Field Exchange

- **National coverage assessment in Mali**
- **Inter-sectoral programming in Burkina Faso**
- **Agriculture & nutrition in Nepal**
- **Pastoral resilience in Kenya**
- **Single coverage estimator in assessment**
- **Nutrition causal analyses in Kenya & Bangladesh**
- **Rapid assessment of older people in Ethiopia**
- **Community driven CMAM in DRC**
- **SAM CCM in Angola**

Contents

Dear readers

Following ENN's bumper issue of Field Exchange on the response to the Syria crisis (issue 48) this issue has reverted to our more normal non-thematic format covering a range of programme types and research areas. We have nine field articles. Three of these relate to CMAM programming. An article by Sarah Morgan, Robert Bulten and Dr Hector Jalipa (World Vision) describes a CMAM programme being implemented in Angola in a context of low staffing capacity and weak health infrastructure that used a volunteer work force yet achieved high cure and coverage rates. Challenges included provision of medical treatment, maintaining effective Ministry of Health RUTF[1] supplies and maintaining incentives of staff. A similarly difficult CMAM context in the Democratic Republic of the Congo is described in an article by Ivan Molton and colleagues where a small scale community based and managed RUTF programme was implemented. In order to get buy-in and community ownership, non-standard entrance and targeting criteria were used (children up to 13 years of age were admitted). In practice, just under half of admitted under 5's and one quarter of over 5's actually met admission anthropometric criteria for severe acute malnutrition (SAM). The many challenges described in the article appear to have been outweighed by the success, with moderate weight gain recorded for over two-thirds of those admitted, using locally sourced foods to make the RUTF and with the most

minimal of external support. A final article on CMAM describes a method and piloting of a new single coverage estimate for performance, which the authors assert can be used in preference to the usual point or period coverage estimates. This can be particularly useful for contexts like multi-district surveys where contextual information is not sufficiently available to make a decision about whether to use point or period coverage.

There are also three field articles about nutrition assessment methods. Two relate to the development and application by Action Contre la Faim (ACF) of their 'Link Nutrition Causal Analysis (NCA)' approach, which identifies plausible causes of undernutrition to inform context specific programming. The method involves local stakeholders and multi-sector representatives who help identify seasonal, structural and societal factors contributing to undernutrition. Experiences of its application in Bangladesh and Kenya are described. In Isiolo, Kenya, the community identified the increased workload of women, as a consequence of the drought, as a critical factor and suggested a number of potential solutions. A final article on assessment describes the method and application of a rapid tool for determining the nutrition and other needs of older people (RAM-OP) in humanitarian contexts. The pilot is conducted in an urban and peri-urban setting in Ethiopia. The results are then com-

pared with a SMART survey and found to be comparable but at two thirds of the cost. Further field trials are envisaged.

There are two field articles that describe 'nutrition sensitive' programming. One is about an FAO nutrition sensitive agricultural project in Nepal, which aims to enhance crop and livestock production, increase food diversity, household self-sufficiency and nutrition knowledge and awareness. However, although there was significant impact on crop and livestock production, nutrition and food consumption impacts were not measured. The second is a multi-sector homestead food production programme in Burkina Faso implemented by Helen Keller International (HKI). The authors examine how agricultural and nutrition activities are harmonised and find that this is done in a very ad hoc way. This leads them to come up with a typology of 'modes of integration', which they hope will help address explicitly ways of working across sectors. This is particularly topical as efforts to implement and scale up nutrition sensitive programming are increasing in many countries (through initiatives such as the Scaling Up Nutrition (SUN) movement) without clear operational frameworks for how sectors can effectively work together and towards a common aim of improving nutrition. Similarly, the shared vision and commitments

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[1] Ready to Use Therapeutic food

of the recent ICN2 meeting (outlined in a views article by ACF) will need clear multi-sectoral strategies and work plans to translate into effective programming. The final field article, written by ACF, describes what is fashionably called 'resilience' programming in the arid and semi-arid lands (ASAL) area of Kenya. This is a drought preparedness project for pastoralists via rangeland and pasture regeneration, water harvesting and livestock marketing initiatives. Although implemented in the context of an emergency, the aim of the intervention is to develop longer term capacities with cash transfers providing an excellent mechanism for achieving some of this aim.

There is also a wide variety of research summaries in this issue; notable pieces as follows. A secondary analysis of 21 DHS data sets applying different data cleaning criteria showed a profound effect on reported prevalence of global acute malnutrition (GAM) (most pronounced for SAM) leading to recommendations for mandatory reporting of cleaning criteria, urgent international consensus on optimal cleaning, and real time validation of extreme variables using electronic data collection. A review of the effectiveness of sixmonthly vitamin A distribution, which has been the primary intervention for vitamin A deficiency since the mid-1990s, concludes that this strategy no longer has a marked impact on mortality due to changes in disease patterns. The authors make a strong case for a policy shift from high dose to frequent low dose vitamin A supplementation. Another review found that the bio-

Inzajeano Latif, Ethiopia, 2014

conversion of Vitamin A (beta carotene to retinol) in pro-vitamin biofortified crops was more efficient than for non-biofortified crops. The authors argue that this supports the focus on efforts to breed plants with increased micronutrient concentrations, to decrease the influence of inhibitors and to offset losses from processing.

An interesting summary of an article on a randomised controlled trial (RCT) in Columbia of an integrated early child development (IECD) intervention for 12-24 month old children found significant effects of stimulation on cognition and receptive language but no significant effect of micronutrient supplementation. We also feature a piece on the high fat, low lean body mass of South Asians and how this is associated with elevated risk of chronic diseases. The review concludes that this is probably due to developmental programming in early life, coupled with nutrition factors and lack of exercise through childhood and adolescence. The authors conclude that food diversification and inclusion of animal source foods would help reduce childhood undernutrition and increase adult lean body mass. Furthermore, childhood undernutrition and adult over-nutrition are a continuum and a larger body of evidence is needed to inform policy on how to deal with this double burden. A related article considers that, in general, the national policy space for public health nutrition is not sufficiently protected. Processed 'fast' foods dominate foreign direct investment (FDI) interest in the food sector, yet reduced use of these foods is needed to tackle a number of non-communicable diseases (NCDs). FDI has economic advantages but at the same time, gives a company greater power over the food supply and vested interests in limiting regulation. Legal protection for investors is common, limiting government's regulatory powers over such companies. Additional research on balancing state interests and legal approaches is needed.

Also of note is, a review by Tufts University on nutrition responses in emergencies very

much accords with current ENN thinking. The authors assert that the contribution of emergency response programming to nutrition goals is rarely considered in assessment of global nutrition agendas, target setting or budgeting. It makes the point that high coverage of effective treatment programmes for wasting in crisis affected countries is needed to reduce child mortality, while global targets for stunting require attention in humanitarian hot spots. In effect, emergency interventions should dovetail with longer-term programming.

One final article to mention is a news item on the recent Global Nutrition Report (GNR), which is the first in an annual series. It tracks worldwide progress in improving nutrition status, identifies bottlenecks to change, highlights opportunities for action, and contributes to strengthened nutrition accountability. Although progress is being made in meeting some of the World Health Assembly targets, there is – as expected – a long way to go.

Finally, we would like to highlight that the ENN are planning another special issue of Field Exchange – this time on 'nutrition sensitive' programming. We will have a guest editorial team to help appraise and guide content. If you are involved in such programming or know someone who is, now would be a good time to start thinking about material to submit (send your suggestions to the contacts below).

We thank our many contributors for providing another rich issue of Field Exchange and hope you enjoy reading issue 49. The next one takes us to a half century. That has to be some kind of landmark!

Yours

Jeremy Shoham & Marie McGrath
Co-editors

Send article ideas for future editions of Field Exchange, including the special issue on nutrition-sensitive programming, to Marie McGrath, marie@ennonline.net

Beatriz Perez Bernabe,Mali, 2014

World Vision, Angola

Community case management approach to SAM treatment in Angola

CHWs invovled in community activity

By Sarah Morgan, Robert Bulten and Dr Hector Jalipa

Until the end of August 2014, Sarah Morgan was Senior Nutrition and Child Health Advisor for World Vision UK, with involvement in World Vision's roll out and scale up of CMAM and innovations in CHW programming since 2007. She is currently a public health doctor in London and Chair of the UK based international TB charity, Target TB.

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Location: *Angola*

What we know already: CMAM is a successful treatment approach for acute malnutrition. The conventional CMAM model of outpatient treatment centres (OTPs) may not always be feasible in contexts where there is particularly weak health infrastructure and low staffing capacity.

What this article adds: A community case management (CCM) approach using volunteers achieved high cure rates and coverage. Further operational research is recommended to refine this approach and identify solutions to implementation challenges, such as access to medical treatment in low capacity rural settings, effective MOH RUTF supply chains, and consistent, appropriate volunteer incentives.

Introduction

The 2012 drought in Angola was described as the worst agricultural season since 1978. An estimated half million children under-five were affected by acute malnutrition in 10 provinces. The provinces of Bié, Huambo, Kwanza Sul and Zaire had the highest global acute malnutrition (GAM) rates, initially estimated at 18-25%[1], with 14-20% moderate acute malnutrition (MAM) and 4-5% severe acute malnutrition (SAM). In partnership with the Ministry of Health (MOH), UNICEF, Africare and People In Need, World Vision launched CMAM programming in these four provinces.

At the onset of this nutritional crisis, capacity to respond was low with limited reach of the rural health system due to a lack of physical infrastructure and health staff. In June 2012, there were only 24 inpatient centres across the country. As admission numbers to these centres doubled, mortality rates ranged from two to four times SPHERE standards[2], an indication of the sub-optimal quality of services. It was clear at design phase that it would be challenging to achieve high coverage and significantly impact the high GAM rates using the standard CMAM model. It was proposed therefore to train and supervise Community Health Activists (CHAs)[3] to deliver Ready to Use Therapeutic Food (RUTF) based on a community case management (CCM) model. From November 2012 to January 2013, under CERF funding, activities began with recruitment and training of trainers for Municipal Supervisors, cascading to training for Commune (commune) Supervisors and CHAs. In January 2013, mass screenings were undertaken across all four provinces. In February 2013, ECHO funding enabled the response to continue with further training, screening, treatment and nutrition education, until December 2013.

Programme summary

Although CHAs are used by non-governmental organisations (NGOs) in Angola to deliver health and nutrition messaging and by the MOH for campaigns such as polio immunisation, they are not a recognised cadre of health workers for delivering routine health and nutrition services. Despite this, given the urgent nutritional situation, the MOH approved using CHAs in a CCM approach for this CMAM project. Across the four provinces, UNICEF provided support to the health system, training staff and opening inpatient therapeutic centres (Unidade Especial de Nutricao (UENs)) to provide care for SAM cases with medical complications and outpatient centres (Programa Terapeutico para Pacientes em Ambulatorio (PTPAs))[4] treating MAM and SAM cases without medical complications, within a 3 km radius. Other projects have found 3 km to be the maximum distance families can reasonably travel to access services. Beyond 3km, CHAs were used to deliver CMAM. See Box 1 for a summary of the health system and programme setup.

The project mobilised a network of over 2,000 CHAs covering 21 municipalities and 76 communes. Each CHA served two to five villages (around 100 households) with responsibility for screening, treatment, referral, follow up and

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Health system set up
Unidade Especial de Nutricao (UEN): An inpatient therapeutic centre treating SAM with complications that exists in most municipalities.

Programa Terapeutico para Pacientes em Ambulatorio (PTPA): A 'traditional' OTP and SFP treating SAM without complications and MAM within a 3km radius that exists at municipal and communa levels.

Hospitals, health centre and health posts: Where UENs were not available, patients suffering from

SAM with complications would go to general hospitals or health centres (this was due to the limited number of UENs but was not national protocol).

Programme setup
Municipal level: Municipal supervisor (1 per municipality, covering 2 – 6 communa)
Communal level: Communa supervisor (1 per communa, covering 10 – 100 CHAs)
Aldeia (village) level: CHA (1 per 2 to 5 villages) for treatment of uncomplicated SAM and MAM beyond the coverage area of PTPAs (3 km)

Figure 1 Programme outcomes for treated SAM and MAM cases

nutrition education. CHAs were recruited by traditional leaders and local administrators. They were required to be literate, respected by the community, and have knowledge of health; many had past experience in community health programmes. Training in detection and treatment of SAM and MAM was provided by World Vision and partners using UNICEF materials. A strong on-the-job training and supervision component was implemented to ensure quality of implementation. Each group of CHAs was assigned to a Communa Supervisor who ensured coverage of all villages in the commune and was responsible for collating nutrition data at the end of each month. These Communa Supervisors were MOH staff, often trained nurses. At village level, delivery of services varied, with some CHAs going house-to-house while others set up a temporary site for treatment. The CHAs workload was around 2-3 days a week.

The use of CHAs required some adjustments to standard CMAM protocols, which were agreed in advance with UNICEF and the MOH:

- Admission and discharge criteria were based on MUAC (mid upper arm circumference) measurements and oedema detection. The discharge criteria used were MUAC >12.5 cm, no oedema, and no complications. Children who met these criteria were kept in the programme for two extra weeks to prevent relapse.
- The quantity of ready to use therapeutic food (RUTF) is normally determined based on a child's weight on admission. As CHAs used only MUAC, individualised RUTF calculations were not possible. All SAM patients were therefore supplied with two packages of RUTF per day, and MAM patients with one packet of Ready-to-Use Supplementary Food (RUSF) per day. This protocol was based on the estimation that the majority of children with SAM were likely to be in the 3.5 to 5.9 kg range. However, the accuracy of this estimation and the impacts of the distribution protocol were not monitored.
- All SAM cases not requiring in-patient treatment should receive routine medical care. However, CHAs were not permitted to administer these, and the alternative plan was to refer children with SAM to the government health clinics in each municipality. However, this proved unfeasible and no

other solution was found, despite extensive discussions. The project relied on either MOH-run campaigns or health centre administration of vitamin A and albendazole. It is unclear to what extent antibiotics were provided through these mechanisms, but it is likely many SAM patients did not receive them. Only cases with complications and severe generalised oedema (grade +++) were directly referred to the health facilities. This was due to geographic characteristics of the project areas, and the low coverage and capacity of health services.

In the second half of the project, as CHAs' workload decreased, delivery of nutrition education sessions and counselling on infant and young child feeding (IYCF) became more systematic. These activities were addressed not only to the mothers of children enrolled in the project, but to the community in general, as a means of preventing malnutrition.

Half way through the programme, it was identified that even within the 3 km radius of a health facility, children with malnutrition were not attending the health facility. Hence World Vision and partners also utilised CHAs within the 3 km radius to identify children and refer them to the PTPA.

Extensive community mobilisation took place through village traditional leaders (Sobas) to promote better feeding practices and CMAM activities, using the project's advocacy materials. Screening activities were supported by the sobas (who conducted weekly meetings), traditional practitioners, teachers and the church leaders. This good relationship built with the community fostered strong participation and a corresponding low default rate.

Due to the small sample size in the initial survey, the high GAM rate in Zaire Province turned out to be significantly lower at 5.6% compared to the initial estimation of 19.8%. Therefore implementation in Zaire Province closed in August 2013 due to low caseload.

Programme outcomes
A total of 705,058 children were screened by CHAs between February and November 2013, an estimated 85.2% of the under-five population. During the project lifetime, 23,865 children were admitted for SAM treatment and 53,229
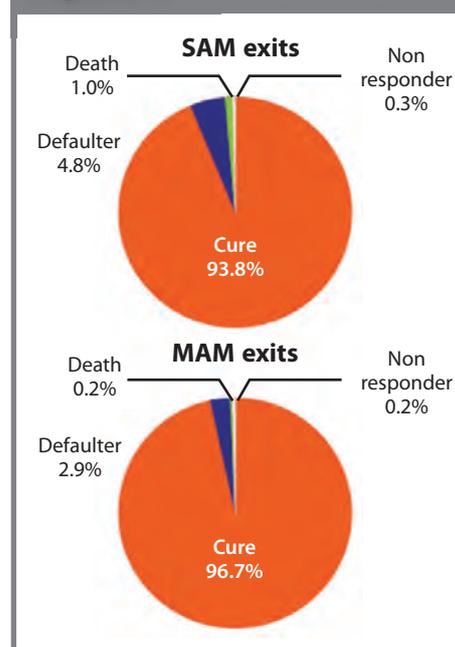
for MAM. This represents 9.3% of all under-fives in the intervention areas. In addition 176,144 mothers of children enrolled in the programme received training and counselling on nutrition and improved IYCF practices.

The programme had high cure rates, low defaulter and death rates, all exceeding SPHERE standards (Figure 1). An independent end of project evaluation[5] in late 2013 demonstrated SAM cure rates of 93.8%. There were some problems with CHA reporting, limiting the accuracy of these results, but even with a reduction of 10% as a margin of error, they remain good.

The programme maintained an average of 2,062 CHAs working out of 2,225 trained. Coverage surveys were undertaken in all three provinces, although due to the patchiness of coverage it was not possible to identify an overall coverage figure. In those areas where CHAs were particularly active, coverage was estimated to be 82.1%. However factors including limited number of CHAs available for implementation, the lack of RUTF and poor transport solutions (see challenges) meant the programme was unable consistently to achieve high coverage and reach its full potential.

Another indicator of effective implementation, median MUAC on admission for SAM cases, was 114 mm (Huambo), 113 mm (Bie), and 112 mm (Kwanza Sul), demonstrating excellent screening procedures. The low death rates also suggest that the CHAs were effective in early case finding and timely referrals to in-patient facilities.

5 Final Evaluation of the ECHO funded World Vision Angola (and partners) programme: Community-based Management of Acute Malnutrition for the most vulnerable children Under 5 in the Republic of Angola. Ellie Rogers, ACF UK, December 2013

6 Semi-Quantitative Evaluation of Access and Coverage (SQUEAC). Huambo Province, Angola. Beatriz Perez Bernabe, June 2013.

Key successes and challenges

Successes

The project successfully mobilised a vast network of community volunteers who were highly motivated and involved in the programme. This was recognised as an important booster to coverage in the SQUEAC survey[6]. The mobilisation of CHAs and utilisation of a CCM approach extended CMAM services to rural areas where the health system does not function and health care seeking behaviour is poor. Independent evaluators recognised that the CHAs generally demonstrated a sound ability to identify and treat SAM and MAM cases using the simplified CMAM protocol, as well as referring children with complications to health facilities. The project also fostered strong links between the Commune Supervisors and the CHAs, ensuring support for quality implementation.

This project's services were adaptable to the needs of the communities. The close proximity of CHAs to communities enabled frequent support and monitoring. Nutrition education sessions and treatment could be provided at a time and place which suited the community and increased participation. The project achieved good integration with the existing health system when Commune Supervisors worked for the MOH, which also built MOH capacity.

The project also raised the profile of malnutrition within the government, church and traditional leaders. Using local administrative and church leaders for social mobilisation proved a very effective strategy for engaging the communities and increasing understanding of malnutrition. Improving nutrition has not been a priority issue on the government agenda in Angola. Previous initiatives to provide treatment services for SAM have not been sustained. The CMAM project partners therefore worked hard to advocate for greater recognition of nutrition issues within national policy. A significant success was the government's commitment to provide RUTF to MOH-run UENs and PTPAs in 2014, assuming this responsibility from UNICEF. Furthermore, nutrition was named as one of three priority health areas for the government in 2014.

Challenges

Stock outs of RUF from the MOH were a challenge throughout the project despite advocacy efforts of World Vision and partners. This was one of the main weaknesses of the intervention. This challenge arose because of an unrealistic expectation that the MOH could manage the RUTF supply. UNICEF received donor funding for the initial supply, but the MOH did not have the capacity to take over after this. Apart from lack of supplies at central level, distribution from the municipal to the commune level was also an issue with a lack of adequate budget for transport. CHAs also faced transportation issues to deliver RUTF in the communities.

There was a gender imbalance in the CHA workforce with the majority of CHAs being men. The mid-term evaluation highlighted this and attempts were made to recruit more women. Nonetheless, this was a challenge for several reasons including insecurity for women travelling long distances, women's commitments in the home, and higher levels of illiteracy amongst women. The service did not appear to suffer on account of this imbalance. Male CHAs reported being comfortable counselling women on IYCF issues and there was no specific finding in the evaluations that women objected to male CHAs doing this. However, as a principle, World Vision would like to empower women to undertake these roles. Thus in future programmes, more efforts will be necessary at the design stage to ensure a better gender balance.

CHAs' literacy, education levels and ability to report was a challenge throughout the project. What were perceived as simple tasks (e.g. recording names and numbers) posed great constraints, especially during the early stages of implementation. The programme carried out extensive capacity building to build CHA skills in assessment, referral and monitoring. Following the mid-term evaluation,[7] even more emphasis was placed on training CHAs and strengthening mentoring and supervision by municipal and Communa Supervisors. Improvements in CHA performance were recognised by the final evaluator.

Adherence to international treatment protocols was not attempted or achieved, as described earlier, although overall cure rates were high. Identified children were meant to attend a health facility for the medications which form part of the standard protocol as CHA were not, due to policy constraints, allowed to dispense medications. A stronger connection between the UNE/PTPA coverage area and the community treatment provided by CHAs would have been desirable to track attendees (data on who attended are not available) and to ensure attendance.

Learning and recommendations

Despite mobilising over 2,000 CHAs, this proved insufficient. The number of CHAs required to cover the intervention area was underestimated during the design phase due to inaccurate municipal level population figures. This resulted in patchy or low coverage. Where population planning figures are questionable, projects should plan for a review and readjustment of CHA numbers early in the implementation phase. However, this requires adequate budget flexibility to allow for additional recruitment, training and supervision if necessary.

CHA incentives were a challenging aspect of the intervention. Inappropriate incentives were initially introduced (mobile phone credit was proposed but due to poor mobile reception in programme areas, this proved inappropriate), then adjusted following the mid-term evaluation with different partners providing incentives (each were unique to the project partners for their respective implementation areas and resourced using private funds). Although this led to an increase in retention and motivation of the volunteers, it is preferable for a contextually appropriate incentive or compensation scheme to be determined at the design stage and implemented consistently. It should be compatible with other initiatives, including other NGO programmes and MOH protocol for frontline workers.

Ensuring access to a stable and regular supply of RUTF, RUSF, therapeutic milk and medication is vital. Implementing partners need to assure buffer stocks are in place before proceeding with a CMAM project. In addition, advocacy should take place to address supply chain blocks, ensure lines of responsibility are clearly delineated and that capacity to deliver is adequate. Ensuring routine medications are provided in this case would require policy and practice change regarding CHA permitted tasks, a workable system of mobile medical teams or a feasible and sustainable system of referral and transport to clinics for an initial check.

Finally, the challenge remains of the inability of the health system in Angola to reach 3km beyond the facility, leaving large rural areas underserved. The project has shown CHAs can be utilised to extend the reach of the health system. Advocacy should continue for CHAs to be included in the health service to ensure better outreach. One of the desired outcomes was to integrate CMAM into municipality plans. Despite the increased awareness of addressing malnutrition, municipalities do not have the funds to include nutrition activities in their budget. In addition, there are policy limitations regarding the remit of CHAs. The MOH appears now to be open to reviewing these issues, thanks to advocacy activities building on this project by UNICEF and World Vision. The Minister of Health commissioned a study to assess the feasibility of using a network of CHAs in the health system, including for nutrition activities and the policy has now been submitted to parliament for approval.

Conclusions

Very few projects to date have implemented CMAM using a CCM model but this experience demonstrates the potential of this approach, particularly where health system capacity is very low. The use of a large and far-reaching network of CHAs with a CCM approach enabled remote communities to be reached with CMAM services, which appeared to be of good quality in terms of cure rates for those covered. The proximity of the CHAs to the communities also enabled close tracking of children and follow-up of treatment. Considering the limited health system capacity, a community-based approach is clearly the most effective method to reach children in Angola. Going forward, further work is needed to strengthen this CCM approach, improving the ability to adhere to the full CMAM protocol. Beyond Angola, this project raises the potential for CHWs to deliver CMAM in other contexts. Adapting and innovating the accepted CMAM model, within the boundaries of a framework of operational research and evaluation, may help close the gap in coverage of prevention and treatment services for acute malnutrition.

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Participatory risk analysis and integrated interventions to increase resilience of pastoral communities in Northern Kenya

Livestock accessing water in Kulamawe location after construction of water trough and 50m³ concrete tank

Muriel Calo, ACF FSL Advisor, 2012

By Daniel Nyabera, Charles Matemo and Muriel Calo

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Muriel Calo was Senior Food Security and Livelihoods Advisor in ACF's New York office at the time of writing. She has a decade of domestic and international experience working on food security and livelihood issues in vulnerable settings, supporting ACF-USA country programmes in East Africa and Asia.

Location: *Kenya*

What we know already: Pastoralism is a key livelihood system that is threatened by recurrent drought in the Arid and Semi-Arid Lands (ASALs) of Kenya.

What this article adds: An ACF drought response in Northern Kenya involved improving drought preparedness capacity through rangeland and pasture regeneration, maintenance of water harvesting structures and livestock marketing initiatives. In emergencies, interventions can and should develop such local longer term capacities in addition to 'classic' short-term livestock assistance. Cash can be an important tool to achieve both ends.

Extensive livestock keeping or pastoralism is an efficient and productive livelihood system that has evolved to enable pastoralist households to survive and thrive in arid and semi-arid rangelands. However, cyclical droughts in the Arid and Semi-Arid Lands (ASALs) of Kenya continue to threaten mainly livestock-based livelihood resiliency. The context is characterised by extensive livestock-keeping (shoats, camels and cattle), a livelihood system that is increasingly under threat and at risk of dependency on aid as drought limits viable livelihood options outside of livestock production.

In Kenya, livestock production in the ASALs accounts for nearly 90% of the livelihood base and nearly 95% of household incomes[1]. With an estimated livestock resource base of 60 million animals,[2] the livestock sector in Kenya contributes 12% of the total GDP and 42% of the agricultural GDP.[3] Despite their contribution to the local and national economy, pastoralists in the ASALs of Kenya have been systematically marginalised for decades. The ASALs were significantly affected in 2011 by a drought which developed into a crisis, as well as the gradual erosion of community resilience and traditional coping strategies by successive shocks and limited development investments. A post-disaster needs assessment identified the entire period from 2008 to 2011[4] as one continuous drought, causing the loss of over US$805 million worth of physical and durable assets.[5]

In the 2011-2013 drought response in Northern Kenya, Action Against Hunger (ACF) intervened in Merti and Garbatulla Districts as part of the USAID-supported Arid and Marginal Lands Recovery Consortium (ARC). More than 85% of these districts were affected by the drought that saw up to 70% of livestock lost due to worsening pasture and browse conditions[6]. Livestock migration from Merti and Garbatulla also intensified due to depressed rainfall, while cases of insecurity and conflict rose.

1 Kenya Ministry of Livestock Development Session Paper #2 National Livestock Policy, November 2008
2 AU-IBAR – Animal Health and Production in Africa, 2009
3 Quick Scan of the Dairy and Meat Sectors in Kenya, Issues and Opportunities, SNV, 2010
4 The 2005/06 drought affected four million people in the ASALs and an estimated 50-60% of livestock (shoats, camels and cattle) died. Many households and communities had only started to recover when 2007/2008 brought triple shocks of post-election violence, high food and fuel prices and El Niño related flooding.
5 Kenya Post Disaster Needs Assessment (PDNA) 2008-2011 Drought. Republic of Kenya
6 National Drought Management Authority – Drought Monitoring Bulletin December 2012

ACF adopted an integrated approach for the drought response programme which focused on improving drought preparedness capacities of the communities in the two districts. The integrated programmes were designed to put the communities as the key actors, thus mobilising them to address collectively common risks and pursue risk reduction measures.

Enhancing community resilience

ACF supported the communities to analyse their risks and then implement practical interventions to increase their resilience. In this regard, communities identified three key areas of support that would mitigate total loss of livestock herds and associated livelihoods. These were: **rangeland and pasture regeneration** along strategic grazing corridors in the districts, construction and maintenance of **water harvesting structures**, and support to **livestock marketing initiatives** to facilitate herd control based on anticipated changes in climatic conditions.

Rangeland regeneration

Rangeland degradation is one of the major problems that pastoralists face in Northern Kenya, in addition to continuous bush encroachment that has reduced the size of available pasture, productivity of the rangeland and pasture quality. ACF supported local communities to conduct a resource mapping and stakeholder analysis. Information was collected from local institutions on the diverse resources in the rangelands of Garbatulla and Merti, and the groups (formal/ informal) that have had a role to play in rangeland resource management. Migratory corridors were drawn and dry and wet season grazing areas mapped out within the livestock movement corridors.

With all stakeholders identified, ACF supported revitalisation of community rangeland management institutions with longstanding indigenous knowledge systems that focused on protection of the rangeland hotspots. To strengthen the local community capacities in the management of dry season pasture graze lands along the migratory corridors, technology transfer was largely based on experiential learning that firmly built on indigenous capacities and best practices. Focus group discussions were held along the migratory routes to determine strengths and capacities, skills and knowledge of the communities within the context of natural resource management.

At this stage, cash based interventions were used to protect identified hotspots (dry season graze lands) mainly through pasture regeneration. Cash was used to stimulate community participation in pasture regeneration in the dry season grazing blocks in an area that was coming out of a long drought. A total of 1346 Cash for Work (CFW) beneficiaries received an average of 3.75 USD for each of three days worked in regenerating the pastures. As a result, more than 15,140 USD was injected into the local economies from the cash disbursement. Pasture regeneration activities involved reseeding by either over-sowing into existing vegetation with a superior species or complete reseeding of denuded land, depending on the condition of the pasture. In both cases, the reseeded land was then enclosed and utilized as per a grazing plan.

These activities were implemented along with training of Rangeland Management Committees on land use and implementation of appropriate grazing management regimes. For example, community action plans on pasture utilisation in the dry and wet season were developed, with dry season blocks being the main focus for reseeding interventions. The use of perennial seeds for reseeding of denuded pastures was also recommended since perennial grasses have good self-seeding ability; with proper management they can establish and spread quickly to give good cover. In this regard, *Cenchrus ciliaris* was identified and utilised.

