

# WHO, UNICEF, WFP and UNHCR Consultation on the Programmatic Aspects of the Management of Moderate Acute Malnutrition in Children under five years of age

24-26 February 2010, WHO, Geneva

## Background

In 2008, WHO's Departments of Child and Adolescent Health (CAH) and Nutrition for Health and Development (NHD), in collaboration with partners and with support from the IASC Nutrition Cluster, convened a consultation on the dietary management of moderately malnourished children. The aim of the consultation (hereon called MM1) was to discover what diets should be used for moderately malnourished children. The conclusions, recommendations and background papers of the consultation have been published in the Food and Nutrition Bulletin, Volume 30, Number 3, September 2009.

The WHO CAH and NHD, in collaboration with UNICEF, WFP and UNHCR, hosted a second consultation to discuss the programmatic aspects of the management of moderate malnutrition in children under five years of age from 24<sup>th</sup> to 26<sup>th</sup> February 2010 (hereon called MM2). The purpose of this meeting was to review the evidence on strategies and programmatic approaches to management of moderate wasting not addressed in MM1 in order to contribute to the process of improving policy guidance and programme implementation in this area.

The general and specific objectives of the meeting were as follows

### **General Objectives:**

- To improve overall policy and evidence-based programme guidance on management of moderate malnutrition, with specific emphasis on children with moderate wasting (i.e. recommendation on package of interventions adapted to different settings).
- 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 determine criteria for **admission and discharge** from specific programmes for moderately wasted children.
2. To **estimate the burden** of moderate malnutrition (i.e. expected numbers of moderately malnourished children).
3. To formulate recommendations on **how to improve management** of moderate cases of wasting in various settings using e.g. food supplementation and/or dietary counseling, and to determine when to start and when to stop specific programmes, and how to mainstream them in national health systems.
4. To formulate recommendations on how to improve **monitoring** of programmes on management of moderate wasting.

## Introduction, scope and objectives

The meeting was opened by WHO on behalf of the organizing agencies, namely WHO, UNICEF, WFP and UNHCR. The chairperson highlighted that around 41 million children are moderately wasted worldwide and the nutrition community has a window to act to address this problem now in the context of accelerated action towards achievement of the MDGs and the renewed global focus on nutrition,

Zita Weise Prinzo (WHO) stated that the overall objective of the meeting was to improve policy and evidence based programme guidance and identification of knowledge gaps to be addressed through research. Specific areas for review include the identification of moderate acute malnutrition (hereon referred to as MAM) and programme admission and discharge criteria, estimation of the burden of MAM, improving the management of MAM in various settings, as well as the monitoring and evaluation of programmes of these programmes. Although the main focus of the consultation would be on moderate wasting, addressing the burden of stunting would be discussed by a working group. Expected outcomes of the meeting would be consensus statements, questions for systematic reviews of the evidence, and identification of research needs in each of these areas.

Flora Sibanda-Mulder from UNICEF suggested that the meeting should critically review terminology used in MAM, in particular terms like ‘programmes for the management of moderate malnutrition’ and ‘supplementary feeding programmes’, in order to encourage broader consideration of strategies and approaches to tackle the problem, including cash transfers/vouchers to enable purchase of appropriate foods and dietary diversity. This needs to be accompanied by dietary and health counselling. She pointed out that the challenges for MM2 consultation included: i) ensuring that the outcomes for the meeting are concrete practical consensus statements that would feed into the Joint statement and guide field practitioners in the improvement of the management of MAM; and ii) pulling together recommendations from both MM1 and MM2 to ensure a comprehensive view of the management of MAM which brings together dietary and programmatic management of MAM.

Caroline Wilkinson from UNHCR highlighted how levels of MAM remain high in many refugee camps with a significant proportion of children failing to graduate from programmes. This suggests that a range of programmatic issues need to be addressed.

Cynthia Souza (WHO) from the WHO Guidelines Review Committee (GRC) explained that this meeting is located within the wider WHO guideline development process which has recently been established. The GRC seeks to standardize procedures for guideline development across the organization and to ensure transparency. It responds to past criticism of the ways WHO might have developed guidelines e.g.. lack of evidence base and too expert driven. During plenary discussion it was agreed that, whilst nutrition research by its nature may not achieve ‘gold standard’ levels of research quality (RCTs) especially in emergency contexts, the best quality of evidence available will be used. WHO clarified its aim to produce guidance within one year of this meeting.

### **Structure of meeting**

Day one and the morning of day two of the meeting were dedicated to presentations and plenary discussion. The afternoon of day two and morning of day three were allocated to working groups in five thematic areas (Working Groups A-E). Each working group were provided with ‘consensus’ statements largely prepared based on conclusions from presenters. The exception to this was the working group on stunting as there were no presentations on this issue. Working groups were then tasked with reviewing and revising these draft consensus statements and required to develop key questions for evidence based reviews as well key areas where there are knowledge gaps that need to

be filled by research. Findings were fed back on the afternoon of day three. The meeting closed with a brief statement by WHO on next steps. The agenda is attached as Annex One.

The following sections report on the proceedings by objective. Each section includes a summary of relevant presentations, and the conclusions and recommendations of the working group.

## **A. Identification, admission and discharge criteria and estimating the burden of moderate acute malnutrition**

### **Identification, admission and discharge criteria**

There were three presentations on aspects of identification, admission and discharge criteria for MAM. Mark Myatt (UCL) presented a paper on the use of a MUAC-based case definition for MAM. The direct use of MUAC in screening for MAM has many advantages, e.g. simplicity and easily used in community settings, acceptability, child survival prediction, cost, age independence, precision, accuracy, sensitivity and specificity. A review of the evidence suggests that based on mortality risk a 125mm threshold for admission of MAM cases to SFPs is most appropriate. As yet there are insufficient data for the use of MUAC for monitoring and discharge criteria. A percentage weight gain approach may be the most useful alternative, however, the percentage weight gain threshold for discharge needs more research and the practicability of the response curve approach needs further exploration. In the meantime, Mark Myatt argued that an “entitlements” approach be adopted, where children are discharged after set periods on the basis of specified responses to treatment.

