

Management of moderate malnutrition in under-5 children by the health sector

Background document for an informal technical consultation on the dietary management of moderate malnutrition - September 30th - October 3rd.

I - BACKGROUND

Introduction

Moderate malnutrition (MM) is defined as a weight-for-age between -3 and -2 z-scores below the median of the WHO child growth standards. It can be due to a low weight-for-height (wasting) or a low height-for-age (stunting) or to a combination of both. Similarly, moderate wasting and stunting are defined as a weight-for-height and height-for-age, respectively, between -3 and -2 z-scores.

MM affects many children in poor countries. Children with moderate malnutrition have an increased risk of mortality and MM is associated with a high number of nutrition-related deaths.¹ If some of these moderately malnourished children do not receive adequate support, they may progress towards severe acute malnutrition (severe wasting and/or oedema) or severe stunting (height-for-age less than -3 z-scores), which are both life-threatening conditions. Therefore, the management of MM should be a public health priority.

In contrast to severe malnutrition, programmes for the management of MM in children have remained virtually unchanged for the past 30 years, and it seems timely to review efforts to improve their efficacy and effectiveness.

Scope of the meeting

The meeting will focus on the dietary management of children with MM. It will aim to answer the question of "What diets should be recommended to feed moderately malnourished children?".

The meeting will examine separately the management of moderately wasted and of moderately and severely stunted children.

The meeting will focus on the management of MM in situation in which food is both secure, i.e. where families have sufficient access to staple foods, and insecure.

The meeting will:

- discuss the nutritional requirements of moderately malnourished children (stunted and/or moderately wasted).
- review the diets that are currently being recommended in dietary counselling of moderately malnourished children and the food supplements that are being given as part of programmes targeting this group.
- examine whether the diets recommended and the food supplements given provide all nutrients needed for the recovery of the children .
- make recommendations on how the currently recommended diets and food supplements given to moderately malnourished children, if inadequate, may be reformulated to improve their efficacy to promote growth.
- discuss the advantages and disadvantages of blanket or targeted approaches for the management of moderate malnutrition; this discussion will cover both programmes relying on dietary counselling and the distribution of food supplements.
- identify knowledge gaps and research priorities to improve the management of moderately malnourished children.

The meeting will not discuss:

- the broader issue of how to perform dietary counselling, how to change feeding practices in moderately malnourished children, or how to deliver food supplements.
- the broader issue of procuring and distributing these food supplements and related problems of logistics, storage, food sharing or leakage.
- the prevention of malnutrition, in particular through the provision of food supplements to pregnant and lactating women or through social programmes, including cash transfer programmes or income generating activities as a means to increase access to recommended foods. It will be acknowledged though that these prevention activities are essential to end malnutrition.
- Management of malnutrition in infants less than 6 months of age.

Another forum/consultation will be organized once work has been undertaken to address the knowledge and research gaps identified during this meeting for the overall management of MM. This later workshop will review the evidence on strategies and programmatic approaches to managing MM and aim to answer questions not addressed by this meeting.

1. Current WHO recommendations for moderately malnourished children

There are currently few specific WHO recommendations for the management of children with MM. Moderate malnutrition is mentioned in IMCI materials², in teaching material on the use of the WHO growth standards³ and the management of moderate wasting is mentioned in WHO and other UN documents related to nutrition in emergencies.^{4,5,6}

1.1 IMCI

In the IMCI algorithm, children with a weight-for-age less than -3 z-score are classified in the "very low weight" category (Annex 1). Most of these children will have a combination of stunting and wasting. Those with severe acute malnutrition (SAM), defined by visible severe wasting or MUAC less than 110 mm or oedema of both feet, are referred to therapeutic feeding programmes.⁷ For "very low weight" children not classified as "severely malnourished", the recommendation is to assess the child's feeding, to counsel the mother and to ask her to come back for follow-up every month (Annex 1).

There is very little difference in the action recommended to the health worker if a child less than 2 years of age has a normal weight or is "very low weight". When a child has a "very low weight", the health worker is advised to ask a few additional questions in order to assess the child's feeding (see Annex 2). In children 2 years of age and above, only mothers of children with "very low weight" receive nutrition counselling. Feeding recommendations during sickness and health do not mention specific nutritional messages for children who have "very low weight" (Annex 3).

Of note, height is not measured in standard IMCI and no distinction is made in the current IMCI guidelines between children who are severely underweight because they are stunted or because they are wasted.

1.2 Training course on child growth assessment

The module of the training course on investigating the causes of undernutrition specifically refers to all children who are moderately underweight or moderately wasted or stunted, without associated overweight. After a detailed interview with the mother, aimed at determining the causes of undernutrition, the health worker is instructed to advise the mother. The advice given depends on the suspected cause of undernutrition and on the age of the child. Most advice given is based on generic recommendations, which are made for well-nourished children of the same age groups, as explained in the standard growth record.^{8,9} For children where an inadequate diet is suspected, some specific advice is given in addition to the general dietary recommendations. These specific recommendations are reproduced in Annex 4. For stunted children, the addition of legumes and animal-source foods to meals is encouraged.