Training and planning with the committees was done as a safeguard to protect management of the regenerated pastures. A rangeland management plan specifying the roles and responsibilities of the rangeland management institutions was drawn up, providing information on the resources and their condition and an outline of the rangeland management processes that will be followed, including monitoring and evaluation of adaptive management. Seasonal pasture availability was analysed based on indigenous technical knowledge of the pastoral communities in the programme area and covered both wet and dry seasons. A grazing plan was drawn up to regulate herd mobility between dry and wet season pastures in Merti and Garbatulla Districts as shown in Tables 1 and 2.

During rainy seasons, pastoralists were in favour of leading herds to very distant pastures in areas highlighted in the seasonal plan to ease grazing pressure. In the dry seasons, noting that the lack of surface water would force herds back to the pastures around the wells, rangeland management committees proposed to have milking herds grazed in the inner circle around the wells, while other animals were kept in the outer circle. The plan was sensitive to the need of the herders – to be in close contact with their herds, and the natural environment.

In addition, the plan highlighted the communal resource-tenure regimes for extended user groups to coordinate access to shared grazing resources in normal years and to allow for negotiations over use of key resources during times of scarcity. This also acted as a guide to other herders to know exactly where to move their animals in order to find available forage and water resources and subsequently mitigating against pasture related conflicts.

While communities prefer to utilise the regenerated pastures in the dry season for grazing, future engagement would focus on supporting the resource management committees to address seasonal deficiency by conserving surplus forage during the high fodder availability period.

Today, restoration of pastureland is one of the principal drought mitigation measures being implemented by the communities with additional support from the newly created county government of Isiolo. A total of nine reserve pastures of 12ha each were regenerated along migratory routes between Garbatulla and Merti District, thus improving access to fodder for at least 23,000 livestock who traditionally utilize the dry season grazing blocks where the reserves are located.

Apart from improving acceptance of ACF participatory strategy in rangeland management, the cash based pasture regeneration exercise promoted information flow and cascading of the roles and responsibilities of Rangeland Management Committees from location to village level, which was essential for mitigating consequences of poor rangeland management.

Simple decision support tools and local level monitoring mechanisms were developed in order

Table 1 — Seasonal Grazing Blocks in Merti

Grazing blocks/Corridor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tiyole, Qurqura, Mado, Roble, Komor Bula, Moliti, Hawaye, Kuri, Kubi Dakara, Biliqi **(Wet Season Grazing Blocks)**	green	blue	blue	green	green	green	blue	green	green	green	green	blue
Mogore, Kubi Dimtu, Diuo Wara, Kuro, Marado **(Dry Season Grazing Blocks)**	blue	red	blue	blue	blue	blue	red	red	red	blue	blue	blue

Table 2 — Seasonal Grazing Blocks in Garbatulla

Grazing blocks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dathach Aroo, Machesa, Andadu, Duse, Bibi, Qone Ireshone, Qarsa, Kubi Ramata, Malkaloni, Datach Chafa, Jillo Dima, Gubatu, Qachi, Korbesa, Kura **(Wet Season Grazing Blocks)**	green	blue	blue	green	green	green	blue	blue	green	green	green	green
Hinafa Bera, Kubi Sera, Kubi Roba, Kubi Haqe, Baqasa, Usmaili/Qotichi, Sutgub, Kuku **(Dry Season Grazing Blocks)**	blue	red	blue	blue	blue	blue	red	red	red	blue	blue	blue

Duse Livestock Market in Boru Somo

to inform decision making, trigger early warning for livestock marketing and inform herd control decisions especially when pasture availability is inadequate to carry herds over to the next season. The main early warning indicators used for development of support tools to monitor pasture include changes in vegetative cover through visual biomass estimates, and changes in water cycle and recharge levels.

An analysis of potential synergies between various land use strategies in the context of Merti and Garbatulla was conducted to improve productivity of the rangeland. This specifically targeted the dry season grazing blocks which were mapped out to guide implementation of integrated water resource management interventions and exploit livestock marketing potential.

Water harvesting for livestock

With the migratory routes clearly mapped out, ACF rolled out a CFW programme that supported rehabilitation and construction of livestock water points to reduce livestock and human deaths at times of drought. The community provided locations for the water pans rehabilitated through the project. Key considerations were the grazing patterns and corridors to the market. It is critical to note that the community was against establishment of new water points without thorough consideration of the effects to the rangeland. The programme therefore concentrated on improving on prioritised water pans. An estimated 186,440 livestock and 40,845 livestock owners benefited from rehabilitated or newly constructed water sources which include water pans, shallow wells, borehole, water storage tanks and access points (livestock water troughs), while 1359 people participated in CFW water point rehabilitation and construction activities.

The CFW programme assisted households to meet immediate needs during a vulnerable period and created employment opportunities for the unemployed, while the rehabilitated and constructed water points ensured retention of milking herds near the settlement to provide required milk for the children and surplus taken to market for income and made it possible to de-silt more earth-dams. As a result of cash inflows from CFW activities, purchasing power of the beneficiaries increased and in turn markets were stimulated. A majority of participants, after action review focus group discussions, asserted that in the unfortunate event of a new drought, they would suffer less because the im-

plementation of activities under the economic asset development component of the ARC project (see earlier) will reduce the risks and mitigate negative effects. "We have no fear of the threat of drought as we have learned to preserve and store pasture, grow and preserve food" responded a participant during a focus group discussion session in Garbatulla[7].

Improving livestock markets

In the ASAL of northern Kenya, there are significant barriers and obstacles to improving household income due to climatic conditions, disabling government policies, poor services, and low terms of trade between livestock products and staple foods. Despite these barriers, a significant proportion of those living in the ASALs retain valuable and profitable assets in the form of livestock. Pastoral communities in northern Kenya face severe challenges in the marketing of their livestock however, including long distances and poor roads in reaching marketing infrastructure, lack of organized market days, limited connections between traders and livestock owners, and poor market awareness. ACF's livestock marketing initiatives in Isiolo County sought to address these issues by contributing to greater sustainability and efficiency of the marketing system.

ACF's assessment of livestock markets in Garbatulla district in 2010 attributed the cause of dilapidation and abandonment of livestock markets to poor placement decisions, weak and corrupt maintenance revenue collection systems, lack of ownership and insecurity. With the livestock migratory routes already mapped out by the Rangeland Management Committees, ACF supported participatory decision-making on appropriate livestock market locations within the migratory routes with a view to rehabilitating 'best bet' market yards that would support strategic destocking of household herds. This should also open up the location to other districts which would then assure the pastoralists of income in the face of drought. Site selection was based on ensuring that there was adequate demand from both traders and producers. Critical location factors for producers that influenced decision making on market rehabilitation included: the market being within a reasonable trekking distance, the site being accessible without infringing on other rangelands, and accessibility to livestock water sources being nearby. In addition, market placement decision making

took into account the locations of other markets to ensure they do not undermine each other.

With ACF support, two livestock markets were rehabilitated in Garbatulla and equipped with the necessary infrastructure that included a sales yard, loading ramp, sanitation facilities, water sources (for livestock water), shading/resting area for livestock, crushes[8] for isolating and examining livestock and office infrastructure. On average, the rehabilitation works cost 20,000USD per market. To sustain efficient management of the rehabilitated livestock markets, ACF facilitated the creation of two Livestock Market Management Committees (LMMC) comprised of local community representatives responsible for managing the markets. Inclusive representation in these committees was guaranteed by representation from key stakeholders drawn from livestock traders, community based animal health workers, peace committee members, environmental management committees, registered women groups and livestock producers. The LMMCs were responsible for setting livestock market days, promoting market awareness (destocking campaigns in the face of droughts), recording livestock sales data, participating in resolution of conflicts and overseeing maintenance of livestock market infrastructure.

In June 2012, ACF partnered with Food for the Hungry (FH) Kenya and SNV Netherlands to lobby for a livestock market co-management model in which local communities share roles and revenue collected with the county council. The model fosters sustainability and efficiency through community ownership and re-investment of funds into improving market infrastructure and support to market processes, based on a revenue-sharing formula whereby the collected cess (tax) is shared between the respective county councils and the Livestock Marketing Associations (LMA). Responsibilities for personnel and repair costs incurred on market days are also shared between the two entities. Prior to the development of this model, no amount of the collected revenues was ploughed back into the market. The model ensures that a considerable amount of the revenue collected is committed towards market maintenance and provision of essential services such as security, loading, and effective structures. The model was adopted in Isiolo County following signing of a Memorandum of Understanding (MOU) between the County Council of Isiolo & Oldonyiro LMA, as this was the selected livestock market for piloting before replication and roll out in four ARC funded livestock markets in Isiolo County.

Significant impact on County Council and LMA revenue and capacity to manage sites was noted with the introduction of the livestock market co-management model, specifically:

- *Increased revenue raising capacity*: Before livestock co-management in Oldonyiro, the County Council of Isiolo collected Ksh.791,780 (USD 9,897) over 28 market

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[7] ARC Evaluation Report - July 2013

[8] A strongly built stall or cage for safely examining livestock.

days (May 2011-June 2012). This revenue included cess from auction, barter and export fees. Following the introduction of co-management, Ksh.465,355 (USD 5,817) was collected during the first 3 market days (seven weeks only), representing 60% of one year (28 market day) collections before co-management[9].

- *Reduction of operation & maintenance costs:* Under the new model, a total of Ksh.90,600 (USD 1,133) was spent on operation costs to collect a total of Ksh.465,355 (USD 5,817), representing 19% of total cess in come generated; compared to 42% average daily expenditure for market days before co-management.
- *Sharing of revenue:* Both parties got their share as agreed in the MOU. During the period of seven weeks of co-management, County Council of Isiolo received a total of Ksh. 257,605 (USD 3,220) while the local community got Ksh.117,241 (USD 1,466) representing 69% and 31% respectively after deduction of daily expenses

In Figure 1, expenditures are expressed as a percentage of total income received for market days before and after co-management. The weekly maintenance cost was an average of Ksh.13,000 against average net revenue of Ksh.70,000. This significant change in revenue is an indication of viability and sustained operations and management of livestock markets in the absence of external support.

Lessons for sustainability

Investments in *rangeland management* are likely to be sustained if follow-up actions are taken:

- Assessing the *pasture seed value chain* and promoting the informal sector to carry out seed production/bulking functions
- Supporting grassroots trainer of trainers' workshops to equip farmers and extension workers with methods, skills and knowledge to design, facilitate and implement *seed multiplication initiatives* in their respective areas. It involves participatory approaches based on experiential learning techniques

and participatory training methods provided by government research actors.

- Supporting establishment of *seed production plots* where pastoralists are provided with the starter grass seed to start them off. In this regard, pastoralists will maintain reseeding of dry season grazing blocks, harvest seeds and store for regeneration in the event of an imminent drought. Technical backstopping is required from government research actors to assist pastoralists in dealing with emerging challenges in the field especially in grass management, seed harvesting and storage.

Considerations for sustaining investments in *water point infrastructure:*

- Local artisans provide technical skills for minor maintenance and running of boreholes, with major maintenance carried out with support from the County (at a fee). Fuel expenses and other running costs are covered through community contribution to a common fund. During the dry period, expenses drastically increase, sometimes exceeding existing community resources. *Tariffs* reflecting seasonal needs, *regular fund contribution* and *effective fund management* remain essential for ensuring continued service on borehole water provision.
- Community prefers *water pans* due to un hindered water access, especially during the dry season, when large herds water from the same water points. Less conflict was noted at the water pans due to every pastoralist getting water unrestricted for the livestock. Considering rain scarcity in this location, it is critical to maintain harvesting of adequate volumes every season through *silt removal and adequate fencing.*
- Community contributions towards maintaining the water pans is considered a low priority due to *low frequency of maintenance needs,* making it a challenge for longer term sustainability of the infrastructure. Even though water pans near settlements are able to raise revenue from live stock accessing water, those in the interior of rangeland lack revenue generation due to lack of follow-up on water payment. If water pan and other water source maintenance needs are considered as an imbedded service cost for optimal rangeland management, this would allow funds to be recovered through other existing services such as markets. Costs could be co-shared between the community and the County Council.

Considerations on sustainability of *livestock market co-management* model:

- Putting local pastoral communities at the centre of decision-making in the management of the livestock markets not only resulted in vibrancy of the livestock markets, but also stimulation of the local economies and improved social welfare. Communities, including the youth, have bought into livestock trade to promote pastoral production systems that are sensitive to drought.

Martin Muchangi, Kenya, 2012

Shoats accessing water from the newly constructed trough in Tana location, Isiolo County

- The co-management has played a critical role in facilitating the livestock value chain. Improved market infrastructure as a result of implementing the livestock market co-management model enabled market access to livestock value chain actors. The trickle-down effect was felt on employment and introduction of platforms to transmit market information outside the market catchment area. Informal employment opportunities were created such as tea vending, catering, animal trekking and branding.
- Replicability of the co-management model is attributable to community participation as the central pillar of the model. The communities served by the model were easily able to identify themselves with it, contributing to the success rate of the model in livestock markets in Northern Kenya.

Conclusions

As climate change puts growing pressure on livelihoods in Northern Kenya, pastoralism is becoming more economically productive as a result of these types of integrated approaches to mitigating drought related risks. It is observed that pastoralists in the ARC programme areas are continually finding new forms of managing and using resources to adapt to drought. The experience of the programme shows that even in emergency contexts, interventions can and should seek to build and develop local capacities to manage appropriately key livestock assets such as rangelands and water, using local and indigenous structures, knowledge and good practice – in addition to providing more classic short term emergency assistance such as de-stocking or feed and water distribution. Cash can be an important tool to achieve both ends simultaneously. There is strong evidence that in terms of economic growth, secure livelihoods and environmental sustainability, pastoralism is the most appropriate economic activity when local capacities are harnessed to design drought risk reduction interventions.

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9   Oldonyiro Livestock Market Co-Management Model (Quarter 1 Report) by FH Kenya (2012)

Figure 1 Trends in expenditure for market operations as a percent of total income

Before Co-Management
After Co-Management

Research

Training of enumerators in Mangaize refugee camp, Niger

Experiences with mobile data collection in UNHCR standardised expanded nutrition surveys

By Ellen Cecilie Andresen, Mélody Tondeur, and Caroline Wilkinson

Since 2011, Ellen Cecilie Andresen has been a nutritionist with the Public Health Section at UNHCR Headquarters. She led the initiative to introduce and scale-up the use of mobile data collection in UNHCR SENS surveys in many African and Asian countries. She has experience in emergency nutrition and in designing and analysing nutrition and food security surveys.

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Caroline Wilkinson is the Senior Nutrition Officer with UNHCR Headquarters. She has been fully involved in the development of the SENS and the introduction of mobile data collection in UNHCR SENS surveys. She worked previously for 14 years with Action Contre la Faim (ACF) in several countries and the HQ in Paris.

Location: *Global*

What we know already: Mobile phone data collection (MDC) is increasingly used by UNHCR in nutrition surveys.

What this article adds: UNHR conducted a review of MDC survey experiences over 2 years. It found the approach improved data quality, saved time in data collection and analysis, the software and hardware are user friendly, and there are cost savings. Training and technical support to survey coordinators and enumerators was effective and critical to MDC success.

In November 2011, UNHCR and partners conducted the first nutrition survey using mobile data collection (MDC) in Kakuma refugee camp in Kenya. Based on the initial positive experience, UNHCR continued and expanded MDC use in nutrition surveys; it is now an integral part of the revised (version 2) UNHCR Standardised Expanded Nutrition Survey (SENS) guidelines[1]. Box 1 outlines how MDC was developed and works in practice. After two years of using MDC in SENS, a review of experiences has been conducted to guide further use and development of the technology and is summarised here.

Experiences were collected through a standardised open-ended questionnaire provided to all eleven SENS survey coordinators who had used MDC by early 2014 (100% response rate), through mission reports from UNHCR´s technical partner CartONG[2], outcomes of a teleconference held in 2013 with experienced MDC in SENS users and technical advisers, and data extracted from SENS reports using MDC, including SMART plausibility reports[3]. Open-ended questionnaires were sent via email to survey coordinators and

covered a wide variety of topics, such as duration of various activities, challenges, and access to technical support.

Advantages to using MDC
Improved data quality
The survey coordinators highlighted that using mobile data collection has enhanced data quality. This was confirmed by 90% of SENS surveys with MDC showing excellent or good scores on the SMART plausibility checks[4] and is attributed to reduced data collection errors and the electronic transmission of data avoiding possible

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1. The UNHCR SENS guidelines (www.sens.unhcr.org) are based on the internationally recognised SMART methods for survey design and anthropometric assessments, and adapted to the specific requirements of refugee settings.
2. Only mission reports from 2013 have been included as the CartONG mission reports mainly address technical aspects and the 2011 and 2012 mission reports are already outdated due to improvements and evolution in software.
3. Plausibility reports have been produced for 44 surveys in 9 countries, and where the surveys had been done prior to the November 2013 upgrade to the SMART plausibility checks, original data were used to create updated plausibility reports.
4. The plausibility check for anthropometry is a tool in SMART methodology/ ENA for SMART software to allow for evaluation of anthropometric data to provide an overall score for the survey quality.

Box 1 — How MDC works in surveys

To use mobile technology for data collection in surveys, UNHCR has chosen a system using standard smartphones with an android platform compatible with Open Data Kit (ODK) applications. ODK is a set of free, open-source applications for creating questionnaires and storing data. The equipment and software needed to set up MDC are android smartphones (one to two per team), ODK applications, wireless router, computer and steady power supply.

The standardised SENS questionnaires are readily programmed and available for MDC and can be reused in any setting. During data collection, the survey teams record all responses directly on the phones. Every day, survey coordinators and supervisors review questionnaires for inconsistencies and provide immediate feedback to the enumerators. At the end of the day and once data quality is ensured, the phones are connected to a local network set up specifically for the survey and data from the phones are transferred to an offline server, where multiple data can be stored. The offline server is accessed through a computer connected to the same local network, and downloaded to Excel-readable format ready for analysis. There is no need for an active internet or mobile network connection to collect and save data.

A beneficial feature of the ODK is that one can switch between languages during an interview, or the enumerator can fill in the questionnaire using one language and the supervisor and survey manager can check in another. This was used in Sudan, for example, where the survey was conducted in Arabic and checked in English.

From the onset of the MDC initiative, UNHCR Public Health Section has worked in close collaboration with the technology non-governmental organisation (NGO) CartONG in the development of all technical elements, training and capacity building, as well as on-going support and development. A strong support system exists, where all field operations have access to remote or in-country support from UNHCR HQ, UNHCR Regional Support Hubs, or CartONG. *For more details, see under lessons learned (training and support).*

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as height, weight and MUAC (e.g. if the child weighs 8.4 kg it is not possible to accidently write 84 kg as the weight range for children 6-59 months will be set to 3-31 kg).

In addition, MDC allows for cross-checking for missing data and other mistakes very soon after data collection. Daily upload and transfer of data allows for same day checking and immediate feedback by the survey coordinator. The survey coordinators reported spending less time than normal on data cleaning, on average one day per survey, and during data cleaning, have noticed less mistakes and errors than with paper-based questionnaires.

Reduced time from data collection to presentation of results

Survey coordinators stated that the use of MDC has made the data collection more efficient. Paper-based questionnaires can take up to one hour to complete in each household; when using MDC, the enumeration teams were reportedly quicker in each household and hence could survey more households per day. Reduced data collection time is linked to the pre-coded skip patterns which make the data collection flow easier, filters to automatically verify age and other parameters, and autofill of certain details such as date and household information. Use of MDC also allows for quicker production of the preliminary results, within four days of the last data collection. With paper-based surveys, double data entry can take up to one week, and cleaning of data can take several days.

> "The final data files quality being the most important criterion to judge efficiency and effectiveness in my eyes – I would go for MDC."
> – Survey coordinator, Burundi.

Ease of using equipment and software

MDC has been well received by both the coordinators and the enumerators. Aided by proper training, guidance sheets and standardised operating procedures (SOPs) the ODK applications, server and download process are easy to manage for the survey coordinators. Survey managers also stated that it is an advantage that the data can easily be transferred to Excel files which is compatible with both ENA and EpiInfo (used in SENS data analysis).

Most enumerators quickly learned how to navigate the ODK format questionnaires and apply them in the field. However, all coordinators reported that some team members struggled with the phones when less frequent procedures had to be used; in these cases the teams were supported by rotating supervisors. During the course of the survey, significant improvements in data entry speed were noted and even those who were less comfortable at the beginning later became positive about using MDC in surveys. The survey coordinators mentioned that MDC makes logistics in the field easier as enu-

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Table 1 — Approximate budget costs for MDC versus paper-based SENS[7]

	Paper-based	MDC
Fixed expenses in USD		
Survey coordinator[8]	20,000	20,000
Equipment for anthropometry and haemoglobin measurements	5,300	5,300
Total	**25,300**	**25,300**
Variable expenses in USD		
Training[9]	6,000	7,000
Mobile equipment[10]	0	1,000
Printing of paper-questionnaires	400	0
Supervisors[11]	6,300	5,040
Enumerators	14,000	11,200
Data collection costs	14,700	11,760
Data entry clerk	2,700	0
Total	**44,100**	**36,000**

meration teams can more easily carry and handle one or two phones instead of a large amount of paper. In some surveys, the coordinator had taken advantage of additional software available on the phone such as GPS and camera. For example, recording of GPS coordinates was found useful to help find the way back to households when teams had to re-visit due to absence at first visit. The camera was used in some surveys for verifying children with oedema.

No need for internet or mobile connection

The offline server system has distinct advantages. Many refugee sites are in remote areas with poor internet and mobile network connection where instant connection to a server would be impossible. Survey teams typically return to a central location where phones can be synchronised with the server. Transferring data offline is more secure[6]. As of Spring 2014, the offline server requires a slightly more complex synchronisation system than simple online server systems. If and when an online server is deemed more useful and data security can be assured, this solution may be used in settings where this is feasible, including sites with stable access to wifi at least at a central location or where teams are working remotely from a central location and mobile 3G is available.

Reduced cost

Using MDC reduces costs linked to the survey. Money is saved on printing and hiring data

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errors during data entry[5]. The variables in the plausibility check that provided most penalty points were mainly age distribution and height digit preference, of which neither could have been influenced by mobile data collection.

High data quality is linked to features of the MDC technology. The questionnaires in ODK allow for setting pre-coded skip-patterns (this reduces the chance of missing questions or incorrect skipping of questions, e.g. after entering a child's age, all relevant questions for that age group will appear), and required questions and pre-set ranges for continuous responses, such

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5 The list of surveys included in review and their plausibility check results are available on request from the ENN (marie@ennonline.net) or the author (see contacts at the end of the article).

6 Given that everyone follows the standard procedure of creating daily data back-up on external hard drive or memory stick.

7 Budget is based on costs in Dollo Ado 2013.

8 To be included if this function is needed in addition to an in-country nutritionist from UNHCR or partner. Cost is based on medium level international consultancy.

9 One extra day should be expected when using MDC.

10 Assuming phones will be used for 3 years and based on following estimates: 15 phones x USD 200 / 3 years. If phones are used for other surveys or activities in addition to nutrition surveys, the cost will be even lower per survey.

11 Cost for supervisors, enumerators and data collection when using MDC is based on 20% more efficient data collection.

entry clerks and time spent on data collection, entry and cleaning. Some survey costs are similar to paper based surveys, such as equipment for anthropometric and haemoglobin measurements and external survey coordinators needed. Training of teams is estimated to last one day longer when the teams are to be trained on using mobile phones, however around 20% fewer days for data collection are needed. Table 1 indicates the budgetary difference between paper-based data collection and mobile phone data collection, based on costs from a paper-based survey in Dollo Ado, Ethiopia 2013. Estimates suggest approximately 25% of variable expenses are saved when using mobile data collection.

Challenges in using MDC

Phones and network

For many survey coordinators, the technical language is new and sometimes difficult to understand at first, although most coordinators get used to the technology during the first survey. Some survey coordinators have encountered problems while transferring data from smartphones to server or from server to Excel. Most problems have occurred after settings have been changed on the computer during the survey, and have shown to be related to lack of knowledge and experience with the technology. All problems have been solved with support from IT specialists in-country or with support from CartONG. In all cases, the teams were able to retrieve temporarily lost data from other back up sources including SD card on phone and temporary server files. As the technology is constantly improving, fewer and fewer problems are encountered, and in later versions of ODK, the responses are automatically saved after each question so that recorded data will never be lost.

Several survey coordinators raised concerns that they have not themselves been able to adapt the questionnaires. In order to adapt the electronic questionnaire, specific training on the software is needed. The technology partner is responsible for making necessary local adjustments to the electronic forms after consulting with the survey coordinator. This involves the use of more advanced software for building the questionnaires needed to fully take advantage of SENS, and to minimise errors during this step. Furthermore, SENS includes standardised questionnaires which should not be changed from country to country, so practically speaking this should not be an issue. However, survey coordinators would want to be able to do this part in-country.

Capacity of survey coordinator and teams

Survey coordinators with some level of computer literacy and management experience with SMART or SENS surveys generally handled the mobile data collection well. Having good knowledge of nutrition surveys in general and SENS specifically has allowed the coordinator to pay more attention to the extra learning aspect of introducing MDC. Inexperienced survey coordinators have generally taken longer to learn the technology, and have also handled ´stress situations´ with unexpected errors or obstacles related to MDC less well. Some survey coordi-

nators mentioned that MDC requires higher technical skills by the enumerators; some struggle and make mistakes although increasingly many are already familiar with using mobile phones and even smartphones.

Battery life and electricity supply

The battery charge of older phones does not last the whole day in the field (resolved by carrying extra phones, additional batteries or portable power packs). However, with newer mobile phones this has not been a problem. Stable supply of electricity is needed for charging the phones overnight. In remote locations the electricity supply might be unstable or planned power cuts might occur in the office during the night and alternative charging options are needed.

Other challenges

There is increased workload in the evenings during data collection. Checking one phone could take 15 minutes, so six teams with two phones each would take three hours. Connecting all the phones to the server and uploading the questionnaires might take another 30-60 minutes. If the survey coordinators also wish to check the excel files and produce a SMART plausibility check, which is recommended, the survey coordinator ends up working for several hours in the evening after data collection. Whether this workload is ´additional´ or not depends on the procedures the survey coordinator is used to in the past. Many survey coordinators are doing daily data check of all questionnaires even when they use paper-based questionnaires and daily data entry of the anthropometric data in order to check the data and produce SMART plausibility checks. For survey coordinators who are used to following this procedure the MDC will actually decrease their daily workload with automatic transfer of data. So, although the daily workload was a disadvantage for some survey coordinators others found that checking of the questionnaires was easier.

Lessons learned

Training and support

Thorough training of survey coordinators and enumerators is crucial for successful implementation with MDC. Survey coordinators especially need in-depth training when conducting a SENS with MDC for the first time. All SENS survey coordinators have either participated in a one-week training prior to survey or received in-country on-the-job training for up to two weeks the first time they were exposed to MDC. After this, remote support will be provided as needed. There is close communication between field and UNHCR HQ, Regional Support Hub Nairobi (RSH) and CartONG. Together with CartONG, UNHCR has produced a number of guidance tools, including training videos, SOPs, practical step-by-step guidance notes, and training presentations. In addition to survey coordinators, IT staff from relevant countries have been trained by CartONG to be able to give in-country support when needed. Survey coordinators reported that this level of training provides a solid base of knowledge, and the current support procedures work well in case of problems.

Timely and efficient support is especially essential during survey preparations and the first few days of data collection, which is when problems might occur before the survey procedures have 'settled in'. Sufficient time needs to be planned for the preparation phase to ensure support with local adjustments to standard questionnaires. Survey coordinators were happy with the current system in UNHCR with close communication with HQ, RSH or CartONG on any day of the week. However, options for more in-country autonomy should be explored.

Technical awareness among survey coordinator and team members

In order to implement a survey with MDC, the survey coordinator benefits from having some level of computer literacy and nutrition survey management experience. In the survey teams, at least one or two team members need to have some level of computer or smartphone literacy.

> "CartONG made themselves SO available and was a great help so this worked very well."
> – Survey coordinator, Kenya.

Equipment and data handling

Smartphones are better than tablets in the field as they weigh less and can be carried in the enumerator's pocket if needed. The smartphones should preferably have a large screen and a slide-out keyboard in addition to the touch screen for ease of data entering, especially for enumerators who are not used to smartphones with a touch screen. To decrease the risk of losing valuable data, UNHCR recommends daily saving of back-ups of the data. Data are automatically saved on the smartphone's SD card during data collection, and should be uploaded from smartphone to server every evening. In addition, it is recommended to extract copies of the server database on a daily basis to the computer and a memory stick as well.

Limitations to the review

A direct comparison between mobile and paper based methodologies would have been interesting and would have strengthened the review. Furthermore, experiences presented in the review have been gathered over a two-year period while the technology has been constantly evolving. Hence some feedback was already out-dated at the time of the review, and this feedback has not been included.

Conclusion

Mobile data collection in SENS surveys has resulted in high quality data collected, analysed and presented in a timely manner with advantageous user-friendliness in the field and cost savings for the operations in the long term. UNHCR Public Health Section will continue to expand the use of MDC in SENS where feasible, and encourages partners to work together on mobile data collection in nutrition surveys.

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What affects the cost of delivering cash transfers in humanitarian settings?

By Clare O'Brien and Fidelis Hove

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Cash transfers have been a recognised alternative to in-kind aid in humanitarian disasters for some years[1]. Under certain conditions, when local markets can accommodate increased demand and prices will remain stable, they may offer benefits to recipients and donors alike. Households often have great freedom as to what they can buy, where and when. Meanwhile, agencies may experience a lighter logistical burden as cash transfers do not require the procurement, transportation and storage of in-kind goods.