Susan Shepherd (MSF) then presented on the advantages of MUAC as an admission and discharge criterion in an MSF selective feeding programme implemented in Burkina Faso over a two year period. In this programme a MUAC case definition of <120mm was used for admission. Choice of this threshold was based on Epicentre analysis of over 60,000 cases comparing number of admissions based on different MUACs and weight for height. Two cohorts were studied, one using 15% weight gain for discharge and the other using 125 mm MUAC for discharge. Findings challenge the current case definition of moderate acute malnutrition using  $WHZ < -2$  and  $\geq -3$  and suggest that current case definitions underestimate MAM in some populations. Furthermore, using MUAC <120mm for admission allows resources to be directed more to young children. In terms of monitoring and discharge, MUAC trends mirror weight gain trends and therefore MUAC seems to be a suitable tool to use for this purpose. However, the 15% weight gain discharge criterion should be reconsidered, as it is insufficient for most severely wasted children. During plenary discussion a caution was sounded about setting the discharge criterion for % weight gain based on plateaus of weight gain observed in treated populations as this plateau might not reflect maximum weight gain

Andy Seal (CIHD) presented on the operational implications of using the WHO Growth Standards (WHO-GS) on programmes addressing MAM. A recent review of a cross-section of 40 programmes found that most SFPs are still admitting on the basis of NCHS-WHM (<80%), although a mix of other admission criteria are also used, including NCHS-WHM, NCHS-WHZ, MUAC, weight for age. While more programmes are likely to use WHO-WHZ in the future, it is likely that programmes will continue to use a mix for some years to come. Analysis of the transition from NCHS-WHM to WHO-WHZ, using a dataset made up from 560 nutrition surveys, showed that median prevalence of MAM increases slightly from 6.85% to 7.78%. This increase in case load is likely to translate into additional funding requirements of approximately four percent. However, for those programmes using weight for age criteria the transition is likely to lead to a large increase in the diagnosis of ‘failure to thrive’ and may result in increased referrals of infants less than 6 months of age to SFPs.

During the following plenary discussion, it was suggested that 15% weight gain may not be an appropriate measure of treatment progress for infants >6 months and <67cm. In this age group 15% weight gain may lead to obesity and therefore weight for age criteria may be more appropriate. Evidence of a reversal of stunting (growth in height) as a result of new diets was also highlighted with the implication that this may make weight for age a more suitable discharge criteria to use (as it is sensitive to wasting and stunting). The need to train those health workers who will screen children in the appropriate use of MUAC was emphasized. It should not be assumed to be easy and simple. Poor measurements at community level can lead to rejected referrals and undermined programmes.

### **Estimating the burden of MAM**

There were several presentations on different methods for estimating the burden of MAM. Critical information for programming needs includes not just prevalence but also incidence and duration of episodes of MAM. There remains a critical need for simplifying and improving methods for estimating prevalence and incidence of MAM. The first of these presentations by Mark Myatt (UCL) looked at the PROBIT approach. PROBIT is an indirect approach that estimates prevalence of MAM using the PROBIT function, which converts parameters of the distribution of an indicator to cumulative percentiles. The PROBIT approach was tested by computer simulation using 560 surveys from 31 countries (n=20,000). Prevalence was estimated using classical and PROBIT methods. Results showed that the PROBIT method can estimate the prevalence of MAM in a way that is proportional to the true prevalence and that bias can be easily corrected. Furthermore, PROBIT can offer sample size savings compared to the classic method (if sample is small, e.g. where n=425). This may be particularly useful when using data from nutritional surveillance systems. It also appears to be a more rapid and precise method although results should be verified with new data and peer reviewed. The PROBIT approach is however less useful for estimating the burden of GAM or SAM where prevalence may be underestimated (possibly due to the presence of oedema) though this needs further exploration. During plenary discussion it was agreed that this work should be submitted to peer review.

Sheila Isanaka (Harvard School of Public Health) then presented on the estimation of duration and incidence of MAM using life table analysis and dynamic models. Both approaches record transition between different nutrition states although the dynamic model is able to include untreated MAM.

In order to assess programme size and needs information is needed on the number of existing cases (prevalence), future cases (incidence, which is calculated using average duration) and duration of treatment. To find average duration of MAM both life table analysis and the dynamic model were applied to data from a longitudinal cohort in Maradi, Niger, of children aged 6-60 months. The life table analysis showed a duration of 1.94 months among treated and untreated children. The dynamic model showed a duration of 5 months for untreated MAM. The dynamic model is simple, but is sensitive to model assumptions. Secondly, using data from an MSF programme in Maradi, Niger in 2006 (n=68,101), the duration of treatment was estimated to be 1 month overall. In conclusion, there is a need to refine the dynamic model and apply it to other settings, and to compile additional estimates of treatment duration from other programmes.

Michel Garenne (Institut Pasteur & IRD, Paris) presented on the estimation of duration of episodes using multi-state life tables, which allow the conversion of population based data into cohort estimates based only on transition rates. The result is equivalent to cohort based estimates. Longitudinal data were used from two data sets from 1983-4 in Niakhar, Senegal (n = 5000) and Bwamanda, Congo (DRC) (n=5000). Mean duration of episodes was determined primarily by the age

pattern of MAM. For MAM and SAM most episodes occurred between 6 and 36 months of age. The mean duration of incidence for MAM was around 7 to 8 months and most children recovered. The relationship between WHZ and MUAC differed significantly in both sites, which suggests the need to adjust anthropometric measures for race.