1.3 Nutrition in emergencies

In emergencies, WHO recommendations depend on the overall nutritional situation, taking into account the prevalence of wasting in children aged 6 to 59 months and the presence of aggravating factors (Annex 5).⁵ When the situation is "serious", the recommendation is to give a supplementary ration to all members of vulnerable groups, especially children and pregnant women. When the situation is "risky", the recommendation is to give a supplementary ration targeted to individuals identified as malnourished in vulnerable groups. For children, this includes all those with moderate wasting defined by a weight-for-height below either -2 z-score or 80% of the median of

the NCHS reference and above -3 z-score or 70% of the median of the NCHS reference. When the situation is "acceptable", the recommendation is not to implement any supplementary feeding programmes and care for malnourished children should be through regular health services. The IMCI recommendation, which is based on providing dietary advice and not on supplementary feeding, is consistent with the recommendations formulated for "acceptable situations" in the emergency guidelines.

Food rations recommended for moderately wasted children in "risky" situations are the same as those recommended for all children in "serious" situations⁵ (Annex 6). There is no recommendation for the management of stunted children.

2 Knowledge gaps - Background issues

The dietary management of MM must address a broad spectrum of conditions and usually combines two different approaches, i.e. dietary counselling and use of food supplements. These two approach are complementary, as dietary counselling is needed even when a food supplement is given. There seems to be a lot of heterogeneity both for programmes based on dietary counselling and for those using food supplements. To make appropriate choices between all of the possible options and to find the right balance between dietary counselling and the use of food supplements when the two approaches are used in combination, the evidence base should be examined in an attempt to provide clear answers to a few key questions. Also, the meeting should look at what is currently being done in practice and what works.

The background issues to be discussed in the meeting will be presented in four background papers prepared and circulated to participants before the meeting.

2.1 What are the nutritional requirements of moderately wasted and stunted children ? (Background Paper 1)

Nutritional requirements of MM children can in theory be estimated by a factorial method using their body weight, expected weight gain and the composition of the tissue they should lay down during recovery.¹⁰ Nutritional requirements of wasted and stunted children are likely to be different. Wasted children have a low lean body mass in relation to their height, usually related to a low muscle mass and low fat stores. In their case, recovering a normal body composition will require the intake of larger quantities of energy, proteins and of all nutrients needed for the synthesis of muscle and fat tissue. Children with stunting but no wasting have muscle and fat mass in relation to their height that is close to normal, but they have delayed bone growth. Providing extra energy is likely to be of little help, as bone growth is not an energy consuming process. Also, excess energy may unnecessarily increase fat mass. On the other hand, these children should receive additional quantities of nutrients needed for both bone growth and lean tissue accretion, not always available in the typical diet of poor children.¹¹

Requirements of wasted and stunted children in terms of energy, protein, minerals, vitamins and essential fatty acids should be estimated before formulating any

recommendation for feeding MM children. It is also important to estimate the degree of confidence that can be achieved when estimating these needs when formulating these recommendations.

2.2 Choice of foods / ingredients for feeding MM children (Background Paper 2)

It is advantageous to consume a diet containing a wide variety of foods; therefore, the diets that families are advised to give to children and the ingredients used for preparing food supplements should be reviewed. Nutrition education programmes usually rely on the promotion of low cost locally available high protein foods. This often leads to the promotion of legumes such as beans, lentils or peanuts. The adequacy of these foods to feed MM children should be reviewed. The nutritional value of these foods, and in particular their protein quality and their digestibility by young children, should be reviewed. Their antinutrient and dietary fibre content should be also examined, in addition to the possibility of removing or destroying these antinutrient factors, if they represent a problem, at the household level.

The discussion on adequacy of legumes should extend to soy flour, which is often used as protein source in centrally processed supplementary foods. Soy flour contains high levels of antinutrient factors, dietary fibres and phytohormones that may have unfavourable effects on the child's nutrition and health if these components are not removed. In industrialized countries, products for infant feeding that contain soy protein isolate are regarded as safe.¹² The process used to remove potentially harmful components from these isolates is much more elaborate than what is used to prepare blended flours used routinely to treat MM children. There may be a need to re-examine the level of antinutrient factors that remain in foods prepared for the MM and their effects on the bioavailability of essential nutrients in, and added to, the blends.

Blended flours most commonly given in supplementary feeding programmes to MM children were designed about 30 years ago,¹³ when the emphasis was placed on the provision of large quantities of protein and energy. These foods are usually prepared by mixing and cooking a legume with a cereal, usually maize and soy flour cooked by extrusion.¹⁴ Maize and soy may be dehulled for preparation of food supplements but this is not required in current specifications (Annex 7), although metabolic studies suggest that blended foods made from whole soy and/or whole maize are definitely inferior.¹⁵ The acceptable content of dietary fibres for blended foods should be reviewed.

Cereal flours are often used to prepare porridges or food supplements for MM children. Their main advantage is that they are usually the least expensive source of energy. However, children were often fed diets relying almost exclusively on cereal while becoming malnourished. Advantages and disadvantages of promoting cereal-based porridges for MM children should be discussed. The merits of fortified cereals as a vehicle for missing nutrients should also be examined.

