Note for the Record
Anaemia Meeting
Thursday 12th March 2009
UNHCR Geneva

UNHCR
United Nations High Commissioner for Refugees
Haut Commissariat des Nations Unies pour les réfugiés

WFP
World Food Programme

Background

Micronutrient deficiencies continue to be a serious public health problem amongst refugee populations worldwide. UNHCR and WFP are working together to reduce micronutrient deficiencies through the provision of improved food baskets; through the introduction of specialized products designed to prevent micronutrient deficiencies; through timely identification and treatment of anaemia; through improved surveillance and program targeting to vulnerable groups; and through integrated programs and joint strategies.

In 2009, UNHCR and WFP are partnering to address the anaemia issues in 7 key countries (Yemen, Algeria, Bangladesh, Nepal, Kenya, Ethiopia and Djibouti) based in-part on the UNHCR Strategic Plan for the Prevention and Treatment of Anaemia. To this end, UNHCR and WFP sought assistance and clarification from experts on the most appropriate methods for assessing and measuring anaemia as well as preventing and treating anaemia. The meeting was dedicated to discussing issues of assessing anaemia, outcomes of interest when providing micronutrient powders or other micronutrient-rich complementary food supplements and monitoring and evaluation.

Objectives

The objectives of the meeting were to seek expert advice and to take decisions on designs and methodologies for assessing anaemia and impact of anaemia-control programs in refugee settings (see agenda in annex).

Proceedings

Numerous issues were explored, including the objectives of the various programmes, ways to measure and follow the trend of haemoglobin and other biomarkers for anaemia among children, what control or comparison group to use if any, cross sectional surveys and/or longitudinal cohort assessments, confounding factors and how they can be controlled or monitored, the advantages and disadvantages of measuring different population groups, timing of surveys and simple techniques to determine whether observed anaemia is likely to be due to iron deficiency and/or other micronutrient deficiencies (e.g. vitamin A), or more due to other factors such as haemoglobinopathies, inflammation, parasitic infestation, malaria etc.

Case studies of the micronutrient deficiency and anaemia control and prevention programmes in Nepal, Bangladesh, Kenya and the planned intervention in Djibouti were presented and they served as a basis for discussion. Details of these case studies can be found in the attached power point presentations.

Acronyms

Hb - Haemoglobin
LNS – Lipid-based Nutrient Supplements
MNP – Micronutrient Powders
WFP – World Food Programme
UNHCR - United Nations High Commissioner for Refugees
GAM – Global Acute Malnutrition

Participants

Baba Fall	Ahmed	UNHCR
Bilhuka	Oleg	CDC Atlanta
Bloem	Martin	WFP
de Pee	Saskia	WFP
Kraemer	Klaus	Sight and Life / DSM
Macías	Kathy	UNHCR
Oman	Allison	UNHCR
Pena-Rosas	Juan Pablo	WHO
Seal	Andrew	ICH/UCL
Spiegel	Paul	UNHCR
West	Keith	John's Hopkins University
Wilkinson	Caroline	UNHCR
Yip	Ray	Gates Foundation
Zlotkin	Stanley	Hospital for Sick Kids, Toronto, Canada

	ISSUES	OUTCOMES
Brief overview of background	• Global trend to moving from camp refugee settings to urban refugee areas	• Need guidelines for urban settings
	• Issues of quality more than quantity of food assistance / availability arising in protracted camp settings • WFP responsible for providing general food rations, micronutrient powders (MNPs,), lipid-based nutrient supplements (LNS), etc. • UNHCR responsible for providing supplementary foods such as fresh vegetables	• Decisions on the food basket and supplementary items are taken jointly during Joint Assessment Missions (JAMs). • UNHCR should be providing fresh foods more often than is actually done
	• UNHCR has begun to measure Hb in women and children in most nutrition surveys in camp settings • High levels of anaemia observed in most settings	• High Commissioner provided additional funds for Anaemia Strategic Plan in 7 countries. • This involves provision of micronutrient rich foods and supplements such as micronutrient powders (MNPs) but also lipid-based products, as well as health (including malaria), sanitation and food security interventions
	• Issues with monitoring/measurements • Staff limitations • Decision-makers at country level do not necessarily understand need for surveys • Lack of consistency in methodologies and indicators • Questions on way to monitor programmes and to evaluate impact of anaemia strategy	• Need for a valid but practical survey methodology • Need limited amount of partners to manage surveys rather than multiple consultants to ensure uniform implementation and reduce administrative issues for UNHCR