During plenary discussion the validity of presented estimates of the duration of episodes generally were questioned especially as seasonal patterns of GAM generally indicate a far shorter recovery time. The validity of 6 monthly surveys was also questioned, as it is then not possible to discern an episode that has a duration of less than 6 months. The need to account for seasonality and other external events was highlighted.

### **Working Group A Consensus statements (to be considered for systematic reviews):**

1. A MUAC-based case-definition:  $115 \text{ mm} \leq \text{MUAC} < 125 \text{ mm}$  without oedema identifies children with low MUAC at elevated risk of mortality. If used, a WHZ-based case definition of  $-3 \leq \text{WHZ} < -2$  without oedema is also possible.
2. Children identified using these case-definitions are likely to respond to appropriate treatment.
3. For children  $> 67 \text{ cm}$  and  $\geq 6$  months of age,  $\text{MUAC} < 125 \text{ cm}$  can be used as a stand-alone admission criteria. **Discharge can be made at  $\text{MUAC} \geq 125 \text{ mm}$  for 2 consecutive visits.** Children admitted using WHZ should be discharged using percent weight gain (exact level to be confirmed, Golden and Briend by independent approaches both suggest approximately 8-10%).
4. For children  $< 67 \text{ cm}$  and  $\geq 6$  months of age, more research is needed to identify the appropriate admission and discharge based on MUAC. In the interim, we can use WAZ for admission in place of different MUAC cut –off points (where growth monitoring programs exist) and percentage weight gain for discharge. The minimum percent weight gain to be achieved for discharge should be confirmed (Golden).
5. An additional criterion for admission to SFP is discharge from outpatient therapeutic treatment (OTP) of children who had SAM, according to existing OTP guidelines (with minimum length of stay in SFP of 2 months).
6. Response to treatment should be monitored through weight. A decision tree or algorithm to guide movement through the program should be developed based on repeated weight measures.
7. The current commonly used methodologies (e.g. SMART surveys) allow for the estimation of the prevalence of MAM but not the incidence. Further research is required to better estimate incidence of MAM in program settings.

### **Research questions:**

1. How do different anthropometric indicators (HAZ, WHZ, WAZ, and MUAC) respond to newly developed treatments for MAM in HIV- and HIV+ children?
2. What is the most appropriate MUAC cut-off for discharge, considering the rate of relapse? Follow-up studies investigating short-term relapse rates should also be undertaken in subsequent pilot programmes adopting a MUAC-based discharge criteria.

3. Among children < 67 cm and above 6 months of age, what are the appropriate admission and discharge criteria?
4. What is an appropriate algorithm for child monitoring within the program?
5. How can we estimate incidence in program settings?

### **B: Strengthening approaches and decision-making for management of MAM in various settings**

Mark Manary (St Louis Children's Hospital, US) presented data from a population treated for MAM in an area of high HIV prevalence before ART were available. Out of 130 children, 22 were HIV+ (16%). There was no difference between the HIV+ and HIV- populations with respect to age, economic or HIV status of parents and wasting or stunting. However, the HIV+ children, if severely malnourished, were more likely to have oedema. Data from the hospital shows that HIV+ children make less progress than HIV -ve children during treatment (lack of weight gain) and that this is a diagnostic criterion for HIV. However, 60% of HIV+ children did still reach adequate WHZ and this did not take significantly longer than HIV- children. In conclusion, these data show that stronger links are required between nutrition and HIV programmes.

Tony Castleman (FANTA-2) presented findings on the management of MAM among children in PEPFAR Programs. PEPFAR aims to integrate nutrition into national HIV responses. The programme provides a number of services including nutrition assessment, counselling and support using the primary approach of food-by-prescription, specialised food products, micronutrient supplementation, water purification and hygiene and food security/livelihood support. Take home food packages are prescribed in daily doses to those attending HIV clinics for ARV treatment. Examples of the programme in Kenya, Tanzania, Uganda, Zambia were presented with details of entry and exit criteria and food regimens (e.g FBF, RUTF or both). More research is needed into whether HIV+ infected children with MAM need different or additional foods to other children with MAM, and also into the effectiveness and cost-effectiveness of different food products – especially in different service delivery settings. Better linkages are also needed between HIV-related services and CMAM.

Drawing on programme experiences largely from Ethiopia and Uganda, Caroline Tanner (Save the Children) presented on operational issues in the management of MAM in the HIV context. Integrated nutrition and HIV guidelines are needed as these are currently inconsistent within and between countries. There are multiple admission cut-offs and rejection issues, therefore single entry criteria as well as clear exit and referral criteria are needed. CMAM and HIV-nutrition programs should be rolled out in tandem to increase decentralisation and reduce defaulting. RUTF seems to work in the treatment of MAM in HIV+ children and needs to be explored as an option for food rations. Finally, monitoring should be streamlined and appropriate methods found to assess programme impact. A key conclusion was that OTPs are good entry points for identifying HIV+ children and that there are good results treating MAM in HIV+ children in OTP. Important knowledge gap areas include the practical implications of using MUAC for children over five and strategies for transition from RUFs to local diets.

Nigel Rollins (WHO) presented a summary of the new WHO guidelines for an integrated approach to the nutritional care of HIV-infected children (6m to 14years). The guidelines aim to ensure an integrated response and include a nutrition and HIV care handbook, chart booklets and a guide to aid adaptation in local contexts. The guidelines borrow from other approaches and include 3 sections: The

first to assess and classify the child's growth and the child's nutrition needs and to develop a nutritional care plan, the second to guide implementation of the nutritional care plan and the third to support children with special considerations. Nigel Rollins requested the group to feedback on the use of these guidelines over the next one to two years.