Animal products usually have a high zinc and iron content with virtually no antinutrients. Compared to soy flour or other legumes, animal products also provide easily digested

high quality proteins. Also, milk products may have an hormonal effect that stimulates linear growth.¹⁶ Their potential advantages, however, should be assessed in relation to their higher costs and the risk they may present at the household level (contamination, possible use as a breast milk substitute for dairy products).

In dietary counselling programmes, or when low fat supplements are used, mothers are often advised to add vegetable oil to the meals of children to increase the energy density. This will have an adverse effect on the nutrient density of the obtained diet. Also, oils have different essential fatty acid compositions, and some may not be adapted for feeding MM children. Their different characteristics and advantages should be reviewed for MM management.

Sugar is often introduced at high concentrations in food supplements given for MM management. This is especially a concern for some lipid-based nutritional supplements, but also for blended flours. Promoting foods with a high sugar content may have negative effects on dental health. It can also reinforce among young children a taste for sweet foods which may unfavourably affect the acceptability of other local foods. Potential problems associated with foods with a high sugar content should be reviewed.

2.3 Dietary management of moderately malnourished children with dietary counselling (Background Paper 3) - What dietary recommendations are currently made to mothers of MM children? Is this likely to meet nutritional requirements of MM children and what evidence is there of effect?

The existing recommendations and current practices for managing MM children should be reviewed. Then, it should be determined if the recommendations, as formulated, are consistent with the estimated nutritional requirements of MM children. This can be determined by analysing the nutritional density of recommended diets using linear or goal programming, or a simulation technique.¹⁷ Interpretation of the results of this analysis should take into account the level of uncertainty that underlies the determination of nutritional requirements of moderately wasted and stunted children. Finally any evaluations of effectiveness should be reviewed.

2.4 Dietary management of moderately malnourished children with food supplements (Background Paper 4) - What food supplements are currently given to MM children? Do they provide all nutrients needed by MM children and do they complement what is missing in the local diet? What evidence is there of effect?

There is a wide range of nutritional products that can be used to treat MM children, from blended flours (e.g. CSB, UNIMIX) and lipid-based nutritional supplements (LNS) designed to provide large quantities of protein and energy, to multi-micronutrient powders or tablets designed to provide only some micronutrients. The composition of all food supplements that are given to MM children should be examined, along with their ability to provide the specific nutrients needed by moderately wasted and stunted children

and their ability to supply the nutrients missing in the family diet. Finally, any evaluation of effectiveness of these supplements should be reviewed.

3. Improving current recommendations

The background documents and recent evidence available at the time of the meeting should be used to improve current recommendations. The following points should be specifically addressed during the meeting.

3.1 What diets should we recommend for children who are moderately malnourished ?

In contrast to children with SAM, children with MM should receive most of the recommended nutrients from usual family foods. Advice and support should be given to the caretakers on how to improve diets being given to the children at home and what foods should be added to provide nutrients that are missing in the diet. Recommendations on how to improve the content of dietary counselling should be formulated during this meeting.

3.2. In which circumstances are food supplements required? What food supplements, should be recommended to feed MM children in these circumstances?

The nutritional composition of food supplements should be adjusted to provide nutrients missing in family foods. This approach has implications for the macronutrient composition of food supplements recommended for MM children. For instance, there may be no need to provide high protein foods if protein does not seem to be a limiting nutrient in the diet of the children. Or there may be little rationale in providing a cereal-based low fat supplement to MM children who are already being given cereal-based low fat foods at home.

In recent years, there have been new attempts to treat MM children with a greater variety of food supplements. Also, there are attempts to improve the food supplements currently being used. There is a need to review how these new attempts are consistent with nutritional recommendations formulated during this meeting, and if possible, data on their efficacy should be compared based on the results of comparative trials.

3.3 How should food supplements be formulated? Do we need a special Codex Alimentarius Standard for underweight children? Can we use current standards? Should current standards be updated ?

Currently, most food supplements given to MM children fall into the category of processed cereal-based foods for infants and young children as described in the Codex Alimentarius.¹⁸ This standard was updated in 2006. At a recent meeting of the Codex Alimentarius Commission, the Indian delegation proposed that a new standard for cereal-based foods be developed for underweight children¹⁹ (Annexes 8). An alternative would

be to adapt the Codex Standard for formulated supplement foods for older infants and young children,²⁰ as suggested by the Australian delegation in response to the Indian proposal. The Standard for formulated food supplement refers to "foods [that] provide those nutrients which either are lacking or are present in insufficient quantities in the basic staple foods" and may indeed be more suitable than cereal-based foods for improving the diet of MM children who usually already have an excess of cereal in their diets.

3.4 Should targeted programmes be recommended for moderate malnutrition? Or are blanket programmes preferable?

Examination of the distribution of weight-for-height indices during food crises suggest that, in most cases, all children lost weight as the distribution is just shifted, without a significant increase of its standard deviation.²¹ The implication of this observation is that blanket distribution would be more appropriate in situations where there is a high prevalence of wasting. Recent data suggest that the distribution of an adapted supplement is the most effective to prevent SAM.²² The relevance of targeted vs. blanket food distribution should be reexamined in view of recent evidence.