Areas of Discussion and Decisions Taken

<table>
<tr><th></th><th>TOPIC</th><th>ISSUES</th><th>DECISIONS</th></tr>
<tr><td rowspan="2"><u>Assessment of anaemia in refugee settings</u></td><td>Blood tests for anaemia</td><td>• Haemoglobin from a finger-prick blood sample is routinely measured and is assumed to be a proxy for iron deficiency and a pointer towards the risk of multiple micronutrient deficiencies

• Some surveys have looked at other factors such as intestinal parasite loads and a future survey will investigate malaria and anaemia combined. These are not systematic

• Iron status is rarely measured apart from in the Kenya study due to complexity and cost

• There are many options for indicators in surveys, but in general there is weak compliance with international standards and little comparability between surveys in different contexts</td><td>• In most situations, Hb alone will suffice as measure of anaemia; if no change after intervention or if other causes of anaemia suspected, other more complicated tests may be required</td></tr>
<tr><td>Haemoglobin cut-offs</td><td>• Question of whether current cut-off points used for surveys are satisfactory or whether they should be adjusted

• Agreement that current cut-off points are satisfactory and that for comparison across surveys it is important to maintain the use of the same criteria

• The most important factors for treatment are functional outcomes and response to treatment</td><td>• Maintain classic Haemoglobin cut-off points for routine assessment (adjusting as necessary for age/altitude etc.)[1]

<table><tr><th>Age or gender group</th><th>Haemoglobin g/L</th></tr><tr><td>Children 6 months to 59 months</td><td>110</td></tr><tr><td>Children 5–11 years</td><td>115</td></tr><tr><td>Children 12–14 years</td><td>120</td></tr><tr><td>Non-pregnant women (> 15 years)</td><td>120</td></tr><tr><td>Pregnant women</td><td>110</td></tr><tr><td>Men (above 15 years of age)</td><td>130</td></tr></table></td></tr>
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[1] Hemoglobin concentration cut-offs to define anaemia are the WHO-recommended cut-offs for each population group. UNICEF/UNU/WHO. Iron deficiency anaemia: assessment, prevention and control. A guide for programme managers. WHO/NHD. 2001

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If a person responds to treatment with iron he is likely to be iron deficient

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Maintain classification system for anaemia as a public health problem

<table>
<tr><th>Category of Public Health Significance</th><th>Prevalance of Anaemia %</th></tr>
<tr><td>Severe</td><td>≥ 40</td></tr>
<tr><td>Moderate</td><td>20 – 39.9</td></tr>
<tr><td>Mild</td><td>5.0 - 19.9</td></tr>
<tr><td>Normal</td><td>≤ 4.9</td></tr>
</table>

Determine appropriate cut-off points for referral and treatment during survey and ensure appropriate mechanisms are in place to refer and treat
Severe anaemia should be treated as a medical emergency and staff in clinics should be trained to detect clinical signs of anaemia and to be able to diagnose and treat

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	Seasonality	• Haemoglobin does not appear to fluctuate seasonally such as is the case with global acute malnutrition • Acute phase response of infection decreases haemoglobin concentration and in that way (seasonal differences of morbidity) could lead to seasonal differences of anaemia • Only hookworm will make a difference to anaemia rates, not ascaris, whipworm, etc.	• Although variations in haemoglobin should not vary much with season, in areas with very high seasonal burden of infection, especially with regard to malaria, associated peaks of anaemia may be observed • Better use of Health Information Systems (HIS) and other secondary sources of information should be made • Due to the interaction with acute phase response of infection, it would be theoretically preferable not to measure the haemoglobin of a child who is currently obviously ill; however, because in practise, determining an ill child may be subjective, exclusion of children that reported illness in the preceding two weeks can be done at the stage of data-analysis
	Developmental Indicators	• Ernesto Pollit has done a body of work on anaemia and development and has developed a pictorial scale of motor development stages in young children • Methodology is simple (asking care giver 'is child already doing the following?' such as crawling, standing, walking etc) and appears to be well understood by caregivers. Motor development steps can be compared to the WHO growth standards and developmental standards These have been tested in cross-sectional surveys and have shown to be easy-to-use and have shown good correlation with chronic malnutrition	• Pilot use of pictorial motor development scales in cross-sectional surveys over the next 2 years • Consider utility of this indicator as an additional impact indicator for nutrition interventions

