone numbers that may be necessary in every OTP.

- **Mobile clinics/teams.** These are an alternative for remote villages. Where mobile health clinics are operating, especially in an emergency situation, the management of severe acute malnutrition should be incorporated. Screening is done to check weight, height, MUAC and oedema. Patients fulfilling the admission criteria are assessed and given a weekly RUTF ration (if they pass appetite test and medical check). A proper referral system and transport is important for the patients that need in-patient care (see section on transport).
- Where the population is widely dispersed, with a relatively low population density, or a nomadic population, treatment should be by mobile team. A vehicle is equipped for an OTP site as well as with vaccines and IMCI medicines. This team then travels to pre-determined sites to a weekly timetable to treat the patients.

A child should **always** be treated at home where there is:
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 (see section on transport). The two arms (in-patient and out-patient) of the programme should always be integrated, with regular meetings, so that there is smooth transfer of patients from one to the other mode of treatment. The same registration number is retained throughout the

[46] Where visits are every two weeks the recovery time is considerably longer than when the same sort of children are seen every week.

[47] One of the main roles of NGOs in this situation is to "cover" areas that are out of the catchment area of the national health services and to provide logistic support.

movements (the SAM-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.

During the weekly visits[48] and specifically during the appetite test, 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 comforted, spoken to and played with. There must be an **educational and play session** that shows the mothers how to play with her child and 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.[49]

Weekly visit to the centre of the beneficiaries and caretaker remain opportunity of targeted **nutrition and health promotion** with topic being adapted according to the prevailing issue.

Diet

There are various commercial types of RUTF: they are nutritionally the same as F100, except the fact that RUTF has iron and F100 does not. Several countries are producing their own RUTF and product and formula need to be validated by UNICEF and MSF to make sure they fulfil the nutritional requirement (refer to the 'UN statement on CMAM and product'[50] and to the ACF general information document on RUTF and F100 in annex 12).

But whatever the product used, let's remember that in out-patients, an important part for the success of the treatment is the quality of the caretaker education.

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

Explain to the caretaker how to give the RUTF at home:

- For breast-fed children, **always** give breast milk before the RUTF, for at least 20-30 minutes. Breastfed children must continue to receive breast milk 8 to 10 times per day, decreasing with increasing age
- 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.[51]
- Wash the child's hand and face with soap before feeding.
- These children often only have moderate appetites during the first few weeks and eat slowly. They must be fed separately from any other children in the household. The child can keep the RUTF with him/her to 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. However, the caretaker should attend to the child

[48] Or fortnightly in some circumstances

[49] Refer to "Manual for the integration of child care practices and mental health within nutrition programmes" page 50 **child development** and page 62 **Mother and child relationship**

[50] http://www.unscn.org/files/Statements/Community_Based__Management_of_Severe_Acute_Malnutrition.pdf

[51] It's recommended to ask the carers to bring back empty packets every week.

every 3-4 hours at least and encourage the child, or give small regular meals of RUTF at these times. Tell the mother how much her child should eat each day (this is given in the look-up table).

- Explain that for the first week or two the child will probably not finish all the RUTF given[52]. The mother should not be upset by this as excess has been given, but as the child recovers his/her appetite will improve so that all the diet will be taken later on in recovery. Uneaten RUTF should not be taken by other members of the family – as the child improves s/he will start to consume nearly all the food.
- Explain that RUTF is the only food the child needs to recover during his time in the programme. It contains all the ingredients that the child needs to recover and is really like a special medicine. It is not necessary to give other foods.
- Explain that the illness has damaged the child's intestine so that the normal family food is not sufficient for the child and may even cause some diarrhoea. Tell the mother that a lot of other foods will delay the recovery of her child. If the child asks for other foods small amounts can be given but she should always give the RUTF **before** other foods and at a different time from regular family meals:

  Never mix the RUTF with other foods. Most cereal or pulse based foods contain anti-nutrients and inhibitors of absorption that make the nutrients in the RUTF unavailable for the child. If other foods are given they should be given at a separate time from the RUTF.
- When RUTF is given abundant clean water must be offered during and after the feed (to satisfy the patient's thirst).

For OTP programmes, if there is a problem with food security or in an emergency situation a "protection" ration[53] could 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.

For children who are being transferred to an OTP from an in-patient facility, 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. The IPF should inform the OTP site and the district focal point by phone when a transfer is being made[54].

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

- ***Amounts to give***

The children must NEVER be force fed.

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[52] NGOs that counsel the mother thoroughly and give 170kcal/kg/d achieve higher rates of weight gain than those that dispense excess and fail to give adequate advice on its use. There are very good physiological reasons for restricting the amount given during the first 2 weeks to about 130 kcal/kg/d (see section on re-feeding syndrome and reasons for introduction of the transition phase in the in-patient section) although this can complicate the OTP protocol slightly.

[53] ACF recommendation: This ration can be given as a family ration, or social safety net projects can be promoted as fresh food voucher...

[54] In all transfers the time of leaving should be noted on the form – and the time of arrival at the destination facility. These transfer times should be analysed periodically to determine if this is a major problem within the district. If transfer times are excessive then a meeting should be held to explore ways of resolving the problem.

After the feed, always offer an additional quantity to the patient if the child takes all the feed quickly and easily, until his appetite is satisfied.

The RUTF can be kept for several days after the package is opened provided it is perfectly protected from insects and rodents and from any sources of contamination. It is also used in day-care management when RUTF is given for feeding overnight, at weekends or during staff shortages.

Table 3: Look up table of Out-patients of the amounts of RUTF to give per day and week[55]

Class of weight (kg)	RUTF Paste		RUTF Sachets (96g)		BP100®	
	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

If possible the amount given during the first two weeks should be reduced by about 15%. Although this can complicate the OTP protocol it removes the probability of some children developing the severe complications during the early phase of treatment (see section on “re-feeding syndrome” as a potential hazard if a child who has been taking far less than the requirement suddenly takes large amounts of the diet, or the mother forces the RUTF that has been dispensed into her child at the start of treatment. High intakes at the start of treatment are dangerous and may account for some of the deaths in the OTP programme).

[55] This is equivalent to about 170 kcal/kg/d. On this amount the child has sufficient RUTF to gain weight at up to 14 g/kg/d. This is never achieved in outpatient programmes where the rate of weight gain varies from about 2 to 10 g/kg/d, indicating an energy intake by the child of between 110 and 150kcal/kg/d. Giving more RUTF encourages sharing within the family as the other members become habituated to consuming the “left-overs”, it also increases the cost of the programme considerably. If stocks of RUTF are short then the amount given could safely be reduced by about 15%. It is better to give all children adequate amounts of RUTF, than excess to some and none to others.

Routine medicines

1. NO other nutrients should be given

The RUTF already contains all the 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. For children with diarrhoea on RUTF or other therapeutic food containing zinc it is not advisable to give additional zinc as this can increase the mortality rate[56] [10].

2. Systematic Antibiotics

Antibiotics should be given to severely malnourished patients, even if they do not have clinical signs of systemic infection. Despite the absence of clinical signs, they nearly all have small bowel bacterial overgrowth and have at least minor infections.

- **Note:** The position of antibiotic administration to children who pass their appetite tests and go straight to OTP has not been determined. They probably do not have a major systemic infection; however, small bowel bacterial overgrowth occurs in ***all*** these children (including those with moderate malnutrition and with reasonable appetites) and these bacteria should be suppressed for optimal response to treatment; asymptomatic children in OTP can also have colonisation with pathogenic organisms[11] . However, one retrospective study in Malawi suggested that antibiotic treatment of children with good appetites and no medical complication is unnecessary [12], however the level of amoxicillin resistance in that population was not assessed; elsewhere it is very high [13,14] which could account for this finding. **If the prevalence of resistance to amoxicillin is high** then metronidazole [15] at a dose of not more than 10mg/kg/d can be given [16].

These enteric bacteria frequently are the source of systemic infection by translocation across the bowel wall. They also cause mal-absorption of nutrients; failure to eliminate substances excreted in the bile, fatty liver, intestinal damage and can cause chronic diarrhoea.

Thus, at the moment these children are usually given antibiotics systematically in a similar fashion to those who require in-patient treatment initially. The antibiotic chosen for routine treatment must be active against small bowel bacterial overgrowth.

- Because many children with **nutritional oedema** (kwashiorkor) have free iron in their blood[17,18], bacteria that are not normally invasive, such as *Staphylococcus epidermidis,* most enteric bacteria and "exotic bacteria" can cause systemic infection or septicaemia. If oedematous children are treated as outpatients they must receive routine antibiotics.

OTP treatment should be oral amoxicillin[57] (if amoxicillin is not available, use oral ampicillin) [58]

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[56] The increase in mortality is probably due to induced copper deficiency with high doses of zinc. This is not a danger with RUTF as the RUTF contains copper. The zinc tablets given for diarrhoea, however, do not contain additional copper.

[57] This is recommended as second-line antibiotic by IMCI: it is given to these immuno-compromised patients who are severe enough to be admitted to a treatment programme. Amoxicillin is normally active against small bowel bacterial overgrowth patients. Where this is used as the first line antibiotic, metronidazole does not need to be given unless the enteric bacteria are resistant in the area and then metronidazole can be given [19,20] provided that the dose does not exceed 10mg/kg/d (one third of that given to normally nourished children) .

[58] 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.

Table 4: Dosage of Amoxicillin

Weight range	Amoxicillin (50 – 100 mg/kg/d) - Dosage twice per day	
Kg	in mg	Cap/tab
<5kg	125 mg * 2	½ cap.*2
5 – 10	250 mg * 2	1 cap * 2
10 – 20	500 mg * 2	2 cap * 2
20 - 35	750 mg * 2	3 cap * 2
> 35	1000 mg * 2	4 cap * 2

- **Chloramphenicol should never be used in babies less than 2 months of age** and with caution in infants less than 4kg or 6 months of age59. Because of the danger of OTP staff giving chloramphenicol to these categories of patient, it should not be used as routine treatment in OTP programmes.
- - Children referred to the OTP from an in-patient facility or have been transferred from another OTP after having received antibiotics should not be given a second course.
- Children who require second-line antibiotic treatment or have significant infections should be treated as in-patients. Therefore there are no recommendations for "second-line" antibiotics for use in out-patient treatment programmes.

3. Duration of antibiotic treatment:

The first dose should be given under supervision; treatment should continue for a total of 7 days. 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).

4. Malaria

For treatment of malaria or malaria prophylaxis, refer to national guideline for malaria treatment[60] (except that quinine tablets should not be used in the severely malnourished). Where complicated patients refuse admission to in-patients they should be treated with the regimen recommended for in-patients (see section on complications).

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

If no protocol is available or is not adequate, refer to the "ACF Specific medical protocol in TFC 2007" and to the "ACF Malaria policy".

5. De-worming

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

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[59] In these children chloramphenicol causes "grey-baby" syndrome which is a dose-dependent toxicity. It is thought to occur in this age group because of immaturity of the liver's enzyme systems. There is insufficient data on the young malnourished child to determine if their liver abnormalities also make dose-dependent chloramphenicol toxicity a danger.

[60] Note all children with severe malaria should be treated as inpatients. The treatment of malaria in in-patients who are severely malnourished may differ from the national protocol. Please see the in-patient section of these guidelines.

Worm medicine is only given to children older than one year, considering children start walking at this age.

Table 5: De-worming treatment

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

6. Measles

Out-patients over the age of 9 months without a vaccination card are given measles vaccine during their 4th visit[61] (including those that have been given measles vaccine as in-patients when severely malnourished). Patients directly admitted to OTP are unlikely to be incubating measles[62] 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, because the antibody response is diminished or absent in the severely malnourished. The measles vaccine is given at a time when there should be sufficient recovery for the vaccine to produce protective antibodies.

7. Vitamin A

Give 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[63]. Do not give high doses of vitamin A routinely on admission to OTP.

Only give Vitamin A in those two cases:

- *Any child with signs of vitamin A deficiency as* xerophthalmia, night blindness *should initially be treated as an in-patient as the condition of their eyes can deteriorate very rapidly.*
- All children should also receive vitamin A if there is an active measles epidemic in progress.
-

Table 6: 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 - (200,000IU = 60,000ug)

Table 7: Summary table of systematic treatment

	Routine medicines
Amoxicillin	- 1 dose at admission + treatment for 7 days at home for **new admissions only**
Albendazole / Mebendazole	- 1 dose on the 2nd week (2nd visit) – all patients
Measles for areas with low coverage (from 9 months)	- 1 vaccine on the 4th week (4th visit) – all patients

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

[62] If they are incubating measles they are likely to fail the appetite test.

[63] Do not give vitamin A routinely to the severely malnourished on admission to the programme; there is an increased mortality in those with oedema and increased respiratory tract infections in both oedematous and wasted children [21,22].

Vitamin A	- 1 dose on the 4th week (4th visit) – all patients

8. Medicines for specific groups of SAM children in OTP.

One dose of Folic acid (5mg) can be given at admission to children with clinical anaemia. There is sufficient folic acid in the RUTF to treat mild folate deficiency[64]. High dose folic acid should not be given where Fansidar (SP) is used to treat malaria.

Surveillance in OTP

Table 8: Surveillance

Frequency	Out-patient
MUAC is taken	Every week
Weight and oedema	Every week
Appetite test is done	Every week
Body temperature is measured	Every week
The IMCI clinical signs (stool, vomiting, etc.)	Every week
Height/Length is measured	At admission and the following week[1] and once a month, or when child substitution suspected [2]
W/H z-score can be calculated	Every week

- Care should be taken not to give excessive drugs to SAM patients, particularly drugs that could decrease appetite.
- Zinc should not be given to patients taking RUTF [10];
- Anti-emetics should not be used in OTP (they all depress the nervous system);
- Paracetamol should only be given for documented fever and not simply with a history of fever.
- The severely malnourished child does not get asthma because of the inhibition of the immune system so drugs such as aminophylline should not be used[65] unless the diagnosis is confirmed.

[1] To avoid measurements mistakes.

[2] 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.

[64] This assumes that the patients are receiving the RUTF at home and that the extent of sharing within the family is very small. If there is doubt whether the child will receive sufficient RUTF then a dose of folic acid can be given.

[65] One of the most frequent causes of asthma like signs in the malnourished is helminth migration through the lungs. This is particularly common with Toxocara canis infection (a worm whose eggs are passed by dogs).

Transfer Out to In-patient care

Outpatients who develop the signs of a serious medical complication (pneumonia, dehydration, etc. - see table in section on admission triage) should be offered transfer to the in-patient facility for management of their condition until they are fit to return to OTP.

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 re-feeding diarrhoea sufficient to lead to weight loss.
- Fulfilling any of the criteria of "failure to respond to treatment":
    - Weight loss for 2 consecutive weighings
    - Weight loss of more than 5% of body weight at any visit.
    - Static weight for 3 consecutive weighings

Reasons for failure to respond should be checked; since causes such as sharing the food at home could be solved without referral to in patient.

- Major illness or death of the main caretaker so that the substitute caretaker requests in-patient care or is incapable or unwilling to look after the malnourished child

When transferred to the in-patient facility, standard in-patient treatment should be applied; however, the routine drugs are individually prescribed depending upon what has already been given, the cause of the transfer and the nature of the complication.

A transfer form with a return sheet has to be sent to the in-patient facility and should contain the summary of the treatment given and the Sam-Number (See section on Monitoring and evaluation). The OTP should also phone the IPF nutrition supervisor, if possible, to inform the IPF about the transfer. When the patient is returned to the OTP similar contact should be made to avoid losing the patient during the transfer. These calls should be recorded on the patient's chart.

Failure to respond to treatment (out-patients)

It is usually only when children fulfil the criteria for "failure to respond" that they need to have a full history & examination or laboratory investigations conducted. Most patients are managed entirely 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 itself a "diagnosis" that should be recorded in the records and the patient put into a different category. For out-patients this diagnosis often warrants referral to a centre for full assessment. If inadequate social circumstances are suspected as the main cause of failure in out-patient management an appetite test, home visit or supervised trail of feeding should be performed before transfer to the in-patient facility.

Table 9: Failure to respond for Out-Patients

Criteria for failure to respond	Time after admission

Primary failure to respond (acute-phase)	
Failure to gain any weight (non-oedematous children)	21 days
Weight loss since admission to programme (non-oedematous children)	14 days
Failure to start to lose oedema	14 days
Oedema still present	21 days
Secondary failure to respond	
Failure of Appetite test	At any visit
Weight loss of 5% of body weight (see table annex 13)	At any visit
Weight loss for two successive visits	During OTP care
Failure to start to gain weight satisfactorily (about 1.5% body weight per week) after loss of oedema (kwashiorkor) or from day 14 (marasmus) onwards.	During OTP care

Usual causes of failure to respond are:

Problems with the OTP:

- Inappropriate selection of patients to go directly to OTP
- Poorly conducted appetite test or appetite "judged" by inexperienced personnel and not measured.
- Inadequate instructions given to caretakers (especially with respect to sharing within the family)
- 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 - social:

- Insufficient RUTF given by caretaker
- RUTF taken by siblings or caretaker
- Sibling rivalry (food as well as RUTF taken by older children)
- All eating from the same plate (the malnourished child should always have his/her own portion of food).
- Excessive intake of other foods of poor quality from family pot or traditional weaning foods/paps.
- Unwilling caretaker
- Caretaker overwhelmed with other work, responsibilities or illness.
- Death of caretaker or major change in family circumstances
- Purposeful discrimination against the child.
- Use of the child's illness to access relief or other services for the family or to ensure the child remains within the programme

Problems of individual children - psychological

- Psychological trauma (witnessing violence or death, particularly in refugee situations and families living with HIV/AIDS)
- Psycho-social deprivation, neglect
- Rumination

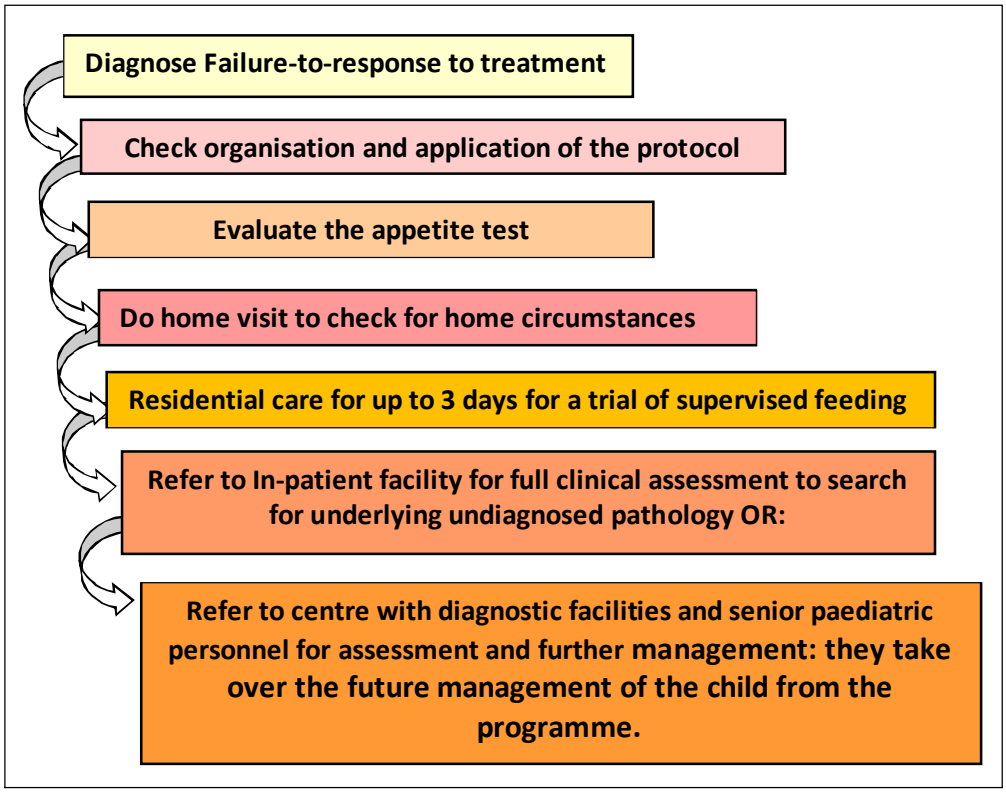
Problems of individual children - medical:

- Initial refusal to go to IPF despite having a medical complication or an inadequate appetite.
- Undiagnosed vitamin or mineral deficiency
- Mal-absorption, small bowel bacterial overgrowth
- Traditional medicines/ herbs being given that are toxic or affect appetite
- Infection, especially: Diarrhoea, dysentery, pneumonia, tuberculosis, urinary infection, otitis media, malaria, HIV/AIDS, schistosomiasis, leishmaniasis and hepatitis/ cirrhosis.
- Other serious underlying disease: congenital abnormalities (e.g. Down's syndrome), neurological damage (e.g. cerebral palsy), inborn errors of metabolism.

When a child fails to respond in OTP where there are no diagnostic facilities and the staff relatively junior they cannot diagnose or manage the medical reasons for failure-to-response. However, where there are a large number of children that fail to respond they, with the supervisor, should review the treatment and ensure that the organisation is correct and the protocol is being properly followed. Retraining may be necessary. The OTP staffs are much better placed to investigate and understand any social and psychological problems that underlie the failure to respond than those in a distant medical facility.

The following schema shows the steps that should be followed

Figure 2: Schema to show the steps to be taken for children that fail to respond to treatment in OTP



- After the diagnosis of failure-to-respond to treatment is made, the organisation and the application of the protocol are reviewed.

- The appetite test is then evaluated. If the child has a good appetite when tested, but is failing to gain weight at home, then it is likely that this is a social problem. The hungry child is not getting the RUTF at home that he will eat willingly at the OTP site. The mother often sees this demonstrated and realises for the first time that there is a problem. A gentle enquiry into the home circumstances should then be made. It is very important that this be done in private, out of earshot of other families, and that the mother is not made to feel guilty – she often does not realise that there is a problem within the household because of her workload or with the other children taking the RUTF. The instructions need to be repeated carefully and slowly.

- The next step is to arrange a home-visit. There are often problems with intra-family distribution, plate sharing and sibling rivalry of which the mother may be quite unaware. Occasionally there is rejection of a child[66], parental psychopathology or use of the child's state to access food and services for the whole family. These problems are usually not determined from either an interview with the mother at the distribution point or even during a home visit.

- If the problem is still not determined, the child is admitted to residential care (IPF or residential health centre) for up to 3 days and fed under careful supervision[67]. If the child gains weight well

[66] This is often due to suspicions about paternity or the household head discriminating against the mother for other reasons.

[67] When tested with the appetite test at the OTP site the child may not take the food eagerly for various reasons (often such children are overawed, intimidated or frightened). The child can take several days to relax and become sufficiently familiar with the staff to take the food readily.

with supervised feeding yet fails to gain weight at home then there is a major social problem that was not determined during the home visit. A further interview with the whole family including the head of the household should be undertaken and the results of the "trial of feeding" discussed with the household head (usually father or mother-in-law) as well as the primary caretaker.

- Children who still fail to respond are referred to an in-patient facility for full medical and psychological evaluation and a search for underlying pathology. Where nothing is found the child should be further referred to a tertiary centre where there are more sophisticated diagnostic facilities and senior paediatric staff.

NOTES:

- Where an underlying medical problem is identified for failure-to-respond to treatment, the further management of the child should be in the hands of the facility making the diagnosis; the further management of the patient is usually under the control of the specialist.
  - For social problems, this may take the form of counselling, family support, support by the neighbourhood or local NGO, or as a last resort, finding an alternative caretaker for the child where there are intractable social problems.
  - Psychological trauma (of the caretaker as well as the patient) is particularly hard to deal with and normally requires a change to a totally supportive safe environment, often with others that have undergone similar experiences. Frequently treatment of the mother is as important for a child's welfare as treatment of the child itself, particularly in conflict situations. Traditional practitioners are usually skilled at dealing with psychological problems [23] and the staff should not avoid referral to traditional practitioners in such circumstances.

- **It is important that children do not languish in OTP for several months**, not responding, and then simply discharged as "non-responders". Such a category of outcome should not exist in an OTP programme.

It should be noted that at each step in the investigation of failure-to-respond in OTP will involve fewer and fewer children as the problems are identified and addressed. There should be very few who require referral to senior paediatricians. Senior Doctors should concentrate on these failure-to-respond children where their training and skills are best used, rather than on routine management of the malnourished who respond well to the standard protocols and can be managed by nurses and their assistants.

Discharge Procedure

1. Criteria of discharge

The children are discharged when they reach the discharge criteria shown in the following table.

Less than 6 months	See separate section for these infants.
6 months to 59 months	• W/H - W/L ≥-1.5 score (WHO growth standards $_{2006}$) [1] on more than one occasion [2] (Two days for inpatients, two weeks for outpatients) **and** • MUAC above admission criteria **and** • No oedema for 14 days
5 to 10 years	• W/H ≥ 85% NCHS on more than one occasion (Two days for inpatients, two weeks for outpatients) **and** • No oedema for 14 days
Adults	• Refer to adults guidelines
Other age groups	• Refer to ACF nutrition advisor for specific cases

Standard OTP discharge is used for children who have had their height measured, whether they have been admitted on MUAC or weight-for-height criteria.

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 or caretakers could be requested to come back for anthropometric follow up only, i.e. every two weeks during one month.

2. Recording the outcome of treatment

The following are the possibilities:

- **Cured**: the patient has reached the criteria for discharge
- **Dead**: if the patients died during treatment in the OTP
- **Defaulter**: the patient has not returned for 2 consecutive visits and a home visit confirms that the patient is not dead

[1] Children often gain height quite rapidly on RUTF. The situation can arise where they do not reach the discharge criteria because they are gaining height so rapidly that the "target" weight continues to increase as fast as or faster than their actual weight. Height gain is a much better indicator of nutritional health than weight gain and such a rapid gain in height indicates nutritional wellbeing. This reversal of stunting on the other hand is very beneficial for the child; if logistics, space and resources permit it is desirable to keep these children in the programme until their "height spurt" slows. If there is pressure on space, RUTF supply, staff and other resources then the admission height can be used to determine the target weight to be gained before discharge.

[2] Frequently, when mothers are told that their child has reached the discharge weight and will be discharged after the next visit the child loses weight in the subsequent week because the mothers want to remain in the programme to obtain RUTF or other benefits for the family. If this is commonly found then either the mothers should not be made aware that their child will be discharged at the next visit, or the child can be discharged after reaching the target weight on one occasion. In the latter case the weight should be double-checked before discharge.

- **Unknown**: the patient has not returned for 2 consecutive visits and no home visit has been performed to determine the fate of the patient or unfruitful home visit

- The other reasons why patients leave the OTP at a particular site are:
- Transfer-out to in-patient facility (they are expected to return)
- Transfer-out to another OTP distribution site[68]
- Wrong admission

Follow up after discharge

Children that have been discharged from the programme should be followed up by the outreach workers and village focal point/ volunteers.

The patients should also 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 are no outreach workers or village volunteers, and no SFP near to the beneficiaries' home, then the follow-up should be organised at the nearest MCH or health centre.

All HIV positive or HIV suspicious SAM cases discharged cured or not, from the programme should be followed by HIV services, whether to continue Co-trimoxazole prophylaxis or be tested to access ART if required or for other HIV services such as Prevention of Mother to Child Transmission.

[68] This is the case when a new OTP distribution site is opened closer to the patient's home. In this case the patient should be transferred to the new OTP and recorded as such with the SAM-Number. At the new OTP the patient is not recorded as a new admission but as a transfer-in from another OTP.

EMOTIONAL AND PHYSICAL STIMULATION[69]

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 the child. 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 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. Children of parents with HIV/AIDS for example may have seen their mother and farther become ill and die in most distressing ways. Orphans are particularly vulnerable. With serious famine they may have been discriminated against within the family by siblings and relatives. 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. The same problems occur in the caretakers; in these circumstances they frequently need psychological or psychiatric support or medication.

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 the IPF 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 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.

1. 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

[69] ACF recommendation: See ACF Manual for the integration of child care practices and mental health within nutrition programmes"

mats, and with the mother or a play guide. There is no evidence that this increases nosocomial infections[70]

Massages are also an important component either to reinforce the mother-child relationship and to stimulate a child's physical and psychological development.[71]

2. Physical activity

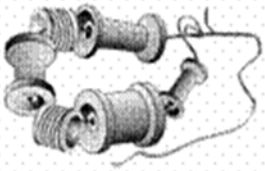
Physical activity itself promotes the development of essential motor skills and may also enhance growth during rehabilitation. For immobile children, passive limb movements and splashing in a warm bath are helpful. For mobile children, play should include such activities as rolling or tumbling on a mattress, 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.

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.

[70] 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.

[71] "Manual for the integration of child care practices and mental health within nutrition programmes" page 32 **Baby massage**

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.

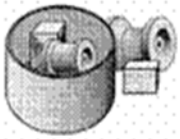


Rattle (from 12 months)
Cut long strips of plastic from coloured plastic bottles. Place them in a small transparent plastic bottle and glue the top on firmly.

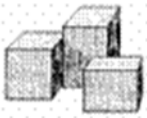
Drum (from 12 months)
Any tin with a tightly fitting lid.

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.

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.

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.

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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IN-PATIENT CARE

The procedure for implementing an in-patient therapeutic programme is detailed in the ACF manual (staffing, material, general organisation)[72]. In integrated programme it will be crucial to evaluate the workload nutrition activities will represent and plan accordingly for added staff.

Patients that require in-patient care have a poor appetite and usually have a complication such as diarrhoea, dehydration, sepsis, pneumonia, severe anaemia, etc. Thus, the patients will often require treatment of both the complication and their routine dietary and medicine section. The management of the complications take precedence over routine care and may change the way in which the routine care is given; the two sections should be read in conjunction with each other.

The principles of the management of In-Patient care

- **Acute-phase.** Patients with an inadequate appetite and/or an acute major medical complication are initially admitted to an in-patient facility for acute-phase treatment. The formula used during this phase (F75) promotes repair of physiological and metabolic functions and electrolyte balance. Rapid weight gain at this stage is dangerous, that is why F75 is formulated so that patients do not gain weight.
- **Transition Phase.** A transition phase is then introduced because sudden change to large amounts of diet, before physiological function is fully restored, can be dangerous and lead to electrolyte disequilibrium and "recovery syndrome". During this phase the patients start to gain weight. RUTF (or F100) is introduced. The quantity of RUTF given increases the energy intake by about 30%. 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 the recovery phase.
- **Transfer to OTP or Return to OTP.** Whenever patients have a good appetite and no acute major medical complication, they are given RUTF and transferred to OTP. 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.

Structure used for in-patient care:

- **In-patient**: management of severe malnutrition in hospitals and major health centres.
  - Patients that are admitted can be treated on a **24/24 hour** basis. Actual treatment at night is only required for very ill children, those that get re-feeding diarrhoea and those that have not taken food during the day. These patients receive the diet 8 meals per 24 hours with full medical surveillance and treatment of complications (there needs to be adequate staff at night).
  - Patients are admitted to a 24/24 hour facility, but are only actively treated during the day with no treatment being offered at night when there is a shortage of trained staff – they are given 6 feeds during the day.
  - Patients can equally be treated on a **Day Care** system (receiving 5 or 6 meals during the day).
    - Those from far away sleep in the facility in a separate room or a separate local structure, on beds or even mattresses on the floor[73]. Such treatment is called "residential day care". There is no provision of staff, surveillance or treatment during

[72] "TFC Manual 2007" by Michael Golden and Yvonne Greletty; Action Contre la Faim; Version 3.4 page 117, **How to implement the treatment in a Nutrition Rehabilitation Centre**

[73] It is important to avoid cots (small beds) 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.

the night. Because of the absence of staff at night such residential-day-care can be used in health centres (and hospitals). 24h care is not required for all the in-patients.

- Patients who live or are hosted by family or friends in the immediate neighbourhood of the facility come each morning and remain in the facility during the day and then return home at night (non-residential day-care).

For all in-patients, as soon as they regain their appetites they should continue treatment as out-patients, wherever the caretaker agrees and an out-patient programme is in place. In exceptional circumstances they can remain in the in-patient/day-care facility for the recovery phase[74].

There are several ways in which patients with SAM can be admitted for in-patient care:

- New admissions
- Children who come spontaneously to the hospital/ in-patient facility because of another illness (such as diarrhoea, pneumonia, malaria etc.) and are found to be severely malnourished on screening or clinical examination.
- Children who come to the hospital because the caretaker or a community volunteer recognises that they have severe malnutrition
- Children who are screened at the hospital/outpatient/emergency departments and found to be severely malnourished. These children should be given an appetite test and IMCI examination according to the triage procedures. If they have a good appetite they should be referred to OTP instead of being admitted.
- Children referred to the in-patient facility by a health centre because they fulfil the criteria of admission to in-patient care (and have not been admitted to the IMAM programme).
- Malnourished Infants less than 6 months old (see separate section).
- Malnourished children of more than 6 months, but less than 3 kg (see separate section)
- These children are NEW admissions and will be given a SAM-number and registered.
- Transfer-In from OTP
- These children have already been under treatment in OTP but have failed their appetite test, have a complication or have failed to respond to treatment and fulfil the criteria to be transferred to in-patient care

These children should already have a **SAM-number** and a **transfer-form** giving all the information on the treatment received in OTP. They are NOT new admissions to the programme but “Transfers-in”. A transfer form (and a phone call) should have been sent with the patient – the transfer form is attached to the multi-chart.[75]

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[74] This applies to children that are abandoned by their families, where the home circumstances are impossible, where there is no caretaker or the caretaker is incapable of managing the patient and there is no alternative caretaker. They remain until a “place of safety” (other relative found, foster care, orphanage etc.) place is arranged. As soon as a placement is arranged the fostering family or orphanage apply OTP treatment. Children less than 6 months and < 3 kg have a separate protocol.

[75] ACF recommendation: The structure which referred the child should be kept informed of the admission of this child in the in-patient facility.

At the in-patient facility, the anthropometric measurements are retaken and oedema checked[76]. Errors occur: if the patient is severely malnourished but fulfils the criteria for OTP management then they should be enrolled in the OTP programme attached to the facility and not admitted to in-patient care, they can then be transferred to the OTP nearest to their home. If they are not severely malnourished they are given some benefit (see OTP section), but are not enrolled in the programme. A list of the OTP sites, the name and phone number of the person in charge and the days and hours that the OTP operates should be in the IPF.