3.5 Cost aspects of the management of moderate malnutrition

When MM is managed by dietary counselling only, the economic affordability of nutrient dense foods for poor families should be assessed. This can be examined by linear programming techniques. A preliminary study showed that family diets complying with current nutritional recommendations were often not affordable to poor families in developing countries.²³

Food supplements are usually given to families of malnourished children, especially in emergency settings. In non emergency situations, some social programmes provide low cost food supplements to underprivileged families. These supplements are sometimes subsidized. The economic rationale of these programmes should be assessed. There may be some justification for the use of some fortified foods or food supplements if they provide expensive nutrients missing in the diets of poor children at a lower cost than non fortified foods. So the cost of food supplements in relation to their nutritional content should be discussed and compared to the cost of family foods.

The cost of MM management should be broken down between the cost to be supported by families and the cost supported by the programmes.

The programmatic costs of different options should be taken into account when choosing the appropriate options. Dietary counselling requires staff time and if an option that includes dietary counselling is chosen, specially recruited staff may be needed. The distribution of food supplements also has a large programme cost, in addition to the cost of the supplements themselves.

4 Special considerations

4.1 Management of moderate malnutrition in areas of high kwashiorkor prevalence

Kwashiorkor is the predominant form of SAM in some areas but its origin is still debated. Insufficient protein intake was regarded as a possible cause since its initial description.²⁴ This theory was challenged about 20 years ago by Golden and Ramdath who proposed that kwashiorkor was related to oxidative stress.²⁵ However, regular supplementation of children with an antioxidant cocktail did not prevent the occurrence of kwashiorkor in rural Malawi.²⁶

Prevention of kwashiorkor has been based for years on the distribution or promotion of foods with a high protein content in moderately wasted children. This approach can be challenged as many kwashiorkor cases do occur in children who are not wasted.

The composition of food supplements given in these prevention programmes may need to be reassessed since many of these supplements are formulated to have a high protein content and little attention has been given to their antioxidant content. Also, little attention was given to their potassium content, although experimental data suggest that insufficient potassium intake may be involved in kwashiorkor.²⁷ A better understanding of the mechanisms leading to kwashiorkor, and in particular of associated nutritional deficiencies, is needed for optimizing the MM management in areas of high kwashiorkor prevalence.

4.2 Should the dietary management of moderate malnutrition be different in high HIV prevalence areas?

Children with HIV infection have higher energy requirements and frequent infections that will delay recovery. It is not known, however, if this has practical implication for the dietary management of MM beyond the recommendation to provide extra energy to cover the additional expenditure related to HIV infection.

5 Next steps

Based on the background documents, and following the discussion that will take place during the meeting, the participants will formulate recommendations on how to improve current recommendations. Also, knowledge gaps including in the area of programming will be identified, and a list of research topics with a detailed research agenda will be set up and prioritized.

II. OBJECTIVES OF THE MEETING

Overall Objectives of the meeting:

1. To identify areas of consensus on the nutrient needs and dietary management of MM in children that can be translated into evidence-based global guidelines.
2. To identify knowledge gaps that should be addressed by research both in the area of dietary management and the modalities for providing that diet.

Specific objectives:

1. To provide an estimate of the nutritional requirements of children with MM, defined by a weight-for-age less than -2 z-scores. These nutritional requirements will be examined separately for children who are moderately wasted and those who are stunted.
2. To examine if current approaches for MM management, based either on dietary counseling or on the provision of food supplements, provide all nutrients needed for the recovery of children with MM.
3. To formulate recommendations to improve the dietary management of MM, either through dietary counseling or food supplementation.

In each of these areas, if the evidence base is not strong enough to formulate recommendations, the meeting should recommend which type of research is needed to address current knowledge gaps.

Expected Products:

1 - Recommendations for the management of moderate malnutrition

WHO will disseminate the proceeding of the meeting among relevant stakeholders. This will start the process for the development of preliminary recommendations for the dietary management of MM. The meeting should also produce a detailed research agenda to generate the evidence needed to strengthen these preliminary guidelines.

2 - Formulation of recommendations for feeding moderately malnourished children for the Codex Alimentarius working group developing standards of food products for underweight children

The main conclusion of this meeting will be presented to the session of the *Codex Alimentarius* to be held in South Africa in November 2008. The meeting report should be used as a background document for the preparation of a new standard to be developed for underweight children or for adapting current standards.

Annex 1: Action to be taken by the health worker according to IMCI when the child is "very low weight" and "not very low weight".

<p>ANAEMIA OR VERY LOW WEIGHT</p>	<ul style="list-style-type: none"> ➤ Assess the child's feeding and counsel the mother on feeding according to the FOOD box on the <i>COUNSEL THE MOTHER</i> chart. <ul style="list-style-type: none"> - If feeding problem, follow-up in 5 days. ➤ If pallor: <ul style="list-style-type: none"> - Give iron. - Give oral antimalarial if high malaria risk. - Give mebendazole if child is 2 years or older and has not had a dose in the previous 6 months. ➤ Advise mother when to return immediately. ➤ If pallor, follow-up in 14 days. If very low weight for age, follow-up in 30 days.
<p>NO ANAEMIA AND NOT VERY LOW WEIGHT</p>	<ul style="list-style-type: none"> ➤ If child is less than 2 years old, assess the child's feeding and counsel the mother on feeding according to the FOOD box on the <i>COUNSEL THE MOTHER</i> chart. <ul style="list-style-type: none"> - If feeding problem, follow-up in 5 days. ➤ Advise mother when to return immediately.