Nigel Rollins (WHO) then presented a summary of the 2009 updates of WHO principles and recommendations on infant feeding in the context of HIV. The previous revision was in 2006/7. In this updated version, national and sub-national health authorities should now decide whether health services will principally counsel and support mothers known to be HIV infected to breastfeed and receive ARV interventions, or avoid all breastfeeding, as the strategy that will most likely give infants the greatest chance of HIV-free survival. Furthermore where breastfeeding is recommended, HIV-infected mothers should exclusively breastfeed 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. When HIV-infected mothers decide to stop breastfeeding (at any time) they should do so gradually within one month. When ARVs are not immediately available, breastfeeding may still provide infants of HIV infected mothers with the greatest chance of HIV-free survival. These updates will be disseminated by WHO and UNICEF and changes to relevant guidelines and tools made accordingly.

During plenary discussion issues of exceptionality around HIV were raised. We do not yet know what is special for HIV-infected children, for example, if MUAC is relevant for this group. There is no evidence that MUAC is suitable for monitoring progress in ARV programmes - indeed it may not be an appropriate measure due to abnormal fat distribution. More research is needed. It is also not known if there are particular foods that function better for HIV infected children, for example, a special formulation of micronutrients, and whether any extra requirements could be added to standard products. It was agreed that good linkages are needed between programmes, however, these linkages should not be forced, but contextually appropriate and capitalising on existing links.

Saskia de Pee (WFP) opened the second day's proceedings with a presentation on food-based guidelines and the choice and development of foods for programs targeting MAM. She summarised the results of MM1 which concluded that current foods used for the treatment of MAM, including regular FBF, are inadequate. WFP has therefore developed CSB++, which has added milk powder, oil and sugar, improved micronutrient premix, dehulled soy and tightened aflatoxin and microbiological specifications. CSB++ will replace CSB in the treatment of MAM and blanket feeding of children 6-23 months old. Where necessary, lipid-based nutrient supplements (LNS, 45-90 g/d) are used, for example, in the onset of emergencies. LNS could also be used for non-responders to CSB++. The composition of CSB++ will be adapted based on new knowledge. It should be noted that WFP has also improved the specifications for CSB (and other FBF), to use the same micronutrient premix as CSB++. Edith Heines (WFP) then presented a 'decision tree' which aims to help field-level staff (many of whom have limited background in nutrition) decide which food products to use for either blanket or targeted supplementary feeding. The range of commodities now include a variety of improved FBFs, Ready to Use Foods, lipid based nutrient supplements and micronutrient powder.

During plenary discussion there was some controversy over the evidence-base for the decision tree. It was suggested that it is peer reviewed to inform further revision. Statements were also made about

the lack of suitable feeding products for treating malnourished infants (children under six months of age).

Mary Shawa (Government of Malawi) presented on a pilot cash transfer scheme in Malawi. The scheme targets households of the lowest expenditure quintile living below the national ultra- poverty line and having labour constraints. The amount of cash transferred is based on the number of household members while there is also a school attendance bonus. Coverage is currently 100,000 households and the aim is to cover 300,000 households. At present households receive on average 16 USD/mo while administrative costs are around 33 USD/mo. When fully scaled up costs are estimated to be \$192 per household per year. Each household receives on average \$13 per month. Results of an external evaluation comparing intervention and control households showed that the scheme led to improved health status and likelihood of obtaining care when sick as well as reduced wasting and underweight. 90% of new income was spent on food. Meal consumption has increased dramatically and the impact on dietary diversification has been highly significant.

During plenary discussion participants enquired about the nutritional adequacy of types of foods chosen by households and whether or not the scheme would also lead to changes in height.

Jeremy Shoham (ENN) presented ongoing research into alternative approaches of addressing moderate acute malnutrition at population level. Results of a retrospective study of 82 SFPs (Navarro, 2006) showed poor performance of SFPs raising the question of alternative interventions in some contexts. Possibilities include expanded general food ration with CSB++ or RUF without an emergency SFP, cash/voucher interventions to allow the purchase of basic rations and appropriate foods, a combination of cash and food, or blanket distribution of specialised foods to children <3 years or <5 years at critical points of the year. ENN and SC UK received OFDA funding in October 2009 to conduct an RCT to test alternative interventions, however, alternative research designs may be more appropriate. ENN would like to engage agencies to re-visit the initial research questions, research design and to participate in the research. During plenary discussion participants agreed that cut-off points based on prevalence of GAM as criterion for implementing emergency SFPs need more research. It was also agreed that RCTs may indeed be difficult to achieve within a programming context and that studies on alternative approaches for addressing MAM may need to adopt other types of design. It was also pointed out that spontaneous recovery rates may in some circumstances be higher than the recovery rates of some badly performing SFPs.

#### **Working Group B Consensus statements:**

1. The specific context that precipitates MAM in children must be considered to determine what approaches and interventions should be instigated. Chronic poverty, child caring practices, disease epidemics and political or natural catastrophe can all result in childhood MAM, but will require different responses. Prevention strategies should always be considered when formulating approaches in childhood MAM. The most common food-based approach, targeted SFPs, may not always be the most effective strategy to combat childhood MAM in a specific context. Use of specialized food-based approaches, blanket rations, general rations, cash transfer programmes, education and promotion of good infant and young child feeding practices, agricultural interventions, and poverty alleviation interventions and social protection should be considered.
2. Targeted SFP performance data from a range of programmes, including coverage data, should be prospectively collected, collated and reviewed over a period of time to increase the knowledge of targeted SFP impact at the individual and population levels. These data should be integrated with

national nutrition reporting systems. The Minimum Reporting Package developed by ENN/ SC UK strives to provide a tool and a mechanism to accomplish this.