One consideration among several when determining the appropriateness of a cash transfer is its cost: the 'value for money' perspective means that what matters is not just a programme's effectiveness but whether the money might have been better spent elsewhere.

The Cash Learning Partnership, CaLP, has funded a set of case studies of emergency cash transfer programmes, to understand their cost and its determining factors. The research was carried out by Oxford Policy Management (OPM)[2]. OPM has also published a guide on the method used, so other agencies can replicate the analysis on their own programmes. This article summarises the findings and provides brief pointers on the method. References to the full papers are provided at the end.

The case studies

We analysed three cash transfer programmes in urban and rural Kenya, and four in Mogadishu, Somalia. The programmes operated between 2009 and 2013 and were run by Oxfam, Concern Worldwide and SOS Children's Villages Kenya (Table 1).

Cost-efficiency or cost-effectiveness?

We conducted cost-efficiency, rather than cost-effectiveness, analysis. Cost-efficiency analysis calculates the administrative costs of delivering a transfer. Cost-effectiveness analysis would have compared the cost with the size of the outcome, e.g. improved food consumption. The latter was not possible because our retrospective analysis had access only to post-distribution monitoring data which could track changes in beneficiary well-being but could not attribute the change to the intervention.

What costs count?

'Administrative costs' cover everything spent by implementing partners other than the transfer received by the beneficiary. They include not only direct purchases e. g. for transport, printing or buying bank cards, but also the estimated value of time spent by staff for everything from proposal-writing to monitoring and evaluation. NGOs might refer to this expenditure as direct and indirect programme costs, operating costs, management costs or support costs. They should not be confused with the narrower concept of 'overheads'. We used this broad definition because changes in the cost of any of these can lead to improvements in programme efficiency.

The findings

We see in Table 1 that the costs of administering the seven case study programmes, proportional to the amount of cash disbursed, varied hugely. The cost–transfer ratio, that measures how much it costs to deliver every $1 received by the beneficiary, is up to six times higher in some programmes than in others.

However, a very high cost–transfer ratio does not automatically signal an inefficient programme; nor is a low cost–transfer ratio always good. The context of where the programme operates, what infrastructure it has access to, who its beneficiaries are, and the size and duration of the transfer, drives a large part of the cost.

So what are these contextual factors, and can anything be done to improve cost-efficiency?

[1] See for example, Harvey and Bailey (2011).

[2] http://www.opml.co.uk/

Table 1 — Summary costs of emergency cash transfer programmes

	Country	Programme	Agency	Payment mechanism	Cost	Cost-transfer ratio
1	Kenya	Nairobi Urban Livelihoods and Social Protection	Oxfam	Mobile money (M-Pesa)	Transfer: $565,000 Admin: $361,000	0.64
2		Marsabit Emergency Programme	SOS Children's Villages Kenya	Smart card	Transfer: $1.39 million Admin: $204,000	0.15
3		Marsabit County Emergency Response	Concern Worldwide	Manual	Transfer: $204,000 Admin: $59,000	0.29
4	Somalia	Emergency Cash Transfer Programme	Oxfam	Hawala agents	Transfer: $5.57 million Admin: $1.12 million	0.2
5		E-cash Pilot	Oxfam	Mobile money	Transfer: $313,000 Admin: $140,000	0.45
6		ECHO Conditional Cash	Concern Worldwide	Mobile money	Transfer: $500,000 Admin: $92,000	0.18
7		IOM Unconditional Cash Transfers	Concern Worldwide	Mobile money	Transfer: $217,000 Admin: $23,000	0.11

Note: The 'cost–transfer ratio' is the total administrative cost divided by the total amount disbursed to beneficiaries. A cost of 0.20 means that for every $100 received by beneficiaries, it costs $20 in operations for it to reach them.

We present here some findings from Kenya and Somalia, and consider the implications.

Kenya

Kenya is vulnerable to regular climate shocks. In rural areas such disasters directly affect livelihoods, while for urban citizens food shortages typically result in price rises. Droughts and accompanying food price hikes have occurred twice recently, in 2009-10 and 2011-12.

Many agencies delivered emergency cash transfers during this time. They were able to use electronic as well as manual payment mechanisms because Kenya has a rapidly expanding banking sector, very widespread mobile network coverage and enormously popular mobile-money services (primarily Safaricom's M-Pesa).

- Oxfam's support to residents of Nairobi's informal settlements (case study 1) incurred a high ratio of administrative costs to transfer value (0.64) mainly because its objective was to give a relatively small payment of less than $20 per month to nearly 2,800 beneficiaries. This resulted in high registration costs. As the lead partner in a consortium, it also spent a lot of time securing funding and conducting advocacy campaigns on the crisis. But the programme ran for a long time, 18 months, so its average administrative costs gradually declined as the fixed costs were offset against more transfers; and the costs of regular disbursement using M-Pesa were low.

- In contrast, SOS Children's Villages Kenya (case study 2) gave much larger transfers of $87 a month to 2,000 beneficiaries in Marsabit, a remote area of northern Kenya. The relative cost of administering the programme was further reduced because the agency received substantial discounts from the payment provider, sQuid and Paystream, keen to trial their smart cards for emergency response. On the other hand, the agency had to set up an office and register beneficiaries and its expenses were increased because poor network connectivity meant that staff travelled regularly to Nairobi to upload data.

- Concern Worldwide's programme (case study 3) fell between these two in terms of its cost–transfer ratio. It had very low set-up costs because it was a continuation of a previous intervention, so it incurred no costs of establishing an office or registering beneficiaries. However, day-to-day costs of disbursement were increased because payments were distributed manually by traders, who charged quite a high commission.

Somalia

The 'south–central' region of Somalia, i.e. the area outside the largely autonomous regions of Somaliland and Puntland, is governed by no single authority and suffers repeated conflicts. In 2011, as in Kenya, it suffered a severe drought. An estimated 1.4 million people were internally displaced, often to camps around Mogadishu. Famine was declared in July 2011, triggering a massive response by non-governmental organisations (NGOs).

However, there were few options for NGOs wishing to deliver cash. The financial services sector was dominated by money transfer (hawala) agents in the absence of formal banking. There was no central bank until 2012, no registered private banks, no ATMs and no point-of-sale terminals in stores. In 2011 two mobile phone companies launched mobile-money services which quickly became popular. Oxfam used the hawala agents for its major emergency response in 2011–12. It then piloted the use of the mobile-money scheme in mid-2012. Concern Worldwide used mobile money for the two programmes we reviewed from 2012–13.

- Oxfam's Emergency Cash Transfer Programme (case study 4) was by far the largest intervention we analysed. It benefited from economies of scale as it reached some 12,500 households who received six payments totalling $5.57 million in transfers. The $1.12 million it cost to administer the programme included commission to the *hawala* agents at 2.5% of the transfer value, and several hundred thousand dollars of staff time to oversee disbursement. Nonetheless, even if a mobile-money system had been available at the time (which it was not), a similar amount might have been spent on purchasing mobile phones and SIM cards for beneficiaries and commission would have been paid to a 'cash facilitator' to transfer money to the mobile network operators. The manual payment system was therefore not necessarily inefficient for a programme of that size and duration.

- Oxfam's 'E-cash' mobile-money pilot (case study 5) tested the feasibility of using the new technology by trialling it for a one-off transfer. This means that the administrative cost looks quite high compared with the amount disbursed, because the purchase of phones and SIM cards was not offset by many transfers. But this brief use was central to the objective of testing the system.

- Once the system had been tested and found to be effective, Concern Worldwide was able to take up the technology and to distribute cash transfers using mobile money at very low cost (case studies 6–7). They benefited from economies of scale, using the mechanism for numerous transfers; in the case of the IOM-funded intervention, they retargeted existing beneficiaries so had no costs of identifying new recipients or providing them with phones.

Implications for implementing agencies

Agencies and their funders are, naturally, keen to pinpoint the high-cost items in their interventions, so that they can consider whether the intervention can be delivered in an alternative, more cost-effective way. At the outset of this research, for instance, we aimed to explore whether electronic payment mechanisms are generally more cost-efficient than manual payment mecanisms.

What we found, though, was that costs are driven not so much by individual line items, but rather by processes. We identify three key lessons:

1. **Many costs are negotiated rather than fixed**, so savings can be made if aid agencies make their programme attractive to participating companies. In Somalia, the hawala agents tried to negotiate an increase in their commission when they realised the inconvenience of having to pay 12,500 beneficiaries in addition to their regular customers; in contrast, in Kenya the smart card provider offered a discount because it wanted to participate.

2. **The state of infrastructure development has a huge impact on cost.** Aid agencies can try to drive innovation in infrastructure development but this risks being complex and expensive. Agencies will incur extra costs, for example, if they attempt to use electronic payment mechanisms in locations where the network coverage is poor, or where recipients and payment agents are unfamiliar with the technology and require training and ongoing support.

3. **More broadly, a key determinant of cost is the amount of new activity required in a programme.** This could entail training new partners, registering beneficiaries, or introducing a new payment mechanism. If cost is the driving force in the design of a programme, there is therefore a risk that innovation will be lost: it is cheaper to keep paying the same beneficiaries with the same payment mechanism than to look for new ones, but this may not result in the programme achieving its objectives.

Cost-efficiency is also affected by choices about the size of the transfer. A programme will look more cost-efficient if the payment to beneficiaries is increased, because although the commission on the payment may also rise, other expenses such as registration costs will remain the same. Again, though, this may not be in line with programme objectives: it may be necessary to pay smaller amounts to a larger population. We conclude that it is therefore more appropriate to make decisions about programme design, such as the selection of the targeting or payment mechanism, on factors other than simply the cost.

For more information:
O'Brien, C, Hove, F and Smith, G (2013). 'Factors Affecting the Cost-efficiency of Electronic Transfers in Humanitarian Programmes'. http://www.cashlearning.org/resources/library/416-factors-affecting-the-cost-efficiency-of-electronic-transfers-in-humanitarian-programmes

O'Brien, C. (2014), 'A guide to calculating the cost of delivering cash transfers in humanitarian emergencies: With reference to case studies in Kenya and Somalia'. OPM Working Paper, June. http://www.opml.co.uk/publications/opms-publications (search under publication type 'OPM Working Paper').

Effect of nutrition survey 'cleaning criteria' on estimates of malnutrition prevalence and disease burden: secondary data analysis

Summary of research[1]

Location: *Global*

What we know already: Standardised methods for collection and reporting malnutrition prevalence data in nutrition surveys are used.

What this article adds: Methods for cleaning data are not standardised, vary and are rarely described in reports. A secondary analysis of 21 DHS datasets applying different cleaning criteria found a profound effect on the reported prevalence of both moderate and severe wasting. This varied by country and was most pronounced for severe wasting. Recommendations include mandatory reporting of cleaning criteria, urgent international consensus on optimal cleaning criteria and 'real time' validation of extreme variables made possible with electronic data collection.

Nutrition surveys, from which the all-important malnutrition prevalence statistics are derived, generally follow similar and standardised methodologies for the collection and reporting of data. However, 'data cleaning criteria' are rarely described in reports, yet are almost always applied to raw data. Their purpose is to exclude very high or low values which are more likely to represent measurement or data error than a truly very large or very small child. They are particularly useful when it is not possible to return to the field to review individual children directly. While there are many reasonable and justifiable ways to decide on the inclusion/exclusion of an individual child or individual measure of growth, there is no one gold standard which is applied in all settings and all situations. Even in the same context, there is every chance that different analysts may select different criteria. The effect of these different choices on the direction and magnitude of malnutrition estimates is currently unknown. A recent paper set out to quantify how different, commonly used data cleaning criteria affect nutrition survey wasting prevalence statistics.

Method

The researchers performed secondary analysis of 21 national demographic and health survey (DHS) datasets, each with anthropometric data collected using standard DHS methods. The datasets were chosen as they represent countries from the Lancet series with a high burden of disease. The total dataset has a reference population of 36 countries, which account for the majority of the global malnutrition disease burden. The 21 were those which had available nutrition surveys done in the last ten years. Each DHS survey size is large enough for robust national prevalence estimates. In total, the 21 DHS surveys comprised n = 216,841 children (after n = 38,136 records with missing age variables had been removed). DHS survey methods are well standardised, both within-country and between countries, with thorough data checking and processing procedures ensuring errors are a rarity.

Weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) Z-scores based on WHO growth standards had previously been calculated from weight, height/length, age, and sex variables using Emergency Nutrition Assessment (ENA) software, developed for the Standardised Monitoring and Assessment of Relief and Transitions (SMART) initiative. Any records with missing WAZ, HAZ, or WHZ were removed (n = 13,545). The mean WAZ, HAZ, and WHZ for each country were then calculated for children aged 6–59 months using the appropriate DHS sample weights.

Extreme value cut-offs

Extreme anthropometric values are considered more likely to represent measurement or database errors than an individual who is truly very small or very large. The cut-offs for defining extreme values depend on the data cleaning method adopted, which may be based on the mean Z-score of either the reference population ('fixed criteria') or the observed data ('flexible criteria'). The study compared five methods that are currently in widespread use (see Table 1), three of which are 'fixed' criteria and two

Table 1	Cleaning criteria: five methods currently in use for cleaning survey data prior to calculation of malnutrition prevalence.			
Cleaning method	**Statistical probability criteria** *Exclude if:*			**Biological plausibility criteria** *Exclude if:*	**Reference mean**
WHO (2006) Growth standards *(WHO, 2006b)*	HAZ < −6 HAZ > 6	WAZ < −6 WAZ > 5	WHZ < −5 WHZ > 5	-	Growth Standards
SMART flags* *(SMART, 2013)*	HAZ < −3 HAZ > 3	WAZ < −3 WAZ > 3	WHZ < −3 WHZ > 3	-	Survey Sample
WHO 1995 Flexible criteria** *(WHO, 1995)*	HAZ < −4 HAZ > 3	WAZ < −4 WAZ > 4	WHZ < −4 WHZ > 4	-	Survey Sample
WHO 1995 Fixed criteria *(WHO, 1995)*	HAZ < −5 HAZ > 3	WAZ < −5 WAZ > 5	WHZ < −4 WHZ > 5	-	Growth Reference
Epi-Info *(WHO, 2006a)*	HAZ < −6 HAZ > 6	WAZ < −6 WAZ > 6	WHZ < −4 WHZ > 6	HAZ > 3.09 and WHZ < −3.09 HAZ < −3.09 and WHZ > 3.09	Growth Reference

HAZ, Height-for-age z-score; WAZ, Weight-for-age z-score; WHZ, Weight-for-height z-score.
* The upper and lower values are flexible, i.e., can be increased based on judgment (WHO, 2006b).
** Recommended for use when the observed mean z-score is below 1.5 (WHO, 1995).

1   Crowe S, Seal A, Grijalva-Eternod C, Kerac M. (2014). Effect of nutrition survey 'cleaning criteria' on estimates of malnutrition prevalence and disease burden: secondary data analysis. PeerJ 2:e380 Full text available at: http://dx.doi.org/10.7717/peerj.380

'flexible. Note that the Z-score is defined by the standard deviation of the reference dataset rather than that of the sample in both the flexible and fixed methods.

The study authors note that the World Health Organisation (WHO) recommends their flexible criteria are adopted when the observed mean Z-score is below −1.5, otherwise they recommend use of fixed criteria. While none of the 21 DHS surveys studied in this work had a mean WHZ less than −1.5, the study applied both fixed and flexible criteria to allow for comparison. It should also be noted that criteria were applied in a manner that replicates their implementation in commonly used nutritional survey software when calculating the prevalence of wasting. Therefore, when using WHO and SMART criteria, outliers were only excluded using WHZ thresholds. However, when using EpiInfo criteria, WHZ, WAZ, and HAZ thresholds were used to identify outliers. When using EpiInfo criteria, exclusions were also made on the basis of biological implausibility criteria, i.e. incompatible combinations of HAZ and WHZ, HAZ >3.09 and WHZ <−3.09, or HAZ <−3.09 and WHZ >3.09.

Analysis

Analysis was performed using Stata version 12 (StataCorp., TX), using the appropriate sample weights defined by DHS. Wasting and severe wasting prevalence based on current case definitions were estimated for each country, excluding records according to each cleaning criteria in turn. The standard deviation of weight-for-height measurements, after the data were cleaned, was then calculated for each country. Country-level wasting prevalence was compared to the international 'integrated food security phase classification' (IPC), which is used to determine the severity of an emergency and guide the need for interventions (see Table 3). The IPC serves here to demonstrate the extent of differences between cleaning criteria. To illustrate the implications for treatment programmes, the study estimated the caseload over a one year period for severe wasting (WHZ < −3) for each of the cleaning criteria in turn, using the formula:

Caseload for severe acute malnutrition $(SAM) = N \times P \times K \times C$ where

N is the size of the population in the programme area

P is the estimated prevalence of SAM

K is a correction factor to account for new cases over the one year period

C is the expected mean programme coverage over the one year period.

Results

In the 21 surveys, there was a total sample size of 163,228 children aged 6 to 59 months. These were representative of a total estimated population of 211 million children. Samples varied relative to country size; India's DHS survey had the largest sample (45,398 children) and Cote D'Ivoire the smallest (1,710 children).

Figure 1 shows the percentage of records excluded from prevalence estimates on the basis of five different cleaning criteria, by country (for children aged 6–59 months). SMART criteria consistently exclude the most children and WHO-2006 criteria exclude the least. However, what difference this makes, in terms of the absolute and relative proportion of exclusions, varies markedly by country. In Burkina Faso, 4.1% were excluded by WHO-2006 and 12.5% were excluded by SMART, while in Turkey 0.3% were excluded by WHO-2006 and 1.3% by SMART.

Prevalence estimates for wasting and severe wasting of children 6–59 months are shown under different cleaning criteria, by country, in Figures 2 and 3 respectively. In many countries, whilst the absolute prevalence figure varies according to cleaning criterion, the IPC category does not change. In other countries, the application of different cleaning criteria results in the crossing of a phase boundary and a different categorisation of 'severity'. The proportional differences in severe wasting are greater than for total wasting.

Estimated clinical caseloads for SAM for every country under each cleaning criteria can be seen to vary greatly. For example, were no cleaning criteria applied for India, the country would have to plan for some 10.4 million SAM cases; with WHO-2006 criteria, for 8.7 million cases; and with SMART flags, for only 6.5 million cases. Large differences in estimated caseload are observed in many counties when the least inclusive cleaning criteria are compared with the most inclusive cleaning criteria. In nine countries, SMART flags exclude all potential cases of SAM.

Figure 4 shows prevalence estimates under the (least inclusive) SMART criteria plotted against the standard deviation of the WHZ distribution before data exclusion. The observed linear relationship helps to explain the differences seen; the wider the survey distribution (due to either lower survey data quality or the heterogeneity of the population), the more likely the extremes are to be excluded, hence the greater the difference in prevalence estimate. It is also important to note here that there may be children with incorrect anthropometric measurements

Figure 1 Percentage of records excluded from prevalence estimates for children aged 6–59 months on the basis of five different cleaning criteria, by country

Figure 2 Prevalence of wasting (WHZ < −2) for children 6–59 months under different cleaning criteria, by country

The coloured boundaries relate to the international 'integrated food security phase classification' (IPC).

that are within the plausible range and so are not removed by the cleaning criteria.

Conclusions and discussion

The results show that the application of different cleaning criteria has a profound effect on the reported prevalence of both moderate and severe wasting. The magnitude of effect varies markedly between different countries, and is most pronounced for severe wasting. This in turn has a marked effect on estimated programme caseloads. Since wasting prevalence is a key statistic but choice of cleaning criteria is not currently standardised, differences in practice between individual analysts could unduly influence the results that are made available to decision-makers. This may potentially lead to inconsistent, inefficient and inappropriate implementation of malnutrition treatment programmes.

This is, to the authors' knowledge, the first paper to highlight this important issue. However, the authors acknowledge study limitations. First, the results are based on a relatively limited number of countries and it is important that the analysis is extended elsewhere, particularly to different types of datasets. DHS follow a standardised methodology and are mostly done in relatively stable environments. Surveys conducted in emergency settings, working under greater pressure and sometimes by more inexperienced teams, may have more issues with data quality, so cleaning criteria may have even more effect on final results – but this would need to be confirmed. Second, in the caseload calculations for therapeutic feeding, it has not been possible to take into account the prevalence of oedematous malnutrition, nor that defined by low mid upper arm circumference (MUAC). These independent criteria for SAM also account for programme admissions and are not influenced by choice of cleaning criteria. So where, for example, the prevalence of oedematous malnutrition is high, the weight-for-height caseload estimates only form a small part of the estimate of global acute malnutrition (GAM); even if wasting caseload doubles, it may not make a large overall contribution to caseload planning.

Another limitation is that the study has focused on the impact of anthropometric cleaning criteria on wasting, and has ignored stunting and underweight. Future work, however, should explore the effect of data cleaning on other forms of anthropometrically defined malnutrition. In some situations, the application of cleaning criteria may well impact heavily on estimates of child overweight/obesity. Effects on stunting (low height-for-age) prevalence are also important to explore.

As well as inadvertent differences due to poor awareness of the effect of cleaning criteria, there is clearly also potential for deliberate "gaming", by which inclusive or exclusive criteria are deliberately chosen to fit political agendas.

Fourth, it is important to extend the analysis to other age groups. This study has focused on children aged 6–59 months since they are the main target group for therapeutic and supplementary feeding programmes. However, malnutrition can also be prevalent in older children (and even in adults in extreme situations) and infants aged <6 months. Cleaning criteria may have different effects on prevalence estimates in these other groups.

The way forward

To address the problems raised in this study, the authors propose several solutions. The first is a call for mandatory reporting of which cleaning criteria were used so that results may be interpreted accordingly. Any inter-survey or time trend differences can thus be accounted for as potentially due to/not due to (if the same criteria are used consistently) data cleaning practices. Building on this work, it may be possible to establish equations by which prevalence calculated using one cleaning method could be "transformed" to an estimate using another method. This would, however, be at best an approximation and would only be needed if raw datasets were unavailable for full re-analysis (the current momentum to open-source datasets as well as results would be helpful here). A third call is for urgent international consensus and guidance on selecting and adopting a single set of optimal cleaning criteria. This would improve the comparability of nutrition survey data (including trend data in the same setting) and the coherence of associated policy recommendations.

Finally, and for the longer term, the authors note the current trend to electronic data collection. This may be particularly useful for nutrition surveys as extreme data values could potentially be validated in the field, reducing or eliminating the need for data exclusion during analysis. The study concludes by repeating a call for greater awareness of cleaning criteria as an explanation of inter-survey differences in malnutrition prevalence.

Figure 3 Prevalence of severe wasting (WHZ<−3) for children 6–59 months under different cleaning criteria, by country

Figure 4 Scatterplot of the difference between prevalence with no cleaning and SMART cleaning, versus the standard deviation of the WHZ distribution for non-cleaned data

Each point is a country (not labelled): black points denote wasting (WHZ < −2) whilst blue points denote severe wasting (WHZ < −3).

Vitamin A policies need rethinking

Summary of research[1]

A mother in Bolivia feeds her child porridge fortified with micronutrient powders

Micronutrient Initiative

Location: *Global*

What we know already: Vitamin A deficiency (VAD) remains prevalent worldwide. Periodic (6 monthly) high dose distribution of VA has been the primary intervention since the 1990s.

What this article adds: A narrow focus on one intervention has hampered progress on VAD. The impact of high dose VA distribution on mortality has only recently been directly measured (DEVTA trial, India) and shows no mortality impact – disease patterns (diarrhoea and measles) have changed, high dose VA has minimal impact on sub-clinical VAD which carries risk beyond mortality and infectious disease. Increasing frequent low-dose vitamin A consumption among deficient populations should be prioritised with concurrent reduction in a high dose approach. Policy change is underway in India.

Vitamin A (VAD) deficiency, defined by the World Health Organisation (WHO) as low serum retinol (<20 mcg/dl), affects around 30% of children throughout low- and middle-income regions, and this prevalence is decreasing only slowly. This poor progress is despite periodic high-dose supplementation that is reported to cover more than 80% of the total child population in low-income countries. The rate of improvement has been about 0.3 percentage points (ppts)/year, e.g. a prevalence change from 30% to 25%. At this rate, it will take another 100 years to eliminate the problem. In contrast, the rate of change in iodine deficiency prevalence is three times higher and, if this rate continues, iodine deficiency will be eliminated in the next decade.

A recently published paper argues that this failure to make more progress on VAD is not due to lack of evidence-based effective interventions, but might be ascribed to a failure to adequately apply scientific knowledge to policy making. One intervention, 6-monthly distribution of high-dose vitamin A capsules aimed at reducing child mortality, has largely displaced alternatives since the 1990s. It is argued that this narrow focus on one intervention and one objective misses the opportunity to reduce widespread mild-moderate ('sub-clinical') VAD in children and women, which periodic high-dose Vitamin A does not ameliorate, but which contributes significantly to risk of disease, in children and in women.

Vitamin A interventions first addressed corneal damage and blindness, starting in the 1970s. Trials and programme evaluations showed that high doses of vitamin A (200 000 IU) at intervals of 6 months to children (usually aged 1–5 years) substantially reduced or eliminated clinical eye signs, after one or more years of intervention Then an unexpected and large effect of 6- monthly high-dose Vitamin A on mortality in children was found in Indonesia, further tested in five prospective trials of 4–6-monthly high-dose vitamin A supplementation. Meta-analyses of these results (plus two with daily or weekly vitamin A supplements of lower dose) at the time (1993) estimated the average reduction of mortality ascribed to vitamin A in children in this age range at 23%. This was apparently due to reduction in measles and diarrhoeal mortality, with no effect on mortality linked to respiratory tract infections (RTIs) or malaria. This finding focused attention on the potential for a major impact on child mortality by 6-monthly high dose vitamin A supplementation for 1–5-year-old children. Since the 1990s, nearly 8 billion vitamin A capsules (VACs) have been distributed to children in over 100 low and middle income countries (LMICs).

However, the impact of this extensive programme, launched in the 1990s, was never directly assessed until recently. Many claims were made of numbers of lives saved, but these were all calculated from the coverage and the expected (i.e. 23%) reduction derived from the early efficacy studies (meta-analysis of eight clinical trials (1986-93)). Thus no direct impact evaluations were done until the 'DEVTA' trial in India (1999–2004). These results were first reported at a meeting in 2007, and finally published in 2013. This massive study with about 2 million children showed no mortality impact [P=0.22, mortality ratio 0.96, relative risk 95% confidence intervals (CIs) 0.89–1.03]. Recently (2010), the meta-analysis was repeated, adding nine newer studies carried out from 1994–2002 (dropping one which involved fortification), for a total of 16 studies. The analysis did not take into account the possible changes in epidemiological patterns in the time between the studies; since the weight ascribed to the newer studies was only 11%, it is not surprising that the conclusion was not altered. What is surprising is that it was not stressed that from 1994 on, only one study showed a mortality effect compared with the no-intervention comparison group [P<0.01, relative risk (RR)¼0.57, 95% CI¼0.42–0.77]; no effect was shown when compared with nutrition education. The others showed no effect (95% CIs all spanned 1.0). In this light, the DEVTA result is less surprising.

One explanation for this apparent change in impact of VAC through time is the shift in disease patterns since the 1980s. Results support the hypothesis that changing disease patterns (diarrhoea and measles) may have altered the effectiveness of VACs. It seems very likely that the overall effect of VACs on young child mortality has decreased over time, and by the 2000s became negligible. Since the 1980s, measles immunisation has all but eliminated measles as a public health problem, including in Africa. Mortality from diarrhoeal disease has decreased with control measures including improved oral rehydration, the use of zinc and expanded rotavirus immunisation in some parts of the world. Thus it is plausible that because the causes of VAC-sensitive child mortality, measles and diarrhoea have been greatly reduced, the recent studies are reflecting the situation on the ground. Finally, the postulated effect (if any) in the DEVTA trial highlights the issue of the age range

investigated, which was 1–5 years in most studies and 1–6 years in DEVTA. From the deaths reported in the DEVTA study, only 20.8% of the total under-5 deaths were in the target group, aged 1–6 years. In less developed regions overall, it is estimated that 32% of the under-5 mortality rate (U5MR) was in 1–4 year old children in 1990–95, and 29% in 2010–15. Thus this huge effort in VAC coverage is directed (e.g. in India by DEVTA) to only one-fifth of the U5MR; a reduction of possibly 10%, as suggested in the DEVTA paper, amounts to only 2% of the U5MR, and probably less. The broader estimates (29–32%) imply, at 10% reduction of 1–5 MR, that about 3% of the total U5MR would be prevented.

WHO formally re-defined VAD as low serum retinol (SR) in 2002, emphasising that the problem was much wider than clinical VAD (which now has a prevalence of less than 1% in children) and likely to extend well beyond VAC-sensitive child mortality. Vitamin A status thus came to be defined by SR levels, with a cut-point of 20mcg/dl referred to as 'low', indicating mild-moderate deficiency, and below 10 mcg/dl referred to as 'severe' deficiency. High-dose VACs every 6 months have a transient and minor impact on prevalence of low serum retinol, and thus on 'sub-clinical' or mild-moderate VAD. Early studies, for example in India (1971) and the Philippines (1979) and a number since, showed this lack of an effect on SR after about two months after administration.

Re-examination of the original results on vitamin A and mortality from Aceh, Indonesia, suggests that the mortality impact itself is largely restricted to the first two months after dose. If so, two 6-monthly doses per year is far from the 'full protection'. There is extensive evidence that SR can readily be raised by frequent low doses of vitamin A. In addition, a recent review of the literature on the impact of food-based approaches (outside the context of fortification) was conducted involving 27 papers published since 1992 documenting results from trials of the impact of 38 foods. It found that 25 had a net positive impact on SR and 18 on serum beta-carotene. In fact, the only common vitamin A intervention that does not have this positive effect on SR is periodic high dose VACs. This was indicated from studies in the Philippines, where prevalence of low SR continued to stagnate or increase, even when VAC distribution reached high coverage; here a national programme of distribution of VACs to children every 6 months, started in 1992 and reaching an estimated 90% from the three national surveys of 1993, 1998 and 2003, showed prevalence of low SR (<20 mcg/dl) in children increasing over this period, from 36% to 38% and then 41%. Closer examination of the data indicated that a transient and small increase in SR (e.g. reducing prevalence by about 10 ppts—from 42% to 32% for the overall sample) could be detected at 1–2 months after the dose, then returning to pre-dose levels, which explained the findings. Studies of vitamin A metabolism give supporting evidence on limited retention of vitamin A from high-dose VACs.