On arrival at the in-patient facility (IPF, 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[77] and "fast tracked" straight to the in-patient ward without having to wait for other less seriously ill patients to be seen. They have their anthropometry checked, a SAM number given (see p.121 in the 'Monitoring and evaluation' part) and are then referred directly to the nurse-in-charge or the to the in-patient facility to start treatment[78].

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 usually 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 doctor/nurse give 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.

Table 10: Summary of Criteria for admission to in-patient care

Factor	In-patient care
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.
Appetite	Failed or equivocal Appetite test
Oedema	• Bilateral pitting oedema[79] (Grade 3 +++) • Both Marasmus and kwashiorkor (W/H<-3z score and oedema)
Skin	Open skin lesions
Medical complications (see section on triage)	Any severe illness, using the IMCI criteria – respiratory tract infection, severe anaemia, dehydration, fever, lethargy, etc.
Candidiasis	Presence of candidiasis or other signs of severe immune-incompetence
Caretaker	No suitable or willing caretaker.

[76] Those patients that have been referred by the community worker but who do not fulfil the criteria for SAM should be admitted to the supplementary feeding programme (if it is operational and if they are MAM). 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. This tangible benefit needs to be discuss with the different stakeholders to be adapted to the context. If a large number of inappropriate referrals attend, then the screening teams should be retrained. There should be regular co-ordination meetings between the in-patient facility and the OTP staff.

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

[78] 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.

[79] In some countries grade + and ++ should also be admitted to an in-patient facility. The risk of death and severity of malnutrition varies greatly from region to region by grade of oedema.

Diet (F75)

The diet used in the acute-phase of treatment is F75[80].

- Six (or five) feeds per day are given where there are few staff at night[81].

- Eight feeds per day are given for 24h care units for the few children who cannot tolerate the increased volumes given with 5 or 6 feeds quite closely spaced during the day and 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[82].

Reserve the full 8-feed regimen for those few children who develop significant re-feeding diarrhoea when they are given fewer feeds, each of larger volume during the day only. Also, those that have had very little intake during the day (e.g. new admissions), those who are very severely ill, vomiting or have had an episode or hypoglycaemia or hypothermia.

In particular, 8 or more feeds need to be given when the larger volume of F75 required with the daytime only regimen 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 24/24h care and should not be treated with the "day-care" regimen. Very occasionally it is necessary to give the diet continuously by naso-gastric drip to reduce the load at any one time on the intestinal absorptive capacity (see section on re-feeding diarrhoea).

- Breast-fed children should **always** be offered breast-milk before the diet during at least 20 to 30 minutes and **always** on demand. The number of breastfeeds during the day should remain (or be up scaled) to comply with the recommendations regarding the child's age.

1. Preparation

Add either one large packet of F75 to 2 litres of water or one small packet of F75 to 500 ml of water[83].

Where very few children are being treated smaller volumes can be mixed using the red scoop[84]. If F75 is not available use one of the recipes given in the annex 15.

Note: there are some recipes in current use that have high concentrations of sugar: these provoke osmotic diarrhoea and should not be used (see note on re-feeding diarrhoea).

2. Amounts to give

Give the amounts in the table below to each patient.

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[80] F75 is NOT a dilute form of F100; it has a completely different nutrient composition and balance. It is designed for children with severe complicated malnutrition who have impaired liver and kidney function with infection. Children should NOT gain weight on F75; the diet allows their biochemical, physiological and immunological function to start to recover before they have the additional stress of making new tissues.

[81] It is better to organise 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 multi-chart.

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

[83] Where small numbers of children are being treated as in-patients, do not order the large packets of F75. These are for use in emergency settings with large numbers of SAM patients.

[84] The amount of powder in the red-scoop varies with the degree to which the powder is compressed into the scoop – if there is moderate compression then one scoop should be added to 21ml of water: if the powder is uncompressed then one scoop should be added to 18ml of water. 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, hypernatraemic dehydration, etc.), or over-dilute diet (failure to recover, deterioration).

Table 11: Amounts of F75 to give during Acute-phase

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

NOTE: Children on F75 are NOT expected to gain weight.

3. 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 (thus 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
- 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 the Acute-phase.

4. 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, cheeks squeezed to force the mouth open or lie back and have the milk poured into the mouth. If a child "splutters" or coughs during feeding the feeding-technique is probably incorrect and the assistant should re-train the mother. It is better for the child not to finish the feed and have and NGT inserted than to develop aspiration pneumonia.

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[85].

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. S**haring the mother's meal with the child can be dangerous** as the mother's meal usually has salt or condiment added in sufficient to provoke fluid retention and heart failure in the malnourished child. Furthermore, the mother's diet does not contain the correct balance of nutrients to treat metabolic malnutrition and will disturb the child's appetite for the F75. The only food apart from F75 that the child should receive is breast milk.

Routine Medicines

1. Systematic Antibiotics

Antibiotics should be given to every severely malnourished in-patient, even if they do not have clinical signs of systemic infection. Despite the absence of clinical signs, they are all infected [24] – these infections are treated blindly[86]. (See note on antibiotics and small bowel overgrowth in the out-patients section).

The antibiotic regimen:

- *First line treatment*: without apparent signs of infection

[85] In many hospital wards the mothers feed the children on their beds individually. Often the F75 is "secreted" under the bed and "kept" by the mother for later feeding if the child does not finish the feed. This can lead to bacterial growth in the F75 and underestimation of the amount taken by the child. It is better to have a "feeding" area where all the children and mothers are brought together. The children can encourage each other.

[86] This is NOT prophylaxis. The children are infected even if they show no clinical signs – it is "blind treatment".

- give oral amoxicillin[87], (if amoxicillin is not available, use oral ampicillin)
- **OR** give a daily IM injection of ceftriaxone for two days (50mg/kg) [88]

⇘ *Second line treatment*[89]: any apparent signs of systemic infection:

- **add** gentamicin IM (do not stop amoxicillin)

  OR
- **add** chloramphenicol[90] (in children over 6months and 4kg in weight only)

  OR
- **change** to either cefotaxime or ciprofloxacin [91] (choose this option if suspicion of severe sepsis (septicaemia)[92]
- **If** suspicion of Staphylococcus infection add cloxacillin [32]

⇘ *Third line*: individual medical decision

⇘ *Anti-fungal treatment*

- Nystatin 100,000 UI orally 4 times daily[93] is added for patients with oral candidiasis in area with high prevalence of candidiasis (>20%) or HIV.
- Children with signs of severe sepsis or systemic candidiasis should be treated with fluconazole (3mg/kg once daily) although it has been associated with mild hepatic damage[94].

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[87] This is recommended as second-line antibiotic by IMCI: it is given to these grossly immuno-compromised patients who are severe enough to be admitted to a treatment programme. Amoxicillin is active against small bowel bacterial overgrowth in most patients. Where this is used as the first line antibiotic, metronidazole may not need to be given – if it is used it is important to give a reduced dose.

[88] The long acting ceftriaxone by IM injection is an acceptable alternative [25]: there are few reported toxic effects; however, it has been associated with precipitation of gall stone formation.

[89] There is increasing resistance to amoxicillin, for ill children with suspected gram negative septicaemia so that for the child with severe sepsis cefotaxime and/or ciprofloxacin would be more reliable (sensitivity in Kenya is: amoxicillin 28%, cefotaxime 95% and ciprofloxacin 99% [13]) However, these latter drugs are substantially more expensive and should be reserved for children with very severe sepsis.

[90] Peak blood concentrations after a standard dose of chloramphenicol in the malnourished are twice those in normal children. Plasma clearance is prolonged [26-29] (in one study 30h in malnutrition as opposed to 12h in normal children [29]), thus the dose should be reduced by at least half in severe malnutrition and given twice daily instead of three times daily.

[91] Where it is available and can be afforded ciprofloxacin is particularly recommended for very severe infections such as septic shock or septicaemia (it use is particularly recommended where there is increased resistance to amoxicillin or where there has been no sensitivity testing and amoxicillin if freely available in the market) [14].

[92] These drugs have cartilage toxicity in children; about 2-3% of children develop joint inflammation after use. For this reason they are not generally indicated in children for less severe infections [30,31]. The use is particularly indicated in salmonella infection (which is particularly prevalent in children with haemaglobinopathies) and severe shigella dysentery.

[93] Malnourished children frequently have oesophageal, gastric and/or colonic candidiasis as well as oral candidiasis. They may have intestinal candidiasis without oral lesions. If more than 20% of the children have oral candidiasis in the IPF then give nystatin routinely to all children with complicated malnutrition whether or not they have lesions in their mouths.

[94] Do not use ketoconazole in these children; there is an unacceptable risk of acute hepatitis (relative risk-228:1 [33]). Likewise itraconazole is also associated with hepatic failure (relative risk 18:1). In 5% of patients treated with fluconazole, transient mild hepatic enzyme elevation is observed. Hepatic failure is reported uncommonly, but does occur – neither its pharmacodynamics nor its safety in severely malnourished children has been assessed.

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.

Table 12: Dosage of Gentamicin, Amoxicillin, Chloramphenicol

Weight range	Gentamicin[95] Dosage once per day	Amoxicillin (50 – 100 mg/kg/d) Dosage – twice per day		Chloramphenicol [26-29] (25mg/kg/d) Dosage – twice per day	
Kg	mg	mg	Cap/tab	mg	Cap/tab
<5kg	5 mg/kg give once daily IM	125 mg * 2	½ cap.*2	-	-
5 – 10		250 mg * 2	1 cap * 2	62.5 mg * 2	1/4 cap * 2
10 – 20		500 mg * 2	2 cap * 2	125 mg * 2	1/2 caps * 2
20 - 35		750 mg * 2	3 cap * 2	250 mg * 2	1 caps * 2
> 35		1000 mg * 2	4 cap * 2	500 mg * 2	2 caps * 2

- The **20mg ampoule (10mg/ml) of gentamicin** should be used. It is very difficult to measure small volumes with the adult (stronger) gentamicin solutions.
- **Chloramphenicol** should never be used in babies less than 3 months of age and with extreme caution in infants less than 6 months of age.
- When **metronidazole** is used for suppression of small bowel overgrowth in the severely malnourished complicated child or the child with kwashiorkor the dose must considerably reduced [16]; its use at standard doses in the malnourished is associated with intra-hepatic cholestasis and liver failure (unpublished)[96]. If it is needed for small-bowel overgrowth not responsive to amoxicillin, amoebiasis or symptomatic giardiasis, then the dose should be ONE third of the usual dose (=10mg/kg/d) because the half live is very prolonged in malnutrition and giving normal doses leads to a steady build up to toxic levels [16,36]. Toxic doses can also cause a serious irreversible encephalopathy [37,38] as well as cholestasis and liver failure.

2. Duration of antibiotic treatment

In-patient care: either continuously until transferred to OTP or every day during Acute-phase + four more days.

3. 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 and not primarily due to sepsis in which IV fluids must be strictly limited).

[95] Gentamicin elimination is prolonged in malnutrition[34] so that once daily administration of 5mg/kg gives adequate blood levels [35] (this prolonged half-life has not been found in all studies). In view of the renal toxicity of gentamicin it is suggested that this does must not be exceeded.

[96] This was at a time when conventional doses were given. The prolonged half-life in malnutrition could have been the cause of the adverse reactions. It is likely that the reduced dose (10-12mg/kg/d) will be safe although this has not been confirmed.

- 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 in conventional hospital settings.
  - They often become colonised with Candida and can give rise to fungal septicaemia.
  - They require fluid or anticoagulants to keep the vein open – but these children have impaired liver function (bleeding tendency) and are very sensitive to fluid overload.
  - They require skilled health persons to insert, re-site and maintain the cannula.
  - 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

Although the National protocol should be followed for asymptomatic malaria in OTP, cases with symptomatic malaria are admitted to in-patient care.

Artemisinin-based anti-malarials are very safe [39] in comparison to other anti-malarials. Combinations with other anti-malarials (ACT) are recommended by the WHO for treating Plasmodium falciparum malaria.

- For uncomplicated malaria Coartem (artemether-lumefantrine) should be the first line of treatment in the severely malnourished using a 6 dose regimen (at 0 and 8 hours then twice daily on each of the following 2 days) [40,41].

- For complicated malaria (e.g. cerebral malaria) children without diarrhoea should be given high dose artemisinin or artesunate suppositories [42]; it the suppository is expelled within two hours the dose should be repeated. For those with diarrhoea, or where suppositories are not available, intramuscular artesunate or artemeter should be given [43,44].

Some of the drugs used in treating malaria are potentially more toxic in the malnourished child than in well-nourished children and should be avoided if possible. Combinations containing amodiaquine should be avoided in the severely malnourished until their safety is confirmed in this group of children[97].

[97] Artesunate plus amodiaquine is widely used, however, amodiaquine was withdrawn for prophylaxis because of its hepatotoxicity [45,46]. In an African trial 6/529 children with uncomplicated malaria (and presumably normal nutritional status) developed mild hepatitis and 1/529 serious hepatitis [47]. Malnourished children already have very abnormal liver function [48] with reduced antioxidant levels and changes in drug metabolising enzymes (cytochromes P450, etc.) which potentially makes them very vulnerable to any hepatotoxic drug.

Do NOT give intravenous infusions of quinine to a severely malnourished case within the first two weeks of treatment[98]. This is frequently part of the National protocol for malaria treatment. The toxic dose of quinine (10mg/l) is very close to the therapeutic dose (5 to 10mg/l) and the elimination half-life is prolonged in severely malnourished children [45,50]. In the severely malnourished quinine can induce prolonged and dangerous hypotension, hypoglycaemia, arrhythmia and cardiac arrest. Quinine is less effective than the artemisinins recommended as first and second line treatments [44].

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

Measles

In in-patients, all children from 9 months without a vaccination card should be given measles vaccine both on admission (and a second dose in week 4th as an outpatient OTP.[99])

Medicines given under specific circumstances only

1. Vitamin A

There is sufficient vitamin A in F75, F100 and RUTF to correct mild vitamin A deficiency; high doses of vitamin A are not required in the child without clinical signs of deficiency and may be dangerous [21,22].

High doses of vitamin A are only given to severely malnourished children under the following circumstances[100]:

- Where the child has any clinical signs of vitamin A deficiency.
- In children over 9 months, where there is an active measles epidemic and the child has not been vaccinated against measles.

The dose regimen is given in the table below:

Table 13: 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 (200,000IU = 60,000ug)

[98] Review of the records described in Grellety [49] shows that 90% of children that received intravenous quinine died.

[99] 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. The second dose (week 4 dose) is given to provoke protective antibodies.

[100] This is a change in policy. There is an increased mortality in oedematous children and an increase in nosocomial infections in marasmic children who are given high doses of vitamin A on admission [21,22]. Furthermore the increase in plasma vitamin A may be as great with low and high doses of vitamin A [51]. The levels of retinol binding protein are very low in the malnourished child. There are significant changes in plasma vitamin A levels in children who have clinical vitamin A deficiency [52,53]; however, the treatment of severe clinical vitamin A deficiency with massive doses vitamin A in the malnourished child is often ineffective [54] and the response appears to be determined more by improvement of the entire diet and recover of liver function [54]. Nevertheless, it is prudent at the present time to give a vitamin A dose to children with clinical eye signs as well as the improved diet until further evidence is available and the findings have been confirmed.

2. Folic acid

There is sufficient folic acid in F75, F100 and RUTF to treat mild folate deficiency[101].
However, all children who have clinical anaemia should be given one single dose of folic acid (5mg) on the day of admission.

3. Antihelminthics[102]

It is safe to delay treatment with antihelminthics until the patient is admitted to OTP; all patients over one year in OTP are treated for intestinal worms[103].

4. Other nutrients

The F75 (and F100, F100 diluted, RUTF) already contains all the 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 do NOT give additional zinc as this can increase mortality [10].

Iron should never be given to the severely malnourished in-patient even if the child is anaemic [18,55-58]. RUTF contains modest, but adequate, amounts of iron, and even if it is used only in transition-phase and recovery-phase, additional iron should not be given.

Table 14: Summary table of systematic treatment of patients (table to be reviewed based on previous changes)

Systematic treatment	Direct admission only to in-patient (Acute-phase- IPF)
Amoxicillin	- Every day in Acute-phase + 4 more days in Transition or until transfer to OTP
Malaria	- Coartem (artemether-lumefantrine)
Measles vaccine from (9 months)	- 1 vaccine at admission if no card (second will be given in OTP)

Surveillance

- Weight is measured, entered and plotted on the multi-chart each day[104].
- The degree of oedema (0 to +++) is assessed each day.
- Body temperature is measured twice per day.

[101] 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.

[102] It is important to keep the number of drugs given to the severely malnourished to a minimum. Most drugs affect appetite, furthermore any drug which potentially affects the level of consciousness (anti-emetics for example), crosses the blood-brain barrier, or causes nausea should be avoided. The appropriate dose of most drugs has not been determined in malnourished children and even standard doses can be toxic because of changes in drug metabolism.

[103] Where systemic helminths are suspected (e.g. stronglydoides, filariasis, schistosomiasis etc), particularly in older or HIV positive patients, then the appropriate antihelminthics treatment should be given in the acute phase.

[104] Length or Height is also taken after 21 days for those few children who remain as in-patients for the recovery phase

- 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.
- 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.

ALL 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 facility – 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 Acute-Phase to Transition Phase

The criteria to progress from Acute-phase 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[105] as the oedema starts to subside).

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

[105] And the child appears to be clinically recovering (i.e. loss of weight in oedematous children is not due to inadequate dietary intake or deterioration.

Treatment of Complications

The following complications are the most common complications and that have specific medical treatment, different from a "normal child" because of severe malnutrition.

We must restrict the numbers and types of drugs given to these malnourished children (their liver and kidney function is compromised as is their blood-brain barrier) - if the drug is not in the protocol then DO NOT GIVE IT without first checking with an expert in severe malnutrition metabolism - do NOT rely on what it says in standard text-books or documents that are produced for treating sick children with otherwise normal physiological function.

When a patient develops a complication, **always** transfer him/her to Acute-phase for treatment (in-patients are transferred back to acute-phase if they are in transition phase and out-patients are referred to facility based treatment if appropriate transport is available and the in-patient facility is within a reasonable distance of the health centre/OTP site).

1. 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 severely malnourished 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; those in transition phase may not be changed back to the acute phase.

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.

Once excess sodium has been given, either because of a mistaken diagnosis or over enthusiastic rehydration in the emergency department, it is very difficult to get the sodium back out of the child. When the F75 diet is given and cell membrane function returns towards normal, large amounts of sodium start to come out of the cells (and potassium enters the cells), this leads to 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 death in the IPF or paediatric ward several days later as the therapeutic diets induce electrolyte movement in and out of the cells. This is much more serious in the oedematous child because there is simultaneous movement of the oedema fluid into the vascular space.

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 be prepared to revise 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![106]

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

- Marasmic eyes are normally sunken[107] without there being any dehydration.

Do NOT diagnose dehydration in malnourished patients because they have sunken eyes.

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 than slight dehydration. On the other hand truly dehydrated children must be appropriately rehydrated if they are to survive.

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.
- Absence of visible "full" superficial veins (look at the head, neck and limbs).
- The child must not have any oedema[108].

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 the signs of shock in the severely malnourished child.

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[106] In dehydration the skin is inelastic because of acute loss of salt and water from 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.

[107] The orbit contains an eye, small muscles and nerves, fat, the lachrymal gland and a venous plexus. In marasmus the fat and lachrymal gland atrophies 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. The degree of sinking is usually greater in marasmus than in dehydration because the volume of blood in the venous plexus is less than the volume of the fat and lachrymal gland; thus, the marasmic child frequently appears to be "very dehydrated" when there is no dehydration.

[108] 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 [59]. This should not be treated with ReSoMal or an IV infusion.

In particular, 1) toxic shock[109], 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; on the other hand, failure to treat dehydration because the clinician thinks that the shock is due to some other cause also leads to death.

Treatment of dehydration in the marasmic patient

Whenever possible, a dehydrated patient with severe malnutrition should be re-hydrated orally. Intravenous infusions are dangerous and not recommended unless there is a) severe shock with b) loss of consciousness from c) 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[110]. The basin hangs close to the ground and is easily cleaned (see picture in annex 3). 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 pulse rate
- RECORD the capillary refill time (of the nail bed) in seconds.
- RECORD the heart sounds (presence or absence of gallop rhythm)

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 the re-hydration fluid "ReSoMal" 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 10ml/kg/h for the first two hours orally or by naso-gastric tube (2% body weight), and then adjust according to the weight changes observed. Weigh the child each hour and assess his/her liver size, respiration rate, capillary refill time and pulse.

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[109] Toxic shock may be caused by bacterial toxins, 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. Severe infections are frequently also associated with liver failure and further compromise of cardiac function.

[110] 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.

- 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[111]. 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.

- 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 <u>at two hours</u>:

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.
  - 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 cautiously with the treatment until the appropriate weight gain has been achieved.
  - Either alternate F75 and ReSoMal or continue with ReSoMal alone.
- *Resolution of the signs of dehydration*,
  - stop all re-hydration treatment and start the child on F75 diet.

<u>TARGET WEIGHT for rehydration with watery diarrhoea</u>

1. If the child has been under treatment for SAM and there is a pre-diarrhoeal weight that has been recorded before the diarrhoea starts:
   - if there has been no weight loss with the diarrhoea then the child is NOT dehydrated and no rehydration treatment should be given.
   - if there has been weight loss, the actual fluid loss is equal to the weight loss and the target rehydration-weight is the pre-diarrhoeal weight. Treatment should not be given to

[111] The average weight of a stool in malnourished children 6 to 24months of age with watery diarrhoea is 32g±5g. The objective is only to replace what is being lost and not to change the overall fluid balance of the child.

increase the weight beyond the pre-diarrhoeal weight. "Prophylactic" administration of ReSoMal to prevent recurrence of dehydration is never given.

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 as all the clinical signs are unreliable. 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 malnourished children[112].
    - 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. (15mg/kg is 1.5% of body weight, so the expected weight gain after 2 hours is from 0% up to 3% of body weight)

[112] This is a "balance of risks", if the child is not in danger of death from dehydration then it is safe to proceed cautiously and avoid the danger of fluid overload and heart failure, either immediately, or later when the diet-induced electrolyte movements occur. This was not such a major danger previously when the diets used (e.g. high energy milk, etc.) did not repair the cell membranes or mobilise oedema rapidly. With modern diets there are usually profound electrolyte movements during the early phase of recovery.

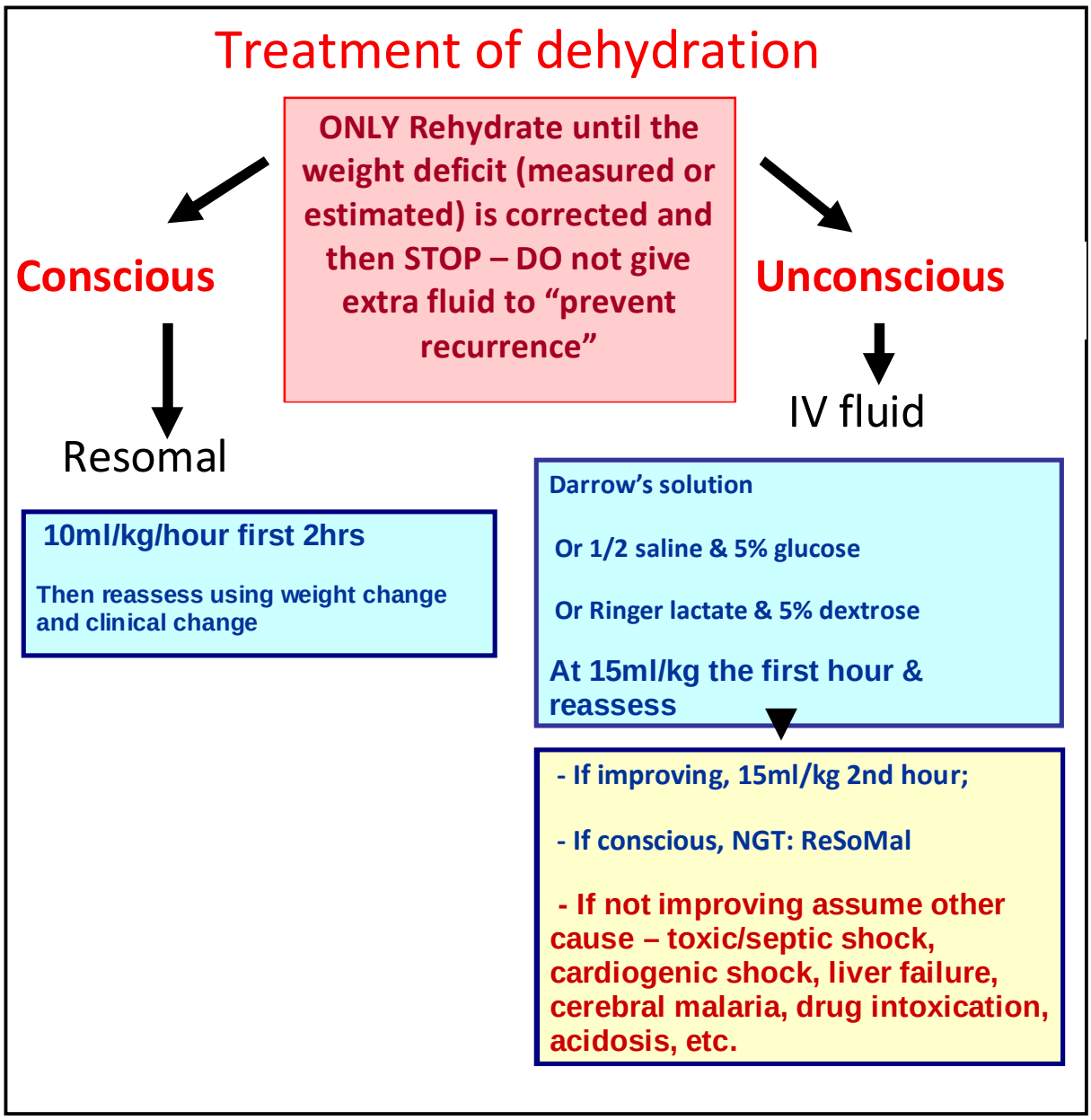
- If there is no improvement and the child has gained weight, then assume that the child has toxic, septic or cardiogenic shock or liver failure. Stop rehydration treatment. Search for other causes of loss of consciousness.
- As soon as the child regains consciousness or the pulse rate drops towards 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; continue to use 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.

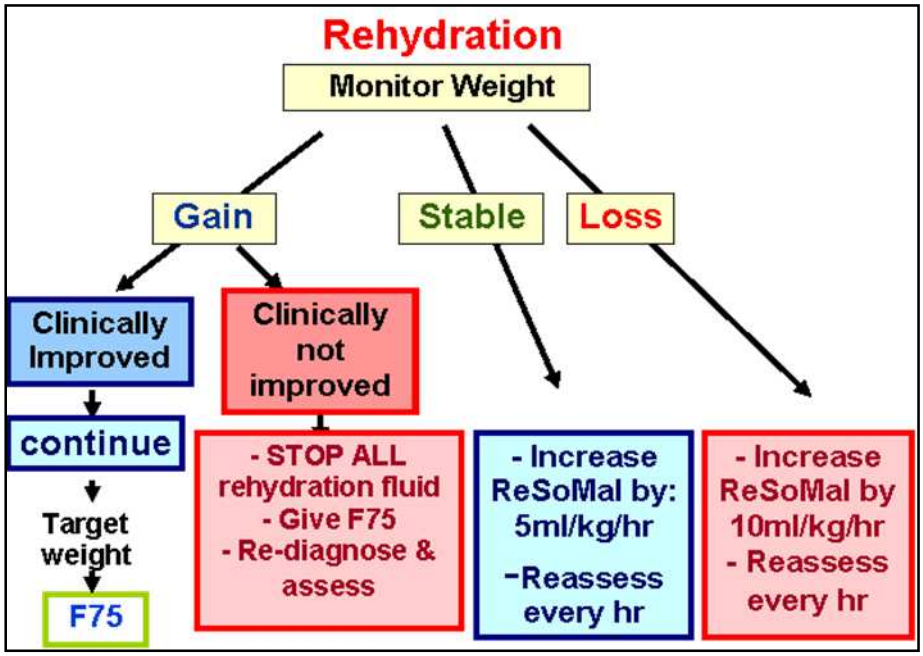
Monitoring of rehydration

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.


Treatment of dehydration
ONLY Rehydrate until the weight deficit (measured or estimated) is corrected and then STOP – DO not give extra fluid to "prevent recurrence"
Conscious
Unconscious
Resomal
IV fluid
10ml/kg/hour first 2hrs
Then reassess using weight change and clinical change
Darrow's solution
Or 1/2 saline & 5% glucose
Or Ringer lactate & 5% dextrose
At 15ml/kg the first hour & reassess
- If improving, 15ml/kg 2nd hour;
- If conscious, NGT: ReSoMal
- If not improving assume other cause – toxic/septic shock, cardiogenic shock, liver failure, cerebral malaria, drug intoxication, acidosis, etc.



Diarrhoea in the oedematous (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 with the fluid in the "wrong place". The hypovolaemia (relatively low circulating blood volume) is due to a dilatation of the blood vessels and 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.

Persistent or chronic diarrhoea

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. The appropriate treatment of persistent diarrhoea is nutritional; it is most often due to nutrient deficiency and will resolve with F75 and suppression of small bowel bacterial overgrowth.

Re-feeding diarrhoea after admission

The intestine of the malnourished child is atrophic and the capacity to absorb large amounts of carbohydrate is limited; there is also frequently pancreatic atrophy so that carbohydrate, fat and protein digestion is compromised. When the child starts on F75[113] there is often an increase in the stool output and it becomes less formed. There is not usually a loss of weight so that the child is not dehydrated and the child should not be given ReSoMal[114] for simple "re-feeding diarrhoea" without weight loss[115]. Re-feeding diarrhoea appears to be more common in children with oedematous malnutrition.

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[113] There are some (inappropriate) recipes for F75 that contain only dried skim milk, oil, CMV and sugar. The high sugar content makes the diet made from these recipes hyperosmolar and the excess sugar can then cause osmotic diarrhoea; the staff then treat this osmotic diarrhoea with ReSoMal. Commercial F75 has much of the sugar replaced by dextromaltose so

- The appropriate treatment is to change the dietary regimen because it is the diet that is the cause of the diarrhoea. Usually, the diarrhoea can be ignored, as the amoxicillin suppresses the small bowel overgrowth and the intestine repairs with the improved nutrition in F75 so that osmotic diarrhoea subsides after a few days. If this does not suffice or there is weight loss then dividing the diet into many feeds, each smaller so that they do not overwhelm the limited capacity for digestion and absorption. This is the main indication for feeding overnight that is all that is required.

For a few children this is insufficient as the intestine or pancreas is sufficiently damaged that even small amounts of F75 can provoke osmotic diarrhoea initially.

- One strategy is to add pancreatic enzymes directly to the feed just before it is given. These are available commercially and are used to treat children with pancreatic insufficiency due to cystic fibrosis –the same dose is used for the severely malnourished child as those with cystic fibrosis. These preparations contain enzymes to digest fat and protein as well as carbohydrate. The enzymes can be withdrawn after a few days as the nutritional state of the child improves and the pancreas recovers. Nearly all children with SAM have some degree of pancreatic atrophy, however, there appears to be regional differences in the degree of pancreatic atrophy seem in SAM children [60] so that the order in which these strategies are applied will depend upon local experience.

- The diet can be changed to one where the F75 is fermented or based upon yoghurt instead of unfermented milk [61,62]. In this case the diet will have to be prepared locally as there is no commercial preparation. This removes lactose from the diet. However, the amount of lactose in F75[116] is very small and unlikely to overwhelm the absorptive capacity even in children with lactase deficiency.

The diet can be changed to one based upon goat's milk or eggs (see annex 15 for recipes).

2. HYPERNATRAEMIC DEHYDRATION[117]

Hypernatraemic dehydration is common in areas with a low relative humidity (dry atmosphere) particularly if there is also a high temperature[118]. It is most often 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. It can also occur if solutions high in sodium (or other osmolyte that is not metabolised) are given so that when the water is lost the osmotically active solute remains in the body. In areas where bottle feeding is common, mothers frequently over-concentrate the infant

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that it is much less likely to cause osmotic diarrhoea. If F75 is to be prepared in the facility then the recipes containing starch (particularly rice starch) should be used (if possible with the addition of some germinated grain flour to add amylase which reduces the viscosity).

[114] The stool composition with "osmotic diarrhoea" is different from infective diarrhoea. With osmotic diarrhoea the unabsorbed sugar is largely responsible for the increased stool output which thus contains much less sodium than with infective diarrhoea. The aim of treatment is always to replace losses so the electrolyte composition of the fluids used in treatment should match that of the stool – ReSoMal or ORS are inappropriate treatments for osmotic diarrhoea. The management is to change the diet that is provoking the diarrhoea.

[115] If there is weight loss then the diarrhoea can also be due to a nosocomial infection.

[116] F100 and RUTF have several time greater lactose than F75 (F75 = 1.3g/100ml, F100 = 4.2g/100ml); it is more likely that the mal-absorption of sucrose is responsible for the osmotic diarrhoea (7g/100ml)

[117] 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 with compromised renal function or glucose in patients with glucose intolerance. In the SAM patient the hyperosmolarity is normally sodium and chloride.

[118] 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.

formula[119]; 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. Apart from bacterial contamination, this is a reason why mothers should not be allowed to reconstitute F75 or F100, and formula feeding should be so strongly discouraged. 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[120]. 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 cerebral oedema (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.

Note: *in desert areas where the humidity is very low and the day-time temperature is very high ALL the children must be given water to drink at frequent intervals. If F100 is used in transition phase and recovery phase, then it should be further diluted and the intake table adjusted for the additional volume required to be given at each feed.*

Diagnosis

The first sign to appear is a change in the texture and feel of the skin. It develops plasticity similar to the feel of dough (flour and water mixed for bread making). The eyes can sink somewhat. The abdomen frequently then becomes flat and may progress to become progressively sunken and wrinkled (so called “scaphoid abdomen” or “prune belly”). The child may then develop a low-grade fever if there is insufficient water evaporation to excrete the heat generated during normal metabolism. The child becomes progressively drowsy and then unconscious. Convulsions follow and if treatment for hypernatraemia is not instituted this leads to death. The convulsions are not responsive to the normal anti-convulsants (phenoparbitone, diazepam etc.). Failure to control convulsions with anti-convulsants may be the first indication of the underlying diagnosis[121].