Adjustment factors for Hb measurement	Altitude	• Altitude is potentially important for cutoffs for treatment and comparing across different camps • For comparison within a population over time, it is not as important	• Routine adjustment for altitude not necessary • Altitude adjustment only needed for direct comparison across populations that live at different altitudes
	Age	• In terms of nutrition interventions, it is more important to target younger age categories of 6 – 24 months or up to 36 months; in which case the need to target these children (also with specific anaemia interventions) when they are 36-59 mo old would be less. If target groups for intervention are going to be limited to younger age groups, anaemia assessment only needs to be done amongst these age groups • Traditional target group for anthropometric surveys is children from 6–59 months of age. Most anaemia surveys are done jointly with the anthropometric surveys and this combination is not likely to change • Age adjustment for younger children may be necessary when measuring cohorts over time, but is not necessary for cross sectional surveys as different groups of children are measured at different points of time; however younger children (6-18 mo) would have had a shorter period of exposure to the intervention when this starts at the age of 6 mo which should be taken into account when choosing age groups that are being compared • After approx. 40 years of age, there is an increase of Hb levels among women, but this will have negligible effect on survey data	• Anaemia measurements should target children aged between **6-59 months** in line with the traditional target group for anthropometric surveys • Haemoglobin measures to be taken on children 6 – 59 months of age without age adjustment in routine surveys; for comparing different surveys, age adjustment or specific selection of age groups for comparison should be used • Measure Haemoglobin in **non pregnant** women of reproductive age between 15 – 49 years old (including lactating women) • For monitoring purposes, it will be useful to be able to disaggregate age groups amongst the 6 – 59 months category

	Physiological Status	• Pregnant women have highest iron needs and in an iron-deficient population are going to be group of women with highest anaemia rates • Haemoglobin concentration decreases until second trimester of pregnancy. If the woman has adequate iron status, Hb should increase in 3rd trimester; if she has poor iron status, Hb will continue to deteriorate until delivery • If anaemia rates amongst non pregnant women are high, we know that they will be even higher amongst pregnant women • In a cross-sectional survey, it will be difficult to find adequate numbers of pregnant women in the population to have stable estimate of Hb status of this group • Lactating women. After delivery, Hb returns to prepregnancy values, unless the woman suffers from iron deficiency. Lactational amenorrhea preserves iron and supports Hb increase • Adolescent girls. Post-menarche, adolescent girls are at greater risk of anaemia and improving their iron status will also benefit them during future pregnancy • After birth, a child's Hb decreases. From the age of 3 months, Hb reflects iron status, but a cut-off of 100 g/L appears more appropriate for 3-9 month olds than the 110 g/L used for 6-59 month olds. Therefore, anaemia is generally assessed among 6-59, using 110 g/L as cut off. Hb increases and anaemia decreases between	• Exclude pregnant women from cross-sectional surveys, unless there is a very specific interest to know anaemia prevalence among this group. Impact of iron supplementation during pregnancy is difficult to assess in cross-sectional surveys, due to the short periods between start of supplementation and moment of measurement • Follow pregnant women through antenatal care programmes where they should receive prevention and treatment; data for pregnant women should be collected there • Include lactating women in the sample of non pregnant women aged 15 – 49 years old • For monitoring purposes it is important to note whether the women is pregnant or lactating • If an intervention specifically targets adolescent girls they should be monitored and included in surveys. In this case it is important to collect data on age at menarche