Policy statements in the early1990s stressed the need for a balanced approach of complementary interventions all involving physiological levels of vitamin A provided frequently (usually daily), except for high doses provided 6-monthly by VACs. VACs were seen as a short-term measure, sometimes described as 'stopgap' until more sustainable approaches could be implemented. This policy recommendation had little impact; almost all resources and attention began to be directed to VACs and have remained there. Fears expressed at that time of the risks ('Disadvantages [of supplementation] include... risks of inhibiting the development of alternative programmes') proved to be prophetic. For example, UNICEF reports that around 70% of LMICs – about 150 countries – distribute at

Taking blood samples to assess micronutrient status during a rice fortification trial in Cambodia

Kuong Khov

least one VAC per year, whereas the Global Alliance for Improved Nutrition (GAIN), the agency taking a lead in fostering fortification, reports that 19 countries have fortification programmes. If policy is now to be changed—or rather, earlier recommendations finally adopted—to replacing VACs with frequent low-dose VA (through supplementation, fortification or dietary change) three questions need to be considered:

- Would there be the benefits of reducing mild-moderate VAD?
- Is this feasible, affordable and good value in promoting health and child development?
- How can VACs be phased out without in curring risks of increasing mortality?

The term 'vitamin A deficiency disorders' (VADDs) has been used to emphasize that VAD has important risks beyond mortality, and these go further than infectious diseases to include anaemia, intra-uterine development and birth outcomes, and cognitive development. Thus reducing the prevalence of 'sub-clinical VAD', or VADDs, would be expected to have extensive benefit for the health and well-being of at least one-third of the population in LMICs, especially women and children. A further strong argument for the importance of vitamin A in health comes

from the recently enlarged understanding of VA's extensive role in maintaining barriers to infection (integrity of epithelia) and of the impact of VAD on immune competence in humans, notably in poorer environments. Benefits of vitamin A adequacy to women's health in general and to that of their unborn children, are almost certain. It is never recommended to give high-dose vitamin A to pregnant women, and thus not to reproductive age women unless pregnancy status is certain—in principle, only during the early weeks after giving birth. Only weekly or daily low doses are recommended otherwise. This is a further strong argument in favour of frequent low-dose Vitamin A intake, so that reproductive-aged women can be included.

The UN in 1993 recommended that 'a combination of interventions is usually needed to prevent VAD; these include dietary modification, breastfeeding promotion, food fortification, and supplementation'. The mixed approach now needs to be implemented, and monitoring needs to include assessment of SR, which is quite feasible using established methods. One direct means of increasing provision of daily or weekly intakes of vitamin A, through fortification, is now well known. A recent comprehensive review assessed fortification as highly cost-effective in terms of expected health benefits. High-pro-vitamin A carotenoid foods and high-retinol foods are also effective; deworming (treating intestinal worms with periodic medication), and increasing intakes of fats and oils which may increase absorption of carotenoids can also make an important contribution. Why has this policy shift towards a mixed approach not happened? The answer lies in the politics of governments and agencies, and associated reluctance from the scientific community to change earlier recommendations. The funding institutions are not yet aware that substantial change is needed, yet the set of hypotheses supporting the status quo do not stand up to the evidence, and sooner or later a shift must happen.

Many in India, for a long time, have questioned the exclusive VAC approach, and proposals for policy change have been made. GAIN is gathering momentum to promote fortification in a number of countries. This will no doubt go some way to solving the problem. However, this fortification initiative at scale is not coordinated with the VAC programmes, and there is competition for resources. Also worrying is the fact that several countries have rejected the idea of mandatory vitamin A fortification on the grounds that their young children already receive two mega doses annually, and this might cause problems of toxicity.

The authors conclude that the priority for increasing frequent low-dose vitamin A consumption among deficient populations should be heightened, with a parallel or subsequent de-emphasizing of 6-monthly high dose VAC distribution. The DEVTA results have already influenced policy in India. It is time for the rest of the world to follow suit. Many millions of poor and malnourished children would benefit.

Capacity support to states in fragile and conflict affected situations: an analytical framework

Summary of research[1]

Location: *Global*

What we know already: Strengthening state capacity to deliver services is a common aid initiative in fragile and conflict affected contexts. However, capacity is a vaguely defined concept which makes it difficult to measure.

What this article adds: An analytical framework is proposed that can be used to research efforts to strengthen state capacity. The concept of capacity is broken down into five capabilities. A series of dimensions – state level (individual, organisation, system), socio-political and historical context, and gender issues – should also be considered. Experiences in applying the framework are sought.

State capacity is one of the big questions facing those working within international development, and there remains plenty of uncertainty regarding effective ways of developing the capacity of weak states in a deep and sustained manner. A recent paper sets out an analytical framework that can be used to research international efforts to strengthen the capacity of states to deliver services in fragile and conflict-affected contexts. The overarching research question is how do international actors interact with the state and local-level governance institutions and how successful are international attempts to develop state capacity to deliver social protection, basic services and support to livelihoods? The primary purpose of the framework and the paper is to provide analytical support to researchers to help inform the design of primary research studies, guide analysis of appropriate data, and promote analytical coherence across the different country programmes.

Despite the remarkable proliferation of capacity building aid initiatives in recent years – particularly in places affected by fragility and conflict, where state weakness is especially pronounced and problematic – there is still much we do not know. Capacity continues to be a fuzzy, slippery and often vaguely defined concept, which makes studying it less than straightforward. The analytical framework set out in the paper can be used to identify existing gaps in state capacity to deliver services and to examine how international actors' capacity support programmes work in practice, and assess the extent to which they are fit for purpose in a given context. While the framework has been developed with a thematic emphasis on state capacity to carry out service delivery functions, it can also be used to study a wider set of state functions.

As an object of study, 'capacity' is too big and too intangible a concept. This makes it difficult for researchers to engage productively and critically with questions around capacity devel-

opment. Drawing on key insights from the existing literature, the authors argue that what is needed is a disaggregation of the concept into a set of constituent parts. As such, the framework adopts as its analytical core the '5 capabilities' (or '5Cs') model, which emerged out of the multi-year Capacity, Performance and Change programme run by the European Centre for Development Policy Management (ECDPM). The 5Cs model breaks the larger concept of capacity down into a series of more specific capabilities (or components of capacity) namely the capability to self-organise and act, the capability to generate development results, the capability to establish supportive relationships, the capability to adapt and self-renew, and the capability to achieve coherence. These encompass the 'soft' or intangible dimensions of capacity so often overlooked in capacity building programming, such as the ability to relate and negotiate with a broad range of state and non-state stakeholders and represent a set of entry points for the study of capacity. By focusing on the five capabilities, it is possible for researchers to identify which components of capacity already exist and which need to be developed and strengthened in order for improvements in service provision to follow.

An additional consideration is what makes up a particular capability? In order for deep and sustained capabilities to exist, an appropriate mix of factors or conditions must be in place - sufficient resources, relevant skills and knowledge, conducive organisational structures, an enabling political environment, and the 'right' kind of incentives. While aid programmes often attempt to build capabilities and capacities through the transfer of resources and knowledge (for example, by providing materials and paying for training), these are not in themselves sufficient. In fact, it is often the messier and more politically difficult work of restructuring relationships and incentives that will lead to deeper, more sustained improvements.

Underpinning all of this is a series of dimensions that must be taken into consideration when researching existing gaps in state capacity or the effectiveness of international attempts to build it. First, capabilities and capacities exist at three different levels of the state: the individual level (states are made up of people), the organisation level (states are made up of departments and ministries, which are in turn made up of people), and the system level (states are made up of systems, which are in turn made up of departments and ministries, which are in turn made of people). Researchers should be explicit about the level at which they are studying capacity, and not assume that improvements at one level equal improvements at the next. Second, capabilities and capacities – as well as the outcomes of capacity building programmes – are strongly mediated by features of the socio-political and historical context. In particular, the way in which states are 'put together' and function can have profound implications for where investments in capacity are made and whether they are sustained over time. Researchers should therefore pay close attention to the broader landscape in which state capacity exists. Third, capabilities and capacities are gendered. As noted, systems and organisations are made up of people and operate according to particular sets of embedded social norms and informal institutions, some of which may limit the genuine participation of certain groups of individuals. Researchers should observe the ways in which capacity building programmes treat gender initiatives - for example, attempt to reform organisational cultures that privilege certain voices over others – and ask whether capabilities and capacities to deliver equitable and gender-sensitive basic services exist or are being developed. Thus, a gender lens involves looking at both the process of capacity development (are women's capacities being built and is programming being carried out in a gender-sensitive way?) as well as the service delivery outcomes of capacity development programmes (has state capacity to deliver equitable basic services increased?).

The authors conclude by encouraging researchers to apply the framework critically and hope that researchers will not only use the framework in their studies but also challenge it based on their empirical experiences. Being open about its strengths and shortcomings will enable researchers in the future to revisit the design of the framework and to re-examine how fit for purpose it is.

Bioavailability of iron, zinc and provitamin A carotenoids in biofortified staple crops

Biofortified beans in Guatemala

Dustin Burnett, USDA WHNRC
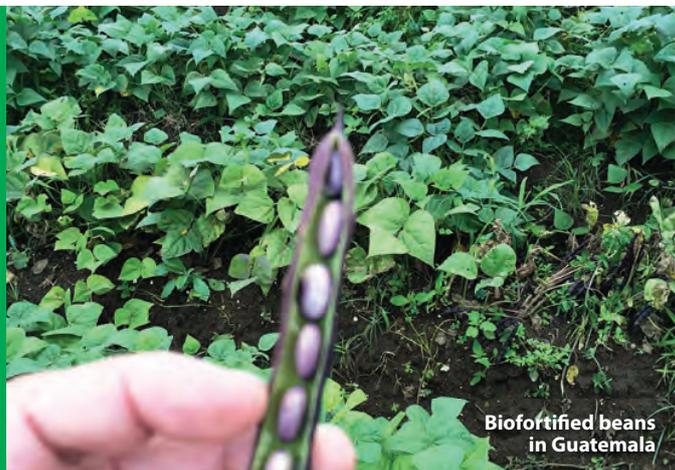
Summary of study[1]

Location: *Global*

What we know already: Biofortification of staple foods is one potential way of increasing micronutrient intake in resource limited populations.

What this article adds: A recent review found that the bioconversion of vitamin A (beta-carotene to retinol) in provitamin A biofortified crops (2.8:1 to 6.5:1) was more efficient than for non-biofortified foods (12:1). Vitamin A bioavailability is affected by dietary habits and food processing while iron and zinc utilisation is affected by phytate which is hard to limit. Evidence supports the focus on efforts to breed plants with increased micronutrient concentrations in order to decrease the influence of inhibitors and to offset losses from processing.

Biofortification seems to improve the nutrient density of stable food crops through conventional plant breeding, agronomic management or genetic engineering. Currently, the most common micronutrients targeted are iron, zinc, and provitamin A carotenoids, due to the high prevalence of deficiencies of these micronutrients among children under the age of 5 years and women of child bearing age in developing areas of Africa, Asia and Latin America. Since a key issue in these areas is low concentration of these mi-

Biofortified cassava root

Dustin Burnett, USDA WHNRC

cronutrients in the most commonly consumed foods, biofortification of staple food crops has been suggested as a way to help alleviate these deficiencies. Biofortification is particularly relevant in the current economy, when price increases for non-staple foods further curtail dietary diversity and food and nutrition security among the poor. In principle, this strategy allows the population to grow and consume the same foods they are accustomed to eating while improving their micronutrient intake. Although concentrations of micronutrients in many of these biofortified crops will remain relatively low, staple foods are eaten in such large quantities in many at-risk populations that, over time, the micronutrients consumed in this manner can enhance micronutrient status and prevent deficiency.

A review of recent studies of biofortified crops aims to assess the micronutrient bioavailability of biofortified staple crops in order to derive lessons that may help direct plant breeding to infer the potential efficacy of food-based nutrition interventions. Key findings of the review were as follows:

Human studies provide the most reliable indication of the bioavailability of micronutrients in biofortified crops, whereas animal and in vitro studies are useful for within-study comparisons of absorption factors and screening of the varieties developed through breeding. The results of the human bioavailability[2] studies for iron (fractional absorption 2.6-9%) and zinc

(17-20%) in biofortified crops were consistent with the results of studies in non-biofortified plants. In contrast, the bioconversion of beta-carotene to retinol in the provitamin A biofortified crops, which varied from 2.8:1 to 6.5:1, was more efficient than the average bioconversion of 12:1 estimated for non-biofortified foods.

Concerns about the bioavailability of micronutrients from crops are much different for minerals than for carotenoids. The bioavailability of provitamin A carotenoids is most affected by dietary habits and food processing. The addition of fat to a meal improves absorption, while extreme food processing, such as treatment with high heat, can result in substantial carotenoid loss. The bioavailability of iron and zinc, on the other hand, is influenced primarily by the presence of anti-nutrients such as phytate. Although phytate levels can be reduced through plant breeding, decreasing them too much may diminish or eliminate the benefits that phytates provide to plants and, potentially, to humans. Therefore, to minimise the negative effects of food processing and the factors that adversely influence bioavailability, biofortification to increase micronutrient concentrations in staple crops remains the primary goal.

1. La Frano. M et al (2014). Bioavailability of iron, zinc and provitamin A carotenoids in biofortified staple crops. Nutrition Reviews, vol 72 (5): pp 289-307.
2. Bioavailability is the fraction of an ingested nutrient that is available for utilisation in normal physiological functions and/or for storage.

Protecting policy space for public health nutrition
Summary of research[1]

Location: *Global*

What we know already: There is growing consensus that strong government regulation of food, beverage and tobacco sectors is needed to protect public health nutrition.

What this article adds: National policy space for public health nutrition is not well protected. Processed 'fast' food dominates foreign direct investment (FDI) interest in the food sector, yet their reduced use is needed to prevent diet-related non-communicable diseases. FDI has economic advantages but gives a company greater power over food supply and vested interest in limiting regulation. Legal protection for investors is common and can limit regulatory power. Additional research on balancing state interests and legal approaches is needed.

A recently published paper addresses important questions about domestic regulatory autonomy and explores the implications of investment law for public health nutrition policies designed to prevent diet-related non-communicable diseases (NCDs) and curb their enormous social and economic costs. It highlights the neglected role of public health policy-makers in national decisions pertaining to investment and investor protection and examines ways to protect policy space for public health nutrition.

A growing global consensus is forming around the need for governments to implement public health nutrition regulation in the form of food taxes and subsidies, informative regulation in the form of food taxes and subsidies, informative product labelling, marketing restrictions and urban planning initiatives targeting processed and pre-prepared (e.g. 'fast') foods high in salt, sugar, saturated fats and trans fats. These interventions apply to the end products of complex food supply chains, any stage of which is usually open to investment by international companies. Foreign direct investment (FDI) in the food, beverage and tobacco sectors of developed and developing countries increased 11-fold and four-fold respectively between 1990 and 2009 and is projected to continue to rise.

FDI in the food sector has occurred primarily in the processed food and beverage industries and in retail outlets, such as supermarkets and convenience food stores, selling products associated with the nutrition transition, i.e. products low in cereal and fibre and high in sugars, salt, saturated and trans fats. Seven of the top 100 transnational corporations – with combined foreign sales in excess of 400 billion USD in 2010 – are involved in the production and retail sale of processed foods. Of the world's top 15 franchises, seven have strong interests in highly processed and 'fast' foods. Thus the key targets of public health nutrition interventions are the objects of extensive and growing investment activity.

Concerns have also been raised that the substantial recent growth in FDI in agriculture, with direct foreign ownership of agricultural land being a common feature, could limit government influence over the modes of production of healthy foods. In 2011, the High Level Panel of Experts on Food Security and Nutrition reported that international investors had leased or purchased an estimated 50 to 80 million hectares of land in middle and low income countries, about two thirds of them in sub-Saharan Africa. In some cases, a single company invests at multiple points in the food supply chain. In Brazil, for example, Coca Cola has invested in the refinement of cane sugar, the production of beverage concentrates, the bottling of sugar-sweetened beverages and refrigeration. This type of vertical investment in the food supply creates efficiencies from an economic point of view but it also gives a company greater power within a country's food supply. It thus increases both the cumulative effect of policy interventions on a given investor's interests and the investor's motivation and capacity to contest regulation.

Governments actively encourage and compete for FDI as these can create employment, facilitate technology transfer, promote competition in the domestic input market, as well as contribute to the host country's corporate tax revenues. Governments offer a range of incentives to attract FDIs, including tax holidays, land grants and other forms of subsidies, and legal protections beyond those offered to domestic investors. Governments encourage investment in the food sector not just in competing for FDI but also to improve food security, since FDI is perceived as conducive to improved food production and processing technologies and more efficient and reliable food supply chains. Governments promote investment in agricultural production through various types of subsidies which can lower the cost of producing the products that are of greatest concern in a public health nutrition context. The subsidisation of corn production in the US provides a classic example. Production subsidies were originally justified partly on food security grounds but today, a substantial proportion of this subsidised corn production goes into making high fructose corn syrup and other caloric sweeteners.

Public health nutrition measures may aim to reduce product sales and limit retail expansion so that there is an implicit tension between government action to promote food security and economic growth by encouraging investment, and government action to reduce the consumption of highly processed foods to prevent diet-related NCDs. These tensions will be compounded by growing FDI in the processed and 'fast' food industry.

Various legal instruments provide protection for foreign investors. Importantly, how a government incentivises investment can have legal implications for subsequent regulation. In other words, a government runs the risk of tying its own hands with respect to public health nutrition regulation in the process of seeking to attract investment. This risk is more evident in the context of contracts and International Investment Agreements (IIAs).

Contracts between a government and a foreign investor are often seen in cases in which an investor purchases state-owned assets or in which a government has offered inducements to investment. Contracts are also commonly used to limit the regulatory changes that can affect an investment through what is known as a stabilisation clause. Like contracts, IIAs grant foreign investors, including large multinationals, legal rights above and beyond those of domestic investors. IIAs are usually bilateral agreements that protect the assets of nationals of one contracting party while such assets are invested in the territory of the other contracting party.

Typically, IIAs protect investors from expropriation (direct taking of title or seizure of land/goods property). These agreements oblige the contracting parties to pay compensation for expropriation of an investment) or for other measures having an equivalent effect (e.g. destroying economic value of an investment or keeping the owner from being able to manage, use or control the property in a meaningful way). Usually, IIAs also provide a guarantee of fair and equitable treatment and of protection against discrimination based on the origin of

1   Thow. A and McGrady. B (2014). Protecting policy space for public health nutrition in an era of international investment agreements. Bulletin World Health Organisation 2014/ 92:139-145 | doi: http://dx.doi.org/10.2471/BLT.13.120543

the investor or investment. Relatively few claims in connection with the food-chain have been filed under IIAs. Examples include 'mad cows disease', prohibitions against the use of certain pesticides to protect human health, the redistribution of private farm lands, modifications to agricultural subsidy regimes and a discriminatory tax on high fructose corn syrup. These examples are not intended to suggest that public health nutrition measures ordinarily violate IIAs. They show instead, that although IIAs are usually interpreted in a manner that favours state autonomy, in implementing measures to protect healthy practices, some actions to induce investment can tie the hands of regulators by exposing a country to the risk of legal liability.

It is important for policy-makers, particularly in countries in the early stages of the nutrition transition, to ensure that FDI is managed in a way that minimises the health risks potentially arising from lowered production costs. Risk management should take place within the framework of existing IIAs and governments must avoid entering into future investment agreements that overly constrain their regulatory autonomy with respect to public health nutrition. It is important that policy-makers protect their policy space in future IIAs. In contemporary treaty practice, states have adopted several approaches to address the scope of their powers to regulate in the public interest. These approaches include: general exceptions; language clarifying the mean-

ing of indirect expropriation and of fair and equitable treatment; clauses carving out specific areas of investment; and clauses permitting contracting parties to refuse to establish investments on specified grounds.

The authors conclude that there is need for additional research on the intersection of investment and public health nutrition policy, especially descriptive studies on how states are balancing the interests discussed in the paper and how different policies affect investment and public health nutrition regulation. There is also a need for legal studies on the implications of different legal instruments and the most appropriate legal approaches to implementing different policy options.

Multiple crises overwhelm emergency food relief agencies

Summary of published article[1]

Location: *Global*

What we know already: The world is facing its largest refugee crisis since World War 2. Inadequate funding is significantly compromising food aid delivery. The US is the world's largest food donor.

What this article adds: Current US food aid systems are inefficient, politically influenced and subjected to budget cuts. An opportunity to reform the US food aid system has been missed. The European Union's (EU) aid programme is also heavily influenced by domestic politics and strategic and historical interests.

An article written in August 2014 in the Lancet makes the case that a set of circumstances including conflict, climate change, poverty and under-development has overwhelmed the emergency food relief agencies and that this is being made worse by antiquated, inefficient and politically influenced food aid systems. The author makes the case that the world is currently facing its biggest refugee crisis since World War 2 with over 51.2 million forcibly displaced people – an increase of 6 million since 2012. Furthermore, funding shortfalls have meant that a third of refugees in Africa have had their food rations cut by more than half. Impending food crises in southern Sudan, Somalia and Central African Republic (CAR) have added to this mix of need but donor pledging for these crises have all fallen short, e.g. the UN aid request for Somalia has only been 25% funded. The High Commissioner for Refugees has stated that "The number of crises around the world is far outpacing the level of funding for humanitarian operations and vulnerable refugees in critical operations are falling through the cracks". Among the hardest hit are the 300,000 refugees from South Sudan and CAR who have had their daily ration

of 2,100 kilocalories reduced by 60% to just 850 kilocalories per day. According to a WFP and UNHCR report, conditions in the refugee camps were poor even before the current funding problems, citing nutritional surveys between 2011 and 2013 showing critical levels of acute malnutrition, stunting and anaemia. More than 85% of the camps surveyed had stunting levels of 20%.

Another issue is that the USA, by far the world's largest food donor at about 2.3 billion dollars annually, is being hamstrung by an antiquated food aid system that is widely agreed to be both costly and inefficient. Efforts to reform the Cold War era system- which requires that the bulk of food is purchased domestically and shipped on US flagged vessels – have been hampered by entrenched business interests and budget cuts. The Deputy Director of USAID is on record as saying that their food aid programme is "under stress". Things could get tougher if a provision slipped into the Coast Guard and Maritime Transportation Act passed by the US House of Representatives goes through. This would raise the requirement that the US food aid be shipped on US-flagged vessels from 50%

to 75% and is being fought by the Obama administration. The current proposal raises shipping costs by 46% according to a Cornell University study, and food can take 4-6 months to arrive. The shipping industry has mounted a lobbying campaign in favour of the higher requirement for US-flagged shipping, arguing that it helps both US national security and jobs.

Meanwhile the food aid system has again missed a chance for reform, as the once-every 5 years Farm Bill that controls it has kept it unchanged. A proposal for change in future years has come in the form of a bill introduced in the Senate in June 2014 that seeks to reform the current system that has been in place since 1954. The Bill would move food aid authority from the agriculture budget (the Farm Bill) to the foreign assistance budget and end the requirements for monetisation (the sale of commodities overseas to fund development activities) and US-food purchase and shipping. This Bill would result in an additional 79 million people receiving food if enacted.

The authors of this article assert that the European Union's (EU) aid programme is also heavily influenced by domestic politics and strategic and historical interests. A report commissioned by the evaluation section of the EU's humanitarian aid arm found that funding decisions were still ultimately determined by national strategic interests. For example, different criteria may apply to aid for recipient countries where there are strong historical ties with the donors. Furthermore, "transparent resource allocations based solely on need is rarely achieved".

[1] Lowenberg. S (2014). Multiple crises overwhelm emergency food relief agencies. Vol 384, August 9th, 2014. www.thelancet.com

Importance of government policies and other influences in transforming global diets

Summary of published article[1]

Location: Global

What we know already: There have been significant global dietary and nutritional changes over the past 20 years or so due to a multitude of factors.

What this article adds: Stable food prices and rising incomes have stimulated overall increases in calorie intake and transition away from staple foods to animal and processed foods. Income growth and modernisation of food systems have been the dominant forces of change, linked to urbanisation and participation of women in the workforce. Income growth has had both positive (hunger reduction, improved dietary quality) and negative (overnutrition) impacts. It appears that food aid/assistance programmes have assured calorie requirements in emergencies but not dietary quality.

The aim of a recently published article is to describe and discuss the dietary and nutritional changes that have occurred since the 1992 International Conference on Nutrition by attempting to untangle the multitude of factors that have contributed to such changes, in particular the role and importance of public policies that influence food prices and/or food availability, especially agricultural policies (e.g. reform of the Common Agricultural Policy), trade and investment policies (e.g. the Uruguay Round Agriculture Agreement), and consumer-oriented policies (e.g. domestic and international food-assistance programmes). A wide range of literature, from detailed global trade models to country-specific descriptions of change, was utilised with analysis conducted through an economic lens, although the approach used for identification and assessment was much broader than the traditional neoclassical economics approach[2].

The framework for influencing factors of dietary change is divided into two broad sets.

One set, categorised as 'trending factors', captures the important developments over the last 20 years in technology, globalisation, population, urbanisation and other socio-demographic factors such as the increased participation of women in the workforce. Another set includes the range of government policies that impinge on diets. These are divided into trade policy, domestic policy relating to agriculture and food, and consumer policy. Both sets of factors influence food consumption and dietary quality via two pathways. One pathway operates through 'income effects' wherein socio-demographic trends or government policies induce changes in income and its distribution, thereby influencing people to change their consumption patterns. The second pathway operates through food prices, food availability, and consumer preferences, all of which can be altered by trends and policies.

The review finds that over most of the past 20 years, stable or falling food prices combined with rising incomes have stimulated increases in calorie intake (see Table 1) and promoted the dietary transition away from starch staples and toward consumption of livestock products and processed foods, although, in the developed world and among the middle classes in developing countries, these same factors have hastened the obesity epidemic. The main forces behind these changes have been technological changes in agriculture, food processing, food distribution and international trade, along with economic growth (aided by international trade and liberalisation of investment).

In the many regions in which dietary change has been observed, the balance of evidence indicates that income growth and modernisation of food systems have been the dominant forces of change, and these changes are closely linked (through cause and effect) to urbanisation and the increased participation of women in the workforce. The liberalisation of international investment, when linked to trade reform, has been an important precondition for globalisation, which in turn, has been an important force driving changes in food systems. The impact of these changes on preferences and lifestyles is critical, as is their impact on the availability of a range of foods that satisfy new demands.

Income growth, in tandem with globalisation patterns, has exerted an important influence on dietary change since 1992. This includes positive effects in the form of hunger reduction and improvement in dietary quality, as well as negative effects associated with overnutrition. Although direct evidence remains scarce, the available information suggests that countries experiencing increases in income inequality are most vulnerable to overnutrition problems.

The price effects of trade and agricultural policy reforms have not had a major impact on diets. Consumer policy vehicles, like food aid and food assistance programmes, do not seem to have major effects on dietary quality, but they have been effective in their basic goal of assuring minimum calorie requirements are met, particularly in times of widespread emergencies.

Figure 1	Regional per capita calorie availability, 1992 and 2007	
Geographic region	**1992**	**2007**
Least-developed countries	1,957	2,162
World	2,634	2,798
Africa	2,300	2,462
North, Central and South America	3,005	3,216
Asia	2,477	2,668
Europe	3,253	3,406
Oceania	3,079	3,182

Data from FAOSTAT

1   Traill. W et al (2014). Importance of government policies and other influences in transforming global diets. Nutrition Reviews Vol 72 (9): pp 591-604. Doi:10.1111/nure.12134

2   An approach to economics that relates supply and demand to an individual's rationality and his or her ability to maximise utility or profit.

Nutrition and brain development in early life
Summary of review[1]

Location: *Global*

What we know already: It is likely that nutrition deficiency during pregnancy and early childhood affects individual cognition, behaviour, long term productivity and also negatively impacts economic development.

What this article adds: Severe acute malnutrition, chronic undernutrition (intrauterine growth retardation and stunting), iron deficiency anaemia and iodine deficiency are key risk factors for poor motor, cognitive, and socio-emotional development and should be a global priority. Effective strategies to address these forms of undernutrition exist; the evidence for impact of other forms of undernutrition on brain development is lacking. Robust research to evaluate interventions in low and middle income countries is needed.

Adequate nutrition is necessary for normal brain development. Nutrition is especially important during pregnancy and infancy, which are crucial periods for the formation of the brain, laying the foundation for the development of cognitive, motor, and socio-emotional skills throughout childhood and adulthood. Thus nutritional deficiencies during pregnancy and infancy are likely to affect cognition, behaviour and productivity throughout the school years and adulthood. Focusing on this early period for the prevention of nutrient deficiencies may have long-term and widespread benefits for individuals and societies. A recently published article presents an overview of the pathway from early nutritional deprivation to long-term brain function, cognition, behaviour, and productivity. The article focuses on nutrition during pregnancy and the first few years after birth, which is the period of most rapid brain development.

Children who are not adequately nourished are at risk of failing to reach their developmental potential in cognitive, motor and socio-emotional abilities. These abilities are strongly linked to academic achievement and economic productivity. Therefore, preventing or reversing developmental losses in early childhood is crucial for fostering economic development in low-and middle-income countries, as well as reducing economic disparities in high-income countries.