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 insipient 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 of 10% sugar-water in sips (little by little) 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[122]. The child should not drink very large amounts of water rapidly.

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[119] 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.

[120] This is the same mechanism that occurs in diabetic coma, where the osmolyte in the extracellular fluid causing hyperosmolar coma is glucose and not sodium: the same care has to be taken with hypernatraemia as with diabetic coma.

[121] In desert areas, such as the Sahel, the major differential diagnosis is meningitis/ encephalitis. Frequently, children with hypernatraemic dehydration are misdiagnosed and treated with antibiotics without confirming the diagnosis of meningitis.

[122] This in most likely to occur In-Patients that have been carried for long distances to the clinic/OTP in the sun, without the mother stopping to rest or give the child something to drink. It is important that those arriving at clinics, OTP etc. are given water/sugar-water to drink on arrival and not to be kept waiting to be seen without shade.

- 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, t**o 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 48h to correct hypernatraemic dehydration. The treatment should start slowly and as the serum sodium approaches normality, the rate of repletion can be increased.

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.

Progress is assessed by serial weighting of the child.

- **First**, put the child in a relatively humid, thermo-neutral (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[123].
- 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[124] 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[125]. Do not give F75 at this stage as it gives a renal solute load (mainly as potassium). Never give F100 or infant formula. Expressed breast milk can be safely given and is the best "rehydrating" fluid if available.

- **Reweigh the child every 2 hours**.
  - If the weight is static or there is continuing weight loss, recheck the immediate environment to try to prevent on-going water losses. Then increase the amount of sugar-water intake to compensate for the on-going weight loss (calculated as g/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.

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[123] 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)[63]. It is critical to prevent this on-going 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 faction of the requirements for replacing on-going 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.

[124] 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/day 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/day = 2.5ml/kg/hour.

[125] 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 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.

3. SEPTIC (OR TOXIC) SHOCK

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

Children that appear "very ill", may have septic shock[126], hypernatraemic dehydration, cardiogenic shock, liver failure, or toxic shock from poisoning with traditional medicines or overdose of therapeutic drugs, aspirin poisoning, 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.

Children with septic shock normally present with very severe illness, if the condition develops **after admission** then it is more likely to be cardiogenic shock, or an adverse reaction to the treatment that is being given.

If the child deteriorates after admission to the in-patient facility, then:

- Review the treatment given to the child to determine if the treatment is the cause of the clinical deterioration.
- Review the fluid (sodium) intake, particularly any treatment given in the emergency ward during admission
- Examine the daily weight changes as this may indicate cardiogenic shock; do not diagnose septic shock in a very ill child if there has been weight gain during the preceding 24h.
- Stop any drugs being given that are not included in the protocol
- Check the dose of drugs given to ensure that they have been adjusted for the malnourished state.

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

The main treatment of septic shock is to give antibiotics active against the infecting organism. This is normally unknown; there are rarely any localising signs in the severely malnourished child, indeed autopsy studies show that they normally have up to 4 different systemic pathogens. Unless there are

[126] Disseminated viral infections that will not respond to antibiotics are often present in the children who die despite optimum treatment [11,64,65]. Trials of modern anti-viral agents have not been assessed in complicated severe malnutrition. The facilities to make the diagnosis ante-mortem are not normally present.

definite indications of a focus of infection (e.g. example chest x-ray shows staphylococcal abscesses or TB) broad spectrum antibiotics should be given. Most children with septic shock have enteric, gram negative bacteria that have translocated from the intestinal tract. Those with haemoglobinopathies (e.g. sickle cell disease) often have salmonella septicaemia.

The principles of treatment is then to maintain the patient in as stable a condition as possible whilst the antibiotics start to work, whilst preventing hypothermia and hypoglycaemia, maintaining fluid balance and giving basic nutrition with F75 to address any major nutritional deficiency.

All patients with septic shock should immediately be:

1. Given broad-spectrum antibiotics[127]

- **Ceftriaxone** by SLOW IV injection once per day (100mg/kg/d on the first day, followed by 50mg/kg/d on subsequent days)

AND

- **Gentamicin** 5 mg/kg/day by 1 injection IM

- If there are extensive open skin lesions or signs suggestive of pulmonary abscesses add Cloxacillin IV: Children: 100mg/kg/d by 3 injections every 8 hours

- If there is no improvement in 24h then:
  - add Ciprofloxacin orally 15-30mg/kg/d in 2 doses
  - add Fluconazole: orally 3mg/kg/d once daily (in areas of high HIV prevalence, where there is oral candidiasis or where the prevalence of candidiasis is >20% add at the start of treatment)

2. Kept warm to prevent or treat hypothermia.
3. Given sugar-water by mouth or naso-gastric tube as soon as the diagnosis is made (to prevent hypoglycaemia).
4. Physically disturb the patient as little as possible (no washing, excess examination, investigations in other departments, etc.).
5. **Not be transported to another facility** unless there are proper facilities to safely transport the patient. **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[128], if there are gastric residue aspirated from the NG-tube, start with half the recommended quantity of F75 until there are no gastric aspirates.

[127] The levels of amoxicillin/ampicillin resistance of enteric gram negative bacteria in many countries is over 70% [13,14]; where the child is severely ill with septicaemia/septic shock, it is unwise to wait for 24h or more using amoxicillin to see if there will be an improvement. It is difficult to retrieve the situation if the child deteriorates over the fist 24h by a change in antibiotics.

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)[129]:

- 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 by NG-tube.

4. ABSENT BOWEL SOUNDS, GASTRIC DILATATION AND INTESTINAL SPLASH WITH ABDOMINAL DISTENSION.

There is a functional ileus with bacterial overgrowth similar to that with intestinal obstruction. The stomach is not emptying, there is no peristalsis and fluid is gathering in the intestinal lumen. **These are very grave signs and the mother should be warned that the prognosis is not good.**

The following measures should be taken:

- Give first and second line antibiotic treatment by intra-muscular injection.
- Consider adding third line antibiotics
- If metronidazole is given then do not exceed a dose of 10mg/kg/d.
- STOP all other drugs that may be causing toxicity
- Give a single IM injection of magnesium sulphate (2ml of 50% solution) and repeat twice daily until stool is passed and gastric aspirated drop.
- Pass an NG-tube and aspirate the contents of the stomach, then:

1. "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.

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[128] It may seem that "aggressive" treatment is warranted to prevent further deterioration, this is unwise. These patients are very fragile and do not tolerate sudden changes – the treatment has to be gentle and gradual. The idea is to "hold" the patient stable with minimum stress to their "milieu interior" until the antibiotics and nutrients start to work.

[129] There is no evidence that albumin infusion lowers morality (relative risk of death with albumin 1.04 (0.95-1.13)) in neonates or adults [66,67]. Very conservative fluid therapy is advised for septic patients who are not in shock [68] and slow cautious fluid therapy for those who are in severe shock; there is nearly always an element of compromised cardiac function in severely septic children. If blood pressure is being measured it should only be raised to 65mm/hg.

2. 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: put oral **nystatin suspension or fluconazole** down the NG-tube.
- Keep the child warm.
- These children are usually unconsciousness, semiconscious or delirious: give intravenous glucose (see section on hypoglycaemia).

Monitoring:

- **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 F75 – table. Aspirate the stomach before each feed. If the volume of residual feed remaining is large, then decrease the amount of F75. If the amount of aspirate is small then the amount can be gradually increased.

- 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.

5. HEART FAILURE

Signs and symptoms

Heart failure should be diagnosed when there is:

- Physical deterioration with a gain in weight[130]
  - this is the most common way of making the diagnosis and does not require any equipment or particular clinical skill
- An increase in respiration rate with weight gain

[130] As heart failure is rare on admission there should be an admission weight, so that weight change can be determined Weight gain in this context is almost always due to fluid retention – the ill child does not ingest sufficient food for the weight gain to be normal tissue gain, and the amount of weight gained is normally more than expected from the energy intake. Even if the full amount of prescribed F75 is taken there should not be any weight gained because of new tissue synthesis so that weight gain is NOT expected in the acute phase of treatment.

- an acute increase in respiration rate of more than 5 breaths per minute (particularly during rehydration treatment)
- > 50 breaths/minute in infants
- >40 in children 1-5 years

- A sudden increase in liver size (this is why the liver is marked before starting any infusion)
- Tenderness developing over the liver
- 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 or haematocrit [131] (needs laboratory, but measures quite accurately the degree of expansion of the intravascular volume)

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.

The cause is an excessive intake of sodium [69-71], either from the diet, from rehydration fluids or from drugs[132]; even with sodium restriction [71] there may still be heart failure due to the residual sodium in the diet [72][133]. With treatment there sodium moves quite rapidly from inside the cells to the extracellular and intravascular space[134].

There is usually also weight gain[135]. As heart failure usually starts after (and due to) treatment, there is nearly always a record of the weight of the patient that was taken before the onset of heart failure.

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[131] 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 mobilisation of oedema – it must not be treated. Transfusions as the circulating volume is expanding sufficiently to drop the Hb usually precipitate acute heart failure and death. In one series where Hb was being monitored during treatment and a fall in Hb treated with transfusion, 20 of 22 children died within 12 hours of the end of the transfusion (unpublished) – see section on anaemia.

[132] Many drugs, for example the penicillin's, are formulated as the sodium salt of the active ingredient. Anti-acid preparations must never be given to malnourished children, they all contain considerable amount of sodium bicarbonate.

[133] The problem of heart failure in malnourished children may be particularly acute in areas where there is selenium deficiency [73]. In some areas well-water is sufficiently high in sodium to induce heart failure in the patients (pers commun, Saskia van der Kam, MSF-H).

[134] The electrolyte abnormality in kwashiorkor is due to "leakiness" of the cell membranes. This is probably due to oxidation and loss of glutathione from the cells [74]. There is also a reduction in glutathione in HIV/AIDS [75]; **therefore it is likely that there is a synergism between severe malnutrition and HIV infection making the control of sodium intake particularly important and induced heart failure during early treatment more common and severe.** This could partly account for the increased mortality reported from areas with a high HIV prevalence.

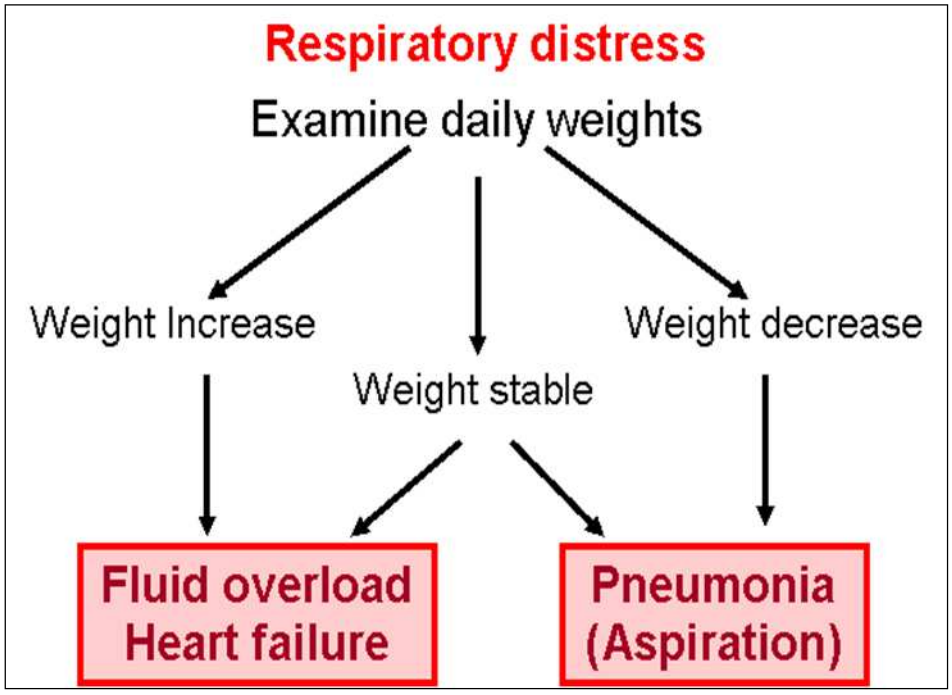
[135] In a study of 11,000 malnourished children, there was weight gain just prior to death in most children that died. The implication is that the commonest cause of death in these children was heart failure [49].

- 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 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[136].

During the initial treatment of SAM, any sodium containing fluid that has been given previously 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**. F75 is a low sodium diet. A common unexpected source of sodium is sharing of the mother's food. Caretakers should always take their food away from the patient.

As oedema fluid is mobilised (kwashiorkor) and the sodium is coming out of the cells (both kwashiorkor and marasmus), the plasma volume expands but the volume of red cells remains constant so that 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 or 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[137]. Small amounts of sugar-water can be given orally to prevent hypoglycaemia.

[136] Occasionally, children with a good appetite can "eat themselves into heart failure" or, more commonly sudden death. At autopsy they all have grossly dilated hearts.

- Give furosemide (1mg/kg)[138].
- 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)[139].

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 incompatibility.

6. HYPOTHERMIA

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

- The room should be kept warm, especially at night (the thermo-neutral temperature for malnourished is from 28°C and 32°C)[140]. Windows and doors should be kept closed at night. A maximum-minimum thermometer should be on the wall (at least in the nutrition ward) to monitor the temperature.
- The children should be in adult beds and sleep with their mothers[141]. There should be adequate blankets.
- Warming is by the "kangaroo technique" for children with a caretaker: the child is placed on the chest of the mother skin-to-skin and the mother's clothes wrapped around the child.
- Put a hat on the child. Most heat is lost through the head; hats should be worn by malnourished children.
- Give hot drinks to the mother so her skin gets warmer[142] (plain water, tea or any other hot drink).
- Monitor body temperature during re-warming.

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[137] 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 disequilibrium syndrome. Of course the sodium will need to be excreted from the cells during further treatment, but treatment should proceed much more slowly and cautiously in any patient that has had an episode of heart failure.

[138] Loop and other diuretics do not work in many of the children. Diuretics are given because it works 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. They should not be given if there is insufficient magnesium or potassium in the diet: there is ample Mg and K in F75. It is relatively ineffective in patients with hyponatraemia and may itself exacerbate hyponatraemia.

[139] Other drugs (*Angiotensin converting enzyme inhibitors, Angiotensin receptor blockers, etc)* have not been assessed in heart failure associated with SAM [76].

[140] Although the thermo-neutral temperature for malnourished patients is 28°C to 32°C, this is often uncomfortably warm for the staff and caretakers who tend to adjust the room to suit themselves; they are well-nourished, clothed and active whereas the patient is malnourished, with a low metabolic rate, and inactive.

[141] This facilitates breast feeding, bonding and keeps the child warm. The mother also gets some rest so that she is more capable of caring for her child, understanding information, making decisions and less likely to default. The beds should be low-to-the-ground so that children can get onto them unaided, are not frightened when they look over the edge and do not hurt themselves if they fall. Mattresses on the floor are often the best, even if the hospital authorities are conventional. This is how many poor people normally rest. The hospital environment should be as close as possible to a home in paediatrics. Normal high beds and caged cots are for the convenience of the staff – they do not have to bend to examine the patient and it is easy to give medicine: they are designed for the staff and not for the patient.

[142] HOT drinks physiologically increase the skin blood flow of the mother and increase the rate of heat transfer from the mother to the child. The drinks should be as hot as the mother can tolerate. The cooling effect of increased cutaneous blood flow on the core temperature is why it is traditional to give very hot tea in desert areas.

⇘ Treat for hypoglycaemia and give second-line antibiotic treatment.

7. FEVER

The malnourished child has a diminished or even absent inflammatory response and very poor temperature regulation. If the children are in a warm environment their body temperature rises because they do not sweat sufficiently[143]. During a hot day when the environmental temperature is above the thermo-neutral range of 28℃ to 32℃ most of the children will develop "fever". They can also develop fever because they are wrapped in blankets during the day. Children, who cannot "excrete" heat because they do not sweat, will remain febrile unless heat is withdrawn from the body.

Malnourished children do not respond to anti-pyretics. Because they fail to work, caretakers and staff often repeat the dosage inappropriately[144], frequently leading to toxicity. Antipyretics are much more likely to be toxic in the malnourished than a normal child. Aspirin should never be used [79] in these situations.

Paracetamol should not be used in the severely malnourished child. Not only should it not be given because it does not work, overdose with paracetamol is the commonest cause of acute hepatic failure in children [33] and 2% of children with an overdose show nephrotoxicity [80], the antidote is sulphydryl containing drugs – it is precisely these same compounds that are universally reduced in oedematous malnutrition making toxicity much more likely [81]. Furthermore, the half-life of paracetamol is greatly prolonged in malnutrition [82] so that repeated standard doses will lead to high blood concentrations making toxicity more likely even in the absence of liver abnormality. Currently paracetamol is dispensed in large quantities for either fever or a history of fever from the mother; this is because it is deemed to be exceptionally safe by the staff.

Moderate fevers, up to 38.5℃, do not need to be treated actively. These children should have blankets, any hat and most clothes removed, and kept in the shade in a well-ventilated area. They should be given water to drink. They should be checked for malarial parasites.

Fevers of over 39℃, where there is the possibility of hyperpyrexia developing, should be slowly cooled.

- Placing a damp/wet room-temperature cloth over the child's scalp, re-dampen the cloth whenever it is dry
- Put the child in a ventilated area or fan the child[145].
- The rate of fall of body temperature must be monitored and when it is below 38℃ active cooling should STOP. There is a great danger of inducing hypothermia with aggressive cooling.
- Give the child abundant water to drink

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[143] The core temperature of children exposed to an environment of 38°C rose by 0.75°C per hour – they all developed fever, whereas the recovered children did not [77]. When the air temperature is at or above body temperature, heat will be **gained** by conduction, convection and radiation, the only way that metabolic heat (about 100kcal/kg/d) can be lost is by evaporation. In these circumstances no drugs or physiological change will reduce the body temperature.

[144] Ninety per cent of children admitted with malaria have aspirin measureable in their blood, 20% have received more than the recommended dose and about 5% have acute aspirin poisoning as the cause of coma rather than cerebral malaria [78]. Furthermore, because they induce nitric oxide salicylates may exacerbate malaria and other conditions provoking a strong nitric oxide response [79] and should not be given to febrile children in malaria's areas.

[145] If the air temperature is above 38°C then the room can be cooled by wetting the walls and "misting" the air with a fine water spray from time to time.

- If the temperature does not decline then the damp/cloth can be extended to cover a larger area of the body.
- STOP active cooling whenever the temperature falls below 38.5℃

8. SEVERE ANAEMIA

Haemoglobin should be measured on admission in any patient that is clinically anaemic[146].

- If the haemoglobin level is above 4g/100ml or the packed-cell volume is above 12% OR if the patient has started treatment with F75 for more than 48 hours (preferably 24 hours) and less than 14 days, then NO treatment is given apart from a dose of folic acid on admission.

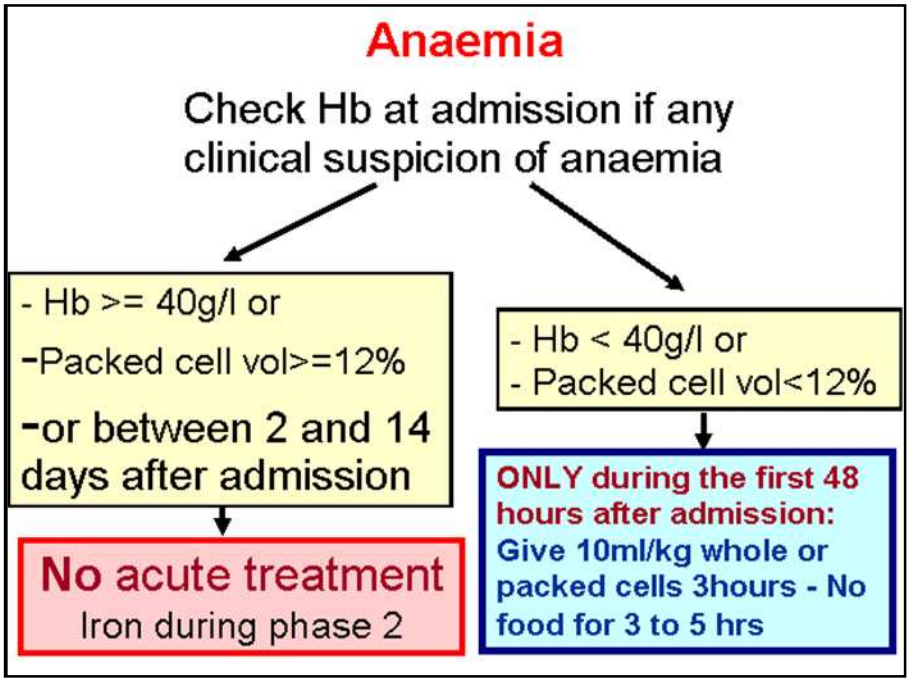
- If the haemoglobin concentration is less than 4g/100ml or the packed-cell volume is less than 12% in the first 24 hours after admission the child has very severe anaemia that should be treated.

- 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 acute-phase 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 a transfusion is necessary during the “black-out” period of 48h to 14 days after starting dietary treatment then it should be by exchange transfusion.

- If there is heart failure with very severe anaemia, and the expertise does not exist locally, then transfer the patient to a centre where there are the facilities and skill to do an exchange transfusion. Heart failure due to anaemia is clinically different from “normal” heart failure – when the failure is due to anaemia alone there is “high output” failure with an over-active circulation, easily felt pulse and heart beat and warm peripheries.

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

[146] Haemoglobin should not be measured subsequently in most circumstances. This is to avoid an untrained person seeing a low haemoglobin level and transfusing the patient during the “black-out” period.



9. HYPOGLYCAEMIA

Severely malnourished patients can develop hypoglycaemia but this is 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; these are signs that the child may have accompanying hypoglycaemia.

The children who develop hypoglycaemia are those that have not taken food for a prolonged period at least 12 hours [83]. If the diet has not been taken during the day the mother should give at least one feed during the night; it is this child who is in danger of developing hypoglycaemia. 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.

- ***Clinical signs***

There are often no signs at all of hypoglycaemia.

Most hypoglycaemic malnourished children do not sweat, have raised hair or go pale: they simply become less responsive and slip into coma; they may present with hypothermia.

One sign of the overactive sympathetic nervous system, which starts before actual hypoglycaemia develops, and is seen in the malnourished child, is **eye-lid retraction**. If a child sleeps with his eyes slightly open, then he should be woken up and given sugar-water or F75 to drink; the mothers and staff should be taught to look for this sign during the night.

- ***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 F75 feeds frequently.

- Unconscious patients should also be given sugar-water by naso-gastric tube. They should then be given glucose as a single intravenous injection (approximately 5ml/kg of a sterile 10% glucose solution[147]).
- 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 (e.g. cerebral malaria, dehydration etc.)

10. 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). For HIV/Aids see separate section.

11. DRUGS

Great care should be exercised in prescribing all 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 (particularly in the brain) and, in kwashiorkor, there may be a defective blood-brain barrier. Those drugs which have been studied (see references) show abnormal pharmacodynamics and metabolism, as Buchanan says "they are even more vulnerable than an ill neonate" [84,85].

Very few drugs have had their pharmacokinetics, metabolism, side effects or major toxicity examined in severely malnourished patients. Drugs that have known side effects in normal children or adults should be used with great caution. Drugs which affect the central nervous system such as anti-emetics, those that affect liver, pancreatic, renal, cardiac or intestinal function adversely and those which cause loss of appetite should not be used, or only used under very special circumstances [86,87].

It is strongly advised that either:

- The malnutrition is treated first, before standard doses of drugs are given. Drugs used for HIV and TB[148] can damage the liver and pancreas. These diseases are not usually rapidly fatal (except military TB and TB meningitis) so treatment should normally be delayed for at least one week whilst the nutritional treatment returns the metabolism of the patient towards normal.
- If it is critical that drugs that are given at the start of treatment for malnutrition have initially reduced doses where the pharmacokinetics are unknown.
- 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 acute phase and can cause serious hepatic damage.
- Drugs can usually be given in standard doses to patients that are in the later stages of treatment in OTP or have lesser degrees of malnutrition.

[147] Do not use the concentrated glucose straight from a vial of 50% glucose – it is very hypertonic and will cause damage and clotting of the vein.

[148] In particular isoniazid, but the other anti-TB drugs are toxic in the malnourished [33,88]

12.Re-feeding syndrome

A rapid increase in the intake of food given to malnourished patients is dangerous (either long standing malnutrition of those who have had minimal intake for more than five days). The patients can develop acute weakness, "floppiness", lethargy, delirium, various neurological symptoms [89], acidosis[90] muscle necrosis, liver and pancreatic failure [91-93], cardiac failure and sudden unexpected death.

- This condition is commonly termed "re-feeding syndrome". There is an extensive literature on re-feeding syndrome in adults and those receiving artificial feeding in developed countries (see references in [94-99]); the syndromes also occur in children [92,100-102]. Although this syndrome is usually unrecognised, even in those with full access to laboratory measurements, a full staff and close patient monitoring and doctors rarely recognise the syndrome or follow established guidelines [103]. The induction of this syndrome is clearly a danger for all those treating the severely malnourished child and clinical awareness is of paramount importance: **all staff should be taught to look for and recognise re-feeding syndromes**.

The syndrome appears to be due to rapid consumption of key nutrients for the metabolism of protein, carbohydrate and lipid as well as the movement of electrolytes between the compartments of the body. There is frequently rapid reduction in plasma phosphorus, potassium and magnesium.

Other problems during re-feeding include re-feeding-oedema[149] and re-feeding-diarrhoea (see separate section).

- The most consistent finding is a rapid reduction in plasma phosphorus. Phosphorus levels are low in SAM children [104] and there is a close relationship between phosphate depletion and death [105,106]. The plasma phosphorus is also related to death during the initiation of treatment of HIV in adults [107]. The induced deficiency results in abnormal energy production in muscle [108] and liver [109]. Although there is adequate potassium and magnesium in F75, phosphorus is a limiting nutrient in F75 (all the phosphorus comes from the dried skimmed milk); thus, it is critical that excess F75 is not given to the children during the acute phase of treatment[150]. F100 and RUTF have adequate phosphorus to support catch-up growth[151]; nevertheless, it is necessary at the start of treatment not to have a sudden jump from the malnourished state to an excess intake[152]. This is the purpose of the transition phase of treatment.

- If there is deterioration during the recovery or transition phase of treatment then the child should be returned to the acute phase.

- For patients that are in the acute phase the diet should be reduced to 50% of the recommended

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[149] The aetiology of re-feeding oedema is unknown; it is probably related to the sodium content of the recovery diets used. It should be noted that the biochemical lesions of kwashiorkor take at least two weeks to recover even if oedema resolved within a few days, so that excess Na intake during this time can lead to re-feeding-oedema. It appears not to carry the same poor prognosis as patients presenting with nutritional oedema. However, if it is common then the application of the protocol should be reviewed. The other patients being treated with the same regimen, who do not safely sequester the additional intake of sodium into oedema fluid and remain oedema-free, are at serious risk of heart failure.

[150] The appropriate level and salt for phosphorus supplementation of F75 has not been determined. There is anecdotal evidence that choice of the wrong salt or dose could be detrimental [104].

[151] Alternative recipes that have reduced amounts of dried skimmed milk are potentially dangerous unless additional phosphorus is added.

[152] Some protocols advocate sudden introduction of intakes as high as 200kcal/kg. It is possible that some of the deaths in OTP are due to caretakers forcing the full ration given in OTP to the malnourished children. Although it would complicate OTP management, it would be sensible to have an initial "transition phase" where the children in OTP were given not more than 130kcal/kg/d for the first one or two weeks of OTP treatment.

intake and gradually increased; judicious supplements of phosphorus[153] could be given if refeeding syndrome is suspected although this has not been studied adequately to make a definitive recommendation.

[153] Most « cola » drinks contain phosphoric acid, which appears to be innocuous.

Severe Acute Malnutrition and HIV/AIDS

The HIV epidemic is affecting most societies in the Developing world. It affects mainly sexually active young adults. These adults are the caretakers 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. Then 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 caretaker 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 grandchildren without obvious means of support it may not be possible for the grandmother to give special care to the malnourished child; in others the household is headed by a child, normally an older sibling. 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 initially (not necessarily a hospital), some need to be cared for in special programmes or facilities using the OTP protocol.

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.
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.

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 slightly higher mortality. 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; exactly the same protocol is used (both in and out-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. Such side effects lead to withdrawal of many of the patients from the ARV treatment programmes. Neither TB nor HIV are rapidly fatal illnesses[154]. All antiviral drugs have significant side effects, and their toxicity and

[154] 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 milliary 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.

pharmacokinetics have not been assessed in the severely malnourished child[155]. They particularly affect mitochondrial function [111][156], which is already compromised in the severely malnourished child [109,112]; the degree of dysfunction is related to mortality and any further mitochondrial insult is likely to have serious effects. Furthermore, there is excessive mortality of patients shortly after commencing ART, that appears to be related to nutritional status [107,113]; initiation of ART and other long-term treatment of illnesses that are not immediately lethal should be delayed until the metabolism of the major organs has improved through nutritional therapy. Other drugs used in HIV/AIDS patients with opportunistic infections are particularly toxic to the malnourished patient (e.g. Amphotericin B).

There are also major interactions between ARV drugs and some of the drugs that may be used in severe malnutrition. For example co-artem 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 there is a danger of patients being enrolled in both programmes where either the nutrition team or the staff of other programme is unaware of the potential drug interactions in the malnourished patient; with ARVs then alternative anti-malarial and TB drugs may be indicated.
Rifampicin-isoniazid appears to have a particular hepato-toxicity in the malnourished patient and should be avoided until the nutritional status of the children has improved [114].

- **The treatment of malnutrition should be started at a minimum two weeks 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 the recovery phase is well established in OTP.
  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.
- Once the patient's SAM is being treated satisfactorily and s/he have had adequate amounts of the essential nutrients to resist the toxic effects of the drug treatment HIV and TB, treatment should be started and should follow the national guidelines.
  Children with SAM and TB should not be immediately transferred to a TB centre where they have little experience in treating SAM; the treatment of the SAM takes precedence in view of the respective mortality rates. The treatment of TB can be carried out within the IMAM programme more easily and efficiently than the treatment of SAM at a TB centre.

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 and TB, on an out-patient basis according to this protocol. There should be access to in-patient facilities

[155] In moderately malnourished children in Malawi the pharmacokinetics of Nevirapine is not abnormal. Toxicity was not assessed [110].
[156] The nucleoside reverse transcriptase inhibitors (NRTI) which are the backbone of ART treatment are associated with mitochondrial toxicity in children comparable to children with congenital mitochondrial disorders and NRTI-exposed adults; they may develop serious lactic acidosis, pancreatitis, cardiomyopathy and neuropathy. Children with severe malnutrition already have mitochondrial abnormalities making them much more vulnerable than well-nourished children.

where the complicated cases and those without appetite can undergo acute phase treatment in association with the HIV care and treatment team/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.

FAILURE TO RESPOND to treatment (in-patients)

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 (see separate section on failure to respond) the most common reason for failure is a social problem, although social and psychological reasons can be the case with in-patient care, it is much less likely.

Table 15: Failure to respond for In-Patients

In-Patients	
Criteria for failure to respond	**Time after admission**
Primary failure to respond (acute-phase)	
Failure to improve/regain appetite	Day 4
Failure to start to lose oedema	Day 4
Oedema still present	Day 10
Failure to fulfil the criteria for recovery-phase (OTP)	Day 10
Secondary failure to respond	
Deterioration after admission in the acute phase	At any time

Note that the day of admission is counted as day 0, so that day 1 is the day after admission [115][157].

Usual causes of failure to respond:

Problems with the treatment facility:

- Failure to apply the protocol appropriately
- Poor environment for malnourished children
- Excessively intimidating, strict or cross staff
- Failure to treat the children in a separate area
- Failure to complete the multi-chart correctly
- Insufficient staff (particularly at night)
- poorly trained staff
- Inaccurate weighing machines
- F75 not prepared or given correctly

Problems of individual children:

[157] It is common practice to call the day of admission day 1; this makes date subtraction on the computer incorrect by one day. In fact the day of admission can be anywhere between 0 and 24h. Like other periods of time – for example age – the length of stay etc is measured in completed days.

- A severe medical complication (see section on complications)
- Drug toxicity (see section on drugs)
- Insufficient food given (criteria for NGT not applied)
- Food taken by siblings or caretaker
- Sharing of caretaker's food
- Mal-absorption
- Psychological trauma
- Rumination (and other types of severe psychosocial deprivation)
- Infection, especially: viral infections, bacterial infection resistant to the antibiotics being used, fungal infection, diarrhoea, dysentery, pneumonia, tuberculosis, urinary infection/ Otitis media, malaria, HIV/AIDS, Schistosomiasis/ Leishmaniasis, Hepatitis/ cirrhosis.
- Other serious underlying disease: congenital abnormalities (e.g. Down's syndrome), neurological damage (e.g. cerebral palsy), inborn errors of metabolism.

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 accurately.
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[158]; do a chest x-ray. 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.

Deterioration/regression after having progressed satisfactorily initially is usually due to:

- Electrolyte imbalance with movement of sodium from the cells and an expansion of the circulation to give fluid overload[159] or to re-feeding syndrome.
- Inappropriate dosage of drugs[160], or use of drugs not recommended in the severely malnourished child.
- 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

[158] 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.

[159] This usually occurs 2 to 4 days after admission. It is more likely to occur in a patient who has been treated aggressively for dehydration in the emergency department or on admission.

[160] The half-life of most drugs is prolonged in the severely malnourished child. If standard doses are given, but not eliminated, then the level builds up in the child from day-to-day until toxic levels are reached. Drug regimens should be reviewed or stopped in any patient that deteriorates under care.

is a common cause of pneumonia in all malnourished patients. Patients should be closely observed whist they are being fed by the caretaker to ensure that the correct technique is being used in the acute phase. One of the advantages of RUTF in transition and recovery phases is that it is much less likely to be force fed and inhaled[161].

- an acute infection that has been contracted in the centre from another patient (called a "nosocomial" infection) or 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 [117].
- 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 commercially produced (F100 and RUTF) but may well occur when they are made in the facility or where untried recipes are introduced or sharing of the mother's food (see re-feeding syndrome – phosphorus is often the limiting nutrient unless milk – a rich source of phosphorus – is included in the regimen).
- Sometime parents bring traditional medicines and other treatments into the facility and give them to the child (a sort of "insurance" in their mind to have both modern and traditional treatments).