		6-24 months after which, it tends to stabilize because of slower physical growth. Iron needs are highest among 6-11, then 12-23 and then 24-59 month old children	
	Women, mothers and men?	• Some surveys measure mothers of children selected for the survey, while others focus on sampling women separately. There is no standardization • These two methods measure slightly different populations. In the mother's group, younger and older aged women are less likely to be included, constituting a pop. aged 18–35 yrs more than 15–49 yrs • Choosing mother's group is logistically easier during a survey, and it provides further information for interpreting the child's data, but for representative data from women of reproductive age (15-49 yrs) it is better to do separate sampling for children and women • The selection of mothers of underfives vs women of reproductive age, probably doesn't make a great deal of difference for iron status • Men have relatively low iron needs and therefore are very unlikely to suffer nutritional anaemia. Anaemia among men is usually caused by parasitic infestation, inflammation, haemoglobinopathies etc. Therefore, in order to know whether there are other factors causing anaemia among children and women in a population besides iron deficiency, measuring Hb in a sample of men aged 15-49 years will be informative (i.e. little anaemia, iron deficiency is main	• For representative data on anaemia among women of reproductive age, collect Hb data on non pregnant women 15 – 49 years old, sampling women specifically, rather than just including mothers of selected children 6 – 59 months old (these mothers can be lactating but this should be noted aside) • Where it is unclear whether high anaemia rates among children and women are predominantly due to iron deficiency, consider including a small sample of men (80-100)[2] aged 15 – 49 years old in the survey (this, in combination with excluding data from subjects reporting illness in 2 weeks preceding the survey, should help to avoid having to do complicated biochemical tests for iron status and infection parameters). If the men have low anaemia prevalence *(<5%? Question to Ray)* and the women or children have high anaemia prevalence, one can conclude that it is predominantly iron deficiciency anaemia

[2] Anaemia cut-off in men <130 g/L

		cause, more anaemia, other causes in population are also important and may need to be investigated)	
Programmatic issues	Flexible schedule method for delivery of MNP	• Rigid schedule has been shown to be difficult for caregivers to follow • Evidence shows that flexible schedule (e.g. 60 sachets to be consumed over a period of 120 days) showed higher proportion of total sachets consumed than same number to be consumed in 90 or 60 days • Flexibility in taking the supplement seems to lend to compliance • Less frequent iron supplementation could result in less saturation of iron receptors and thus better absorption. However, a formulation with less iron for malaria-endemic areas would have to be consumed daily and other micronutrients in the MNP may require more frequent consumption	• Messages that we give to caretakers/populations about use of MNPs is important • Advocate use of flexible delivery schedule rather than one-a-day or every other day • However, formulating an instruction that is understandable and suitable for large-scale distribution is challenging. For example, when a box with 30 sachets is provided for a 2 mo period, the message can for example be, use 15 per month; use no more than one per day and you'll receive again in two months time etc. However, some populations don't have a clear concept of a month's time • These issues should be considered in formulating messages and acceptability/ feasibility trials