3. Programmes for the management of MAM should link with programmes providing care services to children, such as IMCI, programmes on the promotion of appropriate infant and young child feeding practices and more generally programmes aimed at preventing MAM.
4. Evidence is needed to evaluate the effectiveness and cost-effectiveness of a range of approaches for prevention and treatment of children with MAM. These may include modified/expanded general rations, targeted supplementary food distribution, blanket distribution of specialized food products to children < 2 or < 5 years of age (either all year round or at critical junctures in the agricultural calendar), cash transfer/voucher programs, and microcredit initiatives. Review of evidence should consider distinctions between individual and population level outcomes.
5. Evidence is needed on the role that implementation mechanisms and service delivery settings play in the effectiveness of interventions to manage and prevent MAM.
6. Evidence is needed on the relative cost-effectiveness of various food products for management of MAM.
7. In establishing an evidence base, randomized studies are optimal but are not always possible in many contexts. Non-randomized comparative studies can contribute significantly to the evidence base about the impacts of various food products, interventions, and delivery mechanisms on the management of MAM. Observational studies can also add to the body of knowledge in this area.
8. Based on findings about effectiveness and cost-effectiveness, there is a need for decision-making criteria and frameworks to inform choice of optimal interventions in a variety of contexts.
9. Programs addressing moderate malnutrition and programs addressing HIV are synergistic but may have distinct objectives, and they should be linked and harmonized.
10. PMTCT and paediatric HIV services should perform nutrition assessment and counselling and should establish linkages to refer children for nutrition support services as needed, especially where nutrition support services are not available as part of the HIV services. Programs managing acute malnutrition should establish linkages to refer children (and parents) for HIV counselling, testing, treatment and care. Children failing to gain weight or MUAC in programs managing MAM in geographic areas of high HIV prevalence should be tested for HIV and provided with treatment and care as needed.

**Question for evidenced-based review:**

What is the evidence base to recommend the use of targeted SFPs, modified/ expanded general rations, cash transfer/ voucher programmes, microcredit initiatives, and/ or blanket distribution of specialized foods for children < 2/5 years of age in MAM? Within each type of approach, what is the evidence-base to recommend the use of a specific food formulation?

**Knowledge gaps and research needs:**

### Treatment

1. Define response to treatment of children admitted on MUAC and clarify discharge weight gain %
2. Document duration of treatment and duration of MAM episode from various contexts
3. Clarify spontaneous recovery of MAM cases from Michel Garenne dataset
4. Continue defining nutritional requirements of MAM cases
5. Define appetite test for MAM cases
6. Define nutritional, microbiological, chemical etc. specifications for foods aimed at treating MAM

### Programme

7. Measure effectiveness (outcomes, impact, coverage etc.) and efficacy (physiological, clinical etc.) of new products filling MAM specifications in various contexts
8. Measure effectiveness of “non food” approaches in preventing and treating MAM in contexts where MAM determinants are not food related
9. What is the most effective way to target cash transfer programmes in order to have an impact on MAM? Cash transfer programmes may be a part of poverty reduction, social protection programmes or emergency responses.
10. What specific types of cash transfer programmes contribute to food and nutritional status in children under 5 years?
11. What is the most effective approach to monitor the impact of cash impact on the nutritional status of children under 5 years?

### HIV

12. Do HIV+ MAM children need a different food to recover from MAM compared with HIV – MAM children ?
13. Do HIV+ mothers need a different food to recover from MAM compared with HIV – mothers?
14. What would be the ideal timing of starting ARVs in HIV+ infected children with MAM (and SAM) in the absence of other signs requiring ARV treatment ?
15. Could the identification and treatment of diarrhoea pathogens on admission improve treatment of MAM in HIV+ children (faster recovery, higher weight gain etc.)?

### **C: Considerations to address in MAM in infants <6 months**

Marie McGrath (ENN) summarised key findings of the Management of Acute Malnutrition in Infants <6 months (MAMI) project focussing on findings related to the management of MAM. Data show that the burden of moderate (and severe) wasting in infants <6m is significant. Use of WHO-GS will increase the potential caseload of infants <6m in selective feeding programs. Estimated prevalence of moderate wasting in infants <6m is 3.9% (NCHS) and 8.5% (WHO-GS). Data also show that infants <6m are currently under-represented in SFPs (1.52%). A review of 37 guidelines for the management of acute malnutrition show that, with one exception, guidelines are unclear on the admission of this age group into SFPs. Assessment tools for this age group are lacking, though there is potential to use existing breastfeeding assessment tools. Better and more specific guidance is needed. Data collected from the field is poor quality and better monitoring and evaluation of programmes is needed. There is a desire amongst key informants to use a community-based model for the identification and treatment of MAM in infants <6m (using a complicated vs. uncomplicated approach) and there is need for support, guidance, capacity and training for management in this age group. A MAMI task force could be set up to conduct further work in this area.

During plenary discussion the need for separate programmes to treat infants <6m by providing appropriate breastfeeding support was highlighted. This will require separate structures, staff and

management to existing SFPs. The risk of providing breast milk substitutes or therapeutic diets based on misinterpretation of growth standards was also highlighted. Furthermore, for infants <6m growth monitoring is the best way of identifying those at risk rather than one off measurements.