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).
- The medical staff should systematically go through the common causes and determine if they are affecting the child. This is the main role of the medical staff in treatment of the severely malnourished.

Chronic diseases

Children with chronic diseases (Congenital heart disease, neural tube defects, cerebral palsy, brocho-pulmonary dysplasia, chronic renal failure, etc.) should be admitted in the appropriate paediatric word under the care of the paediatrician and followed by the nutrition team.

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

[161] On the other hand, if it is inhaled peanut containing RUTF it is more dangerous [116]

TRANSITION PHASE

During the Transition Phase, a new diet is introduced: this is normally either RUTF or F100.
This Phase prepares the patient for Recovery-phase treatment as an out-patient. Occasionally the recovery-phase is as an in-patient where there is no appropriate home for the child to go to, or the caretaker chooses to remain in in-patient care (see also the care of the less than 6 month old infant).

The transition phase usually lasts between 1 and 5 days – but may be longer, particularly when there is another pathology (e.g. TB or HIV); a prolonged transition phase is a criterion for failure-to-respond.

1. DIET

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

- It is preferable to use RUTF in the Transition Phase. Those children who have been very ill and are going to continue treatment as out-patients with take-home treatment need to become habituated to RUTF before they go home. The table below gives the total amount of RUTF that should be taken during the day. When the patients are taking the full amount they should be transferred to continue their treatment at home. In the in-patient facility, the full day's amount of RUTF can be given to the mother and the amount taken CHECKED five times during the day: it is important for the nurse/assistant in charge to check regularly.
- Children that are not taking sufficient RUTF are either given F100 for a few days and then RUTF re-introduced or returned to the acute-phase or given F75 to make up the deficit in intake (whichever is most efficient and effective in the circumstances of the IPF). No other food should be given to the patient during this period and the caretaker must still not eat in the same room as the malnourished children. Care must be taken that the caretaker or other children to not consume the patients' RUTF.
- They should be offered as much water to drink as they will take during and after they have taken some of the RUTF. One advantage of the RUTF is that there is no need for surveillance during the night so that minimum night staff is sufficient. There is also no need for the staff to spend time preparing and dispensing liquid feed (F100).
- Some patients initially refuse the RUTF completely. 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.

If RUTF is not available, or the child does not readily take the RUTF (younger children and about 10% of the older children prefer a liquid diet) then:

- Use F100 (130ml = 130kcal). **When F100 is used the number of feeds, their timing and the volume of the diet given remains exactly the same in Transition Phase as it was in Acute-phase**.
- It is made up from one small package (=114g) diluted into 500 ml of water or one large package (=456g) of F100 diluted into 2 litres of water[162].

In all cases, breast-fed children should always get the breast-milk during at least 20 – 30 minutes before RUTF or F100 and on demand.

[162] In previous versions it was recommended that for small volumes the red-scoop is used. However, there is a major difference in the amount of water to add depending upon the compression of F100 powder in the scoop. With uncompressed powder one scoop equals 14 ml of water, and with compressed powder one scoop equals 18ml of water. This variation is too large to make the reconstitution of F100 using the red scoop sufficiently accurate to recommend its use.

Even if the child is going to remain in a facility for recovery-phase, RUTF can be given for transition phase and subsequently; this relieves the burden on the staff of making up feeds frequently. It also means that there does not need to be a kitchen for the in-patient facility; this allows decentralisation of in-patient treatment to day-care (residential or non-residential) facilities at health centre level.

Warning: F100 should **never** be given to be used at home. F100 is always prepared and distributed in an in-patient unit by staff trained in its use. F100 should not be kept in liquid form at room temperature for more than 3 hours before it is consumed, if there is a functioning refrigerator, constant electricity and a very clean kitchen/ utensils, then it can be kept (cold) for up to 8 hours (i.e. overnight). A whole day's amount should never be made up at one time even with adequate refrigeration.

RUTF can be used both in in-patient and out-patient programmes, does not require refrigeration and can be taken straight from the sachet.

Table 16: Look up table for RUTF in Transition Phase per 24h

Class of Weight	Paste	Sachets	BP100	Total
	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 acute-phase. However, this varies between an increment of 10% and 50% depending upon the actual weight of the child and the product used.

There are several products that are currently available:

- RUTF Paste is a manufactured (either locally or imported) anhydrous paste made up of dried skimmed milk, sugar, oil, vitamin & mineral mix and a flavouring - usually peanut butter. It contains about 5.4 kcal/g and is normally available in plastic pots of up to 250g or sachets of

500kcal each weighting 96g. There are currently about 20 different manufactures worldwide[163].

- BP100® is a commercial product of Compact. It comes as compressed bars – each bar provides 300kcal.

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 recovery-phase (i.e. only for children who pass the appetite test and are not complicated).

If both F100 and RUTF are being given they can be substituted on the basis that about 100ml of F100 = 20g of RUTF[164].

Table 17: 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 (see the section on infants less than 6 months)		
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

[163] UNICEF supply division, Copenhagen, inspects the factories where these products are produced and ensures that the specifications conform to those laid down by WHO/UNICEF. It is strongly recommended that only products that conform to these specifications are used. Local manufacture is preferred, but the specifications must be followed exactly – although RUTF appears to be like peanut butter it is very different in its composition.

[164] 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

The table gives the amount of F100 (full strength) that should be offered to the patients in transition phase who are not taking RUTF. They should normally be taking 6 feeds during the day and none at night.

2. ROUTINE MEDICINE

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

3. SURVEILLANCE

The surveillance of Acute-phase 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 mal-absorption.

4. CRITERIA TO MOVE BACK FROM TRANSITION PHASE TO THE ACUTE PHASE

Move the child back to acute-phase:

- If there is a rapid increase in the size of the liver
- If any other signs of fluid overload develop (increased respiratory rate).
- If the patient gains weight more rapidly than 10g/kg/d (this indicated excess fluid retention).
- If tense abdominal distension develops (indicates abnormal peristalsis, small bowel overgrowth and perhaps excess carbohydrate intake)
- If the patient gets significant re-feeding diarrhoea so that there is weight loss (see separate section).[165]
- If a complication arises that necessitates an intravenous infusion (e.g. malaria, dehydration etc.)
- If there is any deterioration in the child's condition (see section on re-feeding syndrome).
- If there is increasing oedema (look for unexpected sodium intake, particularly from mother's diet or drugs – if an extraneous source if sodium is found then it should be eliminated and children with good appetites can remain in transition-phase).
- If a child who does not have oedema develops oedema (look for extraneous intake of sodium)

5. CRITERIA TO PROGRESS FROM TRANSITION PHASE TO OTP

- 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).

[165] 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 acute-phase.

- **Or** 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 ++

↘ For patients that have been in heart failure, shown signs of fluid overload (and those that have had severe septic shock), or have shown signs of re-feeding-syndrome during the acute phase, treatment should go more slowly and they should remain in transition phase until they are eating well with no signs for fluid overload and all the oedema has subsided.

A child that is ready to go to recovery-phase 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 sustained 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-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

PHASE 2 FOR CHILDREN WHO CAN NOT BE TRANSFERRED TO OTP

In some cases (no operational OTP in the area, mother disagrees to go to OTP or not suitable mother, or children refusing RUTF or groundnut intolerance…), the patient will not progress to OTP but will progress to Phase 2 in in-patients care.

If the patient cannot go to OTP, he will stay in inpatients but will receive the same treatments than in OTP (cf. section on OTP). If the beneficiary cannot go to OTP because of groundnut intolerance or because he is refusing RUTF, he will be treated with F100.

1. DIET

Breastfed children should always get breast-milk before they are given F100 or RUTF and on demand.

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

- **F100** (100ml = 100 kcal): 200ml/Kg/day of F100 are given. Five feeds par day of F100 should be given. One porridge **may** be given for patients who are more than 8kg (approximately 24 months of age) but it is not necessary to give it unless the patient asks for it. Alternative recipes of F100 are given in annexe 15.
- **RUTF**: RUTF can be used in both in-patient and out-patient settings.

For in-patients, offer the amount of feed given in the table. The children must NEVER be forced fed. After the feed, always propose an additional quantity of F100/RUTF to the patient, until his appetite is satisfied.

Because RUTF can be kept safely the amount for several feeds can be given to the patient/caretaker 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 18: Amount of F100 or RUTF to give in Phase 2 (In-patients) [1]

Class of weight (kg)	6 feeds/ day		5 feeds/d	
	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

NOTE: **Iron** is added 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: 1000 to 1200ml of F100, dilute one tab of ferrous sulphate (200mg) in 4ml water and add 2ml of the solution.
- For 500ml to 600ml of F100, add 1ml of the solution.
- Alternatively, if there are few children, iron syrup can be given to the children.
- RUTF already contains the necessary iron.

The other routine treatments are the same as that given to OTP patients:

1. de-worming
2. measles vaccination and
3. vitamin A before being discharge

[1] Amounts of RUTF are different Phase 2 In-patient and Out-patients. This is due to the fact that children in OTP may eat other foods ("family plate").

2. DISCHARGE CRITERIA

The Criteria to move back from Phase 2 to the Acute Phase (Phase 1) within the IPF are the same as the ones given to move back from OTP facilities to the IPF (cf. OTP section for discharge criteria)

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 or caretakers could be requested to come back for anthropometric follow up only, i.e. every two weeks during one month.

INFANTS LESS THAN 6 MONTHS OLD

One day observation may be necessary to determine the treatment according to the evaluation of breast-feeding practices and breast-feeding possibilities with the mother or other caretaker. However, depending mainly of the state of the child, this observation may need to be much quicker.

Beast-feeding will always be the preferred option in most contexts. Few reasons can prevent a mother from breast-feeding her child (refer to "Acceptable medical reason of use of breast-milk substitute" WHO, 2009 and "Infant feeding Module 1", page 28 for HIV and breast-feeding and Module 2 Infant Feeding in Emergencies[166]).

- Based on WHO recommendations of December 2009[167], any HIV positive woman should either practice exclusive breast-feeding until 6 months of the child and receive ART treatment or when breast-milk substitute is AFASS (accessible, feasible, affordable, sustainable and safe) avoid all breastfeeding and choose another feeding option.

- Breast-feeding can be proposed to any female caretaker who is willing to breast-feed and take care of the infant ("wet nursing" for example).

ACF IFE position paper gives some guidelines in the management of infant feeding in a therapeutic programme.

"ACF teams should be prepared to discuss all of the different options with the infants' caretakers, including, as a priority, wet nursing and re-lactation."

"However this principle does not exclude the use of BMS – these circumstances call for a pragmatic and responsible view. ***This may involve the decision to provide an appropriate BMS.*** *Use of BMS may be temporary or for full artificial feeding of an infant for whom there is no access to breast-milk.*

After assessment and analysis of the situation, ACF will procure appropriate (preferably generic) BMS, labelled in local language when it is necessary and in line with the International Code for Marketing of BMS. Distribution will be done in a responsible manner, treating each case on an individual basis, providing support and follow up to the caretakers and the infants, discussing alternatives on a regular basis and ensuring a continuous unbroken supply of appropriate BMS for those children that need it, until at least the age of 12 months old. ACF will ensure that the families of these infants have access to the necessary resources, such as fuel, clean water and water containers, to be able to artificially feed the infants."

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 and milk based feeds should not be given for home treatment.

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

[166] http://www.ennonline.net/resources/4

[167] "Mothers known to be HIV-infected (and whose infants are HIV uninfected or of unknown HIV status) should exclusively breastfeed their infants for the first 6 months of life, introducing appropriate complementary foods thereafter, and continue breastfeeding for the first 12 months of life. Breastfeeding should then only stop once a nutritionally adequate and safe diet without breast milk can be provided."
HIV and infant feeding – Revised Principles and Recommendations- Rapid Advice – November 2009 – WHO - http://whqlibdoc.who.int/publications/2009/9789241598873_eng.pdf

inadequate stimulation by the feeble infant.

The objective of treatment of these patients is to return them to full exclusive breast feeding. Thus, the admission criterion is failure of effective breast feeding and the discharge criterion is gaining weight on breast milk alone (anthropometry is not used as primary admission criterion).

1. Organisation

It is inappropriate to admit young infants to most general paediatric or nutrition wards. There should be a completely separate ward/section for these infants. This is best integrated with a special service/programme to assist mothers who have difficulty breast feeding. The aim of such a service would be to re-establish exclusive breast feeding and achieve confidence in their ability to produce sufficient milk for their baby to thrive for any mother. It's out-patient arm would counsel and provide one-to-one support for mothers who have difficulty with breast-feeding; the in-patient arm would be for mothers whose children are not "thriving" and become malnourished. If such a service does not exist then the programme should be part of the neonatal service.

The staff should be female and have professional advanced training in breast-feeding support and counselling as well as skills in care of the neonate.

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

2. Admission criteria

The only admission criterion is failure of satisfactory breast feeding so that the child is not gaining weight and developing normally.

This is normally assessed by longitudinal measures of weight (growth monitoring programmes). A single weight-for-height measurement is not a satisfactory admission criterion. This is particularly difficult to measure in small infants, is unreliable at this age without accurate equipment and skill, and, if normal, is an inappropriate measure of "thriving" in the less than 6 months old child. MUAC is not used in the small infant as it changes rapidly in the first 6 months of life (children under 65 cm of length).

From birth to 6 months of age weight-for-age is the most appropriate measure to assess nutritional status. At this age, **failure to gain weight can be defined as acute malnutrition**. However, there are premature or small-for-gestational-age babies born who are being exclusively breast fed and gain weight at a satisfactory rate[168]; they follow their "channels" of growth and even catch-up, crossing centile lines despite the fact that their current weight-for-age may still be much below "normal". Such children are thriving and do not need admission to the programme. The best way to differentiate those infants who are thriving from those that are becoming malnourished is to take repeated weight measures longitudinally; this is the value of the growth-monitoring programme.

Where there is a growth-monitoring programme:

- all infants who are not following the weight-for-age growth channels should be considered for admission;

[168] In the first 6 months of life birth weight is the dominant determinant of current weight. Birth weight is statistically related to current weight up to 18 months of age, but beyond 6 months other factors become statistically more important.

- if they are losing weight or have crossed weight-for-age centile lines because their weight is static then they should be admitted to the programme.

Where there is no growth monitoring programme or there are no "historical" weight measurements and the mother reports that she does not have sufficient breast milk or that the infant "does not like my breast milk":

- The weight-for-age of the infant should be checked
- The infant is checked clinically
- The mother's breasts examined
- The mothers breast-feeding performance is observed

If the infant is clinically well and appears to be breast feeding satisfactorily, the mother should be counselled and given a return appointment in one or two weeks to monitor the weight change of the infant (an accurate infant scale is needed – not a survey scale with 100g divisions).

- Where the infant has a clinical illness,
- the mother's breast feeding performance is not satisfactory,
- the infant appears clinically malnourished,

➔ The infant and mother should be admitted to the programme.

To resume:

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 (irrespective of his/her weight-for-length, weight-for-age or other anthropometry). **or** ↘ The infant is not gaining weight at home (by serial measurement of weight during growth monitoring, i.e. change in weight-for-age) **or** ↘ W/L (Weight-for-Length) less than <-3 Z[169] **or** ↘ Presence of bilateral pitting oedema.

3. Management

The aim of treatment is to return the child to exclusive breast feeding[170].

[169] Infants who are <-3Z weight-for-length are severely wasted. But measurement of length and weight is difficult in young infants and small errors lead to change in category. However, severely wasted infants should be admitted to support adequate exclusive breast feeding even if they are recorded as gaining weight.

[170] The production of breast milk is "demand driven". The malnourished infant is weak and does not cry. S/he does not stimulate breast-milk production either psychologically by crying or physically by suckling sufficiently. Attempts to put such infants to the breast repeatedly fail, the infant continues to lose weight and the mother is confirmed (correctly) in her

This is achieved by stimulating breast-feeding at the same time as supplementing the child during breast feeding until breast milk is sufficient to allow the child to grow properly. Breast milk output is stimulated by the Supplemental Suckling (SS) technique[171]; 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.
- If the child is too weak to suckle, but the mother has milk, the mother should be shown how to express her milk by hand or by pump[172]. The expressed milk can be given by cup or by NG-tube to the baby
- Thirty to sixty minutes after offering a normal breast-feed give **maintenance** amounts of either F100diluted or generic infant formula using the supplementary suckling technique:
- The diet should provide 100kcal/kg/day. For most infant formulae give 140ml/kg/d, for F00dilute, give135ml/kg/day - divided into 8 meals.

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.

A specific multi-chart is used for these infants.

Preparation of the SS-milk[173]

The SS-milk can be infant formula or made by diluting F100 to make F100diluted. Infant formula is diluted according to the supplier's instructions.

- For F100diluted put one small packet of F100 into 670ml of water instead of 500ml[174].

- 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 there is a choice, use a formula designed for premature infants (Yet the purchase of infant formula should comply with The Code and IFE guidelines).

Note:

- Unmodified powdered whole milk should never be used (e.g. Nido®)
- F100 undiluted is never used for small infants (less than 3kg)

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view that attempts at exclusive breast feeding will not work when the infant has reached this stage. On the other hand treating the infant with F75 and then F100 rapidly leads to weaning and the mother sees that the "formula" is the only way to allow her child to recover. Urging the mother to breast feed after this is unsuccessful (as given in manuals for treatment of SAM). These are both losing options. The SS technique is time consuming and requires skill, but is the only technique that works in practice; it is lifesaving.

[171] This is the SAME as the techniques described in textbooks for re-lactation [118].

[172] See Module 2 http://www.ennonline.net/resources/4, for more information on expressing breast-milk

[173] Full strength F100 should NEVER be used for small infants of children less than 3kg. The renal solute load is too high for this category of child and could provoke hypernatraemic dehydration. Older children must either be given ordinary water with the diet if they are less than 3kg or the diet should be diluted.

[174] Or one large packet into 2.7 l of water instead of 2l to make F100 diluted.

Amounts to give by SS technique

The look up table gives the amount of SS-milk to give at each feed.

The amount given is NOT increased as the child starts to regain strength, suckle more strongly and gain weight[175].

Table 19: Look up table of the Amounts of SS-Milk (F100diluted or infant formula) to give for infants during Supplementary suckling.

Class of Weight (kg)	ml per feed (8 feeds/day)
	Infant formula or F100diluted
>=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.

Progress

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 diluted/infant formula, add 5mls to each feed[176].
- 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 and the mother is "responsible" for recovery.
- 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. The amount of SS-milk given at each feed should be reduced.
- Weigh the child daily with a scale graduated to within 10g (or 20g).
- When a baby is gaining weight at 20g per day for 2 consecutive days (whatever her/his weight):

[175] The aim is NOT to have the child gain weight on the supplemental food. This amount is given to ensure that the child does not become more malnourished whilst breast-milk output is increasing. The weight gain is due to the additional intake coming from breast-milk, and the mother should be encouraged when she is told that the recovery is due to her own breast milk. If excess SS-milk were to be given the infant will stop suckling before the breast is emptied and further increases in breast milk output will be inhibited.

[176] 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.

Decrease the quantity of SS-milk given at each feed to one half of the maintenance intake.

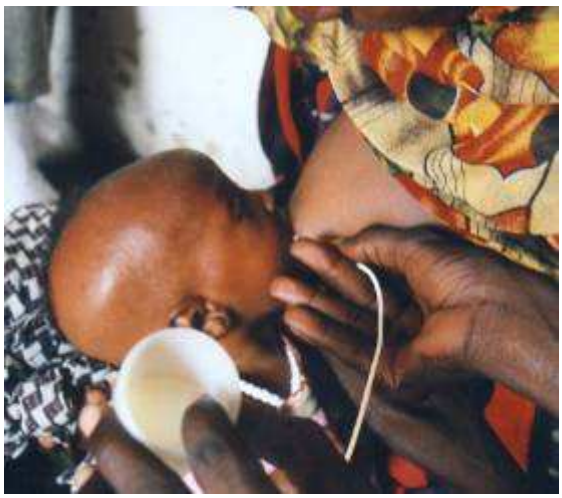
- If the weight gain is maintained for 2 consecutive days (10g per day whatever her/his weight) then stop supplement suckling completely.
- If the weight gain is not maintained when the SS-milk intake is cut in half, then change the amount given to 75% of the maintenance amount for 2 days and then reduce it again if weight gain is maintained.
- If the mother wishes to go home as soon as the child is taking the breast milk greedily and gaining weight then they should be discharged. If the mother is agreeable, they can be kept in the centre for a further 2 days on breast milk alone to confirm that s/he continues to gain weight.
- If the infant is gaining weight on breast milk alone and the mother understands the importance of continuing breastfeeding, s/he should be discharged, no matter what his current weight-for-age or weight-for-length.

4. Supplementary Suckling Technique

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

- The appropriate amount of SS-milk is put in a cup. The mother or assistant 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. At the beginning the mothers find it better to attach the tube to the breast with some tape, later as she gets experience this is not normally necessary.
- 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 about 5 cm to 10 cm below the level of the nipple so the SS-milk can be taken with little effort by a weak infant. It must NEVER be placed above the level of the nipple, or it will flow quickly into the infant's mouth by siphonage with a major risk of inhalation. As the infant becomes stronger the cup should be lowered progressively to about 30cm below the breast.
- With experience, the mother, instead of the assistant, can hold the tube at the breast with one hand and the other holds the infant and the cup. In this way she can perform SS-feeding without assistance.
- 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. Where possible all the mothers with malnourished infants should use the SS-technique together at the same time in a social context. Once one mother is using the SS-technique successfully the other mothers are greatly encouraged and find it relatively easy to copy her.
- The mother should be relaxed. Excessive or officious instructions about the correct positioning or attachment positions often inhibit the mothers and make her think the technique is much more difficult than it is. Any way in which the mother is comfortable and finds that the technique works is satisfactory.

- If the SS-milk formula is changed suddenly then the infant normally takes a few days to become used to the new taste. It is preferable to continue with the same supplementary diet throughout the treatment.



This infant is suckling the breast and also getting the F100diluted (135ml/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.

5. Routine Medicine

These children have to be seen by a nurse every day because they are exceptionally vulnerable.

- **Antibiotics**: Amoxicillin (from 2kg): 30mg/kg 2 times a day (60mg/day) in association with Gentamicin once daily. (Never use Chloramphenicol in young infants)

The surveillance is the same for infants as for older patients in Acute-phase

- Weight is measured, entered and plotted on the multi-chart each day.
- Body temperature is measured twice per day.
- The standard clinical signs are assessed and noted in multi-chart each day
- respiration
- stool
- A record is taken (on the intake part of the multi-chart) if the patient is absent, vomits or refuses a feed

6. Care for the mothers

As the aim is to increase breast milk, the mother's health and nutritional status are critical for the nutritional repletion of the infant[177].

- 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.

[177] The type I nutrients vary in concentration in breast milk according to the mother's status. She does not necessarily appear malnourished as low intakes of these nutrients do not lead to loss of body weight. If the mother's intake is low then the first sign of deficiency can be seen in the breast-feeding infant –there is evidence of very low levels of thiamine, vitamin B12, pyridoxine, iodine, vitamin A, anti-oxidant nutrients, etc. in breast milk samples from many developing countries. The exceptions are iron and copper which are physiologically at low levels in breast milk. Infants born at normal gestational age should have stores of these nutrients to last until they are 6 months of age. Premature infants can develop iron and copper deficiency, there should be sufficient copper in SS-milk, but if the milk is F100dilute then low-birth-weight infants may need additional iron. The concentration of type II nutrients in breast milk is not affected by the mother's status, but there may be an effect upon breast milk volume (this has not been assessed adequately).

- Introduce her to the other mothers in the centre and introduce her to the staff personally: make her feel "at home" in a friendly and relaxing atmosphere.
- Strongly reassure the mother that the technique works and that enough milk will "come into" her breasts as the baby recovers. She will be able, with her own milk, to make her baby better.
- She should drink at least 2 litres per day.
- She must eat about 2500kcal/day of a high quality diet.
- The mother who is admitted in the centre with her child should receive Vitamin A: 1). If the child is below 2 months or the mother is menstruating: 200.000UI (there should be no risk of pregnancy), 2) If the child is above 2 months: 25.000UI once a week.
- Micronutrient supplementation must be given to the mother if necessary.[178]
- The length of stay in the facility should be as short as possible.

Drugs that stimulate milk production

There are drugs which help with lactation – if milk flow is delayed or insufficient after a few days then you can give the MOTHER metaclopramide 10mg 8 hourly [119]. Other drugs that increase milk flow (e.g. chlorpromazine, are less effective, cross into breast milk and will potentially affect the mother and child adversely [120,121]); in some cultures there are local spices that stimulate breast milk output (e.g. fenugreek) but its safety has not been established.

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, and inspected to ensure that no water remains in the tube. If convenient the tube is then left exposed to direct sunlight[179].

7. Discharge criteria

AGE	DISCHARGE CRITERIA
Infant <6 months or <3 kg being breast-fed	• it is clear that s/he is gaining weight on breast milk alone after the Supplemented Suckling technique has been used, • there is no medical problem, • the mother has been adequately supplemented with vitamins and minerals, so that she has accumulated body stores of the type 1 nutrients.

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

Follow-up for these children is very important. The **mother** should be included in the SFP programme and receive high quality food to improve the quantity and quality of breast milk. Where there is no SFP the infant should be followed in the MCH clinic, by the community outreach worker or the community volunteers.

[178] See UN Statement "Preventing and controlling micronutrient deficiencies in populations affected by an emergency" and products sheets (annexe 16).

[179] The UV rays in sunlight penetrate the plastic and can effectively sterilise the tube if it is already clean and all opaque matter is removed.

Infant without any Prospect of Being Breast-Fed

These cases should be really rare, as only few medical conditions prevent mother or a wet nurse to breastfeed (refer to "Acceptable medical reason of use of breast milk substitute" WHO, 2009).

1. Admission Criteria [180]

AGE	ADMISSION CRITERIA
Infant <6 months or <3 kg with no prospect of being breast-fed	• W/L (weight-for-length) < -3 Z-score **or** • Presence of bilateral pitting oedema

2. Management

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.

ACUTE-PHASE

Wasted, marasmic infants of less than 6 months who have no prospect of receiving breast milk can be given F75, F100diluted or infant formula in the Acute-phase[181]. Oedematous infants of less than 6 months should always be given F75 during the acute phase.

Table 20: Look up table of the amounts of infant formula, F100diluted or F75 to give for infants not breast-fed in Acute-phase

Class of Weight (kg)	ml of F100 per feed in Acute-phase (8 feeds/day) **Diluted F100 or infant formula**
=< 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 dilute.

[180] 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 neonatology service/nursery and given infant formula.

[181] NEVER use full strength F100 – it can cause hypernatraemic dehydration in these infants. There has been very little experience in treating these infants in the developing world. In the developed world special formula for premature infants is used – if available it is suggested that these formula are used. The diets given can be the same as those given to infants being fed with the SS-technique. Nearly all these infants have been born prematurely or have had intra-uterine growth retardation, with low birth weight. Thus, the aetiology of the "malnutrition" is normally different in the small infant from the child.

- ***TRANSITION PHASE***

If the infant has been taking F75 during the acute phase then this is changed to infant formula or F100diluted during the transition Phase – the volume of the diet is increased by one third.

- ***RECOVERY-PHASE***

During Recovery-phase, twice the volume of infant formula or F100diluted is OFFERED to the infants –they must NOT be force fed.

Table 21: Look up table of the Amounts of infant formula/F100diluted to offer to infants not breast-fed in Recovery-phase

Class of Weight (kg)	ml of F100 per feed in Recovery-phase (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

3. Discharge criteria

When the infant reaches -1.5 Z score weight-for-height and is gaining weight at 20g/d s/he can be discharged.

The infants will be discharged on generic infant formula, the diet is not changed.

It is essential that the caretaker has access to generic infant formula. This has to be supplied by the clinic or orphanage/ foster parents as commercially produced formula are normally unaffordable by most families with malnourished infants and no mother or wet-nurse available.

Most caretakers[182]/ fathers/ siblings/ foster parents in this situation over-dilute the formula to make it "stretch" and last longer, others use the cheapest milk, which will be dried whole milk, evaporated or condensed milk; these are all unsuitable for maintaining the previously malnourished infant.

The caretaker (father/ siblings etc.) must have the knowledge and facilities to prepare the formula milk safely.

Follow-up for these infants and their caretakers is very important and should be organised by the

[182] In many areas with a high prevalence of HIV there are substantial numbers of "child-headed households", where the adults have all died. These children looking after children present a particular difficulty in terms of livelihood, knowledge, exploitation etc. The whole household needs direct assistance.

outreach worker in conjunction with the community volunteers.

AGE	DISCHARGE CRITERIA
Infant <6 months or <3 kg with no prospect of being breast-fed	≥ -1.5 Z-score weight for length They can be switched to generic infant formula if they are not already taking this diet.

As soon as the infant is treated for severe acute malnutrition, the diet should be switched to infant formula (if F100diluted was being used for the SS feeding) or any milk substitute according to the availability and possibilities assessed in the family and in the community. Bottle feeding should be discouraged, breast-milk substitute has to be given by cup (refer WHO manual Infant feeding 2).

Guidelines are available on procedures to follow when there is need to put in place milk substitute for infant[183]. These recommendations are important to follow in order to guarantee a secure feeding of these children who will benefit from artificial feeding and also to avoid antagonist messages with breastfeeding promotion encouraged by ACF-IN.

You can refer to WHO manual Infant feeding 2[184] to have details on the approach when artificial feeding is implemented and for recipes and choice of the appropriate substitute.

When infants reach 6 months, complementary feeding should be introduced according to WHO recommendations. Refer to "WHO IYCF 2009"[185] for details on implementation and appropriate diet.

[183] "WHO IFE operational guidance" Page 14 6.2; 6.3 and 6.4 **implementing supplementary feeding in infant in emergency** and "WHO Infant feeding module 1" page 37, 4.4 **Alternative to breast-milk how to implement safely**

[184] Chapter 9 page 96 "***when infant are not breastfeed***" and annex 7 page 127

[185] Session 3 page 19

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. On-going analysis of the results allows adjustment and improvement of the programme to the prevailing circumstances. Identification of seasonality and the quantification of its magnitude, prediction of change in incidence of SAM, early identification of deviations from the usual pattern of seasonal change give indications to scale up or down the programme in response and to order supplies and other resources in time for anticipated changes. Without accurate monitoring, evaluation, adjustment and timely identification of problems the programme is incomplete and will be less effective. 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.

1. The SAM number

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.

It is important to use a registration book; individual records are often misplaced[186] or lost completely, and it is very difficult and time consuming to compile a report from individual records, particularly when large numbers of children attend an OTP.

It is important to be able to follow individual patients as they are transferred from one component of the programme to another. With patients being referred from the community to OTP sites to In-patient facilities and then back to the OTP, or transferred to another OTP nearer to their home as OTP sites are opened and closed, it has become impossible to follow an individual's progress.

The system used should ensure that a patient is neither lost from the system during transfer nor registered multiple times as a new case of malnutrition. If each institution and OTP site acts autonomously each arrival is recorded as a new admission (for them) and each transfer is counted as a discharge, so that all patients that are transferred are registered multiple times as new cases[187].

To overcome these problems each NEW case is given a **SAM-number** by the **first programme that starts treatment** of the person. The patient then keeps this same number during ALL transfers. The individual programme can also give a registration number to the patient for their own internal use and filing – a site specific number – but they must use the SAM-Number on all transfer forms and documents related to that patient.

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[186] Even in well run programmes about 10% of records are frequently "missing"; in poorly run centres there are many missing records and the monthly report is consequently often wrong. In particular, the records for dead children are frequently lost. This is because the staff know that the record will not be necessary for follow-up or readmission and the records for dead children are separated from the other records and neglected: they are "finished" according to the staff and do not need to be carefully preserved. The new admissions to each site should have consecutive numbers so that the total number of patients can be verified from the numbers. Furthermore the outcome of patients in registration books and patient' records are often not recorded properly or only marked in the column with an "x" or some other ambiguous mark instead of "died".

[187] This is a major problem when the OTP and in-patient facility are controlled by different authorities or NGOs. Without close cooperation between the agencies the data returned is inaccurate and can lead to false conclusions.

Sometimes a patient has a third number; for example, if there is an in-patient facility attached to a district hospital and the patient has been transferred from OTP as an outpatient, then the patient will have a) a SAM number assigned by the OTP site, b) a In-patient sequential registration number for the malnutrition unit 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 SAM-number.

This SAM number is assigned where the patient is first treated, whether this is an OTP site or in the In-patient facility. This number is unique and should always be denoted as the SAM-No. In all the documents relating to the patient, i.e. for in-patient care - on Multi charts, registration book and transfer forms; for Out-patient care, on the OTP chart, registration book and transfer forms. Where there is a National health card, road-to-health chart or other monitoring document then the SAM number and the admission must be entered into that document retained by the caretaker.

The SAM- Number is a multi-component number made up of the following components:

Code for facility **where first treated** / patient assigned sequential number

For example:

- If a patient is first treated from District of Sebrah in an OTP named "Najid health centre". That patient may have the SAM number of <**OTPNaj/0001**>;
- The 156th patient first treated at the district hospital of Goma may have the SAM number of <**IPFGo/0156**>.

The code for each facility, whether it is an OTP site or an In-patient facility, is set by the District Nutrition officer or the person who has control of the whole programme in the district. Each agency or NGO must liaise with the District Nutrition officer/District Nutrition focal point (or in his/her absence the District Medical Officer), and be assigned a code before a new OTP or IPF is opened.

This number should be recorded on the Multi-charts and in the registration book for in-patient care and in the registration book and OTP chart for out-patient care.

2. Definitions used in compiling the reports

- ***Categories of patient***

- Oedematous and wasted patients are always reported separately. All new admissions to OTP or IPF need to be differentiated by type of malnutrition in the report[188].
- The reports are divided by age group:
- The less than 6 month old children are only reported for the in-patient facility.
- The 6-59 month old children are reported as a separate category in both reports (OTP and IPF).

[188] Although the definition of wasting has changed with the change from NCHS to WHO standards, the definition of oedema has not changed. The aetiology, seasonality, prevalence and geographic distribution of oedema and wasting are quite different. There is no "pre-kwashiorkor" condition; although supplementary feeding of MAM children can prevent deterioration to SAM, supplementary feeding will NOT prevent or change the incidence of kwashiorkor. It is thus very important to differentiate these conditions in the statistical reports.