Below the age of 2 years, with the highest prevalence of malnutrition, there is no specific action for children who are classified as "very low weight". Recommendations are the same.

Annex 2 Standard IMCI recommendations for counselling the mother.

FOOD

➤ *Assess the Child's Feeding*

Ask questions about the child's usual feeding and feeding during this illness. Compare the mother's answers to the *Feeding Recommendations* for the child's age in the box below.







ASK -

- Do you breastfeed your child?
 - How many times during the day?
 - Do you also breastfeed during the night?
- Does the child take any other food or fluids?
 - What food or fluids?
 - How many times per day?
 - What do you use to feed the child?
 - If very low weight for age: How large are servings? Does the child receive his own serving? Who feeds the child and how?
- During this illness, has the child's feeding changed? If yes, how?

Annex 3 - Feeding recommendations during sickness and health

FEEDING RECOMMENDATIONS DURING SICKNESS AND HEALTH

NOTE: These feeding recommendations should be followed for infants of **HIV negative** mothers. Mothers who **DO NOT KNOW** their HIV status should be advised to breastfeed but also to be HIV tested so that they can make an informed choice about feeding

<p>Up to 6 Months of Age</p>  <ul style="list-style-type: none"> ▪ Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours. ▪ Do not give otherfoods or fluids. 	<p>6 Months up to 12 Months</p>  <ul style="list-style-type: none"> ▪ Breastfeed as often as the child wants. ▪ Give adequate servings of: <ul style="list-style-type: none"> _____ _____ _____ <ul style="list-style-type: none"> - 3 times per day if breastfed plus snacks - 5 times per day if not breastfed. 	<p>12 Months up to 2 Years</p>  <ul style="list-style-type: none"> ▪ Breastfeed as often as the child wants. ▪ Give adequate servings of: <ul style="list-style-type: none"> _____ _____ _____ <p>or family foods 3 or 4 times per day plus snacks.</p> 	<p>2 Years and Older</p>  <ul style="list-style-type: none"> ▪ Give family foods at 3 meals each day. Also, twice daily, give nutritious food between meals, such as: <ul style="list-style-type: none"> _____ _____ _____ _____ 
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Feeding recommendations for a child who has SEVERE UNCOMPLICATED MALNUTRITION

- If still breast feeding, give more frequent, longer breast feeds, day and night
- Feed the child with RUTF (ready-to-use therapeutic food) per day (corresponding to 40 g/ kg/day) for 2 months. NOTE: RUTF is a special food for malnourished children aged more than 6 months and should not be shared with other family members. Offer plenty of clean water to drink with RUTF

Feeding Recommendations for a child who has PERSISTENT DIARRHOEA

- If still breastfeeding, give more frequent, longer breastfeeds, day and night.
- If taking other milk:
 - replace with increased breastfeeding OR
 - replace with fermented milk products, such as yoghurt OR
 - replace half the milk with nutrient-rich semisolid food

COUNSEL THE MOTHER ABOUT FEEDING PROBLEMS

If the child is not being fed as described in the above recommendations, counsel the mother accordingly. In addition:



- If the mother reports difficulty with breastfeeding, assess breastfeeding (see *YOUNG INFANT* chart). As needed, show the mother correct positioning and attachment for breastfeeding.

- If the child is less than 6 months old and is taking other milk or foods*:
 - Build mother's confidence that she can produce all the breast milk that the child needs.
 - Suggest giving more frequent, longer breastfeeds day or night, and gradually reducing other milk or foods.

If other milk needs to be continued, counsel the mother to:

- Breastfeed as much as possible, including at night.
- Make sure that other milk is a locally appropriate breast milk substitute.
- Make sure other milk is correctly and hygienically prepared and given in adequate amounts.
- Finish prepared milk within an hour.



- If the mother is using a bottle to feed the child:
 - Recommend substituting a cup for bottle.
 - Show the mother how to feed the child with a cup.
- If the child is not feeding well during illness, counsel the mother to:
 - Breastfeed more frequently and for longer if possible.
 - Use soft, varied, appetizing, favourite foods to encourage the child to eat as much as possible, and offer frequent small feeds.
 - Clear a blocked nose if it interferes with feeding.
 - Expect that appetite will improve as child gets better.



- If the child has a poor appetite:
 - Plan small, frequent meals.
 - Give milk rather than other fluids except where there is diarrhoea with some dehydration.
 - Give snacks between meals.
 - Give high energy foods.
 - Check regularly.
- If the child has sore mouth or ulcers:
 - Give soft foods that will not burn the mouth, such as eggs, mashed potatoes, pumpkin or avocado.
 - Avoid spicy, salty or acid foods.
 - Chop foods finely.
 - Give cold drinks or ice, if available.

Annex 4. Dietary advice given specifically to underweight children in the WHO Child growth standard training course.