### **Working Group C Consensus Statements:**

- 1.Prevention of malnutrition in infants <6m is intimately linked to infant feeding management. Exclusive breastfeeding is the norm for infants <6m. Informed interventions at population and individual level should be taken to restore and protect this norm. Infants with no access to breastmilk are especially vulnerable and need early identification and appropriate support.
- 2.The survival and well being of the infant <6m is intimately linked to the nutritional, medical and psychosocial well being of the mother. Any intervention that targets infants<6m needs to consider and intervene to support the mother and the child as one unit providing support to both.
- 3.It is recommended that ‘children under 5 years’ should be used to refer to the full age range 0-59 m. The age range 6-59m (or 6m – <5 years) should be used when infants<6m are not in consideration
- 4.There is an urgent need for a multi-disciplinary initiative to formulate strategy to address MAMI as part of MAM and identify common ground, gaps and way forward, that include, for example, BFI, IMCI, growth groups, UNICEF community based support and Essential Nutrition Actions.
- 5.A key gap area is how do we define and identify moderate acute malnutrition in infants <6m, and how this should inform treatment.
- 6.Further investigation on the MAM burden of infants <6m in countries is needed urgently, that includes longitudinal data and investigation of underlying causes in different contexts.
- 7.More detailed investigation of the underlying factors (such as feeding practices, clinical conditions, psychosocial, contextual) of malnutrition in infants <6m is needed to inform the management of acute malnutrition in this age group.
- 8.More research is urgently needed to help in identifying infants <6m at high risk of mortality. For example, early studies indicate that MUAC may aid in this regard for infants between 2-<6months old.
- 9.Any statements on MAM should explicitly refer to infants<6m in terms of guidance and/or key considerations and gaps in knowledge base.
- 10.Potentially better practices/complementary initiatives to improve management of MAM in infants <6m that should be coupled with operational research are:
  - a.Any admissions of infants<6m to MAM programmes should be documented.
  - b.Admission and discharge indicators for infants <6m should include breastfeeding status on admission and on discharge.
  - c.A single measurement of weight should not be used to classify an infant as malnourished; assessment should always be accompanied with clinical and feeding assessment and ideally with serial weight measurement.

- d. MAM infants <6m and infants <6m of mothers admitted to programmes should be enrolled in growth monitoring (weight gain).
- e. The IYCF guidance in CMAM training should be used to strengthen the IYCF component of community services, including SFPs.
- f. IFE Module 2 should be used to strengthen individual level assessment and support at facility and of community support/referral services, e.g. stabilisation centres. breastfeeding 'corner's/tents
- g. Where infants are < 45cm (The bottom limit for WHO-GS weight-for-length charts) then clinical assessment, level of development and feeding status should be used to decide on admission and treatment.
- h. It is essential to identify and build the capacity and enable linkages of key people at community level who can support mothers, such as traditional birth attendants or peer counsellors
- i. Where appropriate, infants <6m should be included in nutrition surveys to determine programme coverage and burden of disease. This has implications for equipment and training needs, and capacity to manage cases identified.
- j. Integrated support for optimal infant and young child feeding in acute malnutrition treatment for all children <2 years is needed, in both community and facility based care. This will strengthen staff capacity to manage infants <6m as well as benefit older children.
- k. For infants < 6 months with access to breastmilk, case management should aim to restore exclusive breastfeeding. Breastfeeding status on admission and on discharge are essential outcome measures.

**Questions for evidence-based review:**

1. Do anthropometric criteria for MAM in children >6m apply equally to infants <6m?
2. How should infants <67cm but >6m be managed?

**Knowledge gaps and research needs:**

1. For infants with no access to breastmilk, the feeding option that poses the least risk in a given individual context must be established. Research is needed to investigate how to achieve this in programmes in resource limited settings.
2. There is no evidence on the safety, effectiveness and tolerance of RUF in MAM infants <6m. Review of current experiences is needed urgently.
3. The impact of support to IYCF in CMAM
4. There are different possibilities to adapt current training content such as on the use of growth standards coupled with BF counselling, IYCF counselling, community care of the newborn, IYCF in CMAM, at field level and in different contexts.
5. Breastfeeding assessment tools (see MAMI) in field setting for individual level assessment ("appetite test")
6. How to manage infants >6m that are <67cm – should they be treated as older or younger infants.
7. Field tests of WHO growth velocity tables in the context of infants <6m that are moderately malnourished, to investigate expected weight gain by age in treatment

8. Studies are needed to explore which psychosocial support activities for different settings are most effective.
9. Interpretation of WHO-GS growth charts by health workers.

#### **D: Improving monitoring and evaluation of programmes**

Dr Andre Briend (formerly WHO) presented on a population based approach for determining target weight gain for moderately wasted children after supplementation. In well fed populations, WHZ has a normal distribution, but when the population is malnourished, the distribution is shifted to the left. The objective of a nutrition intervention should be to restore the normal distribution. Mathematical analysis shows that interventions that reach all individuals are necessary to achieve this and that the needed WHZ change of each individual will depend on his initial WHZ and of the average initial WHZ of the whole population. The desirable average WHZ change also depends on the variance of WHZ change. Simulation based on data from DRC confirms these relationships. Findings suggest that programmes targeted to children with MAM should aim at higher WHZ gains in areas where average WHZ is low, and that large variations of WHZ gain can be expected even in successful interventions.

Carlos Navarro-Colorado (Independent Consultant) presented on the minimum reporting package (MRP) developed by ENN and SC UK. The package was developed following evidence of widespread inadequate and non-standardised SFP reporting obtained during a retrospective study of 82 emergency SFPs (Navarro 2006). Objectives of the project are to develop a set of guidelines and tools to aid reporting, including a user-friendly software database and a data repository for agencies which can be used to collate evidence on programme performance. Guidelines and software have been developed, which include important context factors and programme coverage. The package is being piloted in three countries with three INGOs and by a further four local NGOs in Sudan, Gaza, Thailand and Zimbabwe. In the following plenary discussion the need to collect coverage data as part of the MRP was emphasised. The need to integrate the MRP into in-country health information systems was also highlighted. The package is flexible enough to achieve this, as well as to achieve integration into information management and reporting systems of the different UN agencies.

Marc Andre Prost (WFP) reported on the challenges of monitoring MAM in Somalia. In April 2009 WFP took responsibility for targeted SFPs in Somalia and introduced RUSF for treatment of MAM and blanket SFP in Central Somalia. The programme was implemented in an environment of increased fighting between factions, targeting of humanitarian workers and assets and periodic displacement.