- Others would include all SAM patients over the age of 59 months[189].

Type of admission to an OTP

"New admission"*:* This is where a patient has not been under treatment elsewhere – such patients are either referred from the community screening programme or spontaneously come to the OTP seeking treatment. They do not have a SAM number and one should be assigned[190].

"Relapse"*:* This is where a child has been in the programme – IPF, OTP or both – and has been discharged from the programme as **cured.** The same child is now severely malnourished again and is admitted. The child is given his/her original SAM number, but there is a hyphen after the main number with a number denoting the number of episodes of severe malnutrition that the child has had. Thus, if the child with the SAM number <OTPNaj/0001> is discharged cured and is then readmitted to the programme after 7 months, this child is assigned the number < OTPNaj/0001-2>. If the original SAM-No cannot be found a new SAM-No should be given, but it should always have xxx-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. The algorithm for failure-to-respond to treatment should be followed. There should be a home visit to determine if there is a social problem causing the relapse. They usually need to be seen as in-patients and a search made for underlying illness. This is considered as a new admission – although the SAM number is basically the same as for the previous admission, the "-2" at the end indicates that this is a new admission.

"Transfer-in"

- *"Transfer-in" to an OTP from another OTP.* This is where a patient is transferred from one OTP to another OTP; it is NOT a new admission (to the programme for treatment of SAM) and the child should already have a SAM number.

- *"Transfer-in" to an OTP from an In-Patient facility.* This is where a patient is transferred from the In-patient facility; it is NOT counted as a new admission as the patient has been under care in the In-patient facility; the child should already have a SAM number, which will be used by the OTP.

"Return" *from In-Patient care to OTP. This is where a patient has been sent from the OTP for* In-patient care. The child has already been admitted as a new patient to an OTP, has then been sent for In-Patient care and now returned to his/her original referring OTP.

"Readmission": This is where a defaulter returns to either the OTP or in-patient facility to resume treatment after an absence of 2 months or less. The child is not a new admission and is reassigned his/her original SAM-number.

Types of discharge and transfer from OTP

"Cured": A patient reaching the criteria for discharge is called "cured". Discharge to the Supplementary Feeding Programme (SFP) is not considered as a transfer, but as a discharge from the

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[189] The data are not normally broken down by sex if unisex criteria are used for admission; analysis of over 10,000 admissions using unisex (NCHS) criteria show that approximately equal numbers of boys and girls are admitted and their outcome is not different. The WHO tables discriminate against girls; **if sex specific tables are used for admission criteria then the data should also be reported by sex.** Other categories are not routinely reported. Occasionally separate studies are made on a sample to examine other age categories, pregnant or lactating women, special cases (e.g. disabled, twins, and orphans).

[190] During periodic evaluations the number and outcome of screened and referred patients should be compared with the spontaneous admissions. The spontaneous admissions have a tendency to be more severely ill and at higher risk of death, this should affect the proportion of admissions that are transferred to in-patient care for the acute phase.

programme for severe malnutrition. In the SFP there is a special category of children who have recovered from SAM; it is important that their SAM number is recorded in the SFP registration book.

"Died": A patient dying during its stay in the OTP programme AND those who have died in transit from the OTP site to in-patient care but have failed to reach the IPF[191]. If the child was previously reported as "unknown" and is subsequently found to have died, this should be notified in the monthly report, the registration book and the IPF/OTP chart and a "change of category" note made.

"Unknown": This category is for patients failing to attend the OTP programme for 2 consecutive visits where it is unknown whether the patient has defaulted, moved away or died[192]. Subsequently a home visit may determine the true cause of absence from the programme, in which case a "change of category" note can be made on a subsequent monthly report.

"Defaulter": A patient who is absent for 2 consecutive weightings (14 days in out-patient), confirmed by a home-visit for the out-patient component of the programme (by the outreach worker or community volunteers).

"Transfer-out"[193]

- *Transfer-out from one OTP to another OTP*. A patient transferred to another OTP, because it is nearer to his/her home. The patient leaves the OTP in which first registered, but is NOT a discharge from the programme: in the new OTP the patient will be recorded as a "transfer-in" and will retain the same SAM number.

- *Transfer-out to In-patient care.* A patient transferred to an In-patient facility, who has already been given a SAM-No. S/he will be admitted to the IPF as a "transfer-in" and not as a new admission and will retain the same SAM-No. When the patient has finished the in-patient care and comes back to the OTP, s/he will be recorded as a "return" in the OTP registration book.

"Non-response-refused-transfer": Simple non-response to treatment is NOT a category of discharge from OTP. All patients that fail to respond to treatment should be referred to the in-patient facility for diagnosis and further management. This category is ONLY used for patients that are referred to the in-patient facility and refuse to be transferred. This normally occurs when the reason for failure to respond is social. The outreach worker and community volunteers should always make a repeat home visit if transfer is refused for non-responding children. The refusal should be recorded in the outcome; the case should be discussed with the village chief and if necessary reported to the District Nutrition Officer/Medical officer of health.

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[191] This is a very difficult category to complete. Patients leave the OTP and do not arrive at the IPF; where there is no proper coordination between the programmes the data are simply missing. The number of children transferred-out from all the OTP sites in the catchment area should match with the number of transfer-in recorded in the IPF. The discrepancy should equal the number who "did not arrive". Some of whom will have died in transit. Follow up by home visiting of those who did-not-arrive should be attempted to determine the number of "transport deaths". Note: the did-not-arrive children should equal the "did-not-return" plus the defaulters/deaths from the in-patient facility. These data can be determined when all the reports are compiled by the District Nutrition Officer (or the NGO if they have control of the whole programme). If the "did –not-arrive" category contains several children then an investigation should be mounted to visit the parents at home and determine the reasons for non-arrival (no transport, registration money required, died, etc.)

[192] In many programmes all these children are reported as "defaulters" and there is no provision for reporting an "unknown" outcome. The parents of children who die do not return to report the death to the OTP; and busy staff are unlikely to find the OTP chart and record the death. Death reporting is thus haphazard and serendipitous. This leads to biased data, an incorrect view of the success of out-patient management and failure to detect and correct errors in the application of the triage procedure (in particular the application of the appetite test). The death rate in OTP for most published data is therefore a MINIMUM death rate. The maximum death rate is the sum of the dead and defaulting rates! Some independent home follow up studies have shown that more than 10% of "defaulters" are actually deaths.

[193] These are NOT "discharges" from the programme –simply (temporary) "discharges" from the OTP. The term "discharge" is used in both ways and leads to confusion.

"Wrong Admission": Where it is found that a patient who does not fulfil the criteria for SAM has been inadvertently admitted to the programme and given a SAM number. This patient should be discharged as soon as convenient and listed in all the records as a "wrong admission". The SAM number is NOT then assigned to another patient. But the report must indicate the number of wrong admissions to the OTP.

- ***Type of admission to an in-patient facility***

"New admission"*:* This is where a patient has not been under treatment elsewhere – such patients are screened in the out-patients/ casualty/ emergency departments or spontaneously come to the in-patient facility seeking treatment. This category also includes infants of less than 6 months who are not treated in OTP and will not return to OTP. They do not have a SAM number and one should be assigned.

"Transfer-in" *from an OTP to an In-patient facility*. This is where a patient has been under treatment at an OTP site and has been sent to the IPF for in-patient care[194]. This includes patients who failed their appetite test, those who have complicated malnutrition and those that have failed to respond to treatment. These patients are NOT counted as a new admission as the patient has been under care in the OTP; the child should already have a SAM number which will be used by the IPF.

- ***Type of discharge[195] and transfer from an in-patient facility***

"Transfer-out" *to OTP*. This is where a child originally admitted as a new case is transferred to OTP to complete his/her treatment. The SAM-no will have been given by the IPF.

"Return" *to OTP.* This is where a child who has originally been transferred from the OTP is returned to the OTP programme. He will already have a SAM N° given by the referring OTP.

"Died": A patient that has died while he was in the in-patient facility AND those who have died in transit to OTP but have failed to reach that facility.

"Defaulter": A patient that is absent for 2 consecutive weighing (2 days in in-patient)

"Cured": This category should apply mainly to the less than 6 month old infants. The other patients should be recorded as transfer-out to the OTP for completion of treatment. To have many "cured" children is wrong unless there is no OTP in the area.

"Medical-referral"[196]: This category is used for patients with another serious underlying illness (e.g. Hirsprung's disease going for surgical correction, inborn errors of metabolism etc) or undiagnosed failure-to-respond to treatment that are referred for specialist diagnosis, treatment and follow up

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[194] All patients that are seen at an OTP site are "registered" even if they are immediately transferred to an in-patient facility without any specific treatment being given – they will have been examined, a diagnosis of SAM made and been fully assessed and judged to require in-patient care – this constitutes "admission" to the programme. As they have been given a SAM number at the OTP site, they MUST have a transfer form which states the findings of the OTP team and what, if any, treatment they have had. They will not be given a new SAM number at the IPF, but will be registered and reported as a "transfer-in".

[195] These are NOT "discharges" from the programme –simply "discharges" from the in-patient facility. The term "discharge" is used in both ways and leads to confusion.

[196] This is sometimes referred to as "medical-transfer". It is better to reserve the term transfer for movements within the programme with continuing care of the malnutrition and an expectation that the patient will continue under the care of the malnutrition team. If they remain in the same in-patient facility (albeit with other programmes treating the patient – e.g. TB or HIV) then they should be reported as still being under-care of the malnutrition team and included in the monthly report as such.

elsewhere and the service to which the patient is referred will "take over" the future care of the child from the malnutrition team.

"Wrong Admission": This is recorded where it is found that a patient who does not fulfil the criteria for SAM has been inadvertently admitted to the in-patient programme and given a SAM number. This patient should be treated for any other illness for which the patient has been admitted and then discharged. All the SAM records should be marked "wrong admission" and the reason for revision of the diagnosis of SAM entered in the multi-chart; the multi-chart is filed with the other multi-charts and not discarded. The SAM number is NOT assigned to another patient. The monthly report must indicate the number of wrong admissions to the IPF.

3. Tools

- ***OTP tools***

- OTP chart is a single A4 double sided sheet upon which all the OTP information is recorded (see annex 8).

- The OTP Registration book (see annex 07) contains simple basic information to assist management, organisation, control, reporting and evaluation of the OTP site and to ensure that patients are not "lost" if their record is misplaced, misfiled or otherwise readily found when required.

- The OTP monthly report (see annex 14).

The following information is collected in the registration book:

Identification

- SAM No
- Child Name and mother/ father/ caretaker name if it facilitates the child identification and follow up
- Age
- Sex
- Address: The address needs to be sufficiently detailed for the outreach worker (or other home-visitor) to find the actual house. If there is no address then there should be directions and a description of the house.
- Phone N°where this is available.

Type of admission, and transfer record.

- Date of admission
- New admissions: Wasted, Oedematous, Relapse.
- Transfer-in from In-patient care, Return from In-patient care, Transfer-in from another OTP, Re-admission of defaulter (<2month)

Anthropometric measurements on admission and discharge[197]

- MUAC
- Weight

[197] This information is often not recorded in the registration book. Having each child's admission and discharge data listed in the registration book makes evaluation to identify problems with the functioning of the OTP possible and improves the ease and accuracy of compiling the monthly report.

- Height
- WFH Z-score
- Oedema

Outcome

- Date of discharge
- Type of discharge: cured (discharge to the SFP is not considered as a transfer); unknown; defaulter; died; transfer-out to In Patient Care; transfer-out to another OTP and non-response-refused-transfer.
- Name of in-patient facility used for transfer-out.

In-Patient Tools

- In-patient Multi-chart is an A3 folded double sided chart that contains all the information necessary to manage an in-patient with SAM [198]

- Registration book: there should be a special registration book for the SAM children. The in-patient register contains the same information as the OTP register with the exception that an additional column is introduced with the name of the referring OTP site listed. The benefits are the same as with the OTP registration book. The usual ward simple register is not sufficient.

- The in-patient facility monthly report.

In patient multi-chart is the primary tool for managing in-patients (see annexes 9 and 10)

It should be filled for each patient. It is the primary tool for managing malnutrition 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.

The chart 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 in-patient facility);
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. Follows the daily weight of the child which is plotted on a graph.
4. **All** the staff use the same chart. They all have ready access to the information collected by other grades of staff and it can be integrated together to give the doctor/nurse an immediate and accurate indication or the state of progress of the child. 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.
5. The language used in the chart should be the local language understood by all the staff (assistants) and not an international language only understood by the medical staff.
6. 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.

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[198] In many hospitals the administration insists upon using its own style of patient record (docket) – the same type of record being used for all patients within the hospital. This is particularly the case when administrators use the information recorded to charge the patient for their care. Most hospital style records are inappropriate for the type of information necessary to successfully manage moderate numbers of SAM children. Experience has shown that changing from the normal ward record keeping to the simple SAM in-patient chart (and having staff trained in its use), can lower the mortality by up to 50%.

7. The charts and registration book contain all the information needed to analyse and report the results of the in-patient programme in a standard way.

4. Quantitative indicators

Statistics are obtained directly from the registration books (or, alternatively, from individual multi-charts where it is thought that there is a discrepancy or special analyses are to be undertaken: the multi-charts should be filed together sequentially (in order of the facility registration number) and separately from the general hospital records; the records for the children who die should not be separated and filed separately from those that have other outcomes).

Monthly statistics report for In and Out Patients (see annex 14)

The monthly reports are slightly different for in-patients and out-patients.

The data should be reported and indicators calculated for infants less than 6 months (in-patients), children from 6 to 59months and those above 5 years of age (both in an out patients) separately[199].

- In a fully integrated programme, the analysis of the in-patient report should also be broken in terms of each OTP that transfers patients to the in-patient facility. This allows the District Nutrition officer, who will produce the consolidated report, to compare the numbers of children transferred-out of the OTP to the IPF with the number that arrived from that OTP site; and the number of children transferred-out from the IPF who arrived at the satellite OTP.
- The number of children actively in the programme at any one site at the end of the previous month should agree with the number in the programme at the start of the subsequent month. The difference in the SAM numbers of the last newly admitted patient from one month to the next should tally with the number of new admissions reported. The total admissions minus the discharges should agree with the change in the number of patients in the programme.
- As nearly all of the patients in the in-patient facility are transferred to OTP once the acute and transition phases are over, virtually none of those leaving the IPF are fully recovered or "cured", this leads to the "cure rate" calculated in the IPF to be very low; the staff then designate all their transfers to OTP as "cured", when this is not the case. Thus, for the IPF a new indicator is appropriate designated "success-rate". If an in-patient successfully passes through the acute and transition phase in the IPF, this is a successful outcome of the time spent as an in-inpatient.
- It is necessary to consolidate all the OTP and IPF reports together for a single catchment area to get precise data on the total numbers of children treated for SAM and for the death, defaulting and cure rates.

  On the other hand, it is important to have the reports from each OTP and IPF separately. This is necessary to both arrange re-stocking of consumable supplies (RUTF, antibiotics, charts, etc) and also to identify the geographical areas where the major case load arises, how ill the children are in those areas (death rate, transfer-out rate) and the functioning of the individual OTP.

It is expected that:

- Nearly all deaths will occur in the in-patient facility; the OTP will have a very low death rate because they should transfer all the high-risk children to the in-patient facility. If this is not the case then there is a problem with triage, transport or the reputation of the IPF with the community (so that there are many refusals to go to the IPF). To get a proper picture of the functioning of the programme the IPF data have to be integrated with the OTP data.

[199] The data are not usually broken down by sex. At least once per year a sample of new admissions should be taken and the gender ratio calculated for the various indicators in the monthly report.

- The transfer rate from OTP to IPF will vary with the severity of the cases that are identified (if the triage criteria are being appropriately applied). This will vary with season, the security situation and be higher at the start of the programme than later on when children are being identified in the community at an early stage. It will be related to the quality and completeness of the screening programme. Because it is expected to vary from time to time and situation to situation there is not a "standard" transfer rate that is to be achieved. Staff should not attempt to keep the transfer rate as low as possible; each child should have the treatment appropriate for that child[200].
- The defaulter rate from both OTP and IPF will be low. If this is not the case then a complete evaluation of the programme needs to be undertaken; the community is not satisfied with the functioning of the programme.
- There will be no patients in OTP who are discharged with a non-response-to-treatment outcome as they should be referred to inpatient facility for further investigations.
- The "unknown" outcome will remain low if there is an adequate outreach, community mobilisation, follow-up and communication between the arms of the programme.

Indicators for each in-patient facility.

The following rates[201] are calculated for each in-patient facility[202]. NOTE that the definitions are **not** the same for the IPF and the OTP.

IPF Success rate[203]: The children included in this rate are not counted in the overall programme performance, but are used for evaluating the IPF against international performance standards. The success-rate of an IPF is used instead of the "cure rate", but its meaning is almost the same as most deaths occur shortly after admission.

$$\frac{\textit{Number of patients transferred to OTP (transfer-out plus return)}}{\textit{Total number of patients leaving the IPF}^{204}}$$

IPF Success rate (for < 6month old children):

$$\frac{\textit{Number of infants discharged gaining weight on breast milk alone}}{\textit{Total number of infants leaving the IPF}}$$

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[200] At the beginning of a programme. where there is no active screening and in famine or very severe circumstances the transfer rate should be relatively high; in well run stable programmes with active screening in the community the transfer rate may be much lower. It is also expected that the transfer rate will vary with season, the reputation of the IPF and the numbers of patients that refuse transfer. In practice the transfer rate varies from 10% to 50% of new patients seen in OTP. If there is a very low transfer rate, it is likely that the triage procedure is not being properly applied (e.g. the appetite test) and the teams should be retrained.

[201] 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.

[202] Wrong admissions are excluded from all calculations.

[203] As the patients are transferred to OTP before they are "cured" there is no cure rate for the IPF, on the other hand it is demoralising for the staff and pejorative to calculate other indices ignoring the success that the IPF has had in treating children during the acute and transition phase and transferring them successfully to the OTP programme. Therefore the "success" rate should be calculated for IPFs instead of "cure" rates.

[204] Which correspond to total of patients classified as successfully treated and transferred-out or returned to OTP plus those that defaulted, died, had medical-referral or unknown.

"Cure rate" (for IPF – not calculated where there is an OTP programme[205])

There should in general be no patients in this category. All the patients should have been transferred-out to an OPT for the recovery phase, and so this rate is not usually calculated for the IPF. Where there is no OTP programme then the cure rate can be calculated instead of the "success rate".

$$\frac{\textit{Number of patients who reach the discharge criteria and are discharged}}{\textit{Total number of patients leaving the IPF}}$$

IPF Medical-referral rate

A patient that is sent to another health facility or service for more specialist treatment, the staff of the other service will take over the future management of the case so that the patient is not expected to return. The proportion of transferred patients is usually very small if the programme is functioning appropriately[206].

$$\frac{\textit{Number of patients referred for further specialist medical treatment}}{\textit{Total number of patients leaving the IPF}}$$

IPF Death rate

This calculation must INCLUDE patients who are severely malnourished, arrive at the hospital and die in the emergency department before they can be transferred to the paediatric ward/nutrition ward.

$$\frac{\textit{Number of patients who died in the IPF}}{\textit{Total number of patients leaving the IPF}}$$

IPF Default rate

The definition of a defaulter from the IPF is a patient who is absent from the programme for 2 consecutive days (without prior agreement with the staff).

$$\frac{\textit{Number of true defaulters}[207]}{\textit{Total number of patients leaving the IPF}}$$

IPF Transfer-out rate is equivalent to the "success rate" plus the "medical-referral rate" and does not need to be separately calculated for the IPF.

IPF Mean length of stay for successfully treated patients

This is calculated either as:

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[205] Except for infants <6months without a female caretaker. Those that are being treated with the SS technique are usually discharged before complete anthropometric catch-up, therefore the term "success rate" is more appropriate for these infants.

[206] A programme can appear to have a low mortality if the staff transfers all the « sick » children to another facility. Therefore the medical-referral rate is an important additional parameter as well as death rate.

[207] The patient has been home-visited and the reason for defaulting is known. The others patients who haven't been home-visited are considered as discharged 'unknown'.

$$\frac{\textit{The sum of all the days spent by all successfully treated children (discharge date – admission date both included)}}{\textit{Number of successfully treated children}}$$

This is the average of the acute phase plus the transition phase.

IPF Weight gain is not calculated for in-patients that are transferred-out at the end of the transition phase. There is not meant to be any weight gained during the acute phase and the weight gained during the transition phase is only over a few days and is not informative or useful. There is often weight loss during in-patient treatment (especially for those with oedema, and wasted patients with anorexia).

- ***Indicators for each OTP***

  The following are calculated for **each** OTP:

OTP Cure rate[208]

This equals the total number of patients that achieve the discharge criteria used by the programme as a proportion of the total number leaving the programme (**not** including those that are transferred-out to IPF or another OTP[209]).

$$\frac{\textit{Number of patient discharged as cured}}{\textit{Total of patients classified as cured, default, unknown and died}}$$

OTP Death rate[210]

$$\frac{\textit{Number of patient died in the OTP}}{\textit{Total of patients classified as cured, default, unknown and died}}$$

OTP Default rate

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

$$\frac{\textit{Number of true defaulters}[211]}{\textit{Total of patients classified as cured, default, unknown and died}}$$

[208] Also termed "recovery rate"

[209] The transfer-out patients from OTP are expected to return. When they return they will be included in a subsequent month's statistics (they should not be included as leaving the programme twice or in the OTP denominator). If they do not return they will be included in the IPF's statistics of death or defaulting; any discrepancy between the transfer- out from the OTP and those arriving at the IPF will be due to patients who are referred and do not arrive at the receiving facility.

[210] NOTE: the IPF counts the transfer-out patients in the denominator (successful treatment); the OTP does NOT count the transfer-out patients in the denominator as these patients are expected to return to the OTP.

[211] The patient has been home-visited and the reason for defaulting is known. The others patients who haven't been home-visited are considered as discharged 'unknown'.

OTP Unknown outcome rate

This is where the outcome of the patient is not known – the patient has either defaulted or died. The staff should not consider that an unknown outcome is a reason for criticism. It is usually not possible to determine if a child is a defaulter or has died between time of absence of the child and preparing the monthly report – there is provision for revision of the categories of discharged patients from previous months when a home-visit has been made by the outreach worker or community volunteer. If there is no home-visit then the child will remain in the unknown outcome category. This category will either be added to the defaulter rate to give the true defaulter rate or to the death rate to give the true death rate; until the outcome is determined the unknown rate will result in a possible range for the defaulters and for the deaths.

$$\frac{\textit{Number of patients absent from the programme whose outcome is unknown}}{\textit{Total of patients classified as cured, default, unknown and died}}$$

OTP Transfer-out rate is the proportion of the children that are transferred to an IPF or another OTP.

$$\frac{\textit{Number of patient transferred to IPF or another OTP}}{\textit{Total of patients transferred-out plus those classified as cured, default, unknown and died}}$$

<u>There are other rates</u> that are used to evaluate the programme that can be calculated by the District Nutrition officer from the reports. See below to consolidated report:

OTP Mean length of stay (wasted cured children)

This indicator should be calculated ONLY for the cured patients[212] aged 6 to 59 months.

$$\frac{\textit{Sum of number of days for each recovered patient (discharge date – admission date both included)}}{\textit{Number of recovered patients}}$$

Mean rate of weight gain (RWG_{min}) for wasted cured children (OTP only)

This indicator is particularly useful to show the quality of feeding at home. It is related to the degree of sharing of the RUTF within the family. The average weight gain is calculated for all RECOVERED patients from 6 to 59 months of age.

1. *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.*
2. *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[213]:

[212] 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 during an occasional evaluation and analysed separately.

[213] The date of minimum weight is often not known for OTP patients – the date of the lowest weight recorded on the OTP chart should be used. Sometimes the rate of weight gain from admission to discharge is used for convenience. If this method of calculating the rate of weight gain is used, then this should be reported as RWG_{adm}.

3. *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 [122], 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.

RUTF consumption

The monthly RUTF received, dispensed and in-stock should be reported (and other supplies). These data are used to arrange restocking of the OTP/IPF and for ordering fresh supplies.

The data can also be used as a stock control. The average number of children within the programme at the IMAM site (number at the beginning of the month + the number at the end of the month divided by two) multiplied by the average weight of the children and the number of sachets of RUTF given to a child of that average weight per week (multiplied by 4 to get the amount used per month) should agree with the amount of RUTF dispensed.

e.g. Thus, let us say that there are 80 children at the beginning of the month and 100 children at the end of the month, and the average weight of the children is 6kg (this category of child gets 15 sachets per week).

Then the monthly consumption should be around:

- (80 +100)/2 = 100 patients
- 100 x 15 x 4 = 6, 000 sachets per month

There are usually 150 sachets per box. Therefore the RUTF consumption of this OTP should be around 6,000/150 = 40 boxes of RUTF per month. There may be slightly more than this used depending upon the number of appetite tests that are conducted (one or two boxes). If the consumption is much higher than this then the OTP should be visited and the stock control mechanisms, application of the protocol and storage facilities inspected.

Consolidated report for whole programme

- A programme monthly report is prepared by the District Nutrition officer from the individual reports of each Catchment area – that is the Satellite OPTS and the IPF to which they refer patients and from which they receive patients within a defined geographical area. There is normally only one catchment in each district, but in large districts with several in-patient facilities there may be several catchment areas. These are separately tabulated in the district report and the overall rates for the district are then compiled.

  The data for the individual OTPs and IPFs are retained in the database.

- In a programme where patients move from one facility to another during the different phases of their management, the data for any one component indicates how that component is functioning and where it is necessary to evaluate and retrain, but it does not allow for planning of resources or examining the performance of the programme. This is done by calculation of the programme parameters. A proper evaluation of the programme including communication between centres, transport, proper use of forms and completion of the reports, consumption of the RUTF, refusal, defaulting, death, cure and success rates should be shared with all those involved with the programme ideally every 6 months, but at least annually.

- In producing the overall programme statistics the transfer-out and transfer-in categories are not used. The numbers of NEW admissions plus the relapses for all the OTPs and the IPF are added together to give the total admissions for the programme within the catchment area[214]; the number of cures, deaths, defaulting, unknown and medical referrals are also summed over each OTP and IPF and then the overall rates are calculated.

- **Programme cure rate** = Number of patients cured /Total number of exits from the programme
- **Programme default rate** = Number of patients defaulting /Total number of exits from the programme
- **Programme death rate** = Number of patients who died /Total number of exits from the programme
- **Programme unknown outcome rate** = Number of patients with unknown outcome/Total number of exits from the programme
- **Programme medical-referral rate** = Number of patients leaving because of medical referral /Total number of exits from the programme

- **The total number of exits from the programme** = the sum of all the children who were cured, died, defaulted, were absent with unknown outcome and medical-referrals. (Remember that it doesn't include the transfer-out and transfer-in categories.)

- **The transfer-out from the OTPs to the IPF** should match the transfer-in to the IPF. Where the IPF lists the referring OTP sites separately in its report for admissions and discharges it is possible to examine the numbers of patients who fail to reach the destination facility.

- The village screening data are also compiled by the District Health Management team with the Nutrition Office and the statistics, health information and rural development focal points. The data should be mapped to show the pockets of malnutrition act and analysed by month to show any seasonality. This functions as a surveillance system, indicates where new OTP or IPF facilities are to be sited and defines a "normal" year so that future deviations may indicate an emergency situation. The numbers of children identified in the catchment area of an OTP as having SAM from screening should match the numbers of new admissions to the OTP. If this is not the case, the reason should be sought; often this is related to the distance the patients have to travel and indicates the need for opening a new OTP site.

- There are several other indicators that the District Health team members/District Nutrition officer should compile from time to time. These would include:
    - The refusal-to-be-transferred rate
    - The death during transport rate (dead-on-arrival)

  Which would both indicate the need for a new IPF (perhaps in a health centre) to be established close to the patients' homes.
    - Wrong referral rate by the screening teams to the OTPs. *(Indicates need for retraining of screening teams)*
    - The wrong admission rate to the OTP and IPF *(indicates need for retraining of OTP/IPF staff)*.

[214] Do NOT take the average of the rates. Do take the absolute number of children from each OTP and IPF that is new admissions or discharges. Each will have a different number of patients so that an average is biased that is why it is important to add the numbers together and then calculate the overall rate of cure, defaulting, death, medical referral, and unknown outcome.

5. Minimum standards

Reference values have been developed by the Sphere project. They provide benchmarks against which to interpret the functioning of individual in-patient programmes. They give an indication of what might be considered "acceptable" and "bad" functioning under average conditions.

In the last Sphere standards project handbook of April 2011, it is stated that:

"Performance indicators relate to discharged individuals ending treatment. The total number of discharged individuals is made up of all who have recovered, died, defaulted or are non-recovered. Individuals who are referred for complementary services (such as health services) have not ended the treatment and will either continue treatment or return to continue the treatment later. Individuals transferred out to other sites have not ended the treatment and should not be included in performance indicators. Performance-related indicators are as follows:

- Proportion of discharged recovered=
  *(Number of individuals recovered / total number of discharged)*100 %*
- Proportion of discharged died=
  *(Number of individuals died / total number of discharged)*100 %*
- Proportion of discharged defaulted=
  *(Number of individuals defaulted / total number of discharged)*100 %*
- Proportion of discharged non-recovered=
  *(Number of individuals non-recovered / total number of discharged)*100 %*

→ Key indicators (to be read in conjunction with the guidance notes). These indicators are primarily applicable to the 6–59 month age group, although others may be part of the programme.

The proportion of discharges from therapeutic care who have:

- *died is <10 %,*
- *recovered is >75 %,*
- *defaulted is <15 %"*

With the treatment outlined in this manual experience has shown that the mortality rate is consistently below 5% in "good" in-patient facilities. The mortality in OTP should be very much less because these cases are being identified early and are uncomplicated.

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.

REFERENCE LIST

1. Golden MH. The nature of nutritional deficiency in relation to growth failure and poverty. *Acta Paediatr Scand Suppl* 1991;374:95-110.
2. Pelletier DL, Frongillo EA, Jr., Habicht JP. Epidemiologic evidence for a potentiating effect of malnutrition on child mortality. *Am J Public Health* 1993;83:1130-3.
3. Pelletier DL, Frongillo EA, Jr., Schroeder DG, Habicht JP. The effects of malnutrition on child mortality in developing countries. *Bull WHO* 1995;73:443-8.
4. Golden MH. Proposed recommended nutrient densities for moderately malnourished children. *Food Nutr Bull* 2009;30:S267-S342.
5. Miall WE, Desai P, Standard KL. Malnutrition, infection and child growth in Jamaica. *J Biosoc Sci* 1970;2:31-44.
6. Ashworth A, Chopra M, McCoy D et al. WHO guidelines for management of severe malnutrition in rural South African hospitals: effect on case fatality and the influence of operational factors. *Lancet* 2004;363:1110-5.
7. Schofield C, Ashworth A. Why have mortality rates for severe malnutrition remained so high? *Bull WHO* 1996;74:223-9.
8. Collins S. Treating severe acute malnutrition seriously. *Arch Dis Child* 2007;92:453-61.
9. Linneman Z, Matilsky D, Ndekha M, Maleta K, Manary MJ. A large-scale operational study of home-based therapy with ready-to-use therapeutic food in childhood malnutrition in Malawi. *Matern Child Nutr* 2007;3:206-15.
10. Doherty CP, Sarkar MA, Shakur MS, Ling SC, Elton RA, Cutting WA. Zinc and rehabilitation from severe protein-energy malnutrition: higher-dose regimens are associated with increased mortality. *Am J Clin Nutr* 1998;68:742-8.
11. Christie CD, Heikens GT, Black FL. Acute respiratory infections in ambulatory malnourished children: a serological study. *Trans R Soc Trop Med Hyg* 1990;84:160-1.
12. Trehan I, Amthor RE, Maleta K, Manary MJ. Evaluation of the routine use of amoxicillin as part of the home-based treatment of severe acute malnutrition. *Trop Med Int Health* 2010.
13. Bejon P, Mwangi I, Ngetsa C et al. Invasive Gram-negative bacilli are frequently resistant to standard antibiotics for children admitted to hospital in Kilifi, Kenya. *J Antimicrob Chemother* 2005;56:232-5.
14. Noorani N, Macharia WM, Oyatsi D, Revathi G. Bacterial isolates in severely malnourished children at Kenyatta National Hospital, Nairobi. *East Afr Med J* 2005;82:343-8.
15. Heikens GT, Schofield WN, Christie CD, Gernay J, Dawson S. The Kingston Project. III. The effects of high energy supplement and metronidazole on malnourished children rehabilitated in the community: morbidity and growth. *Eur J Clin Nutr* 1993;47:174-91.
16. Lares-Asseff I, Cravioto J, Santiago P, Perez-Ortiz B. A new dosing regimen for metronidazole in malnourished children. *Scand J Infect Dis* 1993;25:115-21.
17. Dempster WS, Sive AA, Rosseau S, Malan H, Heese HV. Misplaced iron in kwashiorkor. *Eur J Clin Nutr* 1995;49:208-10.
18. Ramdath DD, Golden MH. Non-haematological aspects of iron nutrition. *Nutr Res Rev* 1989;2:29-49.
19. Heikens GT, Schofield WN, Dawson S. The Kingston Project. II. The effects of high energy supplement and metronidazole on malnourished children rehabilitated in the community: anthropometry. *Eur J Clin Nutr* 1993;47:160-73.

20. Heikens GT, Schofield WN, Christie CD, Gernay J, Dawson S. The Kingston Project. III. The effects of high energy supplement and metronidazole on malnourished children rehabilitated in the community: morbidity and growth. *Eur J Clin Nutr* 1993;47:174-91.

21. Donnen P, Sylla A, Dramaix M, Sall G, Kuakuvi N, Hennart P. Effect of daily low dose of vitamin A compared with single high dose on morbidity and mortality of hospitalized mainly malnourished children in senegal: a randomized controlled clinical trial. *Eur J Clin Nutr* 2007;61:1393-9.

22. Donnen P, Dramaix M, Brasseur D, Bitwe R, Vertongen F, Hennart P. Randomized placebo-controlled clinical trial of the effect of a single high dose or daily low doses of vitamin A on the morbidity of hospitalized, malnourished children. *Am J Clin Nutr* 1998;68:1254-60.