Dietary recommendations made to underweight children, with a suspected inadequate food intake, *in addition to generic recommendations made to well-nourished children.*

Age 6 months to 1 year

- Advise the mother to breastfeed as often as the baby wants.
- Advise the mother to select nutrient-dense fluids (such as milk, soups) rather than drinks with low nutrient value (for example, tea, coffee, sugary drinks and dilute sweet juices) that easily fill the baby up without providing many nutrients.

Age 1 to 2 years

- Encourage the addition of legumes and animal-source foods to meals to improve the nutrient quality of the diet. This is especially important for the stunted child to promote growth in height without excess weight gain.
- If the diet is mainly cereal-based, encourage the mother to make the cereal thick, not dilute, and add some fat (for example, oil) to increase energy density.
- Encourage feeding yellow-fleshed fruit and vegetables and dark-green leafy vegetables.
- If the child is allergic to a specific food, give advice on use of an alternative that contains similar nutrients.
- Encourage the mother to offer other foods; new foods should be introduced gradually.

Age 1 to 5 years

Advise the mother to:

- Give the child family foods at 3 meals each day.
- Also, twice daily, give nutritious snacks between meals such as

and same advice as for children aged 1-2 years

Annex 5. Decision chart for the implementation of selective programmes.

Note: This chart is for guidance only and should be adapted to local circumstances.

Finding		Action required
Food availability at household level below 2100 kcal _{in} per person per day	⇒	<i>Unsatisfactory situation:</i> <ul style="list-style-type: none"> • Improve general rations until local food availability and access can be made adequate
Malnutrition rate ^a 15% or more or 10–14% with aggravating factors ^b	⇒	<i>Serious situation:</i> <ul style="list-style-type: none"> • General rations (unless situation is limited to vulnerable groups); <i>plus</i> • Supplementary feeding generalized for all members of vulnerable groups, especially children and pregnant and lactating women • Therapeutic feeding programme for severely malnourished individuals
Malnutrition rate ^a 10–14% or 5–9% with aggravating factors ^b	⇒	<i>Risky situation</i> <ul style="list-style-type: none"> • No general rations; <i>but</i> • Supplementary feeding targeted to individuals identified as malnourished in vulnerable groups • Therapeutic feeding programme for severely malnourished individuals
Malnutrition rate ^a under 10% with no aggravating factors	⇒	<i>Acceptable situation:</i> <ul style="list-style-type: none"> • No need for population interventions • Attention for malnourished individuals through regular community services

^a Malnutrition rate is defined as the percentage of the child population (6 months to 5 years) who are below either the reference median weight-for-height –2 SD or 80% of reference weight-for height.

^b Aggravating factors:

- general food ration below the mean energy requirement
- crude mortality rate more than 1 per 10 000 per day
- epidemic of measles or whooping cough (pertussis)
- high incidence of respiratory or diarrhoeal diseases.

From: World Health Organization. Manual on the management of nutrition in major emergencies. Geneva, 2000. Available at:

http://www.who.int/nutrition/publications/nut_emergencies/en/index.html

Annex 6 - Examples of rations for supplementary feeding.

Commodity	Ration 1 (g)	Ration 2 (g)	Ration 3 (g)
<i>On-site supplementary feeding^a</i>			
Blended food, fortified	100	—	—
Cereal (e.g. maize flour)	—	125	60
DSM	—	—	45
Pulses	—	30	—
Oil	30	20	30
Sugar	20	—	15
Salt	—	5	—
Energy (kcal _{in})	725	700	700
Protein (% of energy)	10	11	12.5
Commodity	Ration 1 (g)	Ration 2 ^b (g)	Ration 3 (g)
<i>Take-home supplementary feeding^c</i>			
Blended food, fortified	200	140	250
DSM	—	50	—
Oil	20	50	25
Sugar	15	30	20
Energy (kcal _{in})	1000	1250	1250
Protein (% of energy)	14	14.5	14.5

^a On-site (wet) rations should normally supply (per ration):
 energy: 500–700 kcal_{in}.
 protein: 10–12% of energy.

^b The commodities in this ration should be distributed as a pre-mix.

^c Take-home (dry) rations should normally supply (per ration):
 energy: 1000–1200 kcal_{in}.
 protein: 10–12% of energy.

Annex 7 - Technical specifications of UNIMIX used for management of moderately wasted children (reference: UNICEF Supply catalogue, <http://www.supply.unicef.dk/catalogue/> Nutrition/ Supplementary Food. Accessed September 25, 2007).

0000219 UNIMIX,Super,(CSB),10% sugar

03 NUTRITION

03 Supplementary food

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General Description:

UNIMIX, super (CSB: Corn-Soya Blend) formulated supplementary food for infants and older children based on pre-cooked blend of 70-80% maize and 20-30% soyabean (with addition of 10% sugar against an equivalent amount of cereal).

Micronutrient (vitamin/mineral) composition in accordance with the latest UNICEF requirements (1996). 1 metric ton packed in 40 x 25kg polypropylene bags, polyethylene lined.