New monitoring and evaluation systems and tools were put in place in order to shift the system from monitoring food movements to monitoring nutrition indicators. A programme of training and mentoring was begun for WFP staff and partners. Challenges in implementing new systems include timeliness of reporting from field staff, complex monitoring templates prone to error and difficulties of accessing field sites due largely to insecurity (three WFP staff have been killed and two abducted during the programme). In spite of these efforts monitoring systems still focus too much on food tracking rather than the quality of nutrition programmes and the technical capacity of field staff is weak with high staff turnover. WFP continues to review its monitoring and evaluation processes in Somalia and has initiated a pilot project and several small scale studies to inform program decisions, e.g. on the acceptability of RUSF. A conclusion from this work is that shifting from tracking food to monitoring quality of nutrition programmes is a lengthy process

Cecile Salpeteur (ACF) reported on programmatic actions to address high defaulter rates in an ACF SFP in South Darfur. Experiences from four different sites in South Darfur were assessed between 2004 and 2009 and the effects on programme changes measured. Results showed that continuously implemented SFP could have a better effect mid-term on GAM prevalence, but that seasonal SFP with RUSF may show better performance (though perhaps not over a longer period). In situations of high prevalence of malnutrition or nutritional crisis, a preventative approach (blanket feeding) seems to be better than treatment. It is also essential that the SFP ration should be different from the GFD ration in order to encourage attendance and limit sharing. Furthermore, adequate communication to the population and improved understanding of the opportunity costs of the target population are needed.

Carlos Navarro-Colorado (Independent Consultant) reported on an ENN and SC UK defaulter and access study. The aim of the study is to better understand factors leading to defaulting. Questionnaires have been developed based on anthropological study in Ethiopia and Mali SFPs. The questionnaires (a baseline and extraordinary events questionnaire) are now being administered in randomly selected cohorts of children aged 6 to 59 months in three different sites (Chad, Sudan and Kenya) to follow children for 9-10 months. The aim is to recruit 960 children per site. Results are expected at the end of 2010.

Following these presentations there was a plenary discussion about whether or not participants of SFPs would change their priorities once they saw the greater effectiveness of new food products thereby leading to a decrease of defaulting. There was also a general consensus that all data collected in monitoring, pilots and research should be made available to national governments. Finally, it was suggested that for MAM programming, lessons could be learnt from the CMAM model which is now being integrated into national public health systems.

#### **Working Group D Consensus statements:**

##### Background

1. Nutrition programs aim to reduce the prevalence of malnutrition at the population level and to maximize benefits to the individual child. This can only be achieved by high-quality programs with good coverage. Monitoring and evaluation is essential and should evaluate both quality and coverage of programs.
2. Active screening for moderate wasting in children is a crucial aspect of quality programs.
3. Coverage should be assessed by community-based surveys including nutritional assessments.
4. Programs that offer good-quality services at scale have well-trained staff in sufficient numbers at all levels (including planning and implementation) who are adequately supervised and retrained; this includes checking the quality of anthropometric measures (including regular calibration of instruments), counselling, as well as adequacy and amount of food or non-food interventions provided. Supervisors should analyze program data and use it proactively to make good decisions.
5. The same principles of quality services apply also to projections, procurement, and supply chain management.
6. Breastfeeding support and dietary counselling that is nutritionally sound are an integral part of successful nutrition programs. The adequacy of dietary counselling should be checked against the adequacy of the diet through the use of food composition tables.

7. If food supplements are used, these should provide nutrients that are missing in the diet and have prior demonstrated effect on nutritional recovery.
8. If non-food based approaches are used, the impact on nutritional recovery must be ensured.
9. These objectives can be achieved through either individual or population-based nutritional interventions.

**Monitoring and Evaluation:**

10. The objective of monitoring and evaluation is to improve programs and to inform decision makers to adapt policies and to ultimately maximize the program's benefits to the child.
11. Clearly-defined indicators are important for both facility- and population-based monitoring.
12. Facility-based monitoring: The number of children in different exit categories should be monitored using the following categories: cured, died, defaulter, transferred, relapsed, and non-cured. Clear definition and implementation of admission and discharge criteria are important. Mistakes related to admission and discharge need special attention. Average weight gain, possibly MUAC gain, and median length of stay in the program are the core indicators of response to treatment. The expected average weight gain will be context specific, i.e. it is related to the mean WHZ of the population. Another important indicator is the proportion of children who failed to respond within at most one month and who were referred for medical evaluation in a timely manner. The change in height-for-age z-score is an optional indicator for routine program contexts. These performance indicators should be interpreted by taking into account the prevalence of HIV and tuberculosis infection, especially with regard to relapse and non-responders.
13. Population based monitoring indicators: Such programs should consider the percentage of children who were screened for wasting. In addition, these programs need to monitor the coverage of the program, i.e. the proportion of malnourished children who receive treatment.
14. Combined facility based and population-based monitoring: A combined indicator of facility- and population-based-performance is the change in prevalence of malnutrition. This should be assessed by surveys conducted during the mid-point or latter half of the lean season. Other indicators, such as those related to procurement and supply management, also apply to both levels.

**Knowledge gaps and research needs :**

1. Develop community-based survey techniques to measure program coverage with regard to coverage of screening as well as treatment
2. Examine new and feasible reporting tools (e.g. RapidSMS) to strengthen M&E in a timely manner
3. Assess the usefulness of MUAC as an indicator for treatment response in settings with different levels of wasting

4. Develop tools that can improve reliability of anthropometric measures (e.g. better scales, length/height boards, more appropriate MUAC tapes)
  
5. Develop and pilot the use of linear programming in the formulation of dietary recommendations for moderately wasted children

### **Stunting**

Stunting is a form of malnutrition and a direct outcome of SAM and MAM, but may also occur in the absence of SAM and MAM. In the individual child it can begin in utero and continue for several years.. The window of opportunity to prevent most stunting is within the first two years of life. An effective set of interventions to prevent stunting is available, which not only prevent stunting but lead to lead to improvement in human potential (improved motor and cognitive development, reduced risk of non-communicable diseases, and improved educational attainment, productivity and income.). However, delivery platforms for the implementation of these are weak in many settings. Evidence of effective interventions to manage stunting once it has occurred is less understood. There is a gap in the evidence and programmatic guidance on what countries should do to reduce the burden of stunting.