The evidence is clear that the following conditions are key risk factors for poor motor, cognitive, and socio-emotional development: severe acute malnutrition, chronic undernutrition (as evidenced by intrauterine growth retardation and linear growth retardation or stunting), iron deficiency anaemia (IDA) and iodine deficiency. Preventing these conditions needs to be a global health priority. Effective strategies to prevent or improve these conditions include salt iodisation to prevent iodine deficiency, provision of iron via home fortification (e.g. with micronutrient powders) to prevent IDA, and educational interventions that include a strong emphasis on feeding nutrient-rich animal source foods in conjunction with food supplementation in food-insecure populations. With the exception of a few studies on food supplementation, direct evidence of the impact of these strategies on brain development is scarce. Strategies to promote exclusive breastfeeding during the first six months of life and continued breastfeeding thereafter along with adequate complementary feeding are also likely to improve cognitive development, though additional evidence for the effectiveness of these strategies is also needed.

The following interventions are promising for preventing developmental loss: supplementation with iron and folic acid and/or multiple micronutrients during pregnancy, provision of multiple micronutrients (in addition to iron) during infancy, supplementation with essential fatty acids during pregnancy and infancy, fortified food supplements provided during pregnancy and infancy. However, additional robust research in low-and middle-income countries that evaluates the long-term effects of these interventions is needed.

The design and interpretation of further research should take into account the factors discussed above, the timing of nutrient deficiency or supplementation, the degree of deficiency, the possibility of recovery, and the potential for additive, interacting or mediating effects with regard to the children's experiential input from the environment.

Interventions to improve the home environment and the quality of caregiver-infant interaction are also recommended to complement and enhance the effect of improved nutrition. These types of interventions are crucial to offset the negative effects of adverse environmental conditions (for example, poverty and low maternal education) that often coexist in populations in which undernutrition is common.

WFP/Amjad Jamal 0005

Locally produced supplementary food 'Acha Mum' provides energy and micronutrients (Pakistan)

1 Prado E and Dewey K (2014). Nutrition and brain development in early life. Nutrition Reviews, vol 72 (4), pp 267-284. Doi:10.1111/nure.12102

Contribution of six risk factors to achieving the 25x25 non-communicable disease mortality reduction target *Summary of study[1]*

Location: Global

What we know already: Non-communicable diseases (NCDs) cause more than 35 million deaths every year and account for more than half of the deaths in every region except sub-Saharan Africa.

What this article adds: Nine global targets have been set to reduce premature mortality from four NCDs by 25% by 2025 (25x25). A recent analysis estimates that if risk factor targets are achieved, the probability of dying from the four main NCDs between the ages of 30 and 70 years will decrease by 22% in men and by 19% in women between 2010 and 2025 and delay or prevent more than 37 million deaths. Most of the benefits will be in low and middle income countries. Further analyses are needed to assess benefits by region and country and implementation of effective policies and programmes to reduce these risks..

Non-communicable diseases (NCDs) cause more than 35 million deaths every year and account for more than half of the deaths in every region except sub-Saharan Africa. In 2011, the UN General Assembly adopted a political declaration that committed member states to the prevention and control of NCDs. Subsequently, countries agreed to adopt nine global targets, including an overarching target of reducing premature mortality from the four main NCDS (cardiovascular diseases, chronic respiratory diseases, cancers and diabetes) by 25% relative to their 2010 levels, by 2025 (referred to as the 25x25 target). Countries also agreed on targets for selected NCD risk factors: tobacco use, harmful alcohol use, salt intake, obesity, raised blood pressure, raised blood glucose, diabetes and physical inactivity. Two additional targets focus on treating people at high risk of heart attack and stroke, and on the availability of drugs to treat NCDs.

The risk factors and mortality targets were chosen independently, based largely on the experiences of countries that had been successful in reducing each of them. To plan and prioritise NCD control and prevention strategies, it is important to know how much achieving the risk factor targets would contribute towards reducing NCD mortality and whether additional actions are needed to achieve the 25x25 target. A recently published study therefore analysed the potential impacts of reducing six preventable risk factors on future trends in NCD mortality, in aggregate and by disease for high-income, low-income and middle-income countries.

The study estimated the impact of achieving the targets for tobacco and alcohol use, salt intake, obesity and raised blood pressure and glucose on mortality between 2010 and 2025. The method accounted for multi-causality of NCDs and for the fact that when risk factor exposure increases or decreases, the harmful or beneficial effects on NCDs accumulate gradually. Data used for risk factor and mortality trends were from systematic analyses of available country data. Relative risks for the effects of individual and multiple risks, and for change in risk after decreases or increases in exposure, were from re-analyses and meta-analyses of epidemiological studies.

Key findings

If risk factor targets are achieved, the probability of dying from the four main NCDs between the ages of 30 and 70 years will decrease by 22% in men and by 19% in women between 2010 and 2025, compared with a decrease of 11% in men and 10% in women based on current trends with no additional action. Achieving the risk factor targets will delay or prevent more than 37 million deaths (16 million in people aged 30-69 years and 21 million in people aged 70 years or older) from the main NCDs over these 15 years compared with a situation of rising or stagnating risk factor trends. Most of the benefits of achieving the risk factor targets, including 31 million of the delayed or prevented deaths, will be in low and middle-income countries (LMIC), and will help to reduce the global inequality in premature NCD mortality. A more ambitious target on tobacco use (a 50% reduction) will almost reach the target in men (>24% reduction in the probability of death) and enhance the benefits to a 20% reduction in women.

This type of population-level analysis has limitations. First, as with all estimations of future trends, unexpected factors, (e.g. new highly effective prevention and treatment interventions or macro-economic shocks) can substantially modify trends in risk factors or mortality. Second, despite improvements in epidemiological surveillance, risk factor exposures and deaths in some countries and regions are affected by data shortage and have relied on prediction models. Third, the relative risks (RRs) used in this study were from observational studies, and thus could have been affected by residual confounding. Fourth, the epidemiological studies that informed the RRs were done in largely western and Asian populations. Fifth, the researchers did not analyse physical inactivity because how much of its effects are mediated through obesity, raised blood pressure and glucose has not been quantified, and because there are no consistent data for time trends. Similarly, the researchers did not analyse other forms of tobacco use because of the relative scarcity of data for exposure, which could have led to underestimates of the benefits of reduced exposure for some cancers in south Asia, where oral tobacco use is common.

At present, tobacco use is the most policy-responsive of targeted risk factors with major successes in tobacco control in many countries. Alcohol consumption has decreased in in some high-income countries but remains a major public health burden in Eastern Europe, Latin America and sub-Saharan Africa. Reducing

1   Kontis. V et al (2014). Contribution of six risk factors to achieving the 25x25 non-communicable disease mortality reduction target: a modelling study. The Lancet, vol 384, August 2014, pp 427-436

the harmful use of alcohol in these regions, and preventing its rise in Asia and elsewhere, should be a priority, and can be achieved by use of policies that limit access, increase prices and restrict or ban advertising. Lower dietary salt and better diagnosis and treatment have contributed to reducing blood pressure in some high-income countries. Locally applicable salt reduction or substitution strategies are urgently needed in LMICs, where salt intake remains high. Higher coverage of blood pressure treatment will need strengthening of the primary care system and the development and implementation of guidelines for use by primary care personnel.

The researchers suggest that these findings demonstrate that further analyses are now needed to assess the benefits of achieving risk factor targets in each region and country, and importantly, by implementing effective policies and programmes to reduce these risks. An integrated approach will not only reduce NCD mortality by 2025, but will also help sustain this reduction beyond 2025. Such integration will also be essential to efforts to make NCD reduction a part of the post-2015 development agenda and to efforts to achieve a grand convergence in health across the world by 2035.

Nutrition and brain development in early life Summary of review [1]

Location: Global

What we know already: The double burden of undernutrition and overnutrition is a concern in societies in transition.

What this article adds: The high fat, low lean body mass (LBM) composition of South Asians is associated with elevated risk of chronic disease. A review concludes it is likely due to both developmental programming in early life, and nutrition and lack of exercise through childhood and adolescence. Food diversification with inclusion of animal-source foods would help reduce childhood undernutrition and increase adult LBM. Childhood undernutrition and adult overnutrition are a continuum rather than mutually exclusive problems. A larger body of evidence is needed to inform policy.

Nutrition transition in developing and middle-income countries has led to a rapid increase in non-communicable diseases, including type 2 diabetes mellitus, hypertension, dyslipidaemia and cardiovascular disease, all known to be associated with obesity. The prevalence of obesity assessed with a body mass index (BMI) criterion, however, is still low in these settings, despite rapid gains observed in recent years. In contrast, undernutrition, especially childhood undernutrition, is highly prevalent and remains a pressing issue. In addition, studies from China, Brazil, Mexico and Russia have reported the coexistence of undernutrition in children and overnutrition in adults living in the same household. The double burden of undernutrition and obesity-related chronic diseases has been highlighted as a key concern in societies in transition.

A number of studies have assessed the ethnic differences in body composition highlighting the peculiar high fat, low muscle mass composition of South Asians compared with other ethnic groups. This particular body composition characteristic is considered an important determinant of the elevated risk of metabolic syndrome in this population. Evidence suggests that this fat phenotype in relatively thin individuals may be programmed by undernutrition in early life, as ethnic differences in body composition are evident even at birth. A large number of studies (mainly observational studies in humans and animal experiments) conducted during the past two decades have indicated that compromised nutrition and growth during early life may be associated with subsequent lower lean body mass (LBM), adiposity, and metabolic syndrome.

Early nutritional influences, however, cannot completely account for the low LBM in some population groups, and it is well recognised that nutritional influences operating during later life have a cumulative impact on LBM in adulthood. A large body of evidence suggests that nutritional and exercise interventions help to improve LBM throughout the life course. A recent review examined the possible nutritional influences on adult LBM using a life-course approach which emphasises the influences affecting health and disease in adulthood that operate during different life stages cumulatively and interactively. The life-course approach proposes two theoretical models in which exposures may affect the risk of disease: a 'critical period' or 'developmental programming' model and an 'accumulation of risks' model based on the effects of long-term gradual insults. Two lines of evidence were reviewed: the role of early nutrition in developmental programming of LBM, and the role of nutritional influences that affect LBM throughout the life course.

The reviewers conclude that examining the evidence using this life-course approach suggests that nutrition influences LBM through developmental programming in early life, as well as through its continued role in the accretion of LBM during childhood and adolescent growth. Suboptimal LBM associated with nutritional deficits at different life stages may predispose individuals to fat accretion by influencing the energy balance. Nutrients such as proteins, zinc, calcium and vitamin D are particularly important for linear growth during childhood as well as for improvement of muscle mass in later life. Diversification of cereal-based diets in developing countries by the inclusion of animal-source foods would help reduce childhood undernutrition and increase adult LBM, thereby mitigating the double burden of malnutrition in transitioning communities.

The authors conclude that understanding childhood undernutrition and adult overnutrition as a continuum rather than mutually exclusive problems is particularly useful in formulating nutrition policies to address both these challenges. However, a larger base of evidence is needed to support necessary policy changes. In particular, more studies are necessary to evaluate the efficacy and effectiveness of strategies to improve birth weight and linear growth in children and to promote optimal body composition with higher LBM in adults in developing countries. In addition, studies on the feasibility and cost-effectiveness of these approaches in different settings are required, since the effectiveness of these interventions is likely to be context specific.

1   Kulkarni B, Hills A and Byrne N (2014). Nutritional influences over the life course on lean body mass of individuals in developing countries. Nutrition Reviews, Vol 72 (3), pp 190-204. Doi:101111/nure.12097

Prevalence, clinical predictors, and outcome of hypocalcaemia in severely malnourished children in urban Bangladesh

Summary of review [1]

Location: **Bangladesh**

What we know already: Severely malnourished children are depleted in electrolytes. Therapeutic milks contain calcium, however there is no WHO recommendation for calcium supplementation in treatment.

What this article adds: Hypocalcaemia may cause seizures and death, especially in severely malnourished children. A case control study (n=333) to evaluate the prevalence, clinical predicting factors and outcomes of hypocalcaemia in SAM children in an urban hospital in Bangladesh was undertaken over 1 year. The prevalence of hypocalcaemia among severely malnourished under-fives was 26% and the case fatality rate was significantly higher than in the controls (17% vs 5%). Acute watery diarrhoea (AWD), convulsion, and lethargy assessed on admission to hospital were identified as clinical predictors of hypocalcaemia in such children; these signs should alert clinicians.

With the exception of sodium, children with severe acute malnutrition (SAM) have deficiencies of total body electrolytes, such as potassium, magnesium and calcium. The World Health Organisation (WHO) recommends the routine use of potassium and magnesium supplementation for SAM but there is no recommendation for calcium supplementation, although F-75 (stabilisation phase) and F-100 (rehabilitation) both contain 320 mg calcium per litre. Hypocalcaemia is often associated with serious consequences, such as seizures and death, especially in children with severe malnutrition. Clinical manifestations of hypocalcaemia in SAM children are often subtle due to reduced muscle power and overlap with the clinical signs of hypokalaemia and hypomagnesaemia. In addition, hypomagnesaemia is often associated with hypocalcaemia, leading to fatal seizure in children. Thus, the lack of supplementation of calcium in children with severe malnutrition may impede and/or delay recovery. A better understanding of the predictors of hypocalcaemia in this population

may improve the use of calcium and simultaneously, may help reduce hypocalcaemia-related morbidity and mortality, especially in resource poor settings. There is a lack of published data on the prevalence, clinical predictors and outcomes of hypocalcaemia in SAM children.

The objectives of a recently published study were to evaluate the prevalence, clinical predicting factors and outcomes of hypocalcaemia in SAM children in an urban hospital in Bangladesh. This study was a case-control study with all severely malnourished under-five children (n=333) admitted to the Longer Stay Ward (LSW), High Dependency Unit (HDU) , and Intensive Care Unit (ICU) of the Dhaka Hospital of ICDDR,B[2] between April 2011 and April 2012, who had their total serum calcium estimated, and were enrolled. Those who presented with hypocalcaemia (serum calcium <2.12 mmol/L) constituted the cases (n=87), and those admitted without hypocalcaemia (n=246) constituted the control group in the analysis. The prevalence of hypocalcaemia among severely malnourished under-fives was

26%. The fatality rate among cases was significantly higher than that in the controls (17% vs 5%; p<0.001).

Using logistic regression analysis, after adjusting for potential confounders, such as vomiting, abdominal distension, and diastolic hypotension, the researchers identified acute watery diarrhoea (AWD) (OR 2.19, 95% CI 1.08-4.43, p = 0.030), convulsion on admission (OR 21.86, 95% CI 2.57-185.86, p= 0.005), and lethargy (OR 2.70, 95% CI 1.633-5.46, p 0.006) as independent predictors of hypocalcaemia in severely malnourished children (See Table 1). The main limitation of the study identified by the authors was the lack of measurement of ionized calcium, which is a more accurate reflection of the physiological calcium state.

The study authors concluded that severely malnourished children presenting with hypocalcaemia have an increased risk of death compared to those without hypocalcaemia. AWD, convulsion, and lethargy assessed on admission to hospital are the clinical predictors of hypocalcaemia in such children. Presence of these features in hospitalised children with SAM should alert clinicians about the possibility of hypocalcaemia and may help undertake potential preventive measures, such as calcium supplementation, in addition to other aspects of management of such children, especially in resource-poor settings.

Table 1	Results of logistic regression to explore the independent clinical predictors of hypocalcaemia in under-five children with severe acute malnutrition		
Predictor	**OR**	**95% CI**	**p value**
Acute watery diarrhoea (AWD)	2.19	1.08-4.43	0.030
Convulsion	21.86	2.57-185.68	0.005
Lethargy	2.70	1.33-5.46	0.006
Vomiting	1.95	0.95-4.01	0.071
Abdominal distension	1.54	0.72-3.28	0.264
Diastolic blood pressure	0.99	0.97-1.01	0.323

1 Chisti. M et al (2014). Prevalence, Clinical Predictors, and Outcome of Hypocalcaemia in Severely-malnourished Under-five Children Admitted to an Urban Hospital in Bangladesh: A Case-Control Study. Journal of Health Population and Nutrition. Volume 32, Number 2, pp 270-275, June 2014

2 An international health research organisation located in Bangladesh. See: http://www.icddrb.org/

International foetal growth standards: one size fits all

Summary of published paper [1] and comment [2]

Head circumference measurement in Kenya during the study

Location: *Bangladesh*

What we know already: Foetal growth is an important determinant of infant, child and longer term health. Ultrasound is used worldwide to detect abnormal foetal growth; however there is an absence of international standards for foetal growth.

What this article adds: The multicentre, population-based Foetal Longitudinal Growth Study (FGLS) has produced international foetal growth standards for the clinical interpretation of routinely taken ultrasound measurements and for comparisons across populations. The standards are based on data from urban populations in eight countries where nutrition, health and antenatal needs of mothers were mostly met. Foetuses and newborn infants grew very similarly; recorded inter-country differences in foetal size and growth were more indicative of deprivation than geographical location.

Screening for disturbances in foetal growth is one of the main purposes of antenatal care. There is an absence of suitable international standards similar to the standards used for monitoring infant growth. Whether a particular unborn baby is judged to be too small will partly depend on the choice of foetal biometric charts used. Robust methods for foetal biometric chart de-velopment have been described since the 1990s but according to a recent 'comment' piece in the Lancet, many frequently used charts do not adhere to these standards. Practitioners might not be able to identify and access a methodologically superior chart easily, and instead default to what is loaded onto their ultrasound machine or follow institutional practices which – clinicians acknowledge – can vary according to where the practitioner is working on different days of the week.

The multicentre, population-based Foetal Longitudinal Growth Study (FLGS) of the International Foetal and Newborn Growth Consortium for the 21st Century (INTERGROWTH -21st) Project provides clear direction. Led by researchers from around the world, this study has followed the methods of the WHO Multicentre Growth Reference Study, recruiting more than 4000 pregnant women from geographically defined urban populations in eight countries. Although differing in ethnicity, these women were intentionally sampled for their shared trait of being at low risk of pregnancy complications attributable to malnutrition, obesity, socioeconomic deprivation or major environmental pollution. It is argued that foetuses and newborn infants grow very similarly in these eight different research settings.

From an initial screening of 13108 women, the study achieved a sample size of 4321 which is sufficiently large to produce reliable extreme centiles that are of clinical significance. The main reasons for exclusion were low height, BMI >30 and maternal age (< 18 years or greater than 35 years). Data were collected by ultrasound measurement for five anthropometric measures (foetal biparietal diameter, head circumference, occipitofrontal diameter, abdominal circumference, and femur length) which were obtained every 5 weeks from 15 weeks to 42 weeks of gestation. Centile charts have been produced for all indicators.

Comment

The information is especially valuable for the multi-cultural societies that now exist in many European, North American and Australasian countries, which are characterised by high rates of immigration and intermarriage. To expect all foetuses to have the same growth potential irrespective of ethnic origin is simple and fair. Arguably, the Lancet comment suggests, the most important conclusion that can be drawn from the INTERGROWTH -21st Consortium's findings is that recorded inter-country differences in foetal size and growth are more indicative of deprivation than geographical location. Acceptance of international growth standards involves a change in theoretical approach and sets the bar for universal aspirational targets of foetal growth. Together with newborn growth standards, the new foetal standards are proposed for use worldwide to diagnose foetal growth retardation uniformly and monitor growth from early pregnancy through to the neonatal period. The authors recommend these tools for the interpretation of routine ultrasound measurements and comparisons across populations.

Access the full paper, public comment and more information on the ongoing INTERGROWTH project, at:
https://intergrowth21.tghn.org/

A foetal ultrasound scan as part of the study

1 Papageorghiou AT et al (2014). International standards for fetal growth based on serial ultrasound measurements: the Fetal Growth Longitudinal Study of the INTERGROWTH-21st Project. Lancet 2014; 384: 869–79
2 McCarthy E and Walker S (2014). International foetal growth standards: one size fits all. www.thelancet.com, vol 384, pp 835-6, Sep 6th, 2014

ACF, Ethiopia, 2013

Barriers to access for SAM treatment services in Pakistan and Ethiopia: a comparative qualitative analysis

Summary of research [1]

A mother being interviewed in Ethiopia

Location: *Ethiopia and Pakistan*

What we know already: Community-based sensitisation can overcome lack of awareness that impedes access to SAM treatment; sensitisation is inconsistently implemented.

What this article adds: The primary demand-side barriers to accessing effective SAM treatment services faced by households were analysed, involving two cultural settings and different implementing agencies (MOH-led in Ethiopia, NGO-led in Pakistan). Barriers to access were similar in both well-functioning programmes. Common barriers related to distance, high opportunity costs, awareness of services, knowledge of malnutrition and child's refusal of RUTF. In remote areas with less programme exposure, beneficiaries experienced barriers to remaining in the programme until their children recovered. Research on and investment in the community component of services is needed to ensure access.

L ack of community awareness is a major barrier to access to severe acute malnutrition (SAM) treatment services that can be addressed by comprehensive community-based sensitisation mechanisms. However, community elements of sensitisation, mobilisation and follow-up have not been consistently or successfully implemented when integrating community based management of acute malnutrition (CMAM) into national health systems. A recently published study supported by the Coverage Monitoring Network (CMN)

ACF, Ethiopia, 2013

A health extension worker in Ethiopia

presents a comparative qualitative assessment of the primary demand-side barriers to accessing two different SAM treatment services: a non-governmental organisation (NGO)-implemented service in Pakistan and a service integrated into Ministry of Health (MoH) infrastructure in Ethiopia. The study selected both programmes using two criteria: (i) one programme should be implemented by an NGO and one by the MoH, and (ii) the programmes should be considered 'successful'[2].

Programme characteristics

Ethiopia

The programme in Ethiopia was part of the national Health Extension Programme, with services delivered by two tiers of community health worker (CHW) at basic community-level health posts and at district-level health centres. Over 30,000 salaried health extension workers (HEWs) served kebele-level health posts (two per post, 5000 population). HEWs provided SAM treatment as part of a bundle of health-related services. The Women's Development Army (WDA) was a team of community-level volunteers within the health system, who screened children under 5 years in thirty households in their villages. Children under 2 years old were screened at monthly growth monitoring and promotion sessions and children under 5 years old at Community Health Days, held every three months. This programme was included in the analysis due to its strong level of integration within the national health system.

Pakistan

The programme in Sindh Province, Pakistan, implemented by Action Against Hunger (ACF-USA), had outpatient therapeutic programme (OTP) sites at 11 out of 16 Union Councils (UC; sub-districts) within Tando Mohammed Khan and Badin districts of Sindh Province (3 OTP staff, average 35,000 population/UC). Community nutrition volunteers (literate, numerate and respected community members) screened, sensitised and followed up absentees covering a catchment area of approximately five villages (1500–2500 total population), typically 5–10 km from their homes. In each UC, OTP services were delivered from one static site and two satellite sites selected based on beneficiary location, to bring services closer to the community. This programme was included in the analysis due to its relatively high 'period' coverage (i.e. an estimation of coverage in a given, recent period) of 62.6%.

Methods

Data were collected in May and June 2013. Individual and group discussions were facilitated

1   Puett C and Guerrero S (2014). Barriers to access for severe acute malnutrition treatment services in Pakistan and Ethiopia: a comparative qualitative analysis. Public Health Nutrition. Doi:10.1017/S1368980014602444. The paper is available at: http://www.coverage-monitoring.org/

2   Success was defined as either the extent of coverage level in a recent assessment or the extent of integration achieved within MoH infrastructure. Selecting effective programmes helped control for supply-side constraints, to enable focus on demand-side barriers to access.

by the researcher using a translator. Focus group discussions and individual interviews were conducted with a variety of stakeholder groups including programme staff, communities (including community leaders and other community members) and households with a child who had recently attended the CMAM programme and had been classified as either recovered from SAM or defaulted (up to two barriers were recorded per beneficiary). Table 1 outlines the number of focus group discussions and individual interviews conducted with different respondent types in each country.

Quantitative information, collected in these household visits via a short survey, included information on the child (age, gender), treatment received (clinical outcome, length of stay, other clinical care received) and household factors predicted to be associated with limiting access to services, including education and occupation of parents/caregiver, ethnicity and religion, household size, distance to programme and proxies for socio-economic status (land ownership, roof material, electricity).

Programme areas and OTP sites within them were purposively selected to capture a variety of programme environments, based on criteria including agricultural and topographical characteristics, population density, implementation duration, site specific default rates and technical support received. In Ethiopia's Tigray Region, woredas within and bordering Central Zone (including one woreda in North-west Zone) were selected for having high variation in defaulting rates. Within each site, a minimum of ten beneficiaries were consulted. Households of children who had recovered from SAM were randomly selected where possible using registration records. Defaulter households were purposively selected in each area; efforts were made

A mother interviewed in Pakistan

ACF Pakistan, 2013

Table 1 — Number and type of respondents per country

Respondents	Ethiopia		Pakistan	
	Focus group discussions	Individual interviews	Focus group discussions	Individual interviews
Programme staff		13	6	
Communities	4	7	3	
Beneficiaries Recovered Defaulted		16 21		11 10
Non-beneficiaries		1	2	

to locate all households that had defaulted, either in the past two years or since the beginning of the programme, whichever was greater. A total of twenty-one defaulters were consulted in Ethiopia and ten in Pakistan.

Results

Analysis of demand-side barriers to access produced several themes related to similarities and differences between the two programmes.

Distance (travel time) was a commonly cited barrier and could be complicated by cultural factors, topography, road quality, lack of transportation options and weather, particularly during the rainy season or extreme temperatures. The definition of how far was 'too far' varied – for some, 1 h was too far while others living 3–4 h away consistently prevented regular attendance. In general, caregivers reporting this barrier cited an average distance of 2 h 20 min. In Ethiopia, perception of distance was not consistent across households. When other domestic responsibilities were very time-consuming, even a shorter walk to the programme site was considered too far. All defaulters in Ethiopia citing distance as a barrier came from a mountainous and remote rural woreda with an average walk of 3 h.

Weather posed a particular problem in the Sindh Province of Pakistan, which experiences both flooding and high temperatures. Walking to the OTP posed a challenge to both caregivers (with perceived risk to female caregivers) and the children they carried. The 'opportunity cost' to the caregiver of regular attendance was often substantial, complicated by other pressing responsibilities, including harvesting fields, caring for other dependent family members, tending cattle and walking long distances to fetch water. In Ethiopia, attendance was most difficult during the harvest season, particularly for households dependent on agriculture and daily labour.

Accumulated direct and indirect costs for a child's illness had an *impact on parents' livelihoods*, particularly if inpatient care was required. Waiting at the OTP site took up to 1.5 h, particularly in Pakistan where OTP sites served a large geographic area. Community members living further away would sometimes travel in groups and share a rickshaw fare, thus adding extra costs to their visit. Defaulting was higher among the migratory Koli caste of Hindus and so varied by season. Intensive costs of inpatient treatment in Pakistan also increased the likelihood of premature programme exit.

The *existence of and exposure to health infrastructure* and the *level of integration* into this infrastructure appeared to increase awareness of, and promote access to, CMAM services in different ways. Due in part to the decentralised service provision in Ethiopia (some woreda had OTP at all health posts), and also to effective sensitisation by well-accepted and credible programme staff, beneficiaries could often attend a site close to home. In Pakistan, programme staff felt that there were certain groups of community members with limited programme awareness, including migrant workers and those living at a distance from the OTP site. In Ethiopia, community members and staff exhibited a comprehensive understanding of child health and nutrition, including the importance of breastfeeding, complementary feeding and personal/environmental hygiene. Community awareness was further enhanced through involvement of local leaders. In Pakistan, knowledge of nutrition was restricted by limited exposure to public services and to basic education. Also, there were few other public health programmes to address important local health concerns, such as immunisation and potable water. Sensitisation was a particular challenge in these areas.

In Ethiopia, nearly 30% of defaulters cited children's *refusal to consume RUTF* as a barrier to continued programme adherence (some reported vomiting and diarrhoea or inability to eat a full serving) and six out of these seven cases resulted in defaulting. Several caregivers resolved RUTF refusal through their own efforts or with responsive counselling. Programme staff believed that vomiting and loss of appetite indicated an underlying illness; however, the persistence of this problem suggests that staff knowledge, actions and communications may not have cohered consistently during case management. RUTF refusal was not found to be a barrier in Pakistan.

Conclusions

Barriers to access were similar in both of these well-functioning programmes, indicating that households face similar demand-side barriers even when supply-side barriers are minimised. Efforts to integrate SAM treatment into national health systems should not neglect the community component of health systems and dedicated funding for the community component is needed to ensure access. Further research and policy efforts should investigate feasible mechanisms effectively to reduce barriers to access and ensure equitable service delivery.

Effects of nutritional supplementation for HIV patients starting antiretroviral treatment in Ethiopia

Summary of research [1]

M. Olsen, Ethiopia

Location: *Ethiopia*

What we know already: Poor nutritional status at initiation of ART is associated with impaired treatment outcomes among African patients with HIV.

What this article adds: A randomised controlled trial in Ethiopia found that supplementation with a lipid based nutrient supplement (LNS) resulted in greater gains of weight, lean body mass, grip strength, and immune recovery in food insecure patients with HIV compared with patients initiating ART without/delayed introduction. No major differences between whey and soy based supplements were observed. Benefits are regardless of initial BMI status.

Poor nutritional status at initiation of antiretroviral treatment (ART) is associated with impaired treatment outcomes among African patients with HIV. A recent study investigated whether a three month intervention with a lipid based nutrient supplement (LNS) containing either whey or soy protein improves regain of lean body mass, grip strength, physical activity and immune recovery[2] in patients with HIV starting antiretroviral treatment in a food insecure setting.

In this randomised controlled trial, patients received 200 g/day of LNS containing whey or soy during the first three months of ART. A control group received the supplement during the subsequent three months. Allocation to intervention groups was based on block randomisation and administered by a person not involved in recruitment or data collection. Supplement type (whey or soya) was masked with codes and blinded to everyone involved, while allocation to early or delayed supplementation was blinded to data assessors and data analysts only. There were three main comparisons. Whey and soy containing supplements were each compared with no supplement in participants with a Body Mass Index (BMI) >17, as delayed supplementation groups served as controls. In addition, the study compared whey and soy containing supplements with each other among all participants with a BMI >16. Lastly, the study compared early and delayed supplementation in participants with BMI >17 to investigate potential effects of timing of supplementation. Those with a BMI <16 were excluded and treated for severe acute malnutrition.