23. Williams C. Witch doctors. *Pediatrics* 1970;46:448-55.

24. Christie CD, Heikens GT, McFarlane DE. Nosocomial and community-acquired infections in malnourished children. *J Trop Med Hyg* 1988;91:173-80.

25. Dubray C, Ibrahim SA, Abdelmutalib M et al. Treatment of severe malnutrition with 2-day intramuscular ceftriaxone vs 5-day amoxicillin. *Ann Trop Paediatr* 2008;28:13-22.

26. Ashton M, Bolme P, Alemayehu E, Eriksson M, Paalzow L. Decreased chloramphenicol clearance in malnourished Ethiopian children. *Eur J Clin Pharmacol* 1993;45:181-6.

27. Eriksson M, Paalzow L, Bolme P, Mariam TW. Chloramphenicol pharmacokinetics in Ethiopian children of differing nutritional status. *Eur J Clin Pharmacol* 1983;24:819-23.

28. Mahta S, Nain CK, Kalsi HK, Mathur VS. Bioavailability and pharmacokinetics of chloramphenicol palmitate in malnourished children. *Indian J Med Res* 1981;74:244-50.

29. Mehta S, Kalsi HK, Jayaraman S, Mathur VS. Chloramphenicol metabolism in children with protein-calorie malnutrition. *Am J Clin Nutr* 1975;28:977-81.

30. Gendrel D, Chalumeau M, Moulin F, Raymond J. Fluoroquinolones in paediatrics: a risk for the patient or for the community? *Lancet Infect Dis* 2003;3:537-46.

31. Grady R. Safety profile of quinolone antibiotics in the pediatric population. *Pediatr Infect Dis J* 2003;22:1128-32.

32. Christie CD, Heikens GT, Golden MH. Coagulase-negative staphylococcal bacteremia in severely malnourished Jamaican children. *Pediatr Infect Dis J* 1992;11:1030-6.

33. Murray KF, Hadzic N, Wirth S, Bassett M, Kelly D. Drug-related hepatotoxicity and acute liver failure. *J Pediatr Gastroenterol Nutr* 2008;47:395-405.

34. Buchanan N, Davis MD, Eyberg C. Gentamicin pharmacokinetics in kwashiorkor. *Br J Clin Pharmacol* 1979;8:451-3.

35. Khan AM, Ahmed T, Alam NH, Chowdhury AK, Fuchs GJ. Extended-interval gentamicin administration in malnourished children. *J Trop Pediatr* 2006;52:179-84.

36. Lares Asseff I, Cravioto J, Santiago P, Perez Ortiz B. Pharmacokinetics of metronidazole in severely malnourished and nutritionally rehabilitated children. *Clin Pharmacol Ther* 1992;51:42-50.

37. Zuccoli G, Pipitone N, Santa CD. Metronidazole-induced and Wernicke encephalopathy: two different entities sharing the same metabolic pathway? *AJNR Am J Neuroradiol* 2008;29:E84.

38. Kim DW, Park JM, Yoon BW, Baek MJ, Kim JE, Kim S. Metronidazole-induced encephalopathy. *J Neurol Sci* 2004;224:107-11.

39. Efferth T, Kaina B. Toxicity of the antimalarial artemisinin and its dervatives. *Crit Rev Toxicol* 2010;40:405-21.

40. Makanga M, Premji Z, Falade C et al. Efficacy and safety of the six-dose regimen of artemether-lumefantrine in pediatrics with uncomplicated Plasmodium falciparum malaria: a pooled analysis of individual patient data. *Am J Trop Med Hyg* 2006;74:991-8.
41. Falade C, Makanga M, Premji Z, Ortmann CE, Stockmeyer M, De Palacios PI. Efficacy and safety of artemether-lumefantrine (Coartem) tablets (six-dose regimen) in African infants and children with acute, uncomplicated falciparum malaria. *Trans R Soc Trop Med Hyg* 2005;99:459-67.
42. Gomes M, Ribeiro I, Warsame M, Karunajeewa H, Petzold M. Rectal artemisinins for malaria: a review of efficacy and safety from individual patient data in clinical studies. *BMC Infect Dis* 2008;8:39.
43. Ha V, Nguyen NH, Tran TB et al. Severe and complicated malaria treated with artemisinin, artesunate or artemether in Viet Nam. *Trans R Soc Trop Med Hyg* 1997;91:465-7.
44. Jones KL, Donegan S, Lalloo DG. Artesunate versus quinine for treating severe malaria. *Cochrane Database Syst Rev* 2007;CD005967.
45. AlKadi HO. Antimalarial drug toxicity: a review. *Chemotherapy* 2007;53:385-91.
46. Taylor WR, White NJ. Antimalarial drug toxicity: a review. *Drug Saf* 2004;27:25-61.
47. Sirima SB, Tiono AB, Gansane A et al. The efficacy and safety of a new fixed-dose combination of amodiaquine and artesunate in young African children with acute uncomplicated Plasmodium falciparum. *Malar J* 2009;8:48.
48. Golden MH. Severe Malnutrition. In: Weatherall DJ, Ledington JGG, Warrell DA, eds. *Oxford Textbook of Medicine*. Oxford: Oxford University Press 1996:1278-96.
49. Grellety, Y.The management of severe malnutrition in Africa (Ph.D.) University of Aberdeen 2000.
50. Salako LA, Sowunmi A, Akinbami FO. Pharmacokinetics of quinine in African children suffering from kwashiorkor. *Br J Clin Pharmacol* 1989;28:197-201.
51. Bluhm DP, Summers RS. Plasma vitamin A levels in measles and malnourished pediatric patients and their implications in therapeutics. *J Trop Pediatr* 1993;39:179-82.
52. Large S, Neal G, Glover J, Thanangkul O, Olson RE. The early changes in retinol-binding protein and prealbumin concentrations in plasma of protein-energy malnourished children after treatment with retinol and an improved diet. *Br J Nutr* 1980;43:393-402.
53. Smith FR, Goodman DS, Arroyave G, Viteri FE. Serum vitamin A, retinol-binding protein, and prealbumin concentrations in protein-calorie malnutrition. 2. Treatment including supplemental vitamin A. *Am J Clin Nutr* 1973;26:982-7.
54. Sommer A, Tarwotjo I. Protein deficiency and treatment of xerophthalmia. *Arch Ophthalmol* 1982;100:785-7.
55. Oppenheimer SJ. Iron and its relation to immunity and infectious disease. *J Nutr* 2001;131:616S-33S.
56. Sazawal S, Black RE, Ramsan M et al. Effects of routine prophylactic supplementation with iron and folic acid on admission to hospital and mortality in preschool children in a high malaria transmission setting: community-based, randomised, placebo-controlled trial. *Lancet* 2006;367:133-43.
57. Sive AA, Dempster WS, Rosseau S, Kelly M, Malan H, Heese HD. Bone marrow and chelatable iron in patients with protein energy malnutrition. *S Afr Med J* 1996;86:1410-3.
58. Smith IF, Taiwo O, Golden MH. Plant protein rehabilitation diets and iron supplementation of the protein-energy malnourished child. *Eur J Clin Nutr* 1989;43:763-8.
59. Fechner A, Bohme C, Gromer S, Funk M, Schirmer R, Becker K. Antioxidant status and nitric oxide in the malnutrition syndrome kwashiorkor. *Pediatr Res* 2001;49:237-43.

60. Sauniere JF, Sarles H. Exocrine pancreatic function and protein-calorie malnutrition in Dakar and Abidjan (West Africa): silent pancreatic insufficiency. *Am J Clin Nutr* 1988;48:1233-8.

61. Beau JP, Fontaine O, Garenne M. Management of malnourished children with acute diarrhoea and sugar intolerance. *J Trop Pediatr* 1989;35:281-4.

62. Dewit O, Boudraa G, Touhami M, Desjeux JF. Breath hydrogen test and stools characteristics after ingestion of milk and yogurt in malnourished children with chronic diarrhoea and lactase deficiency. *J Trop Pediatr* 1987;33:177-80.

63. Birt, J. C.Water requirements of malnourished children in extreme hot and dry environments. (MSc) University of Aberdeen 1999.

64. McKenzie D, Hansen JDL, Becker W. Herpes simplex virus infection: dissemination in association with malnutrition. *Arch Dis Child* 1959;34:250-6.

65. Templeton AC. Generalised Herpes simplex in malnourished children. *J Clin Pathol* 1970;23:24-30.

66. Niermeyer S. Volume resuscitation: crystalloid versus colloid. *clin perinatol* 2006;33:133-40, viii.

67. Liberati A, Moja L, Moschetti I, Gensini GF, Gusinu R. Human albumin solution for resuscitation and volume expansion in critically ill patients. *Intern Emerg Med* 2006;1:243-5.

68. Dellinger RP, Levy MM, Carlet JM et al. Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock: 2008. *Crit Care Med* 2008;36:296-327.

69. Phornphatkul C, Pongprot Y, Suskind R, George V, Fuchs G. Cardiac function in malnourished children. *Clin Pediatr* 1994;33:147-54.

70. Piza J, Troper L, Cespedes R, Miller JH, Berenson GS. Myocardial lesions and heart failure in infantile malnutrition. *Am J Trop Med Hyg* 1971;20:343-55.

71. Wharton BA, Howells GR, McCance RA. Cardiac failure in kwashiorkor. *Lancet* 1967;ii:384-7.

72. Harland PS, Mason J, Dunn P. Proceedings: Problems encountered in design of diets for treatment of protein energy malnutrition. *Arch Dis Child* 1974;49:245-6.

73. Manar MJ, MacPherson GD, McArdle F, Jackson MJ, Hart CA. Selenium status, kwashiorkor and congestive heart failure. *Acta Paediatr* 2001;90:950-2.

74. Forrester T, Golden MH, Brand S, Swales J. Reduction in vitro of red cell glutathione reproduces defects of cellular sodium transport seen in oedematous malnutrition. *Eur J Clin Nutr* 1990;44:363-9.

75. Toohey JI. Sulfur metabolism in AIDS: cystamine as an anti-HIV agent. *AIDS Res Hum Retroviruses* 2009;25:1057-60.

76. Saxena A, Juneja R, Ramakrishnan S. Drug therapy of cardiac diseases in children. *ind ped* 2009;46:310-38.

77. Brooke OG, Salvosa CB. Response of malnourished babies to heat. *Arch Dis Child* 1974;49:123-7.

78. English M, Marsh V, Amukoye E, Lowe B, Murphy S, Marsh K. Chronic salicylate poisoning and severe malaria. *Lancet* 1996;347:1736-7.

79. Clark I, Whitten R, Molyneux M, Taylor T. Salicylates, nitric oxide, malaria, and Reye's syndrome. *Lancet* 2001;357:625-7.

80. Mazer M, Perrone J. Acetaminophen-induced nephrotoxicity: pathophysiology, clinical manifestations, and management. *J Med Toxicol* 2008;4:2-6.

81. Lauterburg BH. Analgesics and glutathione. *Am J Ther* 2002;9:225-33.

82. Mehta S, Nain CK, Yadav D, Sharma B, Mathur VS. Disposition of acetaminophen in children with protein calorie malnutrition. *Int J Clin Pharmacol Ther Toxicol* 1985;23:311-5.
83. Kerr DS, Stevens MC, Robinson HM. Fasting metabolism in infants. I. Effect of severe undernutrition on energy and protein utilization. *Metabolism* 1978;27:411-35.
84. Buchanan N. Drug kinetics in protein energy malnutrition. *S Afr Med J* 1978;53:327-30.
85. Buchanan N. Effect of protein-energy malnutrition on drug metabolism in man. *World Rev Nutr Diet* 1984;43:129-39.
86. Mehta S. Malnutrition and drugs: clinical implications. *Dev Pharmacol Ther* 1990;15:159-65.
87. Krishnaswamy K. Drug metabolism and pharmacokinetics in malnourished children. *Clin Pharmacokinet* 1989;17 Suppl 1:68-88.
88. Tostmann A, Boeree MJ, Aarnoutse RE, de Lange WC, van der Ven AJ, Dekhuijzen R. Antituberculosis drug-induced hepatotoxicity: concise up-to-date review. *J Gastroenterol Hepatol* 2008;23:192-202.
89. Thame M, Gray R, Forrester T. Parkinsonian-like tremors in the recovery phase of kwashiorkor. *West Indian Med J* 1994;43:102-3.
90. Kohaut EC, Klish WJ, Beachler CW, Hill LL. Reduced renal acid excretion in malnutrition: a result of phosphate depletion. *Am J Clin Nutr* 1977;30:861-7.
91. Gryboski J, Hillemeier C, Kocoshis S, Anyan W, Seashore JS. Refeeding pancreatitis in malnourished children. *J Pediatr* 1980;97:441-3.
92. Worley G, Claerhout SJ, Combs SP. Hypophosphatemia in malnourished children during refeeding. *Clin Pediatr (Phila)* 1998;37:347-52.
93. Saito T, Tojo K, Miyashita Y, Tominaga M, Masai A, Tajima N. Acute liver damage and subsequent hypophosphatemia in malnourished patients: case reports and review of literature. *Int J Eat Disord* 2008;41:188-92.
94. Mehanna HM, Moledina J, Travis J. Refeeding syndrome: what it is, and how to prevent and treat it. *bmj* 2008;336:1495-8.
95. Miller SJ. Death resulting from overzealous total parenteral nutrition: the refeeding syndrome revisited. *Nutr Clin Pract* 2008;23:166-71.
96. Stanga Z, Brunner A, Leuenberger M et al. Nutrition in clinical practice-the refeeding syndrome: illustrative cases and guidelines for prevention and treatment. *Eur J Clin Nutr* 2008;62:687-94.
97. Flesher ME, Archer KA, Leslie BD, McCollom RA, Martinka GP. Assessing the metabolic and clinical consequences of early enteral feeding in the malnourished patient. *JPEN J Parenter Enteral Nutr* 2005;29:108-17.
98. Fotheringham J, Jackson K, Kersh R, Gariballa SE. Refeeding syndrome: life-threatening, underdiagnosed, but treatable. *QJM* 2005;98:318-9.
99. Khardori R. Refeeding syndrome and hypophosphatemia. *J Intensive Care Med* 2005;20:174-5.
100. Afzal NA, Addai S, Fagbemi A, Murch S, Thomson M, Heuschkel R. Refeeding syndrome with enteral nutrition in children: a case report, literature review and clinical guidelines. *Clin Nutr* 2002;21:515-20.
101. de Menezes FS, Leite HP, Fernandez J, Benzecry SG, de Carvalho WB. Hypophosphatemia in critically ill children. *Rev Hosp Clin Fac Med Sao Paulo* 2004;59:306-11.
102. Kimutai D, Maleche-Obimbo E, Kamenwa R, Murila F. Hypo-phosphataemia in children under five years with kwashiorkor and marasmic kwashiorkor. *East Afr Med J* 2009;86:330-6.

103. De SA, Smith T, Stroud M. Attitudes to NICE guidance on refeeding syndrome. *bmj* 2008;337:a680.

104. Waterlow JC, Golden MH. Serum inorganic phosphate in protein-energy malnutrition. *Eur J Clin Nutr* 1994;48:503-6.

105. Freiman I, Pettifor JM, Moodley GM. Serum phosphorus in protein energy malnutrition. *Journal of Pediatric Gastroenterology & Nutrition* 1982;1:547-50.

106. Manary MJ, Hart CA, Whyte MP. Severe hypophosphatemia in children with kwashiorkor is associated with increased mortality. *J Pediatr* 1998;133:789-91.

107. Heimburger DC, Koethe JR, Nyirenda C et al. Serum phosphate predicts early mortality in adults starting antiretroviral therapy in Lusaka, Zambia: a prospective cohort study. *PLoS ONE* 2010;5:e10687.

108. Thompson A, Damyanovich A, Madapallimattam A, Mikalus D, Allard J, Jeejeebhoy KN. 31P-nuclear magnetic resonance studies of bioenergetic changes in skeletal muscle in malnourished human adults. *Am J Clin Nutr* 1998;67:39-43.

109. Waterlow JC. Oxidative phosphorylation in the livers of normal and malnourished human infants. *Proc R Soc (B)* 1961;155:96-114.

110. Pollock L, Else L, Poerksen G et al. Pharmacokinetics of nevirapine in HIV-infected children with and without malnutrition receiving divided adult fixed-dose combination tablets. *J Antimicrob Chemother* 2009;64:1251-9.

111. Foster C, Lyall H. HIV and mitochondrial toxicity in children. *J Antimicrob Chemother* 2008;61:8-12.

112. Brooks SE, Golden MH, Taylor E. Hepatic ultrastructure in children with protein-energy malnutrition. *West Indian Med J* 1992;41:139-45.

113. Paton NI, Sangeetha S, Earnest A, Bellamy R. The impact of malnutrition on survival and the CD4 count response in HIV-infected patients starting antiretroviral therapy. *HIV Med* 2006;7:323-30.

114. Gendrel D, Nardou M, Mouba JF, Gahouma D, Moussavou A, Boguikouma JB. [Hepatotoxicity of the combination of isoniazid-rifampicin in African children. Role of malnutrition and HB virus]. *Arch Fr Pediatr* 1989;46:645-8.

115. Kaplan R. The nothing that is: a natural history of zero. London: Penguine Books, 2000.

116. Roberts JR, Benjamin JT, Fox S. Crunchy peanut butter: a cause of foreign body aspiration in children. *Clin Pediatr (Phila)* 1996;35:591-2.

117. Murray MJ, Murray AB, Murray MB, Murray CJ. Somali food shelters in the Ogaden famine and their impact on health. *Lancet* 1976;1:1283-5.

118. Hormann E, Savage F. Relactation: Review of experience and recommendations for practice. Geneva: WHO, 1998.

119. Gabay MP. Galactogogues: medications that induce lactation. *J Hum Lact* 2002;18:274-9.

120. Yoshida K, Smith B, Kumar R. Psychotropic drugs in mothers' milk: a comprehensive review of assay methods, pharmacokinetics and of safety of breast-feeding. *J Psychopharmacol* 1999;13:64-80.

121. Tenyi T, Csabi G, Trixler M. Antipsychotics and breast-feeding: a review of the literature. *Paediatr Drugs* 2000;2:23-8.

122. Prudhon C, Golden MH, Briend A, Mary JY. A model to standardise mortality of severely malnourished children using nutritional status on admission to therapeutic feeding centres. *Eur J Clin Nutr* 1997;51:771-7.

ANNEXES

Annexe 1: ACFIN missions – HIV prevalence per country – October 2009

ACFIN missions – HIV prevalence per country October 2009

Country	Prevalence (UNAIDS 2008)	Very High / High / Medium / Low*	ACF Nutrition Programme?	Priority rank
Swaziland	26,1%	Very high	Yes	1
Zimbabwe	15,3%	Very High	Yes	1
Zambia	15,2%	Very high	No	1
Malawi	11,9%	Very high	No	
Central African Republic	6,3%	High	Yes	1
Tanzania	6,2%	High	Yes	1
Uganda	5,4%	High	Yes	1
Ivory Coast	3,9%	Medium	Yes	1
Chad	3,5%	Medium	Yes	1
Haiti	2,2%	Medium	Yes	1
Burundi	2,0%	Medium	No	
Ethiopia	2,0%	Medium	Yes	1
Kenya	N/A	Medium	Yes	2
Liberia	1,7%	Medium	Yes	2
Sierra Leone	1,7%	Medium	Yes	2
Burkina Faso	1,6%	Medium	Yes	2
Guinea	1,6%	Medium	Yes	2
Mali	1,5%	Medium	Yes	2
DR Congo	N/A	Medium	Yes	2
Sudan	1,4%	Medium	Yes	2
North Caucasus	1,1%	Medium	No	
Mauritania	0,8%	Low	Yes	3

Niger	0,8%	Low	Yes	3
Guatemala	0,8%	Low	?	3
Myanmar	0,7%	Low	Yes	3
Colombia	0,6%	Low	yes	3
Paraguay	0,6%	Low	?	3
Somalia	0,5%	Low	Yes	3
Nepal	0,5%	Low	Yes	3
Peru	0,5%	Low	Yes	3
Argentina	0,5%	Low	?	3
India	0,3%	Low	No	
Indonesia	0,2%	Low	Yes	4
Azerbaïjan	0,2%	Low	?	4
Bolivia	0,2%	Low	?	4
Nicaragua	0,2%	Low	?	4
Laos	0,2%	Low	No	
Mongolia	0.1%	Low	No	
Lebanon	0,1%	Low	No ?	
Armenia	0,1%	Low	?	4
Georgia	0,1%	Low	?	4
Pakistan	0,1%	Low	?	4
Bangladesh	< 0.1%	Low	Yes	4
Afghanistan	< 0.1%	Low	No	
Yemen	< 0.1%	Low	soon	4
Philippines	< 0.1%	Low	?	4
Syria	n.d.			4

*** WHO cut-offs: <0.1-0.9% = low; 1.0 – 4.9% = medium; 5 – 14.9% = high; >=15% = very high**

Source: UNAIDS website accessed in July 30, 2009 - excepted for Chad - source UNICEF 2007

NB: prevalence of Russian Federation is used by default for North Caucasus.

Annexe 2: Out Patient Therapeutic Care Programme Draft plan

Out Patient Therapeutic Care Programme Draft plan

1. Introduction

This is a draft plan for an OTP programme. No solid plan can be given, as it depends on many different things, how your centre will be positioned and functioning.

There can be different locations for OTP as well: in an existing building (like a health centre), an annex to an existing building, or a completely new construction. Or just under the village tree.

The type of construction you make depends on if it is an emergency response or working within the MoH structures:

- the place available
- the number of beneficiaries expected
- the time the programme is expected to be in place
- the time available to set up the construction
- the budget available
- …

2. Different spaces needed

- **A fence** or way of "separating" the OTP from the surrounding area, especially if the OTP is in a camp, a densely populated area and/or is there is a high number of beneficiaries and a high pressure to get enrolled in the programme

- **Gates**: preferably 2: 1 entry and 1 exit (especially if high number of beneficiaries expected), that can be closed and locked. If a fence is needed

- **Waiting area**: an area where people wait to be measured and registered. It must be sufficiently big, shady so people don't wait in the sun, and have mats or benches so people can sit. It can be just a roof

- **Health education room**: a room where small groups of people are taken for the health education session and RUTF appetite test is conducted. It must also be shady, airy and have mats or benches. In small programmes, or where there is not enough space, the waiting area and health education room can be the same. Where a lot of beneficiaries are expected, a separate room is preferred

- **Measuring room**: where weight, height etc. are taken. It should be shady, airy, fenced of (or have a wall) and contain a bench or mats
  For the height board and adult scale, a concrete surface is needed to put the material on. There must be a space where the Salter scale can be hung. If adolescents and adults are admitted, a fenced of corner might be necessary to weigh women & girls without too many clothes (eg. Chador)

- **Registration room**: a space, right after the measurements where the register(s) work. It needs space for one table, and some chairs or benches for the beneficiaries

- **Nurse**: a space where the nurse can do the consultation and distribute the drugs. It must be big enough for one table and benches for the beneficiaries.

- **Food distributor**: a space where the rations are distributed. Big enough to put one table and a drum(s) or bag(s) of rations

- **Stock**: if food is left in the centre, an appropriate storeroom is needed, large enough, with protection from rodents and insects (pallets, walls, roof…) from rain and sun, and you must be able to close it and lock everything up to avoid theft

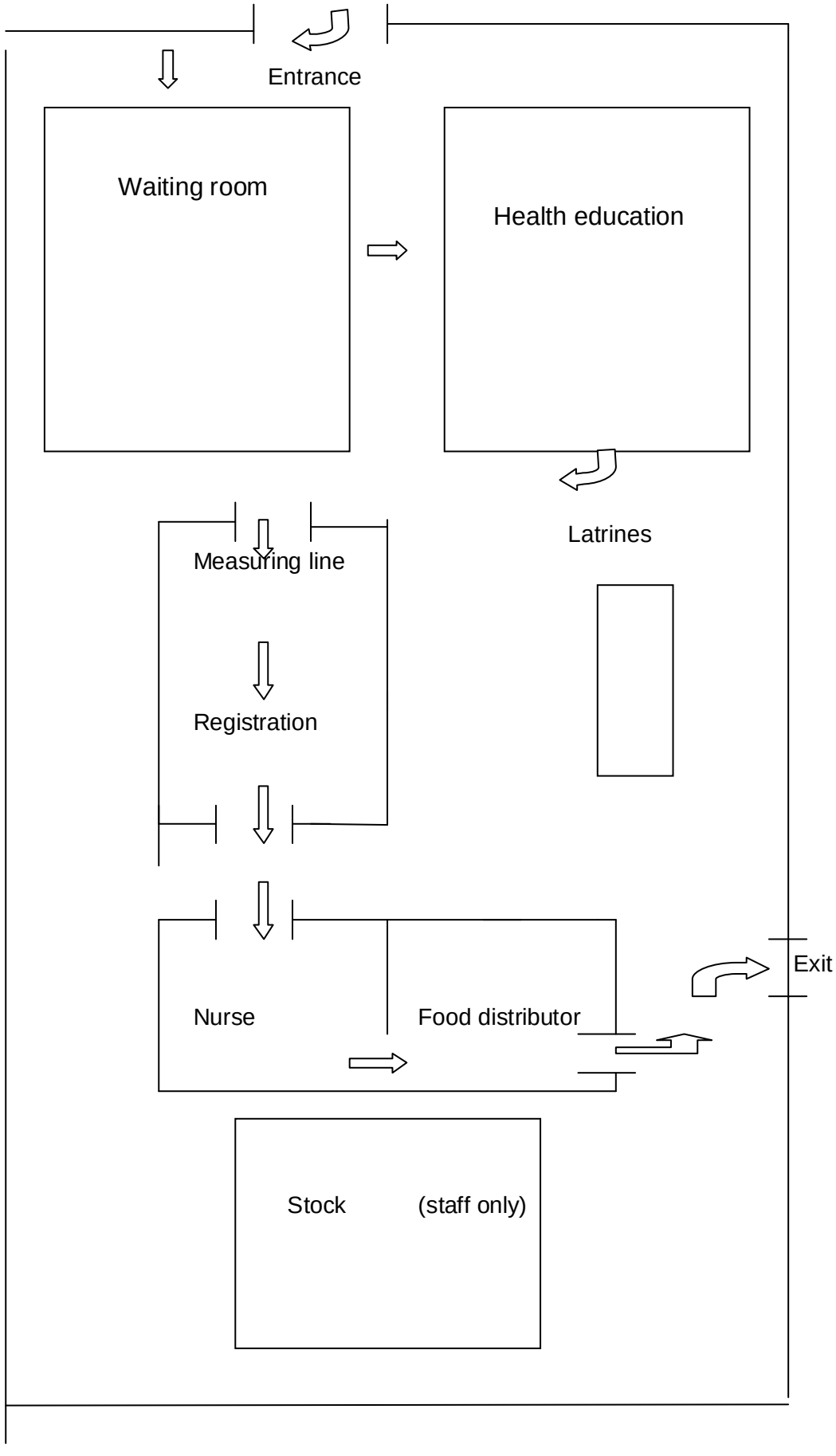
- **Latrines**: A number of latrines, accordingly to the number of beneficiaries and staff expected to be present, must be available

- **Hand washing and drinking points**: a water source must be available to make sure there is enough water to drink for beneficiaries waiting, and to fill the hand washing points (min. one at the nurse, one at the premix room, one at the exit of latrines). If there is an epidemic of cholera or other diarrhoeal of infectious diseases, more hygiene measures must be taken (pediluves, spraying…)

The different spaces can be made up of one big building, with low fences or other to separate the different locations, or of different buildings.

All the spaces, and the doors must in such a logic that beneficiaries can go from one space to another (as above), in a logical “flow”. This means, come in on one side, get out on the other, from there enter immediately in the next room etc. If people have to turn back where they came from, walk to the other side of the centre for the next room… beneficiaries get lost (eg they arrive at the food distributor without being measured), it is easier to cheat (eg. Return twice) and above all, it creates a big chaos.

Drinking water must be available and presented to the beneficiaries waiting, so cups must be available, as well as a space to clean them.


Entrance
Waiting room
Health education
Latrines
Measuring line
Registration
Exit
Nurse
Food distributor
Stock
(staff only)

In-Patient Therapeutic Care Programme Draft plan

1. Introduction

This is a draft plan for a Stabilisation Centre. No solid plan can be given, as it depends on many different things, how your centre will be positioned and functioning.

There can be different locations for SC as well: in an existing building (like a health centre or hospital), an annex to an existing building, or a completely new construction.

The type of construction you make depends on:

- the place available
- the number of beneficiaries expected
- the time the programme is expected to be in place
- the time available to set up the construction
- the budget available
- …

2. Different spaces needed

- **A fence** or way of "separating" the SC from the surrounding area, especially if the SC is in a camp, a densely populated area and/or is there is a high number of beneficiaries and a high pressure to get enrolled in the programme

- **Gates**: 1 gate that can be closed and locked, large enough to have a car/truck entering

- **Registration room**: a room where beneficiaries are weighed and measured and where the registration is done. If a lot of beneficiaries come for screening, a waiting area should also be foreseen

- **Consultation room**: a room where the medical person can do a consultation in private. Big enough, airy room, with space for an examination table, a table and some chairs

- **Phase 1**: One room or tent(s), according to the n° of beneficiaries expected. Beneficiaries stay during day and night. It must be shady, airy but protected. On the ground a concrete floor or plastic sheeting. Space is needed for mattresses. If many beneficiaries, a separate tent should be put in place for severely ill children (intensive care), close to the nursing room, with space for beds and a nursing cabinet

- **Transition phase**: similar to phase 1

- **Phase 2**: similar to phase 1

- **Low weight phase**: a separate phase must be foreseen for the smallest babies, as they are too much at risk of attracting infections when mixed with the other children. Their phase must be in the warmest part of the TFC, close to the nurses. The room/tent must be protected from drafts and water.

- **Kitchen**: for preparation of meals of milk and family meal. If day-care, but beneficiaries stay overnight, a small cooking area must be foreseen for mothers to cook in the evening. The kitchen must be airy, but well protected against insects. It must have stoves in according to the quantity of food that needs to prepared, a table, a cupboard that can be closed and it must in nearby a water tap for washing up and drying

- **Play room**: an area where children can play, and psycho-social sessions can be held

- **Central shelter**: a central shelter, just a roof, where mothers can sit outside when it is too hot in the tents and chat, play with the children, have the health education sessions etc.

- **Health education room**: if sufficient space & budget is available, a special health education room can be added, but if other spaces are available for this activity, it is not absolutely necessary

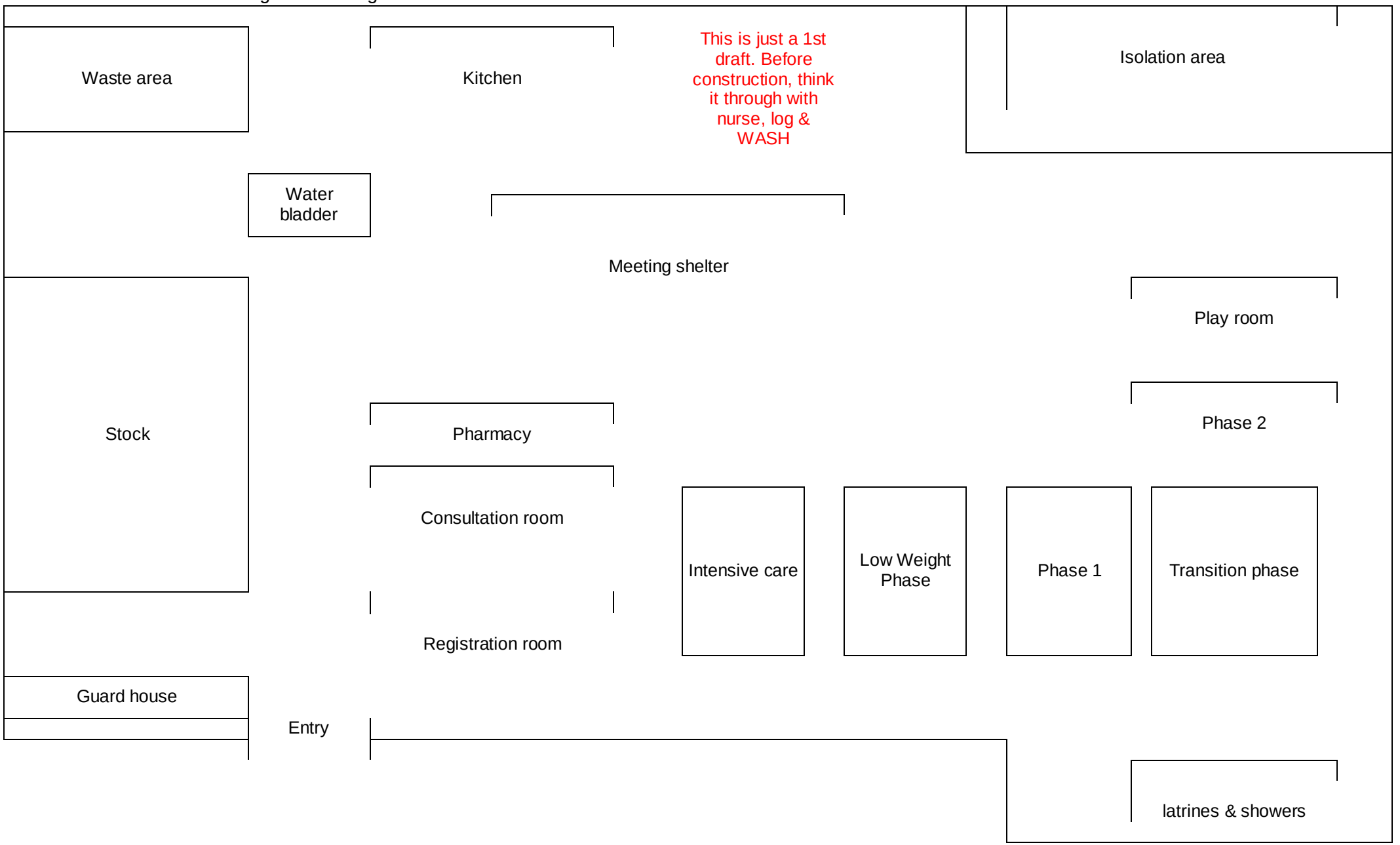
- **Stock**: a stock sufficiently big for the food, drugs and material that will be kept in the centre. A good door and locking system.