	Routine Micronutrient Supplementation	• MNPs or LNS provide relatively low daily doses of range of micronutrients and don't often go beyond recommended daily allowances (RDA) of any particular vitamin or mineral • Studies have shown good outcomes in birth weight and neonatal mortality amongst mothers who were supplemented with multi micronutrients during pregnancy. However there was little change in anaemia compared to iron sulphate tablets alone • Risks of increase in baby size putting mother at more risk during delivery should be considered, whether using MNPs or LNS	• Examine diet of the populations in detail before determining formulation of MNP or LNS to avoid over dosage (e.g. where food aid provides fortified oil and iodized salt, vitamin A and iodine content of MNP should be reduced, or in populations widely consuming iodized salt or water with high natural iodine content, iodine may be excluded from the product) • Continue routine supplementation of iron (to pregnant women), vitamin A (to underfives and postpartum) etc, even if there are ongoing distributions of MNPs • If existing supplementation programmes are working well, consider changing iron pill for a supplement with a more complete range of micronutrients such as unitabs
Survey methodologies	Population surveys or cohort follow up	• Cross-sectional population surveys done at different points in time will give indication on effectiveness of program among population as a whole whereas cohort follow-up of individuals over time will give more information of efficacy of intervention/product. A difference of findings among cohort and cross-sectional survey comparison could indicate a difference of compliance, i.e. higher among cohort and lower in general population • Internal control group looking at other population groups in same population groups allows for better comparison of results (e.g. older children or adolescents who do not receive supplementation) • Positive controls have been used, giving one group an MNP and another group standard products shown to have positive impact on Hb e.g. Iron drops compared to MNP	• As minimum requirement, cross-sectional population based surveys should be performed on an annual basis (during the same season) • Systematic sampling of each of the target groups (usually children 6 – 59 months old and non pregnant, including lactating, women) is preferred over cluster sampling methodology (e.g. generally in long term camp settings this is possible) • Where all eligible individuals in a camp receive the intervention, control groups cannot be drawn from the same target group. In such cases, internal comparison groups can be used for comparison to "treatment" groups to help in data interpretation. The comparison group should not receive additional micronutrients. School feeding may be a concern in this regard. Therefore, adolescent girls (post menarche) may be better. Their prevalence of anaemia is also more comparable to that of underfives, so post-menarche is not of concern

		• Although effectiveness of intervention is our primary concern, it is also important to have data on efficacy as interventions are relatively new and it is by generating "proof" that we will be better able to replicate programmes (e.g. obtain buy in from governments, donors, the populations themselves) • Nested cohorts as part of regular cross sectional surveys could provide information on efficacy and to some extent on effectiveness (issues of ethical clearance related to collection of personal data remain) • Although routine assessments including anaemia and anthropometric measurements, that do not record subject identification do not need any specific ethical clearance, cohort studies will require ethical clearance regarding maintaining personal data that is required for the cohort follow up • It was argued that efficacy of any product should be shown before using it in an intervention. As micronutrient formulation of different MNPs and LNS vary according to situation, it is difficult to have efficacy data on all of different possibilities of formula. However, each product should be formulated using ingredients (or chemical forms of specific nutrients) that have been shown to be efficacious, but not necessarily in the specific combination selected	• Nested cohort survey can be considered when need to assess efficacy has been determined; may need to be age adjusted to allow for "natural" increasing Hb as children get older; or comparisons made with peers of the same age in previous cohort assessment; these cohort studies are also good to help in assessing compliance among the population at large • Cohort surveys (including nested cohorts) should only be done in specific situations where such data are really required. Cohort surveys will require ethical clearance regarding collection and storage of persoanal data
	Compliance of MNPs / LNS	• Compliance to intervention of MNPs/LNS is currently self-reported, posing problems of accuracy for this type of data • We lack methodology to be able to determine compliance with better accuracy	• Introduction of a simple calendar provided to participants for tracking purposes even if only for a sentinel group for monitoring; also acts as incentive • Use some form of packet collection method where participants show used packages before getting next

		than is currently being done • In addition to compliance, we also need to assess whether caregivers received correct amount of food/ LNS/MNPs • Cohort studies that have been done to date have no clear guidelines wrt loss to follow up. This is important in interpretation of findings of the study	stock; also environmentally friendly • Nested cohort may give better indication of compliance as there would be more in depth follow up amongst smaller group of population with more accurate results; haemoglobin change among cohort could then be compared to rest of population sample • There is need to provide guidance as to documentation and interpretation for loss to follow up; higher loss to follow up means more potential bias to survey

	Efficacy vs. effectiveness	• Cohort surveys that are being done in Kenya and Bangladesh are trying to measure efficacy of intervention and not effectiveness as cohorts often have better compliance than whole population • Population-based surveys being undertaken in all countries aim to measure effectiveness	• Need to be clear with what we want to measure. For the most part, efficacy should have been proven before we begin implementation in refugee populations. Therefore, effectiveness of intervention and strategy is what we should be measuring • However, nested cohorts do provide some advantages as discussed above and can be used when appropriate
	Data collection techniques	• Care is needed with quality of finger prick, as depth of finger prick and blood flow can affect haemoglobin readings. Poor blood flow can underestimate Hb and account for much of variability in measurements • Hemocue machines are used to measure haemoglobin in household surveys. Advantage of this is that the test is very rapid and machines are portable and reliable • Dry blood spots are more complicated, especially to store and analyze due to the very small volume of blood collected, and are not appropriate for all tests that may be needed	• Ensure use of appropriate blood lancets and sufficient training of the data collection teams • Ensure accuracy of hemocue equipment and the state of the consumables