The results of the supplementation were considerable, resulting in a more than threefold weight gain, compared with the effects of ART alone, and with substantially more lean body mass gained. The increase of lean mass was accompanied by an effect on grip strength, though no effect on physical activity was observed. Furthermore, the whey containing supplement was associated with increases in CD3 and CD8 counts. No such effect on immune recovery were shown for the soy containing supplement, but when the two supplements were compared, there were no significant differences in their effects. Patients receiving delayed supplementation had a greater weight gain but less gain in grip strength and physical activity than those receiving early supplementation.

Selection bias was low as patient recruitment was consecutive, group allocation was concealed, and the study had a high follow-up rate (88% at three months). For many patients however, there were incomplete data on physical activity.

The study found that supplementation resulted in greater gains of lean body mass, grip strength, and immune recovery in Ethiopian patients with HIV compared with patients initiating antiretroviral treatment without a nutrient supplement. No major differences between the two supplements were observed. The findings are considered relevant for the treatment of all patients with HIV in food insecure settings. Previous observational studies have shown associations between weight gain and improved treatment outcomes across all BMI strata. The authors therefore conclude that the beneficial effects of supplementation can be generalised to HIV patients with inadequate access to food regardless of initial BMI status.

1 Olsen. M (2014). Effects of nutritional supplementation for HIV patients starting antiretroviral treatment: randomised controlled trial in Ethiopia. BMJ | 24th May 2014, Volume 348, pp 12. The full paper and a video abstract are available at: http://www.bmj.com/content/348/bmj.g3187
2 Secondary outcomes included viral load and CD4 counts and auxiliary outcomes included weight and CD3 and CD8 counts.

Implications of inconsistent anaemia policies for children and adolescents in Africa

Summary of published study [1]

Location: *Sub-Saharan Africa*

What we know already: There are many interdependent factors that cause anaemia (infectious and chronic disease, micronutrient deficiencies), which challenges the development of relevant clear, consistent policies and their adaptation to resource-poor settings.

What this article adds: A review to identify international anaemia policies relevant for children in Africa identified some agreement but many inconsistencies, including a wide variety of diagnostic methods, treatment approaches and prevention programmes; inconsistent definitions and target groups; and poor description of the evidence base. These factors limit harmonisation. Anaemia policy development is fragmented and evidence from resource poor settings is lacking. Contextual adaptations of global recommendations are necessary. A single body within WHO should be responsible for devising and implementing a coherent approach to anaemia policy development and access.

In sub-Saharan Africa, the high prevalence of infectious diseases such as malaria, helminthiasis and HIV; chronic diseases including haemoglobinopathies and deficiencies of micronutrients such as iron, cobalamin, folate and vitamin A, are responsible for causing anaemia in an estimated 47% of children and adolescents. This array of interdependent factors is a major challenge for developing clear, cohesive and evidence-based policies for anaemia diagnosis, prevention and treatment. Adapting policies to apply to resource-poor settings in Africa presents an additional challenge.

International anaemia policies relevant for children in Africa are produced by several agencies and by different units within single agencies, for example those dealing with malaria, HIV, nutrition and neglected tropical diseases including helminthiasis. The wide variety of diagnostic methods, treatment approaches and prevention programmes for anaemia in various risk groups that are practised in Africa suggest that the guidance offered by current policies may be inconsistent, or difficult to apply in the Africa setting. An additional complication is the fact that the definition of anaemia in countries varies with age and gender; for example, from Hb<94g/l in infants aged two months to Hb<130g/l in male adolescents.

A recent study identified and compared international policies concerning anaemia diagnosis, treatment and prevention in children. It evaluated the quality of these policies and the extent to which they are based on evidence relevant to the African contexts making recommendations for improvements to the policy making process. The study used the WHO definition for 'guidelines' to identify relevant policies and therefore included documents that contain recommendations about health interventions,

whether they be clinical, public health or policy interventions. Databases and websites of international policy-making organisations were searched for documents relevant for the diagnosis, treatment and prevention of anaemia in children and non-pregnant adolescents (i.e. less than 18 years old) in Africa. No restrictions on language or time period were applied. The search was completed in May 2013.

Results

Several areas of agreement between policies were noted especially in relation to iron supplements and transfusions and the need to treat co-morbidities. It was generally agreed that although there are continued concerns about potential increased risk of infections, iron supplements are generally beneficial for treating anaemia, especially in combination with other anaemia interventions. Iron given with foods was speculated to be safe, although safety when administered as a fortificant has been questioned. There was consensus that blood transfusions are indicated in children with severe anaemia who are clinically unstable. However, there were also examples of ambiguities within individual policies and inconsistencies between policies on key issues concerning anaemia diagnosis, treatment and prevention. For example, the definitions for categories of anaemia severity were inconsistent, many policies did not specify the age group for which the policy had been developed and where target age groups were specified, they varied between policies.

As so few policies explicitly described the evidence on which they had been based, it was not possible to draw conclusions about whether publication of evidence was related to any revision of existing policies or to the development of new policies. Some of the contradictory findings in the evidence are likely to reflect differences

in populations or population sub-groups and their environment, which may limit the generalisability of some policies. However, for others, particularly those concerning diagnostics, there is insufficient available evidence to inform recommendations. The anomalies within and between policies and in some cases their lack of generalisability, mean that information often cannot be pooled to harmonise the policies. Without more context specific research to fill current evidence gaps and to clarify any adaptations that are needed for specific contexts, clinicians will remain uncertain about selecting the best intervention for their own practice. The clear need to adapt global anaemia policies for each context highlights the importance of WHO headquarters restricting itself to making global anaemia policies and then WHO's regional offices can support local adaptations depending on the local context.

Although WHO recommend that its guidelines should specify the duration of their validity, when they should be reviewed and which department will be responsible for initiating the review, most of the policies identified in the study did not have any indication of their duration of validity, and few have undergone any documented process of updating. By analysing the strengths and weaknesses of international policies concerning anaemia in children and adolescents in Africa, the authors have been able to identify and prioritise areas for further work. The authors advise that in order to address the weakest aspects of existing anaemia policies, attention should be focussed on constituting appropriate guideline development and peer review groups and on more rigorous methods for updating and developing policies and

1 Hamdan M, Brabin B and Bates I (2014). Implications of inconsistent anaemia policies for children and adolescents in Africa. Public Health Nutrition 17 (11) pp2587-2594.

incorporating evidence. Furthermore, a comprehensive review of existing research evidence concerning anaemia in African children is urgently needed so that knowledge gaps can be identified and prioritised and research commissioned to fill the gaps. Almost none of the current policies are specifically tailored to Africa, which raises concerns about the appropriateness of these policies in the Africa context. Research located in Africa and involvement of national stakeholders is essential to be able to answer context-specific questions concerning, for example, the risks and benefits of iron supplementation where other infections are prevalent or in groups at high risk of anaemia, such as

those with HIV infection or sickle cell disease and young infants.

Although the lack of policies concerning anaemia diagnosis is particularly worrying since effective anaemia screening and diagnosis is a critical entry point for many children into the health-care system, currently anaemia policy development is fragmented and those concerning iron requirements are based largely on estimates of nutritional requirements from food intake studies in healthy Western children. In areas with high infection exposure, there is a need to identify specific iron biomarkers which are not affected by concurrent inflammation. Hepcidin,

an essential hormone which regulates iron metabolism, may be useful for differentiating anaemia due to iron deficiency from other causes.

Although the review focuses on children, it is likely that a similar lack of harmonisation applies to policies concerning anaemia in other population subgroups, such as pregnant women and the elderly. A critical step towards reducing the high burden of anaemia in African children should be the establishment of a single body within WHO responsible for devising and implementing a coherent approach to revising and developing anaemia policies and for making these policies easily accessible.

Risk factors associated with severe acute malnutrition in infants under six months in India: a cross sectional analysis

By Susan Thurstans

Susan is a registered nurse and midwife with over 12 years' experience in maternal and child health and nutrition programmes in both development and emergency settings. She has held senior and consultant positions with ACF, MSF, the CMAM Forum and Save the Children working in programme assessment, implementation, evaluation and research. Her experience covers the areas of acute malnutrition, nutrition surveys, infant and young child feeding and maternal and child health and HIV.

Location: India

What we know already: Severe acute malnutrition (SAM) in infants <6m is a prevalent public health problem; the greatest country caseload is in India. Many indirect and direct causative factors have been suggested. There is a lack of evidence to inform guidance and programming.

What this article adds: A secondary descriptive cross sectional analysis of the 2005/06 NFHS-3 dataset investigated infant and women's risk factors associated with infant<6m SAM in 3,343 infants< 6m. After controlling for underlying social, economic, biological, behavioural and immediate cause variables, only sharing toilets (P=0.040) and not attending antenatal care (P=0.001) remained associated with SAM. This surprising result may be partly explained by bias, such as age recall (43% of children were excluded at the outset due to lack of age data), survivor bias (cross-sectional study) and data cleaning (25% of infants <6m did not meet WHO anthropometric inclusion criteria). Further examination of case definitions of infant<6m SAM and of WHO cleaning criteria is needed. A prospective study would help distinguish intrauterine growth retardation, growth faltering and clinically associated SAM in infants<6m.

Severe acute malnutrition (SAM) in infants <6 months (<6m) is a prevalent public health problem, even more so since the introduction of the World Health Organisation-Growth Standards (WHO-GS) in 2006 which leads to a large increase in the prevalence when transitioning from the National Centre for Health Statistics (NCHS) reference. There is little evidence related to risk factors associated with infant malnutrition. Furthermore, the management of malnutrition in infants<6m is severely hampered by a poor evidence base upon which to build guidance materials.

The overall aim of this study was to explore possible correlates for malnutrition in infants<6m in India to enhance a causal framework of factors associated with infant malnutrition. India was chosen as it contained both the highest number of infants and the highest number of cases of the outcome of interest (SAM) of all 36 high burden countries identified in the 2008 Lancet 'Maternal and Child Undernutrition' series. According to the 2005/06 National Family Health Survey-3 (NFHS-3) in India, the highest prevalence of wasting can be found in the <6 months age group. Stunting increases gradually

and peaks in the 18-23 month age category, as does underweight, both declining thereafter.

Methods

This was a secondary descriptive cross sectional analysis of the NFHS-3 dataset investigating which risk factors are associated with infant<6m SAM as defined by WHO (weight for height Z-score (WHZ) less than -3). After excluding 3,471 children who did not have age data, 4,665 infants<6m were eligible for analysis. A further 1,248 infants were excluded on the basis of WHZ outside of the inclusion criteria, 53 infants

based on HAZ outside inclusion criteria and 21 infants based on WAZ outside inclusion criteria, giving a final sample size of 3,343 infants<6m.

The children's dataset was used together with data collected from the women's questionnaire. The women's questionnaire was employed to interview all women (ever-married and never-married) aged 15-49 who were usual residents of the sample household or visitors who stayed in the sample household the night before the survey. The questionnaire covered background characteristics, reproductive behaviour and intentions, marriage and cohabitation, knowledge and use of contraception, quality of care and contacts with health personnel, antenatal, delivery, and postnatal care, general health, child immunizations, child health, and child feeding practices, women's and children's nutrition, utilisation of integrated child development services (ICDS), status of women and spousal violence, sexual life and HIV/AIDS and other sexually transmitted infections.

A hierarchical conceptual framework was used to guide analysis (see Figure 1). According to this model, underlying social and economic causes may determine directly or indirectly all variables being studied except for a child's age, gender or likelihood of being a twin. The second level consists of underlying biological and behavioural causes (wealth index, water sanitation and hygiene indicators), which are partly determined by underlying social and economic causes and which may determine directly or indirectly the outcome of SAM. The third level includes immediate causes, which may include feeding practices, low birth weight and morbidity such as diarrhoea.

Univariable associations between the explanatory variables and the outcome of SAM were explored separately using conditional logistical regression. Multivariable analysis using logistic conditional regression to obtain ORs and confidence intervals, adjusted for confounding, were carried out using the hierarchical method and forward stepwise techniques.

The new cut-offs recommended by the WHO for data exclusion were used. Thus all infants with either height for age (HAZ) below -6 or above +6, weight for age (WAZ) below -5 or above +5, or WHZ below -5 or above +5 were excluded as extreme values are most likely a result of errors in measurement or data entry.

Results

Data were available for 51,557 children between 0-59 months, 4,665 of whom were infants. A total of 1,322 infants were excluded on the basis of WHZ, HAZ or WAZ being outside of the inclusion criteria.

Demographic association with SAM

Just over half (51%) of the study population were female. The highest number of infants fell within the 4-6 months age category. The largest number of infants also fell within the poorest wealth category. A total of 6.67% of infants were born with low birth weight (LBW). The majority of infants in the study were currently breastfeeding (98.45%). The prevalence of SAM was 13.27% (201 females and 226 males). Three quarters of study participants lived in rural areas (78.10%).

There was no evidence of an association between SAM and gender (P=0.496, 95% CI: 0.71-1.18) or age (P=0.257, 95% CI: 0.78 to 1.07). Whilst there appears to be an increased risk of SAM where the infant is a twin (OR, 1.21), this association is not significant (P=0.686, 95% CI: 0.47-3.11).

Association between underlying social and economic factors and SAM

In univariable analysis, there was an increased risk of SAM (OR=1.60) with sharing toilet facilities (P=0.042, 95% CI: 1.02-2.53) and using an unimproved water source for collecting drinking water (P=0.046 95% CI: 1.01-1.94). There was a 1.49 increase in odds of SAM for the poorest wealth group compared with the richest, but there is no association (P=0.066, 95% CI: 0.97-2.26). Those infants living in rural areas were slightly less likely to have SAM than those
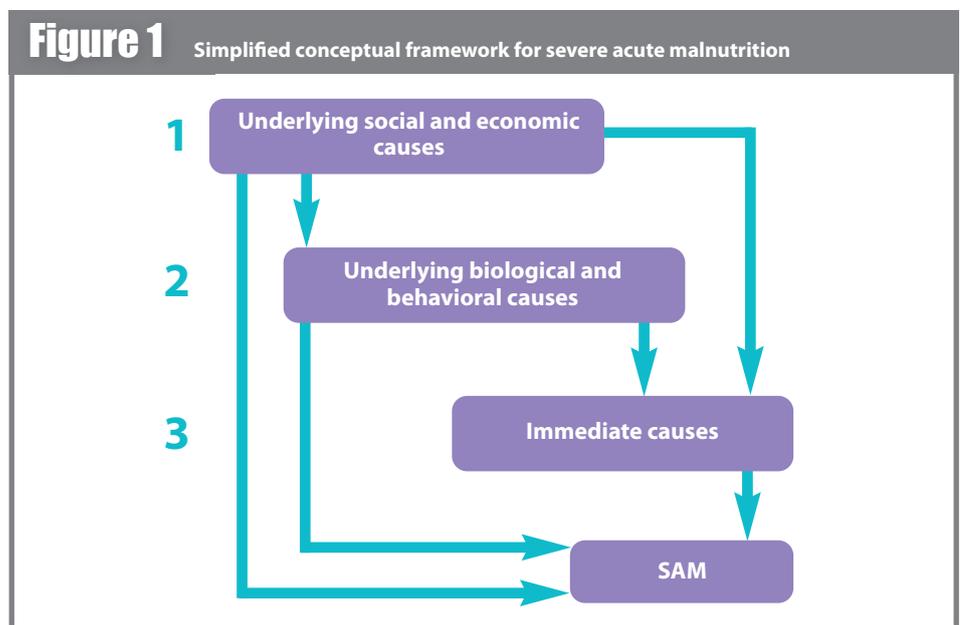
in urban areas but with weak association (P=0.773, 95% CI: 0.74-1.26). There was no association between SAM and the number of household members or number of children under 5 living in the household (P=0.633, 95% CI: 0.82-1.39), the sex of the head of household (P=0.232, 95% CI: 0.49-1.19) and whether the husband lives at home (P=0.810, 95% CI: 0.65-1.40). Likewise, there was also no association between SAM and education levels (P=0.777, 95% CI: 0.86-1.10).

In multivariable analysis, sharing toilet facilities remains associated with SAM but water source for collecting drinking water does not.

Association between underlying biological and behavioural causes of malnutrition and SAM

In univariable analysis, there was a strong association between SAM and not attending antenatal care (ANC) before birth (OR 1.51, P=0.008, 95% CI: 1.05 to 1.42), infants never having been vaccinated (P=0.003, 95% CI: 0.34-1.21) and mothers with a low Body Mass Index (BMI) (P=0.002, 95% CI: 0.55 to 0.87) (see table 6). There was no association between SAM and the length of previous birth interval or with whether or not the child was wanted or if contraceptive needs were met. Infants born with low birth weight had increased odds (OR 1.12) of SAM but there is no association (P=0.309, 95% CI: 0.71-2.99). After adjustment for underlying social and economic causes of malnutrition, mother's BMI and not having been vaccinated is no longer associated with SAM (P=0.078, 95% CI: 0.46 to 1.04). Not ever having attended antenatal care with a trained professional before birth remains strongly associated (p=0.001, 95% CI: 1.21 to 2.22) with SAM. Association between immediate causes of malnutrition and SAM In the univariable analysis, initiation of breastfeeding after one hour (p=0.015, 95% CI: 1.08-2.10) and infants not currently breastfed (P=0.037, 95% CI: 1.06-5.69) are strongly associated with SAM. Infants initiating breastfeeding 1 hour after birth have 1.51 times the odds of SAM than those initiating less than 1 hour after birth. Infants not breastfeeding at the time of the survey had 2.45 times the odds of SAM. There appears to be no association with other feeding practices such as eating solids the previous day which appears protective (OR=0.75) though with no association. Despite increased odds, there was no association with SAM in infants who drank from a bottle with a nipple (OR=1.25, P=0.261) or who were given infant formula (OR=1.16, P=0.604) or powdered milk (OR=1.15, P=0.364). Likewise there was no association with morbidity such as a recent history of diarrhoea (OR1.14, P=0.1222, 95% CI: 0.96-1.37), fever in the last 2 weeks (OR=1.38, P=0.076, 95% CI: 0.97-1.96) or cough in the last 2 weeks (OR=1.05, P=0.533, 95% CI: 0.90-1.23)

After controlling for both the underlying social, economic, biological and behavioural causes, there is no longer an association with current breastfeeding or with initiation of breastfeeding after one hour.

Figure 1   Simplified conceptual framework for severe acute malnutrition

1 — Underlying social and economic causes

2 — Underlying biological and behavioral causes

3 — Immediate causes

SAM

In summary, after controlling for underlying social and economic variables, biological and behavioural variables and immediate cause variables, those showing association with P<0.05 remained in the model. The model shows evidence for inclusion of sharing toilets (P=0.040) and not attending antenatal care (P0.001).

Discussion

The prevalence of SAM in infants was 13.27%, consistent with the 13.1% reported in the NFHS-3 report. This is the highest incidence of SAM compared with those reported for other age groups, highlighting the importance of addressing SAM in infants. There did not appear to be any association with gender and the prevalence of SAM in infants.

Underlying behavioural and biological variables with a good or strong association with SAM in this analysis were not ever attending ANC and a mother having a low BMI. Only not ever attending ANC remains associated with SAM after adjustment for underlying social and economic variables.

In univariable analysis, LBW infants had increased odds of SAM but with no association. This is not consistent with other studies findings which have found the contrary. The lack of association between LBW and SAM in this analysis may have been affected by recall bias in the collection of data for the LBW indicator (this relied on maternal reports of birth weight).

The strong association with attending ANC and infant SAM may be a proxy of other factors such as health access or health behaviours. No information was available as to why women did or did not seek ANC.

The lack of association of SAM with any infant feeding indicators, after controlling for underlying social and underlying biological causes, is surprising. However, though the evidence base is strong that exclusive breastfeeding reduces the risk of death and illness, the results of this analysis are consistent with the fact that there is little to support an association between exclusive breastfeeding and better growth in early infancy.

Strengths, limitations and bias

There may be selection bias in the sampling as a cross sectional study does not consider those infants who have died of SAM. This analysis is only based on survivors. Secondly, the high number of infants (3,471) included within the dataset for whom data on age is missing (women could not recall an infant's age), is likely to be the cause of some selection bias. Likewise, the exclusion of 1,322 infants on the basis of WHO cleaning criteria is a major source of potential bias, particularly if even a fraction of those excluded are in fact truly SAM rather than measurement errors as assumed.

NFHS-3, like all DHS surveys, is a household-based survey. Infants with SAM usually require inpatient treatment with the mother present, and so those infants who were unwell with SAM or being treated for SAM as inpatients would not have been included in this analysis. There may also be bias in relation to the criteria used to define SAM; in this analysis SAM diagnosis was based on WHZ scores. The data does not consider additional criteria such as clinical presentation, infants with no appetite and bilateral pitting oedema (this is not recorded in NFHS-3). In practice, the diagnosis of infant SAM is

often more complex. Guidance on what criteria to use is not consistent.

Data on maternal depression was not collected in the NFHS-3 and therefore not included in analysis but may have been a significant risk factor for SAM.

Whilst some studies look at children attending health centres, this analysis offers a cross sectional perspective of India and so avoids some of the bias associated with attending health centres.

This analysis focused on SAM as an outcome. Other studies have looked at both severe and moderate levels of acute malnutrition or wasting, in addition to stunting and underweight indicators and found associations. A similar analysis to examine the association between the variables in this analysis and other indices and stages of acute malnutrition may be useful.

It is also worth considering the possibility of reverse causality with breastfeeding practices (i.e. infants who grew slowly were more likely to have early introduction of complementary foods to improve their growth) and how this affects the analysis of feeding practices as a risk for SAM.

It is not known how SAM infants found in a study such as this differ from a hospital based study in terms of their clinical condition, appetites, physiological changes and body composition. It is likely that the effect of some of the variables may have been diluted by the less severe of the severely malnourished infants.

Conclusions

The lack of association with the majority of variables makes the enhancement of a causal framework for infant malnutrition challenging. The results do however raise some important considerations and call for recognition of the importance of studies with negative findings. In this analysis, ANC and shared toilet facilities show an association with infant SAM, though the association for sharing toilets is weak. Possible explanations have been offered for this, including bias.

Further examination of case definitions of infant<6m SAM is needed. Research is needed to explore the clinical presentation of infants classified as SAM using WHO-Growth Standards case definitions in both community and institutional settings. Both WHO and NCHS are statistical anthropometric case definitions used to screen or act as a marker of what is going on; neither is based on clinical condition or directly linked to mortality. A prospective cohort study recruiting during the intrauterine period would be useful to provide coherence between intrauterine growth, birth weight, catch up growth, growth faltering and the incidence and degree of SAM. Work is also needed to explore the WHO cleaning criteria to assess how appropriate they are and ensure they do not miss an important subgroup of infants.

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House-to-house monitoring, conducted by a local Auxiliary Nurse Midwife (ANM)

Scalable integrated early child development programme using a conditional cash transfer programme in Colombia

Summary of research [1]

A mother and her child in Colombia

WFP/Zaida Marquez, Colombia, 2014

Location: *Colombia*

What we know already: Poverty and the associated poor nutrition and lack of psychosocial stimulation are associated with poor child development.

What this article adds: A cluster randomised controlled trial in 96 towns in Colombia of an integrated early child development intervention (targeting the poorest 12-24 month olds), delivered on a large scale by local women, found significant effects of stimulation on cognition and on receptive language; there was no significant effect of micronutrient supplementation on outcomes and no interactions between supplementation and stimulation. Stimulation can be delivered effectively at scale as part of an existing welfare programme; tapping into local community networks is key. The extent of generalisability to other populations remains to be determined.

An estimated 219 million children aged less than 5 years in developing countries are failing to reach their developmental potential; poverty and the associated poor nutrition and lack of psychosocial stimulation have been identified as major risk factors. There are increasing demands for cost-effective, sustainable and quality integrated early childhood development programmes at scale that include nutrition and psychosocial stimulation components.

A recently published study set out to investigate whether an integrated early child development intervention, combining psychosocial stimulation (weekly home visits) and micronutrient supplementation and delivered on a large scale by local women in Colombia, benefited children's cognitive, language, and motor development and their height, weight and haemoglobin levels. The study was conducted on beneficiaries of the Familias en Acción conditional cash transfer programme in Colombia [2].

The study involved a cluster randomised controlled trial in 96 towns in Colombia using a 2 x 2 factorial design with arms of psychosocial stimulation, micronutrient supplementation, both combined and control. The intervention lasted 18 months. Computer generated allocation was applied. It was not possible to blind participants to their allocation to stimulation and the researchers did not use a placebo for micronu-

trients, but the testers were blind to group allocation. Participants were children aged between 12-24 months at enrolment and their primary caregivers, who were participants in the welfare programme. They were from the lowest stratum of socioeconomic classes in Colombia, representing the poorest one fifth of the population. The prevalence of anaemia was 46% and of stunting was 16%.

Cognitive, receptive and expressive language and fine and gross motor scores on the Bayley scales of infant development-111 and height, weight and haemoglobin levels were measured on enrolment and at the end of the intervention. The effect of stimulation on cognition was 0.260 of a standard deviation (P = 0.002), and 0.218 of a standard deviation (P=0.032) on receptive language. The researchers did not detect significant effects of supplementation on any outcomes and there was no significant interaction with stimulation.

Limitations of the study were that there were no measures of iron status and no placebo was used for micronutrients. Baseline analysis showed that the four samples were well balanced with no reason to suspect systematic biases or confounding factors affecting results.

One problem is whether the impacts are significant from a policy perspective and whether they are sustainable. Although the size of the

impacts corresponded to more than a third of the gap in cognitive development between children in the lowest socioeconomic classes in Colombia and those in middle class families, whether these impacts are sustained in the medium and long term remains to be seen.

The authors conclude that this study provides new evidence that early childhood stimulation programmes delivered through the local community can be run effectively on a large scale and at low cost (the programme cost $500 per child per year). The key to generalizability of such programmes is to identify and tap into local community networks, which often exist alongside social welfare systems with established local administrative capacity. The extent of generalisability to other populations remains to be determined. The authors hypothesize that impacts could be improved by hiring full time home visitors and supervisors living locally.

1 Attanasio O et al (2014). Using the infrastructure of a conditional cash transfer programme to deliver a scalable integrated early child development programme in Colombia: cluster randomised controlled trial. BMJ 2014;349:g5785

2 Familias en Acción is the largest national welfare programme in the country; it began in 2002 and targets the poorest 20% of households. Beneficiaries receive cash payments if they comply with two requirements: regular health check-ups for children aged less than 6 years and regular school attendance for children aged more than 5 years.

Nutrition in emergencies: Do we know what works?

Summary of paper [1]

A school feeding programme in Central African Republic

WFP/Donaig Ledu, CAR, 2014

Location: *Global*

What we know already: Nutrition action in emergencies is well accepted and attracts significant resources. There is a lack of evidence on what are effective interventions. Closer links are needed between emergency and development programming.

What this article adds: The contribution of emergency response programming to nutrition goals is rarely considered in the assessment of global nutrition agendas, target-setting, or budgeting. Representation of more geographical and operational contexts in research is needed. High coverage of effective treatment of wasting in crisis affected countries is needed to reduce child mortality. Global targets for stunting require attention in humanitarian 'hotspots'. Investment in high quality research for a list of gap areas and on 'delivery' science is needed. Emergency interventions should dovetail with longer term programming. Commitments to effective emergency preparedness and response should be fully incorporated into worldwide plans of action for nutrition in the post-2015 agenda.

A recent paper reviews empirical evidence that currently underpins consensus positions on 'what works' in terms of nutrition actions in emergency settings. The authors aim to highlight important knowledge gaps, while sharing valuable lessons to a broader non-nutritionist audience, and to nutritionists who work mainly in non-emergency settings. Some of the 'headlines' of this paper are summarised below.

The scale of donor funding for nutrition actions in humanitarian contexts now dwarfs that of non-emergency programming, suggesting a need for greater engagement of, and learning among, professionals who work in these two related but still largely siloed fields of practice.

In 2012, nutrition-specific actions (listed as free-standing proposals for defined nutrition activities with their own budget lines) represented 11% (US$437 million) of the total funding requirements (US$7.7 billion) under the United Nations' Consolidated Appeals Process (UN/OCHA, 2012). That does not include amounts dedicated to food aid in general (including micronutrient fortified cereal flours or emergency high-energy biscuits). In addition, around 2.6 million children under 5 years of age were reached with 32,000 metric tons of specialized food products by UNICEF in 2012, in emergency and non-emergency settings. If all forms of nutrient delivery, and complementary actions to address undernutrition, were combined, the total allocated toward nutrition actions in emergencies in 2012 can be estimated as more than half a billion US dollars. This significant focus on nutrition in emergencies contrasts with 1992 (the first year of consolidated multi-agency appeals), when there was no specific mention of nutrition at all among the 27 appeals that generated US$257 million in emergency response resources.

Since mortality during crises is often mediated by a serious deterioration in nutritional status, it has long been accepted that nutritional rehabilitation and maintenance of adequate nutritional levels can be one of the most effective interventions to decrease mortality. As a result, the goals of nutrition action in emergencies typically include:

(a) Reducing levels of wasting (GAM and SAM with or without oedema) to below conventionally-defined emergency rates or thresholds

(b) reducing and/or preventing micronutrient deficiencies

(c) reducing the specific vulnerability of infants and young children in crises through the promotion of appropriate child care, with special emphasis on infant and young child feeding (IYCF) practices

(d) preventing a life-threatening deterioration of nutritional status by ensuring access by emergency-affected populations to adequate, safe and nutritious foods that meet minimum nutrient needs.