### **Working Group E Consensus Statements:**

1. Stunting in young children is an outcome of a complex set of circumstances and determinants, including ante-natal, intra-uterine and post-natal nutritional deficits. Significant reductions in stunting can be achieved through a comprehensive set of interventions that effectively link management and prevention, and address underlying determinants. These not only prevent stunting but lead to lead to improvement in human potential (improved motor and cognitive development, reduced risk of non-communicable diseases, and improved educational attainment, productivity and income).
  
2. A window of opportunity exists during the prenatal period and the first two years of life to prevent stunting and achieve optimal development. A large percentage of stunting appears to be due to poor maternal nutrition resulting in LBW newborns as well as normal BW infants that are at greater risk for stunting. Women's and adolescent nutrition has been neglected in recent years. We need to revisit women's and adolescent girls' nutrition in order to break the inter-generational cycle of growth retardation and its consequences.
  
3. Stunting is a proxy indicator for longer term nutritional deprivation that results not only in linear growth retardation but also gives rise to a series of functional deficits, including loss of psychomotor and cognitive skills with lifelong functional consequences.
  
4. Stunting should be defined not only in terms of height-for-age but it should encompass aspects such as growth velocity and incremental growth in length or height.
  
5. To prevent and manage stunting effectively a broad integrated package of strategies and interventions is required. Three critical dimensions include social and behavioural change, food-based approaches (including fortified products) and care for infectious diseases and malnutrition.

6. There is evidence that specific foods, including breastmilk, and nutrients will promote linear growth. The inclusion of animal source foods in children's diets is particularly appropriate because these foods contain significant amounts of micronutrients: especially zinc, iron, fat, vitamin B 12, riboflavin and vitamin A. There is some evidence that milk promotes linear growth.
7. Population-based approaches are needed in combination with individual targeting to prevent and manage deficits in linear growth, however, this is context specific. Regular nutritional surveillance is needed to detect a potential problem of growth faltering and monitor change. This could be used in combination with active case detection and referral.
8. An agreed upon set of effective strategies and interventions exists. However, access to these delivery platforms (health infrastructure, supply chains, health worker capacity) is weak in many settings especially where the problem of stunting is greatest. Delivering effective behaviour change interventions is more complex than delivering vitamin A capsules and well trained staff in adequate numbers are required.

**Research questions based on knowledge gaps:**

1. What proportion of stunting will be prevented through management of SAM and MAM?
2. What key nutrition and medical interventions for pregnant women will prevent IUGR and prenatal programming for stunting? What is the timing of these interventions during pregnancy that will result in the most cost-effective impact?
3. While a set of interventions to prevent stunting is available, there is currently little knowledge about the best set of options in different settings. Also the most cost-effective timing of interventions for maximum impact needs to be researched. The development and refining of evidence-based decision making tools for programme managers is recommended to guide the type and timing of interventions in different contexts.
4. What is the specific profile of macro and micronutrients (and specific foods, e.g. milk powder) needed to improve and maintain adequate linear growth? The development of a strategic short-term operational research agenda is recommended and the identification of ongoing research and gaps.
5. What are appropriate indicators and assessment tools to identify children at risk of linear growth retardation? What is currently done, what are the gaps and what complementary measures are needed? A background study/literature review is recommended as well as the identification of gaps, convening of TAG and identification of gaps for operations research.
6. Currently there is little guidance for field programme personnel to formulate and recommend the best possible diets based on locally available foods and determine the nutrient gaps that may need to be addressed through fortified food products (including MNPs). The development of an easy to use linear programming tool is recommended to enable field-based nutrition staff and programme managers to formulate good diets and identify the determinants where the limitations/gaps are.
7. Intra-uterine growth retardation is likely to be (at least partly) reversible through appropriate care and nutrition. Information is needed on the best maternal interventions and their timing

during pregnancy. A background study/literature review is recommended as well as the identification of gaps, convening of TAG and identification of gaps for operations research.

8. Information on the most cost-effective (and DALYs) set of interventions and their timing during the first 24 months can prevent and manage stunting. Also, what are the options after 24 months? Under what conditions can catch-up growth occur?
9. How to strengthen delivery platforms for effective interventions to prevent stunting. Lessons learning from other countries successful in reducing stunting is recommended (e.g. Thailand, Vietnam, Brazil) and investment in delivery science operational research (quality assurance, quality improvement).

### **Conclusions and next steps:**

WHO will move forward on the development of guidelines for the management of MAM. The consensus statements that require systematic reviews of the evidence will be developed into questions for the review process. In addition, all questions identified by the working groups for conducting evidence-based reviews will be prioritized .

By the end of this year WHO in collaboration with WFP, UNICEF and UNHCR aims to produce a joint statement on specifications for foods for treating MAM that will also include some of the issues covered in this consultation. Other relevant guidelines will also be updated once the systematic reviews of the evidence have been carried out as per the WHO GRC process.

A body is needed to identify and highlight knowledge gaps as well as coordinate research to address knowledge gaps. This would involve coordinating and harmonising research protocols, to document and make available in one place, all relevant information; and to disseminate results through moderating ongoing discussions and regularly updating relevant information. It was suggested that the Global Nutrition Cluster or SCN might fulfil this function until a broader more inclusive body (possibly a new nutrition science committee) is established to coordinate in the long term.