Conclusions

A flow diagram / figure summarising the hierarchy of decisions will be developed. It will aim to cover who would be included, how, when (under which circumstances to include men, adolescents, nested cohorts etc..) and what to measure.

Annex 1

Agenda Anaemia Meeting 12 March 2009
Assessing Anaemia and Impact of Anaemia Control Programmes in Refugee Settings

Introduction

Micronutrient deficiencies continue to be a serious public health problem amongst refugee populations worldwide. UNHCR and WFP are working together to reduce micronutrient deficiencies through the provision of improved food baskets; through timely identification and treatment of anaemia; through improved surveillance and program targeting to vulnerable groups; through integrated programs and joint strategies; and through the introduction of specialized products designed to prevent micronutrient deficiencies.

In 2009, UNHCR and WFP are partnering to address the anaemia issues in 7 key countries (Yemen, Algeria, Bangladesh, Nepal, Kenya, Ehtiopia and Djibouti) based on the UNHCR Strategic Plan for the Prevention and Treatment of Anaemia. To this end, UNHCR and WFP are seeking assistance and clarification from experts on the most appropriate methods for assessing and measuring Anaemia as well as preventing and treating Anaemia. The meeting will be dedicated to discussing issues of assessing Anaemia, outcomes of interest when providing micronutrient powders or other micronutrient-rich complementary food supplements and monitoring and evaluation.

Paul Spiegel will chair the meeting, which will be held in room 204 in the main UNHCR building on the second floor.

Time	Topic	Presenter
9:00-9:15	Welcome and Introduction	Paul Spiegel and Martin Bloem
9:15-10:15	Case descriptions: • Nepal, Bangladesh and Djibouti • Kakuma	Caroline Wilkinson, Allison Oman and Saskia de Pee
10:15-10:30	Coffee/Tea Break	
10:30-11:45	Assessing anaemia (Hb) and what other factors affect Hb ▪ Physiological such as age, pregnancy; ▪ Other nutritional causes such as VAD, folate etc; ▪ Pathological such as infection, haemoglobinopathies etc. ▪ Identification of key areas of weakness and risks) ▪	Andy Seal
11:45-13:00	Other outcomes of interest when providing micronutrient powders or other micronutrient-rich complementary food supplements, such as • Iron deficiency • Other micronutrient deficiencies • Anthropometry • Morbidity • Motor development / developmental milestones • Subjective reports: both positive (appetite, health, more lively etc) as well as negative (diarrhea, vomiting, no impact etc)	Stanley Zlotkin
13:00 - 14:00	Lunch	UNHCR Cafeteria
14:00 - 14:30	Drafting of key recommendations based on the assesing Anaemia and other outcomes of interest sessions.	

14:30 - 16:00	Monitoring and Evaluation • Monitoring program implementation, including MNP acceptance and use, and how to link these data to impact evaluation. • Evaluation of impact, different options depending on who receives MNP (subgroups of population or entire population), including phasing-in, trend data, dose-response, comparison groups, cross-sectional surveys and/or longitudinal cohort(s)	Saskia de Pee
16:00-16:15	Coffee/Tea Break	
16:15-16:45	Monitoring and Evaluation session continued	Group
16.45 -17.30	Ethical issues & Scientific partners Experience with Kakuma (JHU & KEMRI), Nepal (CDC), Bangladesh (UNHCR refugee setting, WFP with AC Nielsen non-refugees)	
17:30 – 18:00	Drafting of key recommendations based on the monitoring and evaluation and ethical issues and scientific partners sessions and preliminary conclusions of the day	Group
	Closing Remarks/Wrap-Up	Paul Spiegel
	Reception UNHCR cafeteria	