Technical Specifications:

Composition:

- Whole maize: 70-80%
- Whole soyabeans: 20-30%
- Sugar: 10%

Maize can be partly or fully replaced by whole wheat. (The actual composition, giving percentages within the above range must be clearly specified by the manufacturer and the sugar % approved by the customer).

Revised Vitamin/Mineral Premix:

Vitamin premix:

Amounts for 1kg of finished UNIMIX:

- Thiamine mononitrate.....2.8 mg
- Riboflavin.....8.2 mg
- Vitamin C (stabilized ethyl-cellulose coated)..600 mg
- Pyridoxine hydrochloride.....1.65 mg
- Niacin.....50 mg
- Ca-d-pantothenate.....28 mg
- Folic acid.....2 mg
- Vitamin B-12.....13 mcg

- Vitamin A palmitate (stabilized).....23000 IU
- Vitamin D (stabilized).....2000 IU
- Vitamin E (as tocopherol).....75 IU
- Soy flour defatted (toasted) or starch to reach total weight (additional soy flour may be added as a carrier, if desired) to make total weight 1000 mg.

Mineral Mix:

- Calcium carbonate, food grade FCC or equiv.....2600 mg
- Zinc sulphate, hydrated FCC grade ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$)...120 mg
- Ferrous fumarate, purified FCC grade.....80 mg
- Copper sulphate, pentahydrate, FCC grade.....7 mg
- Iodized salt (0.007 %/Iodine).....6500 mg

TOTAL WEIGHT9307 mg

Processing instructions:

UNIMIX shall be manufactured from fresh ingredients of good quality, free from foreign materials, substances hazardous to health, excessive moisture, insect damage and fungal contamination. The ingredients shall comply with all relevant national food laws and standards. The ingredients must be stored under dry, ventilated and hygienic conditions. Only safe insecticides may be used for storage.

The production process shall be in accordance with the 'Code of Hygienic Practice for Foods for Infants and Children' and 'Code of Sound Manufacturing Practices' of the Codex Alimentarius (Volume 4, Second Edition, FAO Rome 1994).

BLENDED FOOD shall be manufactured using one of the following processing methods:

Extrusion:

Cleaned cereals and pulses/oilseeds/soyabeans are mixed in the correct amount, gritted and precooked through extrusion at a temperature not exceeding 160°C. The extrusion product is cooled to ambient temperature immediately after extrusion and milled into a fine flour.

Roasting/milling:

Cereals and pulses/oilseeds/soyabeans are separately roasted at a temperature not exceeding 180°C (recommended: cereals 10 min. at 140°C; pulses/oilseeds/soyabeans 15 min. at 170°C). The roasted products are cooled to ambient temperature immediately after roasting, mixed in the correct amount and milled into a fine flour.

Subsequently the flour is homogeneously mixed with the vitamin/mineral supplement and (if applicable) sugar and/or oil.

Additional Product Specifications:

Shall comply, except when otherwise specified, with the 'Standards and Guidelines on Foods for Infants and Children' of the Codex Alimentarius (Volume 4, Second Edition, FAO Rome 1994).

Shall be suitable as a dietary supplement for older infants and young children as well as other vulnerable groups for serving as porridge, gruel or extender to other foods.

The following requirements to be met:

Taste:

It shall have a pleasant smell and palatable taste, which young children will like and enjoy.

The manufacturer shall replace batches of UNIMIX which, within the shelf-life, are found by the contracting organization to have taste deviations such as an off taste or a bitter taste making the product unsuitable for or unusable by the final consumer for whom the product is intended.

Shelf-life:

It shall retain above qualities for at least 12 months from date of manufacture when stored dry at ambient temperatures prevalent in the country.

Flour characteristics:

It shall be a uniform fine texture with the following particle distribution:

95% must pass through a 600 micrometer sieve;

100% must pass through a 1000 micrometer sieve.

Dispersibility:

It shall be free from lumping or balling when mixed with water of ambient temperature.

Cooking time:

It shall be suitable for older infants after a cooking time not exceeding ten minutes when prepared in water of ambient temperature.

Moisture and crude fiber:

It shall contain a moisture content not exceeding 12% and a fiber content (based on dry product) not exceeding 5% (dehulling of soya or pulses is not required).

Nutritional value:

It shall contain not less than the following nutritional value per 100g dry product:

- Total energy 400 kcal
- 14 % protein (Nx6.25)
- 6% fat

Energy density:

It shall contain, when prepared as a gruel, not less than 100 kcal/100 ml.

Safety:

It shall be free from objectionable matter.

It shall not contain any substances originating from microorganisms, or any other poisonous or deleterious substances like heavy metals or pesticide residues, in amounts which may represent a hazard to health (permitted level of aflatoxin: 20 ppb).

Not exceed the following levels of microbiological contamination (maximum/gram finished product):

- Mesophilic aerobic bacteria:.....100,000
- Coliforms:.....100
- Salmonellae (per 25 g sample).....0

The variation of the final product with respect to contents of moisture, fiber, protein, fat and micronutrients shall not exceed plus or minus 5% of the original value using standard analytical techniques: products not meeting this requirement are liable for rejection.