Increasing attention is also being paid to preventing a crisis-driven deterioration of nutritional status by protecting and enhancing baseline levels of nutritional status, promoting enhanced nutrition knowledge and behaviours that may enhance a child's linear growth trajectory (and hence prevent stunting), and focusing on maternal and infant nutrition in the context of the broader thousand days agenda. However, the contribution of emergency response programming to nutrition goals is rarely considered in the assessment of global nutrition agendas, target-setting, or budgeting. For example, the influential Roadmap to Scaling Up Nutrition document makes no mention of humanitarian interventions. This is unfortunate given the scale of resources at play and the reality that many of the countries carrying the highest burden of stunting or micronutrient deficiencies are fragile states that have recently had, or continue to face, acute and/or chronic emergencies. What is more, many nutrition innovations have been explored in emergency contexts and these should at least inform, if not be linked explicitly with, actions promoted in post-emergency and in non-emergency settings.

A major hurdle to documenting successful innovation is the fact that measuring the effectiveness of nutrition actions in emergencies is beset with difficulty. It is not possible deliberately to withhold an intervention in order to achieve a comparison or control group. This means that the evidence of a beneficial impact can rarely be obtained experimentally; usually it can only be derived from data that provide plausible evidence of an effect.

It is possible to argue that combined humanitarian responses are increasingly effective in saving lives, given that the numbers of people dying in the disaster contexts have halved between the early 1990s and 2011, despite a doubling of reported crisis events and a more than doubling of the number of people affected by such emergencies. However, the contribution of nutrition actions to mortality reduction, let alone to defined nutritional outcomes, is at present poorly investigated.

The difficulty and expense of conducting high quality data collection in most sudden-

1   Webb. P et al (2014). Nutrition in emergencies: Do we know what works? Food Policy 49 (2014) p33–40. http://dx.doi.org/10.1016/j.foodpol.2014.03.016

WFP/Eyad Al Baba, Palestine, 2014

WFP voucher scheme in Palestine

onset, and even many chronic, humanitarian emergencies cannot be underestimated.

Cost-effectiveness studies of various strategies are also scarce. So too are studies of alternatives; what might work differently or better in different contexts. To date, such studies have been concentrated in just a handful of countries (such as Niger, Malawi and Bangladesh), suggesting a need for replication and elaboration in more regional and operational contexts. Such analyses are essential if programming decisions are to be more empirically underpinned in coming years and able to document convincingly the value-added of recent innovations.

Inevitably, the trend towards 'bundling' of activities into complex multifaceted programming responses also adds to the difficulty of separating out the effectiveness of individual components.

As of 2011, there were still 165 million stunted children under the age of 5, as well as 52 million children who were wasted in both emergency and non-emergency settings. It is therefore vital to recognize that the goal of addressing stunting and wasting is unlikely to be achieved without progress in countries requiring large-scale humanitarian action, as well as the appropriate investments needed to move rapidly on a post-crisis trajectory. One of the interventions with the largest predicted effect on mortality in individual children is the treatment of severe wasting because it has the highest mortality risk, Thus expanding the coverage and effectiveness of both institutional and community-based programs focused on treatment and prevention of wasting is needed to reduce child mortality. Moderately wasted children are at increased risk of mortality, and since their number is much larger than the number affected by severe wasting, more deaths occur among the moderately malnourished. Furthermore, the first 1000 days of life in many countries may occur in the context of an emergency (be it a seasonal peak in nutrition and health insults or a full-blown humanitarian crisis). Therefore, emergency responses cannot afford to ignore the importance of prevention.

On the other hand, global targets for stunting reduction also require attention to the institutional, human and budgetary capacities needed

for scaling up evidence-based nutrition-specific actions in countries that are still humanitarian hotspots. For example, the Lancet's 2013 set of 34 countries with a high burden of stunting (with greater than 20% prevalence rates) in which 90% coverage of effective interventions would help achieve required global stunting reduction targets includes Afghanistan, Yemen, the Democratic Republic of Congo (DRC), Niger, Chad, Iraq and Mali. Achieving 90% coverage of any of the 10 recommended essential actions in nutrition would be a major, costly challenge in any of these countries. That is partly because they represent fragile if not failing states in which the institutional and human capacity to support universal coverage of health and nutrition services remains severely compromised. It is also because countries like Niger and the DRC have seen increases, rather than decreases, in stunting rates since 1985.

Actions to prevent stunting, while addressing very high levels of both wasting and micronutrient deficiencies in such countries will require a much closer linking of nutrition strategies, programming approaches and funding initiatives across the conceptual divide that still separates development activities from emergency response. In other words, the specific contribution of actions addressing nutritional deficiencies in humanitarian contexts has to be understood as an essential contribution to the international community's overall nutrition agenda.

There remain important knowledge gaps that require priority attention. While the literature on nutrition interventions in emergency settings has been growing, there are still many knowledge gaps.

For example, more attention must be paid to study designs so that practical questions framed by cost and choice among alternatives can be answered. Much recent research relating to nutritionally enhanced food aid products seeks to compare multiple products that are not designed, packaged or programmed in identical ways. As a result, basic questions of importance to managers about effective modes of distribution, logistics, qualified supervision needs, instruction requirements for caregivers, sharing, acceptability and potential displacement of other elements of the local diet are typically not adequately addressed.

More work is also needed on the appropriate uses of products created with specific nutritional goals in mind, including the use of Ready to Use Foods (RUFs) in programming aimed at preventing stunting, multiple micronutrient powders as vehicles to address maternal anaemia, and lipid-based supplements as potential complements to local complementary foods.

At the same time, a focus in a lot of recent research on product performance should not obscure the critical importance of improving our understanding of how best to deliver products and services. Detailed cost-effectiveness analyses are needed of alternative approaches to achieving specified goals, including sustaining impacts (i.e. ensuring that children who recovered after severe

acute malnutrition (SAM) or moderate acute malnutrition (MAM) interventions remain well.

Other elements of emergency responses promoted by the international community have so far received too little scrutiny and require empirical study. These include, the effectiveness of various recommendations on infant and young child feeding (IYCF) approaches in emergencies; the aetiology of oedema in MAM and SAM and how/where best to treat it; the relevance of joint distributions of wasting and stunting among populations repeatedly affected by crises and the relative importance of focusing on rapidity of weight gain in treatment versus other measures of nutritional wellbeing; how best to assess and address the needs of adults (particularly the elderly) in emergency settings; how to implement effective SAM and MAM interventions for breastfed infants under 6 months; how to assess the contribution of delivered food products to local diets and dietary practices; the potential for differentiating needs of, and programming approaches to, children 6–24 months relative to those 25–59 months; the sensitivity of Mid Upper Arm Circumference (MUAC) for assessing SAM in children under 6 months or for establishing entry into/exit from programmes dealing with wasting; validation of proxy measures for diet quality, household and individual food security and nutritional wellbeing in the dynamic and often volatile contexts of emergencies; how to assess and best deal with intra-household sharing of resources (particularly those derived from food-based interventions); and appropriate cut-offs in wasting measures for determining emergency thresholds for adults versus children and potentially for pastoralists versus sedentary populations.

Investment in high quality research around these topics will be returned in its contribution to more cost-effective programming during emergencies as well as, potentially, in non-emergency settings. Effective action requires an expanded research agenda to understand implementation and cost-effectiveness at scale/ However, this is hindered by the 'absence' of research on the delivery sciences including operational research, lack of, or poor-quality, assessments, scarce funding for delivery research, and the reluctance of journals to publish it.

Wasting, stunting, micronutrient deficiencies, maternal undernutrition and even obesity can be found in both emergency and non-emergency settings and should be tackled wherever they are found. Thus, while high quality programmatic research must help further improve the design and impact of effective emergency nutrition interventions, these should be seen as entry points that dove-tail with, rather than supplant, longer-term actions that seek to resolve and prevent underlying causes of poor nutrition. The significant resources applied to nutrition actions in emergency contexts should be recognized within broader assessments of efforts taken to combat malnutrition. As such, commitments to effective emergency preparedness and response should be fully incorporated into worldwide plans of action for nutrition in the post-2015 agenda.

Cash transfers for families affected by floods in Pakistan in 2010

ACF-Pakistan, N. Sobecki, 2010

Literature review on impact of cash transfers on nutritional outcomes

By Bridget Fenn and Ellyn Yakowenko

Bridget Fenn is an epidemiologist with a background in nutrition. She is currently a consultant for the Emergency Nutrition Network (ENN) and is Principle Investigator on the Research in Food Assistance for Nutrition Impact (REFANI) Pakistan study involving seasonal cash transfers (cash and vouchers) and the impact on childhood nutritional status in humanitarian settings.

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Location: *Global*

What we know already: Nutrition action in emergencies is well accepted and attracts significant resources. There is a lack of evidence on what are effective interventions. Closer links are needed between emergency and development programming.

What this article adds: The contribution of emergency response programming to nutrition goals is rarely considered in the assessment of global nutrition agendas, target-setting, or budgeting. Representation of more geographical and operational contexts in research is needed. High coverage of effective treatment of wasting in crisis affected countries is needed to reduce child mortality. Global targets for stunting require attention in humanitarian 'hotspots'. Investment in high quality research for a list of gap areas and on 'delivery' science is needed. Emergency interventions should dovetail with longer term programming. Commitments to effective emergency preparedness and response should be fully incorporated into worldwide plans of action for nutrition in the post-2015 agenda. .

The Consortium for Research on Food Assistance for Nutrition Impact (REFANI) – comprised of Action Against Hunger | ACF International (ACF), Concern Worldwide, the Emergency Nutrition Network (ENN) and the University College of London (UCL) – is a three year project funded by UKAID, aimed at strengthening the evidence base on the nutritional- and cost-effectiveness of food assistance programmes. REFANI's research focuses on three studies with cash and/or voucher-based food assistance interventions. REFANI's objective is to determine whether a reduction in acute malnutrition and/or an improvement in micronutrient status can be achieved through the intervention. A cost-effectiveness component will evaluate the tested interventions. The REFANI literature review focused on the evidence gaps in measuring the impact of cash transfers (CTs) on nutritional outcomes. This is a synopsis of the review.

Emerging cash-based solutions

CTs are direct cash payments or transfers using modalities such as paper vouchers, debit/smart cards or mobile phones. Transfers can be conditional (CCTs), where participants need to meet a defined set of standards (such as attending an education session, getting a child vaccinated, etc.) or unconditional (UCTs). The choice of food, cash or voucher transfer should be made on the basis of an assessment of population needs, cost efficiency, the market availability of basic goods, the functioning of markets and secondary market impacts, the flexibility of the transfer and risks of insecurity and corruption (DG ECHO 2013, DFID 2013, Sphere 2011, ACF 2007). CTs need to take into consideration recipient preferences (Harvey and Bailey 2011, Bailey and Hedlund 2012), scale and value of the transfers, convenience to recipients (Devereux 2008) and targeting and 'labelling' of the transfer,

both of which may influence a household's spending patterns (Kooreman 2000, Lyssiotou 2005).

Cash transfers and nutritional outcomes

There is a trend towards developing complementary or alternative approaches for preventing acute malnutrition. In 2014, CTs addressing nutrition accounted for about 11% of the total of cash interventions, but the inclusion of nutritional outcomes has not been the norm (Bailey and Hedlund 2012). The fungible nature of cash is both an advantage and a challenge in terms of achieving specific outcomes (Harvey and Bailey 2011). It has been suggested that for CTs to have a nutritional outcome, they require more explicit nutrition objectives and actions and need to ensure access to quality health services (Leroy et al. 2009, Alderman 2014).

Presently there is limited and inconsistent evidence on the impact of CTP on nutritional outcomes (Ruel and Alderman 2013, Manley 2012). A general consensus is, that transfers (both food and cash/vouchers) are not likely to be efficacious when implemented as stand-alone interventions and are most effective when complemented with other nutrition-sensitive and nutrition-specific interventions (Bailey and Hedlund 2012, Black et al. 2008, Bhutta et al. 2008, Ruel and Alderman 2013, Holmes and Bhuvanendrah 2013).

Gaps in knowledge on impact of cash transfers on nutritional outcomes

There is insufficient empirical evidence to demonstrate that cash is an appropriate substitute for food-based interventions to prevent acute malnutrition in children or mothers, including pregnant and lactating women (PLW), and to understand the circumstances under which CT

Cash transfer for families affected by Typhoon Bopha in the Philippines in 2012

interventions are likely to be effective. The existing evidence of the impact of CT on nutritional outcomes originates mostly from conditional cash transfers implemented in development contexts in Latin America, with mixed results (DFID 2011, Manley et al. 2012, IEG 2011, Gaarder et al. 2010, Fiszbein et al. 2009, Bailey and Hedlund 2012). The focus on nutritional outcomes in these studies centres mostly on children and rarely on women (Holmes and Bhuvanendrah 2013). The possible reasons for mixed results include: (1) differences in programme factors, e.g. additional complementary interventions; (2) different CT design features, e.g. the amount of the CT (Holmes and Bhuvanendrah 2013); (3) differences in evaluation indicators, especially when different indicators are used to measure the same aspect e.g. women's empowerment (Carlson et al. 2014); and, (4) attribution complexity on the other sources of household income, e.g. remittances have not been adequately accounted for (Molyneux 2008).

Complementary interventions
Taking into account the food intake and natural disease cycle, there is a consensus that CTs need to be complemented with other nutrition-specific and -sensitive interventions to maximise effectiveness (Bailey and Hedlund 2012, Black et al. 2008, Bhutta et al. 2008, Ruel and Alderman 2013, Holmes and Bhuvanendrah 2013). In terms of nutritional outcomes, no significant difference was found between the cash only strategy, compared with the food only strategy (Langendorf et al. 2014). Bailey and Hedlund (2012) conclude that cash is unlikely to impact through a health pathway, unless access to quality health services is guaranteed. More evidence is required on the specific impacts and pathways conferred by complementary interventions to CTs and to identify the contexts in which CT complementary interventions are required to prevent or reduce the risk of developing undernutrition.

Design, communication and sustainability
Designing appropriate context specific CT is critical. This requires a good understanding of the enabling environment of a programme. CTs need to be disbursed in a timely and predictable manner, with clear programme guidelines on eligibility, schedule and time periods for entitlements, if households are to manage risks effectively (Barrientos and Scott 2008). The design features of CTs, timing and duration of the intervention, the amount of the transfer, the frequency of distribution, conditionality, modality (cash vs voucher), and the effective communication of CT objectives all have a potential impact on the nutritional success of a CT. At present, evidence of the actual impact is difficult to interpret, and appears to be conflicting and context specific.

Targeting interventions to PLW and younger children, during the first one thousand days window, has greater impact on child nutritional outcomes (Bhutta et al. 2008, Bryce et al. 2008). However limited evidence exists on the impact of emergency CTs on child nutritional status and none on PLW. There is also little evidence on how a CT recipients' gender determines the outcomes, both in the short and longer term (Lyssiotou 2005, Attanasio & Lachene 2002). There is no evidence on longer-term cost-effectiveness of CTs or on the number of cases of malnutrition averted in the medium and longer-term (Bailey and Hedlund 2012).

Behaviours, processes, empowerment, care practices and nutrition impact pathways
Evidence on household level decision-making regarding the use of CTs is limited and difficult to generalise as it is highly context-specific and depends to some extent on socio-cultural norms and individual choices (Barrientos and DeJong 2004). It is important to unpack the factors that determine CT recipient's decision-making, use of the transfer and how this influences child's nutritional status.

Mother's well-being – diet, mental and physical health and empowerment – determines their own nutritional status and their ability to care for their child, which both ultimately affect the child's nutritional status (Carlson et al. 2014, van den Bold et al. 2013). For women and mothers, there appears to be little evidence to indicate the impact of emergency CTs on the underlying determinants of their nutritional status. Improving women's nutritional status is rarely a specific objective; when it is, anthropometric data is not collected to assess an intervention's outcome.

Provision of CTs to women could free up their time by reducing the need to pursue income-generating activities and might have positive outcomes on child feeding and caring practices (Leroy et al. 2009). However, giving women a CT could increase risk of intimate partner violence (IPV). Given the growing evidence of a significant association between IPV and wasting, stunting and underweight (Hasselmann and Reichenheim 2006, Ackerson and Subramanian 2008, Rico et al. 2011, Salazar et al. 2012), this relationship needs to be further unpacked.

Despite some positive examples of improved knowledge and attitudes of mothers enrolled in CTs with complementary education components, more research is needed on how CTs may affect the social and care environment (Bailey and Hedlund, 2012).

Cost-effectiveness
Findings indicate that CTs are potentially an affordable option to fulfil food assistance objectives. However, there remains a large gap regarding the measurement of CT cost-effectiveness generally, and specifically in addressing nutritional outcomes (Hoddinott et al. 2013, Hidrobo at al. 2012, Audsley et al. 2010 & Devereux et al. 2008).

Given these identified gaps in knowledge and evidence around CTs and nutritional outcomes, the REFANI research is geared to address some of these gaps. To stay informed on REFANI studies and activities, please visit www.actionagainsthunger.org/refani or get in touch with Ellyn Yakowenko, email:
eyakowenko@actionagainsthunger.org

Cash transfer in Uganda

Research

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Cash transfers for families affected by floods in Pakistan in 2010

Model farmers at the village demonstration farm in Fada N'Gourma

Experience of intersectoral integration in an NGO nutrition programme and a typology for programme design

Jody Harris, Burkina Faso, 2013

By Aaron Buchsbaum and Jody Harris

Jody Harris is a Senior Research Analyst in the Poverty, Health and Nutrition Division of the International Food Policy Research Institute. A public health nutritionist, her research interest is primarily around the theory and practice of linking the agriculture and health sectors for nutrition outcomes, including the study of intersectoral coordination in government and NGO systems.

Aaron Buchsbaum worked for two years with the USAID SPRING project as a research assistant and as a knowledge management coordinator. Aaron has a technical and academic background in international public health and clinical nutrition, with an interest in agriculture and health policy. He served as a U.S. Peace Corps volunteer in Burkina Faso from 2008-2010, where he focused on community health in a town of 5000 people.

Location: Burkina Faso

What we know already: Multi-sectoral efforts are needed to address malnutrition. There is limited definition of and evidence on how to implement intersectoral actions.

What this article adds: A qualitative assessment of HKI's multi-sectoral homestead food production program explored experiences of how intersectoral action was implemented in practice. The study found that, although the project was designed for beneficiaries to benefit from harmonized agriculture and nutrition activities, little attention was paid to ways program staff could work collaboratively; many found ways to work together in an ad-hoc manner, varying implementation over different program areas. The analysis reveals a typology of different 'modes of integration' which can help program designers explicitly address ways of working across sectors, which should then be monitored and tested for impact.

Malnutrition is fundamentally multi-causal, and efforts to comprehensively address it will therefore necessarily be multisectoral. Two sectors in particular are known to have a direct influence on the underlying determinants of malnutrition: the health sector, in particular public health and hygiene; and the agriculture sector, which generates food and income. But 'development' and 'emergency' nutrition actors are wrestling with how to bring these discrete and differently-oriented sectors together. This case study documents how intersectoral coordination happened in a homestead food production project for improved nutrition outcomes in Burkina Faso, and what this tells us about design of intersectoral programmes more broadly. The analysis offers an early 'typology' of ways to approach integrated projects, which may assist those designing programmes to better articulate how implementers are expected to work across sectors.

Defining and measuring 'integration'

There is now a fairly comprehensive literature on 'what works' in reducing undernutrition, including integrating actions across several different sectors[1]. However, partly due to challenges in the definition and measurement of 'integration', there is a limited literature base from which to gather evidence on how to implement these intersectoral actions. Modes of intersectoral working- or how the sectors can or should interact - are not well defined in the few intersectoral non-governmental organisation (NGO) programmes available for review. Where definitions of integration are made explicit in different studies, they appear to form a continuum moving from less to more coordinated working; each stage along this continuum represents dif-

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[1] Ruel, Alderman at al, 2013. Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? The Lancet 382 (9891): 536–551

ferent levels of interaction between actors in different sectors, but definitions are often unclear. There is a need for further research on different modes of integration in practice, particularly as multiple sectors are increasingly being programmed together.

Context

Burkina Faso is a Sahelian country and, as is the case with many of its neighbours, food insecurity is a major challenge; agricultural production is subject to cyclical crises of drought, heat waves, and flooding. Food access is therefore variable, with an annual hunger season falling between June and September during which staple grain stores are low, and availability of fresh foods varying over the year. Alongside poor access to diverse foods, child feeding practices are often seen to be inadequate in the country, with very low rates of exclusive breastfeeding in infants and late introduction of complementary foods. As a result, levels of chronic undernutrition (manifesting as stunting) remain at around 45 percent.

In response to these challenges, Helen Keller International (HKI) implemented its flagship Enhanced Homestead Food Production (E-HFP) programme model between 2009 and 2012, targeting women and children in 1,200 households across 30 villages. Marrying the health and agriculture sectors within its programmes, the project provided support for home gardening and small animal production alongside messages on Essential Nutrition Actions (ENA). The aim of the E-HFP model is to expand access to nutritious food and to improve knowledge and practices for better nutrition outcomes, specifically iron status and child growth. The project was targeted to mothers of children under two years of age and was designed to 1) increase the availability of micronutrient-rich foods through increased household production of these foods; 2) generate income through the sale of surplus production; and 3) increase knowledge and adoption of optimal health- and nutrition-related practices, including the consumption of micronutrient-rich foods. These pathways were supported by homestead food production activities and nutrition behaviour change & communication (BCC) activities and delivered by a variety of NGO, government, and volunteer trainers.

A number of levels of staffing were involved in the E-HFP project: managers from HKI, partner NGOs, and local government ran the project, overseen by a steering committee. Government field agents and NGO facilitators provided cascades of training and inputs to community-level farmer leaders and health volunteers, who in turn delivered the information to mothers of small children through Village Model Farms and women's groups. These different levels of participant as well as project beneficiaries are the respondents who informed this study, providing their thoughts, experiences, and insights on the design, implementation, and

monitoring of an intersectoral programme from the point of view of those working within it.

At the end of the 3-year program cycle, an independent impact evaluation conducted by the International Food Policy Research Institute (IFPRI) found nutritional impact was limited to increases in children's dietary diversity, intake of iron-rich foods, and small increases in haemoglobin concentrations among young children, but no reduction in stunting[2]. One major conclusion of the study was a need for stronger links to water, sanitation and hygiene (WASH) programming[3], adding an additional sector and therefore further need to understand how sectors can work better together.

Methods

This was a qualitative study, exploring experiences of intersectoral integration in HKI's E-HFP programme in Burkina Faso. The overall research question was: *How and why did different sectors integrate at different programmatic levels within HKI's E-HFP project in Burkina Faso?* Within this, seven sub-questions were articulated[4]; for this article, we choose to focus especially on

the following: *To what extent was any designed-for integration implemented at each programmatic level; how much integrated working was implemented even in the absence of integration in design?* The study was exploratory, and analysis focused on what could be learned about implementing intersectoral action to inform similar future projects.

As part of the planning process for this study, an understanding of how integration was planned within the design of the programme was required. Various documents associated with the programme were reviewed to provide background, and an initial scoping visit to the programme site was conducted, after which a

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2 Dillon et al, 2012. Impact evaluation of HKI's E-HFP programme in Burkina Faso. IFPRI, Washington DC
3 HKI has added this component in their current round of programming, and a multi-country study is assessing impact in collaboration with IFPRI. See http://www.ifpri.org/book-741/node/10328 for details.
4 These questions, along with the full study design and findings, can be found in the full study report at http://www.springnutrition.org/publications/reports/growing- together-experiences-intersectoral-integration-ngo-nutrition-program

Figure 1 Integration by design
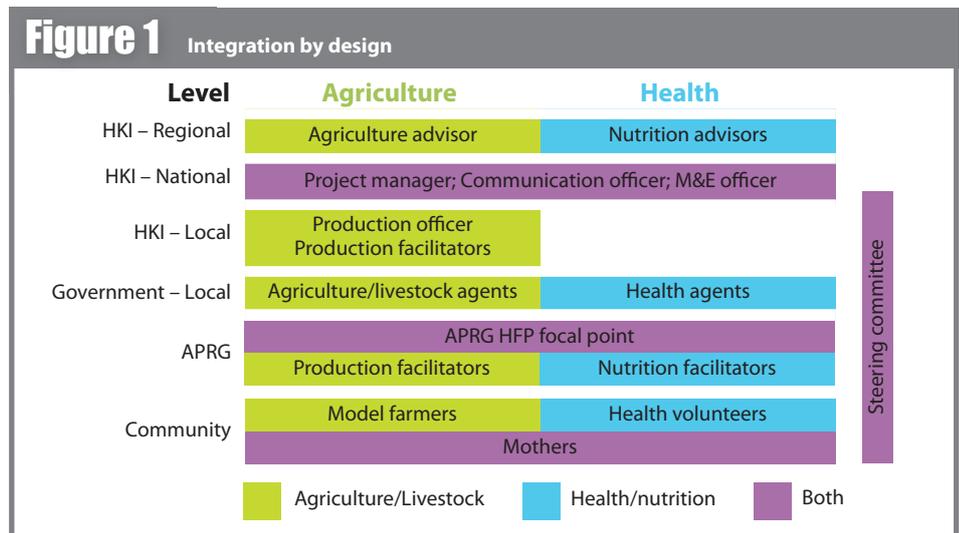
APRG: Association d'Appui de Promotion Rurale du Gulmu; HFP@ Homestead Food Production

Figure 2 Supervision structures
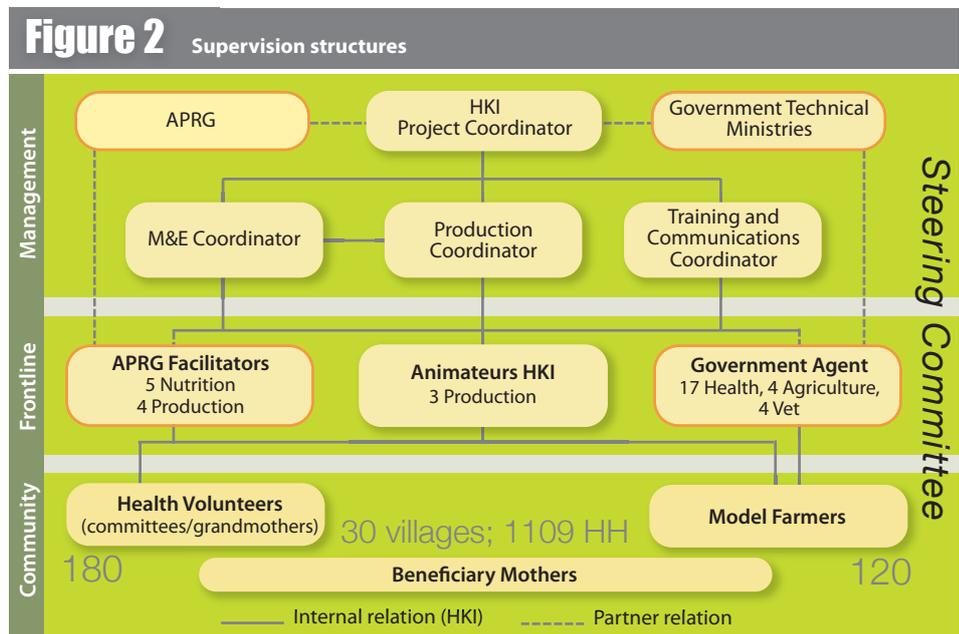
visual tool was constructed to show how integration was envisaged at different levels in initial project design (Figure 1). Subsequently, a published framework[5] guided the creation of a full interview guide, and interviews were undertaken at different levels (management, government and NGO field staff, and beneficiaries) to capture (1) information on any planned integration, (2) how this was realised in implementation, and (3) how these integration efforts were monitored. Interviews were undertaken by a small team of four Burkinabé interviewers (two male, two female) familiar with both French and local languages; each had previously worked on IFPRI qualitative research, and full training on interview methods was given. Data were analysed using framework analysis, with themes compared between respondents of different categories (agriculture versus health sector workers, field workers versus managerial staff, etc.).

Findings

Design and organisation

The project was not designed to integrate sectors at all levels (Figure 1), and management structures reflect the mostly separate sectoral supervision and reporting lines at field level (Figure 2). While budgets in the initial plan were split evenly between agriculture and nutrition, managers reported that in reality, a far larger proportion was spent on agriculture—particularly agricultural inputs for community workers on the agriculture side—than was spent on nutrition BCC/ENA. The major structure in place for intersectoral coordination was the Steering Committee, comprising representatives for each sector at each level from management to beneficiaries. It was convened every six months to discuss project experiences, problems, and results, but was not felt to have achieved its full coordinating

potential, and was said to be mostly a reporting body between different parts of the programme that also made decisions around process issues such as levels of procurement.

Management systems appeared to have evolved as the project progressed, adapting to the competencies of managers on the ground, and there was no reported monitoring of whether or how different sectors were interacting. In the design of the project, there was no HKI manager for the health side below the communications manager in Ouagadougou. Some respondents felt that this left a gap in technical and supervisory capacity on the health side, with BCC/ENA activities left entirely to the local partner NGO[6] in terms of implementation. An innovation in intersectoral supervision was the advent of joint supportive supervision visits: Government and NGO managers from both sectors (health and agriculture) undertook periodic tours together of Village Model Farms to critique and find solutions to issues relating to different sectors. Overall, management was kept within separate sectors both by design and by implementation, other than the intersectoral Steering Committee and joint supervision visits every six months.

"There are no difficulties [in integrating the sectors from a management point of view]; it's just that the managers [at HKI] haven't seen that it is necessary. HKI has a different manager for each sector, who attends only that sector's training. If there was a strategy for integration, it would be very interesting."
– NGO manager

Overall, the major conceptual basis for integration was not made explicit, but appears to

have been through harmonised messaging; while programme managers designed messages to be complementary (and there was intersectoral oversight at the managerial level within each NGO), actors from separate technical sectors were asked to deliver messages separately in the field, and it was at the level of the beneficiary mother where all messages came together. It was therefore down to each mother to put these messages together and create improved nutrition through improved practices, preparation, and consumption of the nutrient-rich foods she produced.