- **Latrines & showers**: A number of latrines & showers, accordingly to the number of beneficiaries and staff expected to be present, must be available. The showers must have a good evacuation system. The latrines must be well lit at night

- **Washing area**: an area with water taps, some concrete slab and a drainage, where caretakers can wash their clothes, especially needed if 24h care, or if people stay overnight; but also needed if day care, so mothers can perform their daily tasks in the centre

- **Hand washing and drinking points**: a water source must be available to make sure there is enough water to drink for beneficiaries and to fill the hand washing points (min. one at the nurse, one at the premix room, one at the exit of latrines). If there is an epidemic of cholera or other diarrhoeal of infectious diseases, more hygiene measures must be taken (pediluves, spraying,…)

- **Isolation area**: in areas where there is an epidemic on-going (measles, dysentery,…) or where other contagious diseases are common, an isolation area is obligatory, in other situations it is more than advisable to have it just in case. The isolation area should consist of 1 or more rooms/tents (in case isolation is needed for more than one disease) with separate latrines and showers, and a way of fencing it off from the rest of the centre. Make sure that it is comfortable enough (with some space outside etc.) so that isolated people do not feel imprisoned.


Waste area
Kitchen
This is just a 1st draft. Before construction, think it through with nurse, log & WASH
Isolation area
Water bladder
Meeting shelter
Play room
Stock
Pharmacy
Phase 2
Consultation room
Intensive care
Low Weight Phase
Phase 1
Transition phase
Registration room
Guard house
Entry
latrines & showers

Annexe 3: anthropometric measurements

1. Checking for bilateral pitting oedema
2. Taking the MUAC
3. Taking the weight
4. Taking the length/height
5. Calculating the Weight/Height

1. CHECKING FOR BILATERAL PITTING OEDEMA

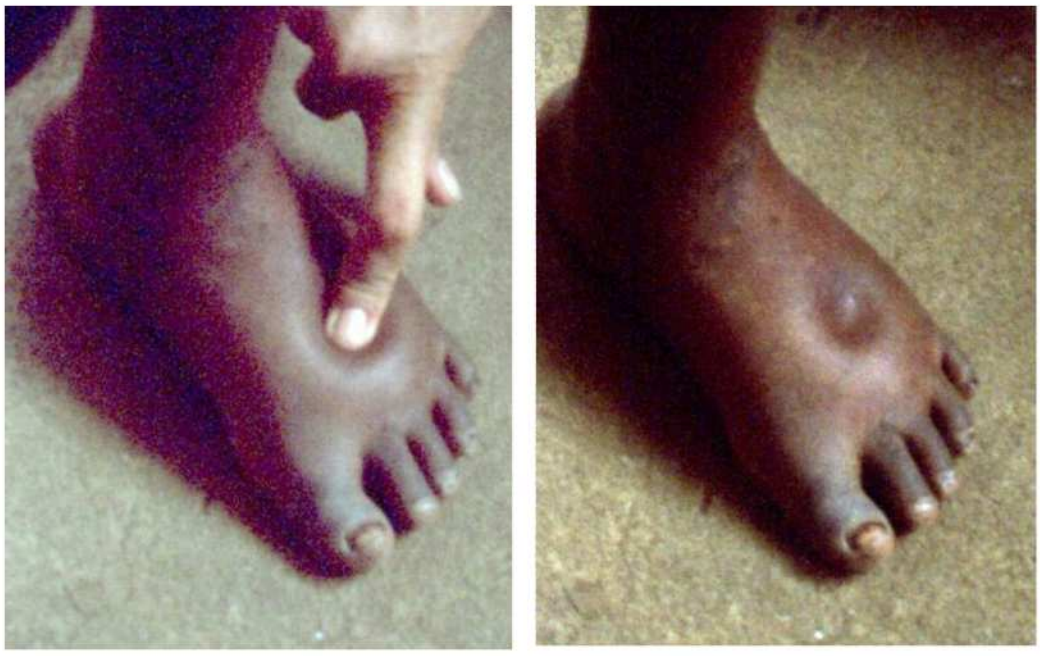
Bilateral oedema is the sign of Kwashiorkor. Kwashiorkor is *always* a severe form of malnutrition. Children with bilateral oedema are directly identified to be acutely malnourished. These children are at high risk of mortality and need to be treated in a therapeutic feeding programme urgently.

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.

Nutritional oedemas are classified as follows: + for feet, ++ for feet, tibia and forearm, +++ for the face and entire body.

You must formally test for oedema with finger pressure

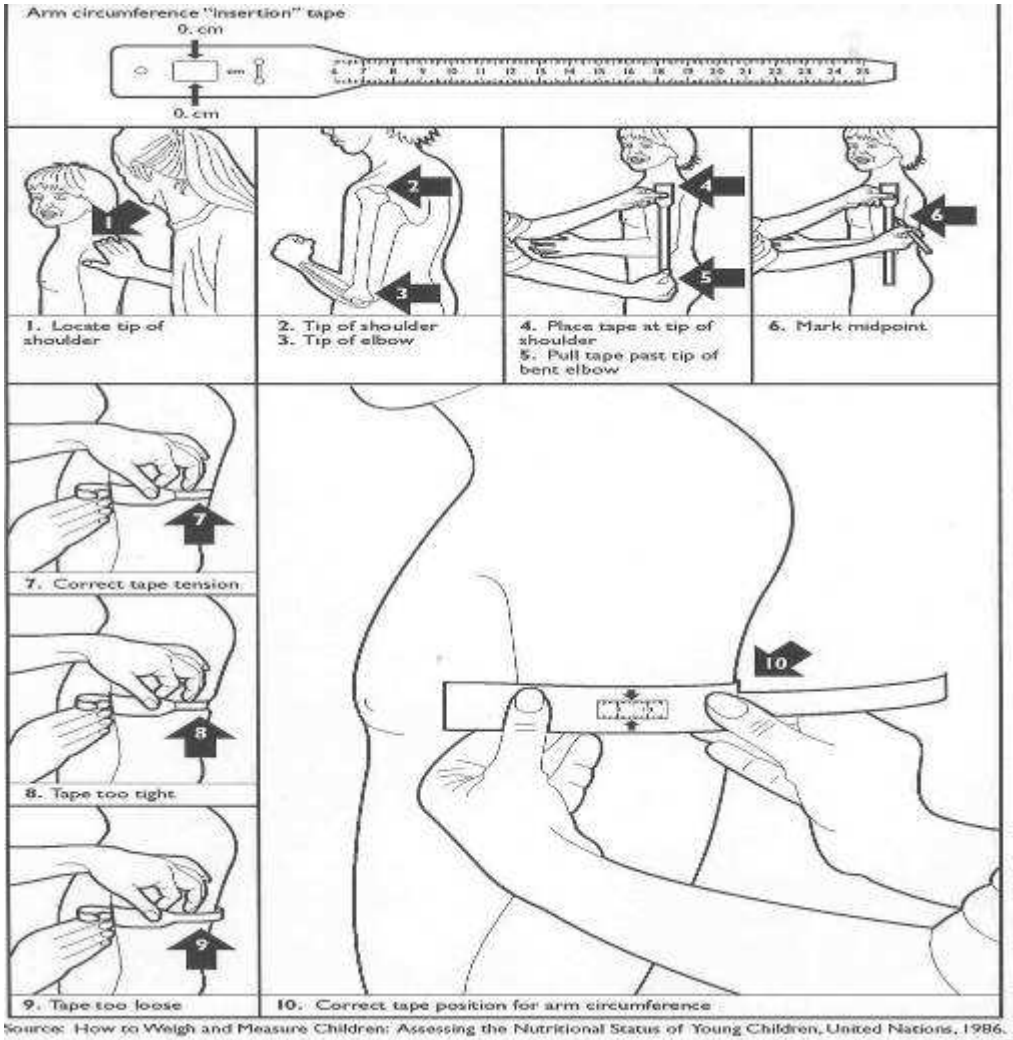
you cannot tell by just looking



2. TAKING THE MUAC

MUAC is used as an alternative measure of "thinness" to weight-for-height. It is particularly used in children from one to five years: however, its use has been extended to include children of over 65cm in height – or children of walking age.

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 fingertips. 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.
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.



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

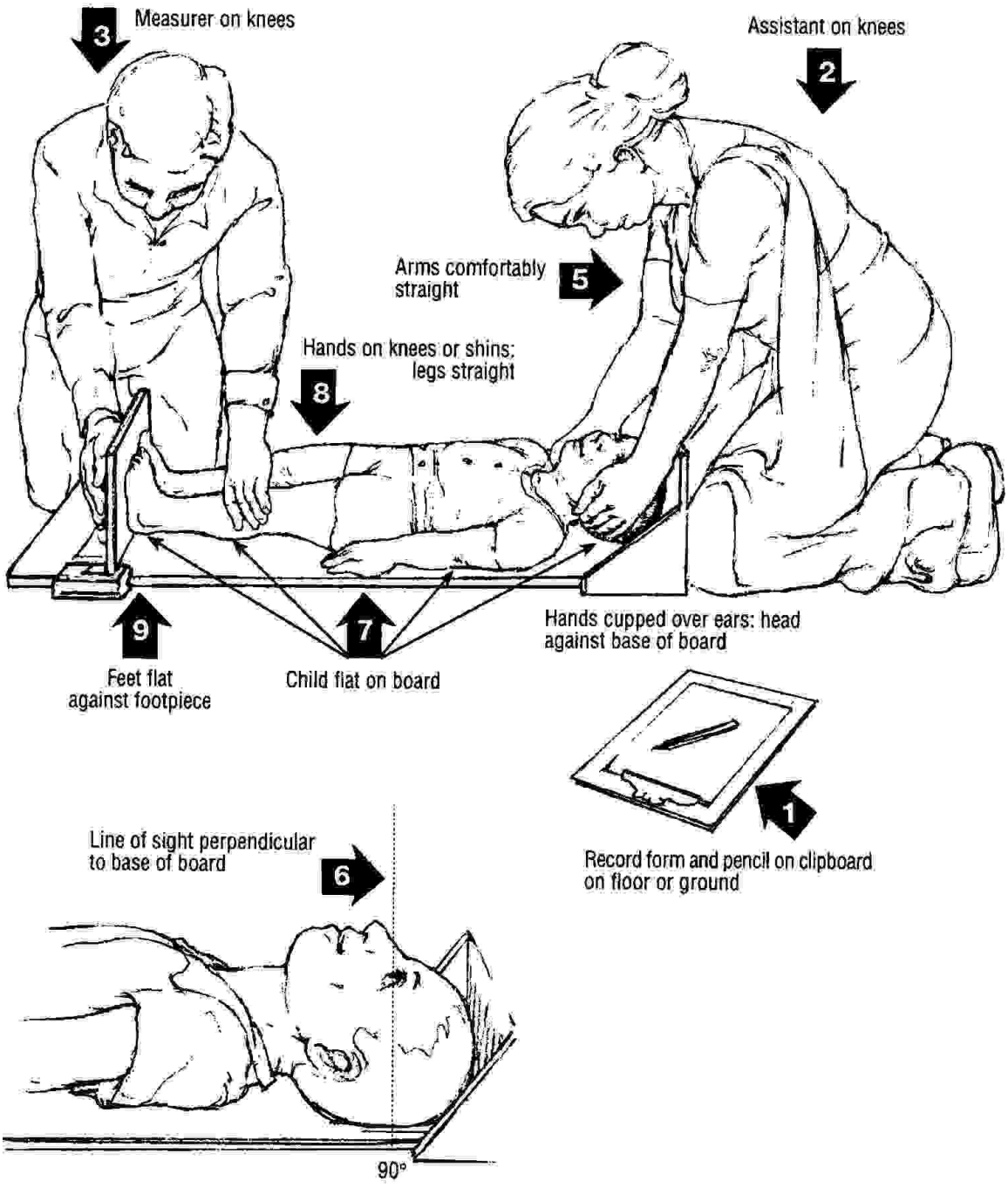
3. TAKING THE WEIGHT

Children are weighed by using a 25 kg hanging sprint 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.

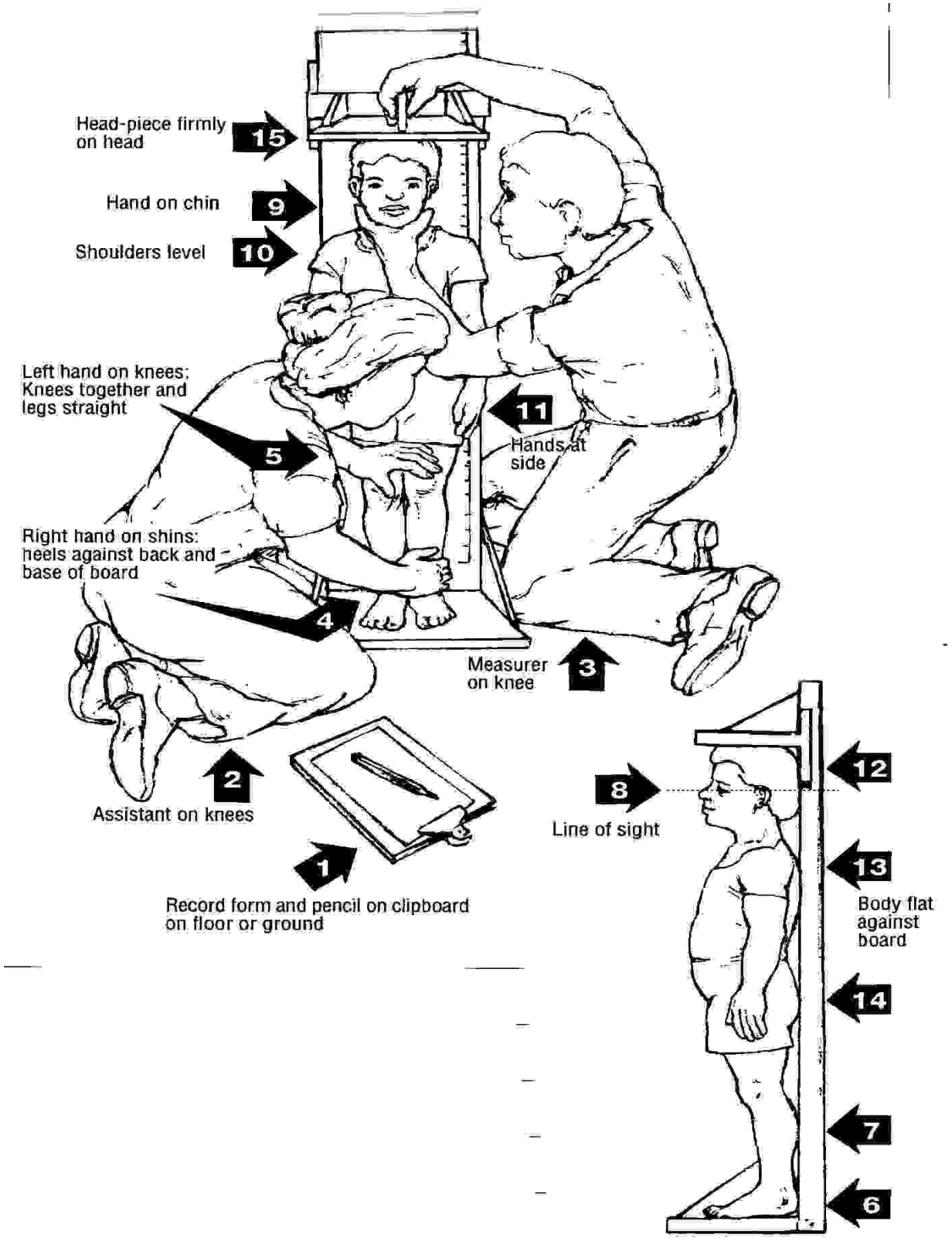
When the child is steady, record the measurement to the nearest 100 grams, the frame of the scale being at eyes level. Each day, the scales must be checked by using a known weight.

4. TAKING THE LENGTH/HEIGHT

For children less than 87 cm (85cm will be used if NCHS criteria are used), the measuring board is placed on the ground. The child is placed, lying along the middle of the board. The assistant holds the sides of the child's head and positions the head until it firmly touches the fixed headboard with the hair compressed. The measurer places her hands on the child's legs, gently stretches the child and then keeps one hand on the thighs to prevent flexion. While positioning the child's legs, the sliding foot-plate is pushed firmly against the bottom of the child's feet. To read the measure, the foot-plate must be perpendicular to the axis of the board and vertical. The height is read to the nearest 0.1 centimetre.



For children more than 87 cm (85cm will be used if NCHS criteria are used), 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.



5. CALCULATING THE WEIGHT/HEIGHT

How to use the weight/height ratio tables?

Example: a child boy is 67 cm tall and weighs 7.9 kg

- Take the boy table, look in the 1st column and look for the figure 67 (=height).
- Take a ruler or a piece of card place it under the figure 67 and the other figures on the same line.
- On this line find the figure corresponding to the weight of the child, in this case 7.9 (=weight).
- Look to see what column this figure is in. In this case it is in the WEIGHT MEDIAN column. In this example the child's weight is normal in relation to his height. He therefore has an appropriate weight for his height.

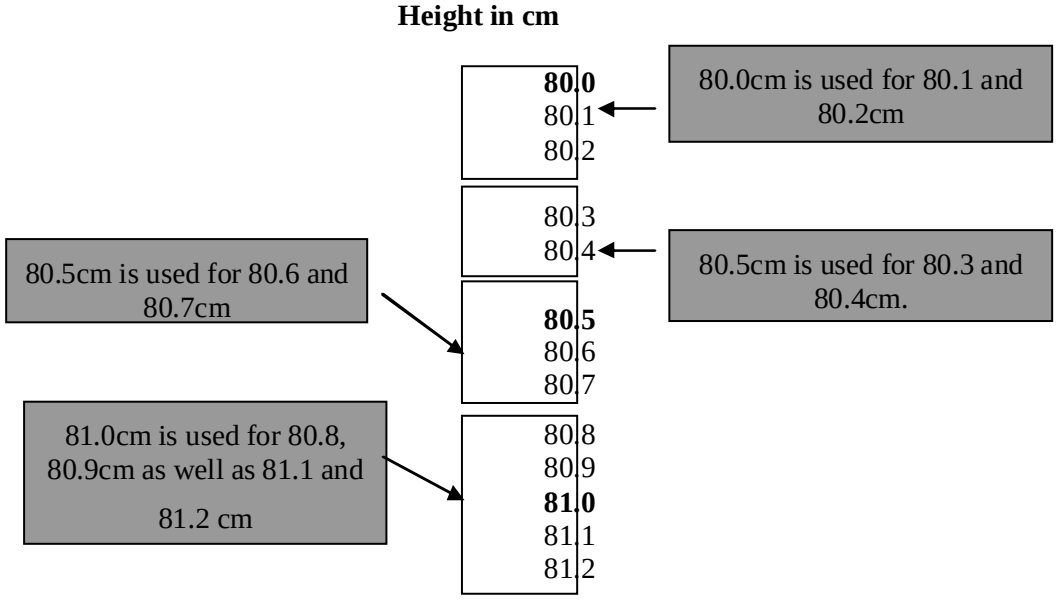
Example: a child is 78.5 cm tall and weighs 8.8 kg

This child is in the -2 SD column. He is too thin in relation to his height. He is moderately malnourished.

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 9.6 kg. This is between 9.1 and 9.8 kg. Conclusion, to express the fact that the child is between these 2 weights, write down that this child's percentage is between -2 and -1 z-score or <-1zscore (it's easier for registration and follow up to always use the inferior number).

Annexe 4: Weight-for-height table (WHO_{2006}) - © Michael Golden

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

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

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

Annexe 5: Weight for Length (measured lay down Height<85cm) in percentage of the median (NCHS references)

Length (cm)	100% Median	85%	80%	75%	70%	60%
49	3.2	2.7	2.6	2.4	2.2	1.9
49.5	3.3	2.8	2.6	2.5	2.3	2.0
50	3.4	2.9	2.7	2.6	2.4	2.0
50.5	3.4	2.9	2.7	2.6	2.4	2.0
51	3.5	3.0	2.8	2.6	2.5	2.1
51.5	3.6	3.1	2.9	2.7	2.5	2.2
52	3.7	3.1	3.0	2.8	2.6	2.2
52.5	3.8	3.2	3.0	2.9	2.7	2.3
53	3.9	3.3	3.1	2.9	2.7	2.3
53.5	4	3.4	3.2	3.0	2.8	2.4
54	4.1	3.5	3.3	3.1	2.9	2.5
54.5	4.2	3.6	3.4	3.2	2.9	2.5
55	4.3	3.7	3.4	3.2	3.0	2.6
55.5	4.4	3.8	3.5	3.3	3.1	2.6
56	4.6	3.9	3.7	3.5	3.2	2.8
56.5	4.7	4.0	3.8	3.5	3.3	2.8
57	4.8	4.1	3.8	3.6	3.4	2.9
57.5	4.9	4.2	3.9	3.7	3.4	2.9
58	5.1	4.3	4.1	3.8	3.6	3.1
58.5	5.2	4.4	4.2	3.9	3.6	3.1
59	5.3	4.5	4.2	4.0	3.7	3.2
59.5	5.5	4.6	4.4	4.1	3.9	3.3
60	5.6	4.8	4.5	4.2	3.9	3.4
60.5	5.7	4.9	4.6	4.3	4.0	3.4
61	5.9	5.0	4.7	4.4	4.1	3.5
61.5	6	5.1	4.8	4.5	4.2	3.6
62	6.2	5.2	5.0	4.7	4.3	3.7
62.5	6.3	5.4	5.0	4.7	4.4	3.8
63	6.5	5.5	5.2	4.9	4.6	3.9
63.5	6.6	5.6	5.3	5.0	4.6	4.0
64	6.7	5.7	5.4	5.0	4.7	4.0
64.5	6.9	5.9	5.5	5.2	4.8	4.1
65	7	6.0	5.6	5.3	4.9	4.2
65.5	7.2	6.1	5.8	5.4	5.0	4.3
66	7.3	6.2	5.8	5.5	5.1	4.4
66.5	7.5	6.4	6.0	5.6	5.3	4.5
67	7.6	6.5	6.1	5.7	5.3	4.6
67.5	7.8	6.6	6.2	5.9	5.5	4.7
68	7.9	6.7	6.3	5.9	5.5	4.7
68.5	8	6.8	6.4	6.0	5.6	4.8
69	8.2	7.0	6.6	6.2	5.7	4.9
69.5	8.3	7.1	6.6	6.2	5.8	5.0
70	8.5	7.2	6.8	6.4	6.0	5.1
70.5	8.6	7.3	6.9	6.5	6.0	5.2
71	8.7	7.4	7.0	6.5	6.1	5.2
71.5	8.9	7.6	7.1	6.7	6.2	5.3
72	9	7.7	7.2	6.8	6.3	5.4
72.5	9.1	7.7	7.3	6.8	6.4	5.5
73	9.2	7.8	7.4	6.9	6.4	5.5
73.5	9.4	8.0	7.5	7.1	6.6	5.6
74	9.5	8.1	7.6	7.1	6.7	5.7
74.5	9.6	8.2	7.7	7.2	6.7	5.8
75	9.7	8.2	7.8	7.3	6.8	5.8
75.5	9.8	8.3	7.8	7.4	6.9	5.9
76	9.9	8.4	7.9	7.4	6.9	5.9
76.5	10	8.5	8.0	7.5	7.0	6.0
77	10.1	8.6	8.1	7.6	7.1	6.1
77.5	10.2	8.7	8.2	7.7	7.1	6.1
78	10.4	8.8	8.3	7.8	7.3	6.2
78.5	10.5	8.9	8.4	7.9	7.4	6.3
79	10.6	9.0	8.5	8.0	7.4	6.4
79.5	10.7	9.1	8.6	8.0	7.5	6.4

80	10.8	9.2	8.6	8.1	7.6	6.5
80.5	10.9	9.3	8.7	8.2	7.6	6.5
81	11	9.4	8.8	8.3	7.7	6.6
81.5	11.1	9.4	8.9	8.3	7.8	6.7
82	11.2	9.5	9.0	8.4	7.8	6.7
82.5	11.3	9.6	9.0	8.5	7.9	6.8
83	11.4	9.7	9.1	8.6	8.0	6.8
83.5	11.5	9.8	9.2	8.6	8.1	6.9
84	11.5	9.8	9.2	8.6	8.1	6.9
84.5	11.6	9.9	9.3	8.7	8.1	7.0

Weight for Height (measured standing up Height≥85 cm) in percentage of the median (NCHS references)

Height (cm)	100% Median	85%	80%	75%	70%	60%
85	12	10.2	9.6	9.0	8.4	7.2
85.5	12.1	10.3	9.7	9.1	8.5	7.3
86	12.2	10.4	9.8	9.2	8.5	7.3
86.5	12.3	10.5	9.8	9.2	8.6	7.4
87	12.4	10.5	9.9	9.3	8.7	7.4
87.5	12.5	10.6	10.0	9.4	8.8	7.5
88	12.6	10.7	10.1	9.5	8.8	7.6
88.5	12.8	10.9	10.2	9.6	9.0	7.7
89	12.9	11.0	10.3	9.7	9.0	7.7
89.5	13	11.1	10.4	9.8	9.1	7.8
90	13.1	11.1	10.5	9.8	9.2	7.9
90.5	13.2	11.2	10.6	9.9	9.2	7.9
91	13.3	11.3	10.6	10.0	9.3	8.0
91.5	13.4	11.4	10.7	10.1	9.4	8.0
92	13.6	11.6	10.9	10.2	9.5	8.2
92.5	13.7	11.6	11.0	10.3	9.6	8.2
93	13.8	11.7	11.0	10.4	9.7	8.3
93.5	13.9	11.8	11.1	10.4	9.7	8.3
94	14	11.9	11.2	10.5	9.8	8.4
94.5	14.2	12.1	11.4	10.7	9.9	8.5
95	14.3	12.2	11.4	10.7	10.0	8.6
95.5	14.4	12.2	11.5	10.8	10.1	8.6
96	14.5	12.3	11.6	10.9	10.2	8.7
96.5	14.7	12.5	11.8	11.0	10.3	8.8
97	14.8	12.6	11.8	11.1	10.4	8.9
97.5	14.9	12.7	11.9	11.2	10.4	8.9
98	15	12.8	12.0	11.3	10.5	9.0
98.5	15.2	12.9	12.2	11.4	10.6	9.1
99	15.3	13.0	12.2	11.5	10.7	9.2
99.5	15.4	13.1	12.3	11.6	10.8	9.2
100	15.6	13.3	12.5	11.7	10.9	9.4
100.5	15.7	13.3	12.6	11.8	11.0	9.4
101	15.8	13.4	12.6	11.9	11.1	9.5
101.5	16	13.6	12.8	12.0	11.2	9.6
102	16.1	13.7	12.9	12.1	11.3	9.7
102.5	16.2	13.8	13.0	12.2	11.3	9.7
103	16.4	13.9	13.1	12.3	11.5	9.8
103.5	16.5	14.0	13.2	12.4	11.6	9.9
104	16.7	14.2	13.4	12.5	11.7	10.0
104.5	16.8	14.3	13.4	12.6	11.8	10.1
105	16.9	14.4	13.5	12.7	11.8	10.1
105.5	17.1	14.5	13.7	12.8	12.0	10.3
106	17.2	14.6	13.8	12.9	12.0	10.3
106.5	17.4	14.8	13.9	13.1	12.2	10.4
107	17.5	14.9	14.0	13.1	12.3	10.5
107.5	17.7	15.0	14.2	13.3	12.4	10.6
108	17.8	15.1	14.2	13.4	12.5	10.7
108.5	18	15.3	14.4	13.5	12.6	10.8
109	18.1	15.4	14.5	13.6	12.7	10.9
109.5	18.3	15.6	14.6	13.7	12.8	11.0
110	18.4	15.6	14.7	13.8	12.9	11.0

Annexe 6: Weight-for-height charts for adolescents (NCHS)

WEIGHT-FOR-HEIGHT CHARTS FOR ADOLESCENTS (NCHS)

Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe	Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe
110.0	18.4	15.6	14.7	12.9	**141.0**	34.1	29.0	27.3	23.9
110.5	18.6	15.8	14.8	13.0	**141.5**	34.4	29.2	27.5	24.1
111.0	18.7	15.9	15.0	13.1	**142.0**	34.8	29.5	27.8	24.3
111.5	18.9	16.0	15.1	13.2	**142.5**	35.1	29.8	28.1	24.6
112.0	19.0	16.2	15.2	13.3	**143.0**	35.4	30.1	28.3	24.8
112.5	19.2	16.3	15.3	13.4	**143.5**	35.8	30.4	28.6	25.0
113.0	19.3	16.4	15.5	13.5	**144.0**	36.1	30.7	28.9	25.3
113.5	19.5	16.6	15.6	13.6	**144.5**	36.5	31.0	29.2	25.5
114.0	19.6	16.7	15.7	13.8	**145.0**	36.8	31.3	29.4	25.8
114.5	19.8	16.8	15.8	13.9	**145.5**	37.1	31.6	29.7	26.0
115.0	20.0	17.0	16.0	14.0	**146.0**	37.5	31.9	30.0	26.2
115.5	20.2	17.1	16.1	14.1	**146.5**	37.8	32.2	30.3	26.5
116.0	20.3	17.3	16.3	14.2	**147.0**	38.2	32.4	30.5	26.7
116.5	20.5	17.4	16.4	14.4	**147.5**	38.5	32.7	30.8	27.0
117.0	20.7	17.6	16.6	14.5	**148.0**	38.9	33.0	31.1	27.2
117.5	20.9	17.7	16.7	14.6	**148.5**	39.2	33.3	31.4	27.4
118.0	21.1	17.9	16.9	14.7	**149.0**	39.5	33.6	31.6	27.7
118.5	21.3	18.1	17.0	14.9	**149.5**	39.9	33.9	31.9	27.9
119.0	21.5	18.2	17.2	15.0	**150.0**	40.3	34.2	32.2	28.2
119.5	21.7	18.4	17.3	15.2	**150.5**	40.6	34.5	32.5	28.4
120.0	21.9	18.6	17.5	15.3	**151.0**	41.0	34.8	32.8	28.7
120.5	22.1	18.8	17.7	15.5	**151.5**	41.3	35.1	33.1	28.9
121.0	22.3	19.0	17.8	15.6	**152.0**	41.7	35.4	33.4	29.2
121.5	22.5	19.1	18.0	15.8	**152.5**	42.1	35.8	33.7	29.4
122.0	22.7	19.3	18.2	15.9	**153.0**	42.4	36.1	34.0	29.7
122.5	23.0	19.5	18.4	16.1	**153.5**	42.8	36.4	34.3	30.0
123.0	23.2	19.7	18.6	16.2	**154.0**	43.2	36.7	34.6	30.2
123.5	23.5	19.9	18.8	16.4	**154.5**	43.6	37.1	34.9	30.5
124.0	23.7	20.1	19.0	16.6	**155.0**	44.0	37.4	35.2	30.8
124.5	24.0	20.4	19.2	16.8	**155.5**	44.2	37.6	35.4	30.9
125.0	24.2	20.6	19.4	16.9	**156.0**	44.6	37.9	35.7	31.2

WEIGHT-FOR-HEIGHT CHARTS FOR ADOLESCENTS (NCHS)

Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe	Height (cm)	100% Median	85% (target)	80% <mod	70% <Severe
125.5	24.5	20.8	19.6	17.1	**156.5**	45.0	38.2	36.0	31.5
126.0	24.7	21.0	19.8	17.3	**157.0**	45.4	38.6	36.3	31.8
126.5	25.0	21.2	20.0	17.5	**157.5**	45.8	38.9	36.7	32.1
127.0	25.3	21.5	20.2	17.7	**158.0**	46.2	39.3	37.0	32.4
127.5	25.5	21.7	20.4	17.9	**158.5**	46.6	39.6	37.3	32.7
128.0	25.8	21.9	20.7	18.1	**159.0**	47.1	40.0	37.7	33.0
128.5	26.1	22.2	20.9	18.3	**159.5**	47.5	40.4	38.0	33.3
129.0	26.4	22.4	21.1	18.5	**160.0**	48.0	40.8	38.4	33.6
129.5	26.7	22.7	21.3	18.7	**160.5**	48.4	41.1	38.7	33.9
130.0	27.0	22.9	21.6	18.9	**161.0**	48.8	41.5	39.1	34.2
130.5	27.3	23.2	21.8	19.1	**161.5**	49.3	41.9	39.4	34.5
131.0	27.6	23.4	22.1	19.3	**162.0**	49.8	42.3	39.8	34.8
131.5	27.9	23.7	22.3	19.5	**162.5**	50.2	42.7	40.2	35.1
132.0	28.2	24.0	22.5	19.7	**163.0**	50.7	43.1	40.5	35.5
132.5	28.5	24.2	22.8	19.9	**163.5**	51.1	43.5	40.9	35.8
133.0	28.8	24.5	23.0	20.2	**164.0**	51.6	43.9	41.3	36.1
133.5	29.1	24.7	23.3	20.4	**164.5**	52.1	44.3	41.7	36.5
134.0	29.4	25.0	23.5	20.6	**165.0**	52.6	44.7	42.1	36.8
134.5	29.7	25.3	23.8	20.8	**165.5**	53.1	45.1	42.5	37.2
135.0	30.1	25.6	24.1	21.1	**166.0**	53.6	45.6	42.9	37.5
135.5	30.4	25.8	24.3	21.3	**166.5**	54.1	46.0	43.3	37.9
136.0	30.7	26.1	24.6	21.5	**167.0**	54.6	46.4	43.7	38.2
136.5	31.0	26.4	24.8	21.7	**167.5**	55.1	46.9	44.1	38.6
137.0	31.4	26.7	25.1	22.0	**168.0**	55.6	47.3	44.5	38.9
137.5	31.7	27.0	25.4	22.2	**168.5**	56.2	47.7	44.9	39.3
138.0	32.1	27.2	25.6	22.4	**169.0**	56.7	48.2	45.4	39.7
138.5	32.4	27.5	25.9	22.7	**169.5**	57.3	48.7	45.8	40.1
139.0	32.7	27.8	26.2	22.9	**170.0**	57.8	49.2	46.3	40.5
139.5	33.1	28.1	26.4	23.1	**170.5**	58.4	49.6	46.7	40.9
140.0	33.4	28.4	26.7	23.4	**171.0**	59.0	50.1	47.2	41.3
140.5	33.7	28.7	27.0	23.6	**171.5**	59.6	50.6	47.6	41.7

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.