Weight/Volume/Dimensions:

Packed in 25 kg bags:

- estimated weight: 25.000 kg
- estimated volume: 60.000 cdm

Shipping Details:

The product is packed in new, laminated woven polypropylene outer bags (minimum weight 80 grams) with polyethylene inner bags (minimum thickness 75 micron or 300 gauge) of 25 kg contents. The bottom of both PP and PE bags is double folded and stitched together, above the stitching line the inner PE bag is heat sealed. The top of the PP bag is heat cut (to prevent fibrillation), folded over the inner PE bag and stitched together. After the bag is filled with 25 kg of UNIMIX the top of both PP and PE

bags is double folded and stitched together, below the stitching line the PE inner bag is heat sealed.

The required markings on the outer bags will be indicated separately.
For shipment by sea, incoterms must be 'FCA Containerized, named port'

Each shipment must be accompanied with the following documentation:

- a) Certificate of origin
- b) Health Certificate
- c) Radioactivity certificate

The supplier must provide, upon request, all necessary documents and certificates which UNICEF may require for the import of the product, and, where necessary, for their transit through any country.

The country office/customer must indicate specific requirements regarding documentation, in their order.

Instructions for use:

Mix one (1) part UNIMIX with three (3) parts cold water, stir until boiling and cook as necessary for a maximum of 10 minutes.

Annex 8 - Proposal for new work to establish a standard for processed cereal-based foods for underweight infant and young childrenⁱ

160. The Delegation of India recalled that the 29th session of the Commission had adopted the Revised Standard for Processed Cereal-Based Foods for Infants and Young Children. India's comments related to minimum cereal content, energy density and protein content in the revised Standard. The delegations of India and Thailand had reserved their position on the decision of the Commission to adopt a revised Standard. The Commission agreed to request the Committee on Nutrition and Foods for Special Dietary Uses to evaluate the need for revising sections 3.2, 3.3 and 3.4 of the adopted standard.

161. The Delegation drew the attention of the Committee to the adverse effects of malnutrition especially in developing countries of the world, causing a high infant, child and maternal mortality. Further consequences of malnutrition could lead to high level of anemia, low weight gain during pregnancy, acute infections and chronic diseases. It also significantly affects cognitive development and learning achievements of children and this puts additional stress on health care expenditures.

162. A vicious intergenerational cycle of malnutrition commences when a child is born with low birth weight. While malnutrition is caused by multiple problems including poverty, lack of health care and low consumption of protective foods such as milk, cereals, fruits and vegetables, the delayed and inadequate complementary feeding is found to be an important reason for the onset of malnutrition among children of 6 months to 2 years.

163. The Delegation indicated that in India about 46% of children in 0 to 3 years of age group are underweight and about 30% of children born in the country whose birth weight was reported, had low birth weight. Micronutrient deficiencies are also wide spread and 79% of children between 6 month to 3 years suffer from anemia. The Delegation indicated that in developing countries 146 million children under 5 years are underweight. Of these more than a half live in south Asia and 57 million live in India. The Delegation also emphasized that about 30000 children die each day and most of these children live in developing countries. Malnutrition contributes to these deaths.

164. The Delegation of India also pointed out that improving nutritional standards, particularly in the early years, is crucial for achieving the "Millennium Development Goals", and that priorities must be altered for reducing child malnutrition by half by 2015. The delegation stated that while multiple strategies are required for addressing the problems of under nutrition in children, issues of timely and adequate complementary feeding with appropriate levels of nutritional density foods are very important.

165. The Delegation of India therefore urged the Committee to start working on a separate standard for Processed Cereal-Based Foods for Underweight Infants and Young Children so that nutritionally and energy dense composition in the proposed standard will help to reduce the burden of malnutrition in the developing countries.

166. The Delegation of the EC, while acknowledging the importance of this problem in developing countries, was of the view that the proposal for this work came in the beginning of the meeting and that it was not enough time to study this question in detail. The Delegation indicated that a number of issues such as nature of standard (regional or world-wide) and products concerned should be clarified. The delegation indicated that more thorough analysis of the problem was needed and proposed to prepare a more structured project document on this matter for consideration by the next session of the Committee

167. The Delegation of Australia questioned whether the existing Codex Guidelines on Formulated Supplementary Foods for Older Infants and Young Children could help to address this problem.

168. Several delegations and observers supported the spirit of the document and volunteered to join India to develop the revised version of supporting document containing analysis and proposals on how the Committee could address this issue.

169. The Committee agreed that the Delegation of India with assistance from other interested partiesⁱⁱ working electronically would revise the document in the light of comments at the current session and prepare a more structured project document for consideration by the next session of the Committee.

Source: Proposal for new work to establish a standard for processed cereal-base foods for underweight infants and young children. In: Report of the 29th Session of the Codex Committee on Nutrition and Foods for Special Dietary Uses, Bad Neuenahr-Ahrweiler, Germany, 12 - 16 November 2007. Available at:
http://www.codexalimentarius.net/download/report/687/al08_26e.pdf p18-19.

ⁱCRD 9 (prepared by India).

ⁱⁱAustralia, Brazil, Ghana, Guatemala, Indonesia, Republic of Korea, Malaysia, Mexico, South Africa, Thailand, CI, IBFAN, ISDI and NHF.

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