Annexe 7: Registration book OTP /TFC (French & English)

No d'ordre	No d'enreg	No Unique de MAS	Nom de l'enfant	Nom des parents	Adresse (préciser secteur-block-no de tente)	Admissions			Age	Sexe (F/M)	Admission								
						Type d'admission	Si transfert de				Date	Poids (kg.g)	Taille (cm)	P/T%	Oedèmes (0,1,2,3)	PB (mm)	Diagnostic		Date
							Nom du Crenas/CSI	Nom du Creni/SNT/ Pédiatrie											
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

	Reg #	SAM Unique No	First name	Name	Address	Admission									
						Type of admission	If transfer In		Sex	Date	W	H	W/H	Oed	MUAC
							Name of the OTP	Name of the SC							
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

	Discharge						Type of Discharge			Date of Minimum Weight	Minimum Weight	Observation
	Date	W	H	W/H	Oed	MUAC	Type	If transfer Out				
								Name of the OTP	Name of the SC			
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Annexe 8: OTP Chart (front page & back page)

	SAM Unique N0_____/_____/_____/_____							
Name					**N° Reg.**			
Mother Name					**OTP Name**			
Address					**District**			
Age (Months)		**Sexe**	M	F	**Admission date (dd/mm/yy)**			
Refered By	Community		Self refered	SFP	Health structure		TFU refusal	
Admission	New	Relapse	Default (less 2 months)		From TFU	Back from hospital		
Nbr of poeple in the familly			**Twin**	Yes	No			
Familly ration	Yes	No	**Distance from house**					
Admission anthropometry								
Weight (Kg)		**Height (cm)**		**P-T z-score**		**MUAC (mm)**		
Admission criteria	Oedema		W/H		MUAC			
History								
Diarrhoea	Yes	No			**Stool per day**	1-3	4-5	>5
Vomiting	Yes	No			**Cough**		Yes	No
Appetite	Good	Medium	No		**Still Breastfeed**		Yes	non
If other, specify								
Physical examination								
Resp.Rate *(# min)*	<30	30 - 39	40 - 49	50+	**Température**	°C		
Breathing	Normal	Asymetrical	Wheezing	Irritable	**Conjonctive**		Normal	Pale
Eyes	Normal	Sunken	Conjunctivitis		**Dehydration**	No	Medium	Severe
Ears	Normal	Discharge			**Mouth**	Normal	Smooth	Candida
Lymph Nodes	Normal	Asymetrical	Symetrical		**Handicap**		Yes	No
Skin	Normal	Scabies	Peeling	Ulceres abcesses	**Extremities**		Warm	Cold
Transfer In and out during the treatment (Use 1st adm. SAM UNIQUE N0)								
Transfer In					**Transfer out**			
Location	**Date**	**Reg No of other facility**			**Reason**	**Location**	**Date**	
Home Visit (HV)								
Date	**Reason for HV**		**Date of HV**		**Findings**			

SAM Unique N0_____/_____/_____/_____									Target Weight							
	Adm	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Date (dd/mo)																
Anthropometric Information																
Height (cm)																
Weight (kg.g)																
Weight Change (+ / 0 /-)																
Oedema (0 to ++)																
MUAC (mm)																
W/H (Z- Score or %)																
Questionnaire's carer																
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 (good/mod/poor)																
Medical examination																
Pale Conj (0 to ++)																
Respir.rate /min																
Temp. C?																
Nutrition																
App.test (Pass/Fail)																
Trt carer choice (in/out)																
RUTF given (# sachets)																
Other foods																
Medical treatment																
Amoxicillin dose																
Malaria trt dose																
Folic Acid dose																
Vitamin A dose																
De-Worming																
Measles vaccination																
Person in charge																
OUTCOME																

A : Absent **- DF:** Defaulter **- TI:** Transfer In Patient **- TO:** Transfer another Out Patient **- X:** died **- C:** Cured **- RT:** Refuse Transfer **- HV:** Home visit **- NR:** non Respondent **- U:** Unknown

Notes :

Annexe 9: In-patient Chart

Therapeutic Treatment Multi-Chart for Severe Malnutrition

SAM Unique No
Registration No..... Country.....
Sheet No..... Centre.....
Father's name Care hosp-ward/hosp-SNU/TFC
First Name..... Day-care/Day-care-non-res
Address..... Age (d/m/y).....
..... Birthdate___/___/___
Distance to house..... Sex.....

Major Problems
1 .....
2 .....
3 .....

Breastfeeding.....Y / N
Complementary feeding.....Y / N

Admission Date___/___/___
Time.....am/pm
Transfer In Y/N
If Y from.....
Readmission Y / N
If Y, Type
Reg No .....

Discharge Date___/___/___
Cured ☐ Abandoned ☐ Cause
Dead ☐ Time .....am/pm .....
Med transfer ☐ To..... .....
Transfer Out ☐ To..... .....
Nutritional referral ☐ To.....

Anthropometric Chart

Date																						
Height (cm)																						
Weight (kg)																						
Wt for Ht (%)																						
MUAC (cm)																						
Oedema (0 to +++)																						

Weight to reach

.....%

Weight Chart

Therapeutic Diet

Date																						
Phase																						
# meals/day																						
F75/F100/F100D																						
ml / feed																						
ml /day																						
Iron added																						
RUTF																						
gr / feed																						
gr or sachet /day																						

Time																						
1																						
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

A=Absent
V=Vomit
R=Refused
NG=tube
IV=IV Fluid

Amount taken

100% ☐
3/4 ☐
1/2 ☐
1/4 ☐
=ml=extra

Routine Medicines																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
Vitamin A …….iu																							
Folic Acid 5mg (po)																							
Antibiotic 1 Time																							
Antibiotic 2 Time																							
Malaria Rx																							
Worm rx in phase II																							

Special Medicines*																							
Antibiotic 3 Time																							
Resomal ml																							
IV fluid/blood																							
NG tube																							

*Enter Name, dose and route of administration (oral-po, intramuscular-IM, or intravenous-IV) for each drug. Enter an X in the upper left corner if prescribed - the nurse signs the box when the drug is given.

Test Results																							
Hb/Pcv																							
Malaria smear																							
Glucose																							
TB test																							

OBSERVATION

Card Y☐ N☐	IMMUNISATION DATES Birth	1	2	3	4
BCG					
Polio					
DPT					
Measles			Extra	Extra	

DISCHARGE Education Given On	Dates	Sig.
Causes of malnutrition		
Diarrhoea, RTI, Fever		
Skin, eye and ear infection		
Play and stimulation		
Child nutrition		
Child care		
Hygiene		
Sexually Transmitted Disease		
Family Planning		
Other……		
Vitamin A given	Y	N
Immunisation up to date	Y	N
Breastfeeding on discharge	Y	N

Annexe 10: History and examination sheet for SAM

History and Examination sheet for severe malnutrition - page 1 - History

Reg· N°..... **Parent's name:**..... **First name:**..... **Age**.....*d/m/y* **Sex** .....

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

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

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

History of present illness

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

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

1..... .....*h/ d/ wk/ mo/ yr*
2..... .....*h/ d/ wk/ mo/ yr*
3..... .....*h/ d/ wk/ mo/ yr*
4..... .....*h/ d/ wk/ mo/ yr*

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

.....

.....

.....

.....

.....

.....

.....

.....

.....

Systematic questions (give additional details of abnormalities above)

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

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

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

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

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

Fever *N Y* **Convulsions** *N Y* **Unconsiousness** *N Y*

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

Treatment given .....

Past and social history

Past diseases: describe.....

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

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

Mother's age .....yr nº live births ..... nº Living children .....

Family eating together: nº adults..... nº children.....

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

Diet history

breast feed alone for .....*wk/ mo* age stopped breast feeding.....*wk/mo*

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

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

Last 24h -describe

History and Examination sheet for severe malnutrition - page 2 - Examination

Reg· N°..... **Parent's name:.....** **First name:.....** **Age.....*d/m/y*** **Sex .....**

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

Ear Nose & Throat

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

Respiratory system & Chest

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

Cardiovascular system & Hydration

Oedema *none/+/++/+++/uncertain feet/ pretibial/ hands/ face/ generalised*
Hydratation *normal/ dehydrated/ shock/ uncertain* **Passing urine** N Y
Eyes *normal/ sunken/ staring* **Peripheries** *normal/ warm/ cold*
Pulse rate ...../min *normal/ strong/ weak* **Heart sounds** *normal/ gallop/ murmur*

Gastro-Intestinal

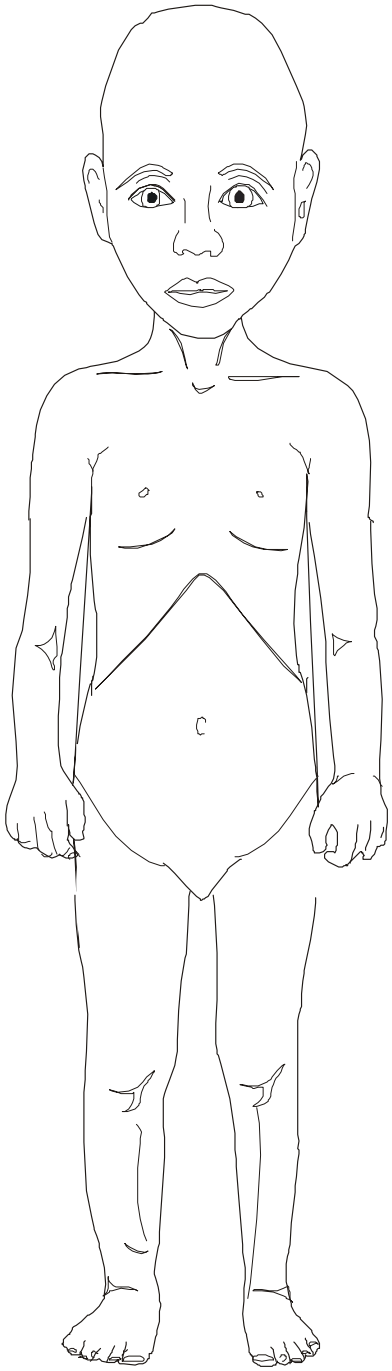
Stool *not seen/ normal/ soft/ watery/ green/ pale/ mucus/ blood/*
Abdomen: *normal/ distended/ tender/ visible peristalsis*
bowel sounds: *normal/ active/ quiet/ absent* **splash** N Y
Liver .....cm below costal margin *normal/ firm/ hard smooth/ irregular*
Spleen *not felt/ felt/ large - normal/ firm/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

Nervous system

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

Skin Hair Bone Lymph Nodes

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



Describe abnormalities below and draw on diagram

.....

.....

.....

.....

.....

.....

.....

Diagnoses 1: **2:** **3:**

Annexe 11: Referral forms and community reports (1. Transfer – 2. OTP to in-patient – 3. Home vistit report – 4. Community screening)

1. Transfer form

SAM Unique N0			
From	OTP TFU Hosp Other ……	Name	Reg No
First Name		Transfer date	
Family Name		Sex M / F	Carer

Fill the table

	Date	Weight	Height	W/H	MUAC	Oedema	Appetite test
Admission							
Transfer							

Circle the type of care and the diet treatment given

Phase	P1	Transition Phase	Phase 2
Diet	F75	F100 / PN	F100 / PN
Type	In	In	In / Out
Date			

	Drugs	Dose	Date
Routine drugs	Vit A		
	Folic acid		
	Measles vac		
	Amoxicilline		
Specific treatment		Dose	Date

Reason for transfer

Special problem

Laboratory test

2. OTP to in-patient form

Referal slip after screening for SAM In patient care

OTP SITE_____ _____ _____
CHILDS NAME _____ **Age** _____ **Sex** _____
FAMILY NAME _____ **NAME OF THE CARER** _____
ADDRESS _____

DATE VISITED

Weight	Height	W/H	MUAC	Oedema	Appetite test	Complication

Reasons

Examinator name _____ **Signature**_____

3. Home visit report

Home visit form

Reason for home visit: Absence Y/N Defaulter Y/N Non Responder Y/N Other……

SAM Unique Number

OTP SITE_____ _____ _____
CHILDS NAME _____ **Age** _____ **Sex** _____
FAMILY NAME _____ **NAME OF THE CARER** _____
ADDRESS _____

DATE VISITED

Findings

Outreach worker name _____ **Signature**_____

4. Community screening

Referral slip after screening at community level

OTP SITE _____ _____ _____

CHILDS NAME _____ Age _____ Sex _____

FAMILY NAME _____ NAME OF THE CARER _____

ADDRESS _____

DATE VISITED _____ MUAC _____ OEDEMA _____

Other Findings _____

Outreach worker name _____ Signature _____

Annexe 12: Ready to Use Therapeutic Food (RUTF) NUTRITIONAL INFORMATION

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).

There are currently two commercial types of RUTF: Plumpy'nut® and BP 100® and several countries are producing their own RUTF using recipes that produce products that are both nutritionally the same as F100, but have also been shown to be physiologically similar to both F100 and the commercial RUTFs.

Plumpy'nut®

Plumpy Nut is a ready-to-eat therapeutic spread, presented in individual sachets. It is a paste of groundnut composed of vegetable fat, peanut butter, skimmed milk powder, lactoserum, maltodextrin, sugar, mineral and vitamin complex.

Instructions for use: Clean drinking water must be made available to children during consumption of ready-to-eat therapeutic spread. The product should only be given to children who can express their thirst.

CONTRA-INDICATED FOR CHILDREN WHO ARE ALLERGIC TO COWS MILK, PROTEINS OR PEANUTS AND ASTHMATIC PEOPLE (RISK OF ALLERGY).

Recommendations for use: In the management of severe acute malnutrition in therapeutic feeding, it is recommended to use the product in phase 2 (two) in the dietetic management of severe acute malnutrition. In phase 1 (one) use milk based diet (F75).

Storage: Plumpy Nut has a shelf life of 24 months from manufacturing date. Keep stored in a cool and dry place.

Packaging: Plumpy Nut is presented in sachets of 92 g. Each carton (around 15.1 kg) contains 150 sachets. One sachet = 92 g = 500 Kcal.

Mean Nutritional Value of plumpy'nut®

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

BP 100 MedicFood

BP100 MedicFood is a compressed food product for use in the rehabilitation phase (Phase 2) of severe malnourished children and adults. The nutritional specification is close to identical with the specification for the therapeutic milk F100. The major nutritional difference between BP100 and F100 is that BP100 contains iron (10mg per 100g). In the initial phase of the treatment of severe malnutrition (Phase1 and Transition)

Who to give BP100: Children from 12 months old, adolescents and adults severely malnourished in the rehabilitation phase (Phase 2) of the treatment. BP100 should never be used for patients below 6 months old.

How to use BP100: BP100 can be eaten as a biscuit directly from the pack together with **sufficient drinking water** (2,5 to 3 dl per bar), or crumbled into water and eaten as porridge. For children 12 to 24 months of age, BP100 should always be given as porridge due to their problems demanding water when thirsty.

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

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

Local production of RUTF

The required ingredients for RUTF are as follows:

Four basic ingredients of RUTF: sugar; Dried Skim Milk; oil; and a vitamin and mineral supplement. In addition up to 25% of the weight of the product can come from vegetable sources such as oil-seeds, groundnuts or cereals such as oats.

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

- taste and texture suitable for young children

- does not need additional processing such as cooking before consumption
- resistant to contamination by micro-organisms and a long shelf life without sophisticated packaging
- ingredients are low cost and readily available in developing countries

Recently WHO/UNICEF/WFP/SCN have produced DRAFT specifications for RUTF. They are as follows:

Ready to use therapeutic food

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 has to be 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. [215]

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

[215] 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.

Annexe 13: - 5% weight loss

5 % weight loss

Last week weight measurement	5%WL	
4,0	**0,2**	**3,8**
4,1	**0,2**	**3,9**
4,2	**0,2**	**4,0**
4,3	**0,2**	**4,1**
4,4	**0,2**	**4,2**
4,5	**0,2**	**4,3**
4,6	**0,2**	**4,4**
4,7	**0,2**	**4,5**
4,8	**0,2**	**4,6**
4,9	**0,2**	**4,7**
5,0	**0,3**	**4,8**
5,1	**0,3**	**4,8**
5,2	**0,3**	**4,9**
5,3	**0,3**	**5,0**
5,4	**0,3**	**5,1**
5,5	**0,3**	**5,2**
5,6	**0,3**	**5,3**
5,7	**0,3**	**5,4**
5,8	**0,3**	**5,5**
5,9	**0,3**	**5,6**
6,0	**0,3**	**5,7**
6,1	**0,3**	**5,8**
6,2	**0,3**	**5,9**
6,3	**0,3**	**6,0**
6,4	**0,3**	**6,1**
6,5	**0,3**	**6,2**
6,6	**0,3**	**6,3**
6,7	**0,3**	**6,4**
6,8	**0,3**	**6,5**
6,9	**0,3**	**6,6**
7,0	**0,3**	**6,6**
7,1	**0,4**	**6,7**
7,2	**0,4**	**6,8**
7,3	**0,4**	**6,9**
7,4	**0,4**	**7,0**
7,5	**0,4**	**7,1**
7,6	**0,4**	**7,2**
7,7	**0,4**	**7,3**
7,8	**0,4**	**7,4**
7,9	**0,4**	**7,5**
8,0	**0,4**	**7,6**

Last week weight measurement	5%WL	
8,0	0,4	7,6
8,1	0,4	7,7
8,2	0,4	7,8
8,3	0,4	7,9
8,4	0,4	8,0
8,5	0,4	8,1
8,6	0,4	8,2
8,7	0,4	8,3
8,8	0,4	8,4
8,9	0,4	8,5
9,0	0,5	8,6
9,1	0,5	8,6
9,2	0,5	8,7
9,3	0,5	8,8
9,4	0,5	8,9
9,5	0,5	9,0
9,6	0,5	9,1
9,7	0,5	9,2
9,8	0,5	9,3
9,9	0,5	9,4
10,0	0,5	9,5
10,1	0,5	9,6
10,2	0,5	9,7
10,3	0,5	9,8
10,4	0,5	9,9
10,5	0,5	10,0
10,6	0,5	10,1
10,7	0,5	10,2
10,8	0,5	10,3
10,9	0,5	10,4
11,0	0,5	10,5
11,1	0,6	10,5
11,2	0,6	10,6
11,3	0,6	10,7
11,4	0,6	10,8
11,5	0,6	10,9
11,6	0,6	11,0
11,7	0,6	11,1
11,8	0,6	11,2
11,9	0,6	11,3
12,0	0,6	11,4

Last week weight measurement	5%WL	
12,0	0,6	11,4
12,1	0,6	11,5
12,2	0,6	11,6
12,3	0,6	11,7
12,4	0,6	11,8
12,5	0,6	11,9
12,6	0,6	12,0
12,7	0,6	12,1
12,8	0,6	12,2
12,9	0,6	12,3
13,0	0,7	12,4
13,1	0,7	12,4
13,2	0,7	12,5
13,3	0,7	12,6
13,4	0,7	12,7
13,5	0,7	12,8
13,6	0,7	12,9
13,7	0,7	13,0
13,8	0,7	13,1
13,9	0,7	13,2
14,0	0,7	13,3
14,1	0,7	13,4
14,2	0,7	13,5
14,3	0,7	13,6
14,4	0,7	13,7
14,5	0,7	13,8
14,6	0,7	13,9
14,7	0,7	14,0
14,8	0,7	14,1
14,9	0,7	14,2
15,0	0,8	14,3
15,1	0,8	14,3
15,2	0,8	14,4
15,3	0,8	14,5
15,4	0,8	14,6
15,5	0,8	14,7
15,6	0,8	14,8
15,7	0,8	14,9
15,8	0,8	15,0
15,9	0,8	15,1
16,0	0,8	15,2

Last week weight measurement	5%WL	
16,0	0,8	15,2
16,1	0,8	15,3
16,2	0,8	15,4
16,3	0,8	15,5
16,4	0,8	15,6
16,5	0,8	15,7
16,6	0,8	15,8
16,7	0,8	15,9
16,8	0,8	16,0
16,9	0,8	16,1
17,0	0,9	16,2
17,1	0,9	16,2
17,2	0,9	16,3
17,3	0,9	16,4
17,4	0,9	16,5
17,5	0,9	16,6
17,6	0,9	16,7
17,7	0,9	16,8
17,8	0,9	16,9
17,9	0,9	17,0
18,0	0,9	17,1
18,1	0,9	17,2
18,2	0,9	17,3
18,3	0,9	17,4
18,4	0,9	17,5
18,5	0,9	17,6
18,6	0,9	17,7
18,7	0,9	17,8
18,8	0,9	17,9
18,9	0,9	18,0
19,0	1,0	18,1
19,1	1,0	18,1
19,2	1,0	18,2
19,3	1,0	18,3
19,4	1,0	18,4
19,5	1,0	18,5
19,6	1,0	18,6
19,7	1,0	18,7
19,8	1,0	18,8
19,9	1,0	18,9
20,0	1,0	19,0

Last week weight measurement	5%WL	
20,0	1,0	19,0
20,1	1,0	19,1
20,2	1,0	19,2
20,3	1,0	19,3
20,4	1,0	19,4
20,5	1,0	19,5
20,6	1,0	19,6
20,7	1,0	19,7
20,8	1,0	19,8
20,9	1,0	19,9
21,0	1,1	20,0
21,1	1,1	20,0
21,2	1,1	20,1
21,3	1,1	20,2
21,4	1,1	20,3
21,5	1,1	20,4
21,6	1,1	20,5
21,7	1,1	20,6
21,8	1,1	20,7
21,9	1,1	20,8
22,0	1,1	20,9
22,1	1,1	21,0
22,2	1,1	21,1
22,3	1,1	21,2
22,4	1,1	21,3
22,5	1,1	21,4
22,6	1,1	21,5
22,7	1,1	21,6
22,8	1,1	21,7
22,9	1,1	21,8
23,0	1,2	21,9
23,1	1,2	21,9
23,2	1,2	22,0
23,3	1,2	22,1
23,4	1,2	22,2
23,5	1,2	22,3
23,6	1,2	22,4
23,7	1,2	22,5
23,8	1,2	22,6
23,9	1,2	22,7
24,0	1,2	22,8

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

FACILITY		Implementing agency/ Health facility	
REGION		Report prepared by	
ZONE / AREA		MONTH / YEAR of reporting	
OPENING DATE		TYPE OF PROGRAMME	*In-patient* / *Out-patient* / *Mobile clinic*

Group age	Total beginning of the month (A)	ENTRY							Total Admissions Entry (C)	EXIT								Total Discharges Exit (F)	Total end of the month (G)
		New admissions			Re-admission		Transfer in (B5) from another therapeutic unit			Discharges (D)						Transfer out (E)			
		W/H or MUAC or BMI (B1)	OEDEMA (B2)	Relapse (B3)	After defaulting (B4)	After medical transfer	TFC	OTP		CURED (D1)	DEATH (D2)	DEFAULTER (D3)	UNKNOWN (D4)	NON-RESPONDER (D5)	MEDICAL TRANSFER (D6)	To out-patient (E1)	To in-patient (E2)		
< 6 months																			
6-59 months																			
5-10 years																			
11-17 years																			
> 18 years																			
TOTAL																			

New admission = Patient directly admitted to your programme to start the nutritional treatment. Marasmic (W/H<-3 Z-score or W/H<70%) (**B1**), Kwashiorkor (**B2**) or Relapse (**B3**)

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 months after 2 months, it is considered 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 60 days 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 programme and is referred to another out-patient programme

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

Total end of the month (G) = Total beginning of the month (A) + Total admisssions (C) - Total discharges (F)

Average weight gain and average length of stay (only for children 6-59 months cured & marasme)		
Average weight gain		g/kg/day
Average length of stay		day

Weight gain = [discharge weight(g) - admission weight(g)] / [admission weight (kg) x nb of days between admission and discharge day]

Average weight gain = sum of weight gains/ Nb of 6-59 months cured **Average length of stay** = sum of length of stay/ Nb of 6-59 months cured

Annexe 15: Recipes for F75, F100 and ReSoMal using CMV.

* F75

Type of milk	Milk (g)	Eggs (g)	Sugar (g)	Oil (g)	Cereal powder (g)*	CMV** (red scoop=6g)	Water (ml)
Dry Skim Milk	25	0	70	27	35	2	Up to 1000
Dry Whole Milk	35	0	70	20	35	2	Up to 1000
Fresh cow milk	280	0	65	20	35	2	Up to 1000
Fresh goat milk	280	0	65	20	40	2	Up to 1000
Whole Eggs	0	80	70	20	40	2	Up to 1000
Egg yolks	0	50	70	15	40	2	Up to 1000

* Cereal powder should be cooked for around 10 minutes and then the other ingredients should be added.
** CMV = Special Mineral and Vitamin mix adapted to severe acute malnutrition treatment (® Nutriset)

* F100

Type of milk	Milk (g)	Eggs (g)	Sugar (g)	Oil (g)	CMV** (red scoop=6g)	Water (ml)
Dry Skim Milk	80	0	50	60	2	Up to 1000
Dry Whole Milk	110	0	50	30	2	Up to 1000
Fresh cow milk	900	0	50	25	2	Up to 1000
Fresh goat milk	900	0	50	30	2	Up to 1000
Whole eggs	0	220	90	35	2	Up to 1000
Egg yolks	0	170	90	10	2	Up to 1000

* ReSoMal

Ingredient	Amount
Standard WHO-ORS	**one l-litre packet**
CMV** (Mineral &Vitamin mix)	**1 red scoop (6 gr.)**
Sucrose (sugar)	**50 g**
Water	**2000 ml**

- **For small quantities of ReSoMal – F75 – F100 using the red scoop**

Product	One red scoop	Water to add
ReSoMal	**5.9g**	**140 ml**
F75 (powder)	**4.1 g**	**20 ml**
F100 (powder)	**4.1 g**	**18 ml**

Annexe 16: UN Statement on micronutrients

World Health Organization | World Food Programme | unicef

Joint statement by the World Health Organization, the World Food Programme and the United Nations Children's Fund

Preventing and controlling micronutrient deficiencies in populations affected by an emergency

Multiple vitamin and mineral supplements for pregnant and lactating women, and for children aged 6 to 59 months

BACKGROUND

Deficiencies of micronutrients are a major global health problem. More than 2 billion people in the world today are estimated to be deficient in key vitamins and minerals, particularly vitamin A, iodine, iron and zinc. Most of these people live in low income countries and are typically deficient in more than one micronutrient. Deficiencies occur when people do not have access to micronutrient-rich foods such as fruit, vegetables, animal products and fortified foods, usually because they are too expensive to buy or are locally unavailable. Micronutrient deficiencies increase the general risk of infectious illness and of dying from diarrhoea, measles, malaria and pneumonia. These conditions are among the 10 leading causes of disease in the world today (*1*).

The groups most vulnerable to micronutrient deficiencies are pregnant women, lactating women and young children, mainly because they have a relatively greater need for vitamins and minerals and are more susceptible to the harmful consequences of deficiencies. For a pregnant woman these include a greater risk of dying during childbirth, or of giving birth to an underweight or mentally-impaired baby. For a lactating mother, her micronutrient status determines the health and development of her breast-fed infant, especially during the first 6 months of life. For a young child, micronutrient deficiencies increase the risk of dying due to infectious disease and contribute to impaired physical and mental development.

MICRONUTRIENTS IN EMERGENCIES

Micronutrient deficiencies can easily develop during an emergency or be made worse if they are already present. This happens because livelihoods and food crops are lost; food supplies are interrupted; diarrhoeal diseases break out, resulting in malabsorption and nutrient losses; and infectious diseases suppress the appetite whilst increasing the need for micronutrients to help fight illness. For these reasons it is essential to ensure that the micronutrient needs of people affected by a disaster are adequately met. For this to happen it is critical that general food-aid rations are adequate and well balanced to meet nutrient needs, and that they are distributed regularly and in sufficient quantities.

PIERRE VIROT

One way to meet the recommended daily intake of micronutrients is to provide foods fortified with micronutrients (*2–3*). Fortified foods, such as corn-soya blend, biscuits, vegetable oil enriched with vitamin A, and iodized salt, are usually provided as part of food rations during emergencies. The aim is to avert micronutrient deficiencies or prevent them from getting worse among the affected population (*4*). Such foods must be appropriately fortified, taking into account the fact that other unfortified foods will meet a share of micronutrient needs.

However, foods fortified with micronutrients may not meet fully the needs of certain nutritionally vulnerable subgroups such as pregnant and lactating women, or young children. For this reason UNICEF and the WHO have developed the daily multiple micronutrient formula shown in Table 1 to meet the recommended nutrient intake[1] (RNI) of these vulnerable groups during emergencies (*2, 3, 5*).

Table 1. The composition of multiple micronutrient supplements for pregnant women, lactating women, and children from 6 to 59 months of age, designed to provide the daily recommended intake of each nutrient (one RNI)

Micronutrients	Pregnant women[a]	Children (6–59 months)[a]
Vitamin A µg	800.0	400.0
Vitamin D µg	5.0	5.0
Vitamin E mg	15.0	5.0
Vitamin C mg	55.0	30.0
Thiamine (vitamin B1) mg	1.4	0.5
Riboflavin (vitamin B2) mg	1.4	0.5
Niacin (vitamin B3) mg	18.0	6.0
Vitamin B6 mg	1.9	0.5
Vitamin B12 µg	2.6	0.9
Folic acid µg	600.0	150.0
Iron mg	27.0[b]	5.8
Zinc mg	10.0	4.1
Copper mg	1.15[c]	0.56[c]
Selenium µg	30.0	17.0
Iodine µg	250.0[d]	90.0

[a] See ref. *3*; [b] see ref. *5*; [c] see ref. *13*; [d] See ref. *14*

Pregnant and lactating women should be given this supplement providing one RNI of micronutrients daily, whether they receive fortified rations or not. Iron and folic acid supplements, when already provided, should be continued. When fortified rations *are not* being given, children aged 6 to 59 months should be given one dose each day of the micronutrient supplement shown in Table 1; when fortified rations *are* being given, children aged 6 to 59 months should be given two doses each week of the micronutrient supplement shown in Table 1. This schedule is shown in Table 2.

Furthermore, vitamin A supplements should continue to be given to young children and mothers post-partum according to existing recommendations. Breastfeeding and appropriate complementary feeding should also continue to be promoted actively.

The multiple micronutrient supplements should be given until the emergency is over and access to nutrient rich foods is restored. At this time the micronutrient status of the population should be assessed to decide whether further interventions to prevent and control micronutrient deficiencies are needed.

Two multiple micronutrient supplement formulae are currently available from UNICEF, one for pregnant and lactating women (*2*) and one for children aged from 6 to 59 months (*15*). The micronutrient composition of these formulae correspond to approximately one RNI for each nutrient and therefore are similar to those presented in Tables 1a and 1b.

Table 2. Schedule for giving the multiple micronutrient supplement shown in Table 1 which provides a daily recommended nutrient intake (1 RNI)

Target groups	Fortified food rations are NOT being used	Fortified food rations are being used
Pregnant and lactating women	1 RNI each day	1 RNI each day
Children (6–59 months)	1 RNI each day	2 RNI each week

MONITORING

The delivery of supplements should be monitored to assess coverage while existing micronutrient programmes should continue as before emergency (*6*). The health of target groups should be monitored to ensure that they are protected from deficiencies as well as from excessive consumption. Indicators for this are described in several WHO publications (*7–12*).

Moreover the continued need for supplements and fortified foods should be assessed periodically during and after the emergency. As the crisis wanes, the general distribution of supplement is likely to be reduced and then increasingly targeted to specific groups.

[1] Recommended nutrient intake is defined (RNI) as the daily dietary intake of a nutrient sufficient to meet the nutrient requirements of nearly all apparently healthy individuals in a specific population group, usually by age and sex (*9*). The definition of the RNI is equivalent to that of recommended dietary allowance (RDA) used by the Food and Nutrition Board of the United Sates Institute of Medicine (*10*)

REFERENCES

1. *The World Health Report 2001: Reducing risks, promoting healthy life*. Geneva, World Health Organization, 2001.
2. *UNICEF/UNU/WHO. Composition of a multi-Micronutrient supplement to be used in pilot programmes among pregnant women in developing countries. Report of a Workshop*. New York, UNICEF, 1999.
3. FAO/WHO. *Vitamin and mineral requirements in human nutrition*, 2nd ed. Geneva, World Health Organization, 2005.
4. WFP. Nutrition in Emergencies WFP Experiences and challenges and micronutrient fortification: WFP experiences and ways forward. WFP Policy papers May 2004.
5. Institute of Medicine. *Food and Nutrition Board Dietary reference intakes. Application in dietary assessment. A report of the Subcommittee on Interpretation and uses of dietary reference intakes and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes*. National Academic Press, Washington D.C., 2001.
6. WHO/MI. *Safe vitamin A dosage during pregnancy and lactation. Recommendations and report of a consultation*. Geneva, World Health Organization, 1998. (WHO/NUT/98.4).
7. *Indicators for assessing vitamin A deficiency and their application in monitoring and evaluating intervention programmes*. Geneva, World Health Organization, 1996 (WHO/NUT/96.10).
8. WHO/UNHCR. *Pellagra and its prevention and control in emergencies*. Geneva, World Health Organization, 1999 (WHO/NHD/99.10).
9. WHO/UNHCR. *Scurvy and its prevention and control in emergencies*. Geneva, World Health Organization, 1999 (WHO/NHD/99.11).
10. WHO/UNHCR. *Thiamine deficiency and its prevention and control in major emergencies*. Geneva, World Health Organization, 1999 (WHO/NHD/99.13).
11. WHO/UNICEF/ICCIDD. *Assessment of iodine deficiency disorders and monitoring their elimination*. 2nd ed. Geneva, World Health Organization, 2001 (WHO/NHD/01.1).
12. WHO/UNU/UNICEF. *Iron deficiency anaemia. Assessment, prevention and control. A guide for programme managers*. Geneva, World Health Organization, 2001 (WHO/NHD/01.3).
13. FAO/IAEA/WHO: Trace elements in human nutrition and health. WHO. Geneva. 1996
14. WHO. Prevention and control of iodine deficiency in pregnant and lactating women, and in children less than two years old. Report of a consultation. Geneva. (In press).

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