Field-level integration

HKI identified and trained government agents from agriculture and health to provide assistance to frontline workers in the form of specialised training and occasional supervision. Government agents from both sectors were evenly split in terms of their feelings around time pressures for this work, which was in addition to their formal roles. Some felt that they had too little time available for this additional work, that it upset their regular work, and that it was particularly time consuming to gather individuals for meetings or trainings. Others reported no difficulties in undertaking this additional work and were able to organise one set of roles around the other with no conflict with other activities.

Frontline respondents at all levels reported that they were not required by their supervisors to work together in the field with those from other sectors. However, some reported working together anyway; this varied by level, but general motivation for working with colleagues from other sectors was high. Government agents in particular were not told by their supervisors to meet across sectors, and according to these respondents, they never did.

NGO facilitators were also not required to work together in the field, although they were supposed to hold monthly planning meetings together. Some reported working together anyway, for practical reasons (such as companionship on journeys or better planning of coherent training sessions) although this was not mandated centrally, so it was down to individuals to decide and organize joint working. While joint field visits were reported on occasion, few facilitators reported holding joint trainings as a regular event.

At the community level, the picture appears to be more confused; several community-level workers professed that meeting with those working on the other side of the project was not ordered and did not happen; others said it was not ordered but happened anyway; still others said meetings across sectors were ordered and facilitated by supervisors. Again, processes appear to have been ad hoc, depending on the level of initiative taken by supervisors and individuals. Integration in this form was likely to have been uneven throughout the project areas.

A woman in her garden in Fada N'Gourma

Jody Harris, Burkina Faso, 2013

5   Garret and Natalicchio, 2012. Working multisectorally for nutrition. IFPRI, Washington DC
6   Association d'Appui de Promotion Rurale du Gulmu (APRG)

"No, we never initiated a joint activity together. The health volunteers did their work; we did ours. There was no confusion between tasks."
– Village lead farmer

"No, it wasn't planned, but we worked together. The farmer leaders helped often, and I supported them on certain occasions as well. That was a personal initiative and allowed us to pass certain information in a collaborative way, and to show us where our work needed to be completed."
– Community health volunteer

At all levels, the two main benefits of integrated working expressed by respondents were that it capitalised upon collective strengths to deliver complementary interventions, and promoted learning between individuals; disadvantages expressed particularly at higher levels were around practical issues, such as timing of getting to the field together, and work pressures.

Conclusions: thinking through modes of integration

The assumption in all homestead agriculture-nutrition programmes, including HKI's E-HFP project, is that the provision of interventions to improve agricultural production, health behaviour, and empowerment will create synergies that help to improve nutrition outcomes. What is often less explicitly articulated is exactly how these synergies are expected to occur; it is likely that the form of integrated action chosen, and the assumptions underlying these choices, would affect achievement of programme goals. This case study describes how integrated working occurred in the context of one particular programme and sheds some light on how those involved in the E-HFP activity experienced intersectoral working, and suggest some lessons going forward.

While the overall intersectoral goal of delivering harmonised messages and activities to project participants remained throughout the design and implementation of the E-HFP project – and project staff at all levels were generally motivated to work with those from other sectors – intended modes of intersectoral working in practice were not clear in the project design. This is to be expected with a new project where ways of working across sectors are being learned at an organisational level, and aligns with findings from other assessments of intersectoral working. But without explicit attention to these different potential modes of working from the start, intersectoral processes become ad hoc and confused.

Several distinct modes of integration emerged from the interviews and subsequent analysis. These were seen with respect to approaches to targeting, message design, cross-sectoral training, and joint implementation. We have labelled the different modes with words found often in the intersectoral coordination literature but rarely defined; this is not intended to tie a particular word to a particular meaning forever, but only to facilitate this explanation and take discussion forward (Table 1). What emerged ultimately is a tentative typology of different modes of integration (Figure 3) which may help project designers be more explicit about the expected ways of working across sectors, and likewise help researchers test these different modes with a degree of standardisation.

Each of these modes of intersectoral working is being used in parts of the E-HFP project. There would be pros and cons to each mode of integration in different contexts (such as availability and initial level of understanding of actors from different sectors, project aims, existing extension systems etc.); these would need to be thought through for each particular project, and one or more modes of integration chosen accordingly.

In future projects involving cross-sectoral working, programme designers and managers should pay explicit attention to modes of integration at the design stage, thinking about strategies as well as day-to-day processes for collaborative working, about how to track and monitor whether these are happening during implementation, and about how to assess whether different modes affect impact. This learning can start to improve ways of working in complex intersectoral programmes such as those required for tackling malnutrition.

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Table 1 — Definitions of words in the typology

	Similar targeting?	Harmonised design?	Cross-sectoral training?	Joint implementation?
Co-location	Yes	No	No	No
Coordination	Yes	Yes	No	No
Collaboration	Yes	Yes/No	No	Yes
Cross-training	Yes	Yes/No	Yes	No
Integration	Yes	Yes	Yes	Yes*

*Implementation is by a single cross-trained individual

Figure 3 — Typology of modes of integration

1. **Co-location:** Different sectoral programmes are implemented in the same place with similar targeting; assumptions of synergy even in the absence of coodinated design.

2. **Coordination:** Design of programme elements or messages is harmonised between sectors, but training and implementation are separate.

3. **Collaboration:** Field workers with separate sectoral training come together to implement joint activities within a programme (which may or may not be coordinated by design).

4. **Cross-training:** Field workers receive cross-sectoral training for improved understanding, but programme elements (coordinated or not) are delivered by each sector separately.

5. **Integration:** Field workers receive cross-training and individuals are expected to deliver coordinated programme elements from more than one sector.

Watering can, © Dominic Chavez/World Bank

A typical view over the mid hill areas of the Mid-Western Region of Nepal

Improving food security and addressing nutrition of vulnerable farming communities affected by conflict and natural disaster in mid-western Nepal

By Guido Agostinucci

Guido Agostinucci is an agronomist who collaborated with the Faculty of Agriculture of the University of Viterbo and worked as consultant with FAO since 2008. He worked in Nepal as field operations officer and is currently working as consultant on the Syria crisis.

Location: *Nepal*

What we know already: Due to longstanding internal conflict and recurrent natural disasters, chronic food insecurity is widespread in agricultural Nepal. There are benefits in linking nutrition with agriculture and emergency response with longer term programmes.

What this article adds: An FAO led project, to improve food security and nutritional status and decrease aid dependency in households in mid-western Nepal, enhance crop and livestock production, increase availability of diverse nutritious foods, improve household self-sufficiency, and enhance nutrition knowledge and awareness.

Nepal is among the poorest and least developed countries in Asia with almost one-third of its population living below the poverty line. About 32% of the total area and 28% of the total population of Nepal are exposed to risks from natural disasters. Agriculture is the mainstay of the economy, providing a livelihood for 66% of the population and accounting for 39% of the country's Gross Domestic Product[1]. As a result of a decade long internal conflict from 1996 to 2006, an unstable political situation and recurrent natural calamities[2], the Nepalese population, especially the most vulnerable and marginalised segment, continue to suffer from both immediate and long term effects of such events. Chronic food insecurity is pervasive and widespread throughout the country, with localised pockets of extreme food deficiencies. Contributing factors include land ownership issues, geography (landlocked country with vast mountainous terrain) and difficult physical and economical accessibility to agricultural inputs, such as improved crop seeds and fertilisers.

Nepal has the highest malnutrition prevalence in Asia;[3] half of Nepalese children under the age of 5 are stunted (low height-for-age) as a result of chronic malnutrition[4]. The situation is even worse in Far and Mid-Western regions of the country, particularly in hilly and mountainous regions[5] due to factors including low agricultural productivity, limited purchasing power of the local population, high food prices prevailing in the markets, geographical isolation and underdeveloped market linkages.

Project overview

Due to the combined effects of the conflict, ethnic tensions, occurrence of floods and landslides in addition to three consecutive years of drought, both local food production and the food security status of the most vulnerable section of the population in a number of districts of the Mid-Western region of Nepal, were severely weakened. In response, the Food and Agriculture Organisation of the United Nations (FAO) formulated a project aimed at improving the food security and nutritional status of affected vulnerable farming communities with the ultimate goal of reducing their dependency on external food aid. The main goals of the project were to: a) increase vegetable and cereal production for household consumption and income generation; b) improve post-harvest capacities; c) replace livestock assets and ensure better animal health care; and d) improve nutritional knowledge and dietary practices through nutrition education.

1   MoAD, 2013. Department of Agriculture, Ministry of Agriculture Development. http://www.doanepal.gov.np/

2   Nepal is one of the 20 most disaster-prone countries in the world. NRRC, 2011. Disaster Risk Reduction in Nepal: Flagship Programmes. Nepal Risk Reduction Consortium (NRRC), Kathmandu.

3   Hobbs, C., 2009. The cost of coping: A collision of crises and the impact of sustained food security deterioration in Nepal. United Nations World Food Programme, Kathmandu.

4   Shively, S., Gars, S. and Sununtnasuk, C., 2011. A Review of Food Security and Human Nutrition Issues in Nepal. Purdue University, West Lafayette.

5   OCHA, 2008. Nepal Needs Analysis Framework Key Findings September 2008. United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). Kathmandu

View over a typical farm household in the mid-hills of Pyuthan, Nepal

While the Mid-Western Region of Nepal was selected as the main region of project implementation, being the cradle of the decade long conflict, the specific areas for project intervention were selected on the basis of a pre-established set of criteria as follows:

- Incidence of conflict-induced deaths, injuries and handicaps
- Number of displaced people due to the conflict
- Incidence of conflict-related damage to infrastructure
- Vulnerability to droughts, landslides and hailstorm
- Occurrence of plant and livestock diseases
- Absence of projects providing similar kinds of support.

Based on these criteria, the districts of Jajarkot, Pyuthan, Salyan, Rolpa and Rukum were targeted. Beneficiaries within each district were selected according to the following criteria:

- Households affected by conflict with a special focus on female headed households, families with three or more children and internally displaced persons
- Disadvantaged groups, such as Dalit and Janjati individuals
- Households in remote areas
- Very poor families with food self-sufficiency for less than six months per year
- Households with no irrigation facilities
- Households affected by crop and livestock diseases
- Landless households for livestock related activities
- Households with less than 2 ropani (0.1 Ha) of land.

In 2008, the project was funded by the Kingdom of Spain and related activities were implemented from June 2008 to December 2009. The project was implemented directly by FAO in close partnership with the Department of Agriculture (DoA) and the Department of Livestock Services (DLS) of the Ministry of Agriculture and Cooperatives (MoAC). It involved collaboration with Village Development Committees (VDC), District Development Committees (DDC), Ministry of Health and Population (MoHP) and other UN agencies. Project implementing partners belonging to community based organisations (CBOs) and non-governmental organisations

(NGOs) were also essential for effective and efficient implementation of project activities.

Project activities

Project activities were divided into three components: a) crop production, which included training and provision of cereal and vegetable seeds to farmers; b) livestock production which included provision of goats and training, veterinary equipment and shed construction materials and c) nutrition education, including Trainings of Trainers (ToT) and trainings for beneficiaries. In addition, given the agro-ecological diversity of the country and in order to select the most appropriate production packages and cultivation techniques, differentiations were made based on the altitude at which beneficiaries were cultivating their crops. Accordingly, project areas were divided into high hill areas (> 1,800 metres above sea level (m.a.s.l)), mid hill areas (800 to 1,800 m.a.s.l) and low hill areas (< 800 m.a.s.l). In high hill areas, the project supported the production of wheat (Triticum aestivum) and maize (Zea mays), in addition to goat husbandry. In mid hill areas, wheat, maize, finger millet (Eleusine coracana), winter (radish, turnip, broadleaf mustard, pea, French bean, carrot, cabbage onion, cauliflower and broccoli) and summer (cucumber, French bean, tomato, okra and chilli) vegetables were grown. As for the livestock sector, beneficiaries located in mid-hill areas were also supported on goat husbandry. In low hill areas, the crops supported were wheat, summer and winter vegetables. In addition, beneficiaries also received support on goat production.

The choice of the 20 species of crops to be supported for production was based on their adaptation to the local agro-conditions and on their nutritional value. The selected varieties were those preferred by local farmers and approved by the MoAC. Similarly, for the livestock production component of the project, animals adapted to local climatic and feeding conditions were selected and procured locally; this also prevented transport induced stress. In addition, nutrition education activities were implemented in all three agro-ecological areas covered by the project.

Results

A total of 15,768 beneficiary households were supported by the project. Out of these, 14,173

households undertook crop production activities, 1,595 households were involved in livestock production and 8,670 families actively participated in nutrition trainings. Just under one quarter (23.7%) of beneficiary households were headed by women while 55.2% belonged to marginalised communities such as Dalits and Janjatis. Overall, 7.4% of beneficiary families assisted by the project had been directly affected by the conflict through displacement, loss of a family member and/or loss of production assets. A total of 144 community health workers participated in FAO's TOT sessions on nutrition. The project also enhanced the capacity of NGOs, Government bodies, CBOs, veterinary staff and extension workers who were directly involved in project implementation. Detailed results by project component are as follows:

a) Crop production

While seed species were chosen based on their suitability to the different agro-ecological areas, priority was given to crops that would contribute most to food security and dietary intake. Both winter and summer cereals were chosen so as to provide the bulk of the food and energy in the form of carbohydrates. Winter and summer vegetables were selected so as to provide essential vitamins and minerals. The agriculture sector training programme was divided into summer and winter cropping seasons and included TOTs and trainings for beneficiaries. In each district, staff from the DoA and implementing partners were trained on technical matters specific to each crop, as well as on how to select seeds for multiplication and quality testing. Training and communications strategies were also an important topic of the ToTs which were essential to transfer acquired knowledge efficiently. The beneficiary training sessions were carried out at village and settlement levels and included valuable topics such as nursery preparation, crop management issues to enhance crop productivity, sensitisation on post-harvest losses and physiological maturity

A farmer assisted by the project shows her vegetable garden

of vegetables, seed selection and preservation for future planting. All beneficiaries received a pictorial handbook to reinforce learning.

b) Livestock production

A total of 3,296 goats (3,190 does and 106 bucks) were distributed to 1,595 households with each family receiving two does. In addition, one in every 15 households was provided with a high quality buck to be shared for breeding purposes amongst the community. Roofing materials for the construction of an improved design of sheds for the recovery of animals were also provided to all livestock beneficiaries. Remaining shed construction materials and the necessary labour for the construction were taken care of by the beneficiaries themselves; this confirmed ownership and commitment to the activity. In each district, a set of veterinary equipment was provided to the District Livestock Service Office (DLSO) to ensure the provision of essential veterinary services such as artificial insemination, vaccination, disease diagnosis and training. All livestock beneficiaries received a comprehensive training on goat rearing in addition to a pictorial handbook to reinforce learning. The trainings were organised through ToTs for NGOs and government staff.

c) Nutrition education

The sensitisation programme on nutrition was carried out through the support of Female Community Health Workers (FCHWs) who were selected from FAO's existing partners in each VDC. FCHWs and FAO's implementing partners were trained through a series of ToTs and subsequently passed on the acquired knowledge by organising nutrition education training for beneficiaries. These specifically focused on pregnant and breastfeeding women, women with children below five years of age, elderly people and poor households. Topics included practical demonstrations on how to select and prepare nutritious foods, nutritional practices for different age groups and hygienic recommendations for food preparation. Ingredients utilised during the preparation of nutritious food included those deriving from crops grown with the support of the project. In order to support training efforts on nutrition education, two different handbooks were developed - one handbook reinforced nutrition knowledge of community mobilisers while the second targeted nutrition education at beneficiary families.

Impact

The project significantly enhanced the crop and livestock production capacities of the beneficiary households. As part of the crop component of the project, approximately 8,120 hectares of vegetables and cereal crops were planted. Compared to local varieties cultivated with traditional methods, average yield increases ranged between 10% and 25% while higher resistance to local pests and diseases were observed (see Table 1 for details). Because of this, most beneficiary farmers decided to re-plant second generation seeds of rice, maize, wheat and finger millet, as well as some vegetable species distributed by the project. Moreover, the significant number of species and varieties of crops supported by the project increased awareness amongst farmers on the importance of crop diversity, thus lowering the risk of total crop failures to which monocultures are more susceptible. The importance of choosing quality seeds and the fact that these are the least expensive but most important factors influencing yield potential were other fundamental concepts learnt by farmers. Thanks to the project, the availability of second generation quality seeds at the local level increased considerably. Beneficiaries also gained a better consciousness of the nutritional content of each crop species, allowing them to have more balanced and nutritious diets.

In terms of livestock activities, the project allowed a more sustainable improvement of the goat sector and increased the availability of animal products which represent an important source of protein. On average, each beneficiary was able to add between one and two units to their goat flock after the first year of the project. The provision of essential veterinary equipment to district level government livestock service providers ensured support to farmers beyond the duration of the project. Moreover, capacity development in livestock production was institutionalised through TOTs to key government personnel and partner NGOs.

The nutrition component of the project bridged the agriculture and livestock sectors. Nutritional status or food consumption was not directly measured. However dietary diversification was supported by promoting the availability of vegetables and animal proteins; the number of vegetable species grown increased from an average of 3.7 prior to the project intervention,
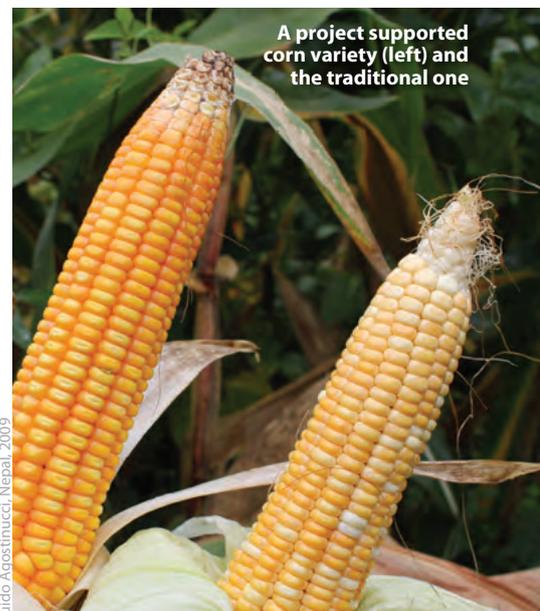
A project supported corn variety (left) and the traditional one

Guido Agostinucci, Nepal, 2009

to 5.1 by the end of the project. The number of months for which beneficiaries consumed self-produced vegetables also increased, from 3.3 months to 4.3 months a year. There was a fall in the number of beneficiary households reporting food self-sufficiency for less than 6 months a year (81% to 67%) and an increase in those with more than six months self-sufficiency (from 19.2% to 33%). The increased number and availability of goats and goat products in the communities is assumed to have increased consumption of proteins from animal origin. The nutrition component of the project also enhanced the nutritional knowledge of beneficiaries and increased awareness of nutritious and locally available food. It raised awareness about the importance of associating nutrition with agriculture, as well as linking emergency responses in such sectors with medium and long-term programmes.

The activities carried out under the project were replicated and expanded to some additional ten districts in a subsequent FAO project which was funded by the European Union. Likewise, the training materials produced by the project were utilised by the Department of Agriculture and Department of Livestock Services for their capacity building programme and ToTs of personnel.

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Table 1 — Average crop yields and impact of crop production activities per crop type

	Maize	Wheat	Rice	Finger millet	Summer and winter vegetables
Average baseline yield data (t/Ha)	1.47	1.22	1.88	1.03	11.98
Average yield after project (t/Ha)	1.76-1.84	1.4-1.5	2.0-2.2	1.18	n.a.
Area cultivated with project support (Ha)	1,206	1,120	155	4,743	448 x 2
Additional impact of project activities	20-25% yield increase, better quality fodder, shorter production cycle, reduced vulnerability to lodging, self-production of seeds by farmers	15-20% yield increase, improved varieties utilised, a portion of production kept as seed for next planting season	10-15% yield increase, self-production of seeds by farmers	Promotion of its use intercropped with maize, important nutritional crop	Each household cultivated an average of 350 m², promotion of vegetable production and consumption for improved nutrition, new species introduced, approx. 20% of production sold for income generation

Support to breastfeeding is one aspect of IYCF-E included in the IYCF-E Toolkit

Infant and Young Child Feeding in Emergencies (IYCF-E) –Toolkit for implementation

By Britni Burkhardsmeier (Programme Coordinator, Save the Children USA), Nicki Connell (Emergency Nutrition Advisor, Save the Children USA) and Sarah Butler (Emergency Nutrition Team Leader, Save the Children USA)

Overview of IYCF-E Toolkit

Disruption and displacement of populations in emergency situations greatly impacts the health and nutritional status of infants and young children. Adequate nutrition and care of children has been identified as one of the key factors to promote child health and survival. Consequently, Infant and Young Child Feeding in Emergencies (IYCF-E) support has become a major strategy in reducing child morbidity and mortality during humanitarian emergency responses.

In 2013, Save the Children developed an IYCF-E Toolkit for use by the global community during emergency responses. The aim of the initiative was to provide assistance to field practitioners on creating successful IYCF-E programmes that will work with parents and communities to protect, promote and support safe and appropriate IYCF-E practices. The IYCF-E Toolkit is available online on Save the Children's Emergency Health and Nutrition external website . Since being created in 2013, the toolkit has already undergone a modification process in order to make it more user-friendly. In addition, some documents in the Toolkit have been piloted in the Typhoon Haiyan response in the Philippines in 2013-2014. In order to facilitate accessibility, the Core Toolkit has been translated into Arabic,

available now on the website, and is currently being translated into French, which will be available early 2015.

The IYCF-E Toolkit consists of three main folders – Core Toolkit, Key Implementation Resources, and References – in the following layout:
1. Determine the Need
2. Programme Planning
3. Caseload and Supply Needs
4. Staff
5. Orientation and Training
6. Proposal Development, Monitoring and Reporting
7. Policy
8. Coordination and Communications

The Core Toolkit includes all documents considered essential for planning and implementing an IYCF-E response. The Key Implementation Resources include sample job descriptions and supervision checklists. The References include all key guidelines and manuals related to IYCF-E including agency-generated materials (e.g. Concern Worldwide, Action Against Hunger and CARE). The IYCF-E Toolkit was developed in conjunction with Save the Children's field offices, which shared documents that had already been developed and which were then adapted for application to multiple contexts.

Middle East regional training

Using the same funding from USAID's TOPS programme and Save the Children USA's internal funding including the IDEA Fund, Save the Children led a Middle East Regional IYCF-E Training from 28th September – 2nd October, 2014 in Istanbul, Turkey. Save the Children identified the need to deliver IYCF-E training when it became apparent that comprehensive IYCF-E trainings are not common globally, particularly in relation to implementation of IYCF-E programmes. With the IYCF-E Toolkit version 2 recently developed, it was an ideal time to hold a training that also orientated participants to the IYCF-E Toolkit so tools could be put into use effectively. The Middle East was identified as the priority region given the recent IYCF-E challenges specific to the Syria response.

Save the Children, International Medical Corps, World Food Programme, World Vision, Support to Life, International Orthodox Christian Charities and Physicians Across Continents were represented by the fifteen participants who attended the training. Four facilitators provided expertise and instructions throughout the training. Two of these facilitators were from Save the Children (an Emergency Nutrition Advisor and an IYCF-E Advisor), the third facilitator was a Lecturer and Assistant Director of Nursing from the University of Balamand, Lebanon and the fourth facilitator was a Mental Health & Child Care Practices Advisor from ACF. In addition, Save the Children invited two guest speakers: the Save the Children/UNICEF Regional IYCF Advisor and Save the Children Jordan's Nutrition Coordinator, in order to ensure the training was tailored to the regional context.

The five day training consisted of technical and practical sessions. The technical sessions focused on key IYCF-E areas considered priorities for the Syria response, such as relactation and

the use of breastmilk substitutes. Practical sessions focused on a simulated case study response. This structure allowed the participants to strengthen and apply the technical knowledge that they were learning and to provide constructive feedback about the tools in the toolkit.

The training also provided a unique opportunity for the facilitators to learn from the participants about the challenges faced in the Syria response with regard to IYCF. This information was largely gained during the following sessions: *Why is IYCF-E Important in the Syria Response; Challenges with IYCF-E in the Syria Response; Myths and Misconceptions and the Panel Discussion on Breastmilk Substitutes.* Valuable information was gained and captured from the participants and has since been fed back to the Infant Feeding in Emergencies (IFE) Core Group, in order to widen the evidence base for IYCF programming in the Syria response. Daily feedback from the participants and an evaluation at the end of the training was very positive. The training was useful and informative, participants

planned to share information with colleagues and to make adjustments to their IYCF-E interventions as needed. The IYCF-E Toolkit was considered very comprehensive and useful for future IYCF-E responses.

As this was the first IYCF-E training that Save the Children has conducted, there were many lessons learned. The facilitators acknowledge that IYCF-E is a huge technical area and could be a two to three weeks training at least, if all topics are covered. Therefore regional priorities must be identified and the agenda for similar one week, regional trainings should be tailored to the audience with further adaptation based on participant feedback. The sessions matched the layout of the IYCF-E Toolkit, which worked well. The case study simulation was very helpful in building confidence to apply the toolkit.

Future plans
As the toolkit was created in 2013, there are additional updates and modifications that have

been identified which need to be incorporated. Therefore, pending further funding, it is recommended that a Version 3 is produced during 2015 in order to update technical aspects in line with recent research. It is also recognised that the IYCF-E Toolkit should be more extensively piloted in additional emergency response settings to confirm that the Toolkit is as relevant, practical and easy to use as was originally intended. To date, some documents in the IYCF-E Toolkit have been used in the Typhoon Haiyan response in the Philippines in 2013-2014 but a comprehensive pilot in multiple settings would strengthen the Toolkit further.

It is intended to roll out further IYCF-E trainings in additional regions and countries where the need is identified. Save the Children is securing funding to do this.

For any comments, questions or to discuss interest in piloting the IYCF-E Toolkit during 2015, please email:
iycfetoolkit@savechildren.org

Hunger And Nutrition Commitment Index (HANCI)

The Hunger And Nutrition Commitment Index (HANCI) is a project of the Institute of Development Studies (IDS) with funding from Irish Aid, UKAid and Children's Investment Fund Foundation (CIFF). The project produces an annual index[1] (now in its second year) that ranks governments on their political commitment to tackling hunger and undernutrition[2]. It works with partners in five countries (Bangladesh, Malawi, Nepal, Tanzania and Zambia) to analyse government action on hunger and undernutrition in more detail and to support advocacy.

Hunger and undernutrition are amongst the most persistent global development challenges. Reasons for insufficient progress in reducing hunger and undernutrition include lack of political will or political prioritisation. Strong and high level political commitment is essential to prioritise the fight against hunger and undernutrition.

The HANCI comprises two sub-indices: the Hunger Reduction Commitment Index (HRCI) Scores and the Nutrition Commitment Index (NCI) Scores. The Indicators comprise a Developing Country Index and a Donor Country Index. There is not a strong correlation between the country ranks of NCI and HRCI (i.e. commitment to hunger and nutrition are not the same thing).

Developing Country Index
HANCI compares and ranks the performance of 45 developing countries based on 22 indicators of political commitment. The indicators are split between indicators of commitment to hunger reduction (10 indicators) and indicators relating to commitment to addressing undernutrition (12 indicators) and both are grouped under three themes:
- Laws (legal frameworks, e.g. the level of constitutional protection of the right to food)

- Policies (government programmes and policies, e.g. the extent to which nutrition features in national development policies/ strategies)
- Spending (public expenditures, e.g. the percentage of government budgets spent on agriculture)

Donor Country Index
The HANCI project also produces an index to determine overall political commitment of donor countries to tackling hunger and undernutrition. This considers factors such as the amount of aid given for agriculture, food security and nutrition, and policies and treaties that could impact on hunger and nutrition levels in poor countries. The donor country indicators are applied to 23 OECD member countries that are compared based on 14 indicators. These indicators are split between indicators of commitment to hunger reduction (9 indicators) and indicators relating to commitment to addressing undernutrition (5 indicators). These are grouped in two ways: 1) policies, programmes and legal frameworks and 2) public expenditures.

For more information, including the 2013 report and latest news, visit: **http://www.hancindex.org/**

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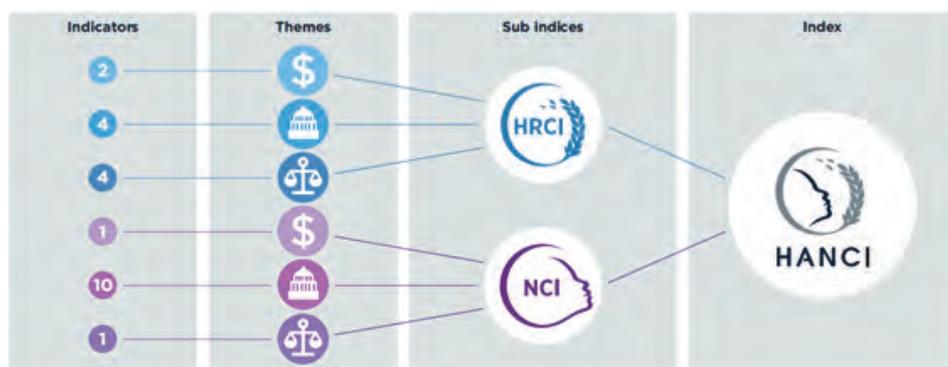
[1] http://www.hancindex.org/the-index/
[2] Hunger is the result of an empty stomach; it makes people more susceptible to disease and thus leads to increased illness and death. Undernutrition is related to, though subtly different from, hunger. Undernutrition results from both a critical lack of nutrients in people's diets and a weakened immune system. Undernutrition is not only a consequence of hunger, but can also exist in the absence of hunger, and can be caused by non-food factors.

Global Nutrition Report

This Global Nutrition Report (GNR) is the first in an annual series. It tracks worldwide progress in improving nutrition status, identifies bottlenecks to change, highlights opportunities for action, and contributes to strengthened nutrition accountability. The report series was created through a commitment of the signatories of the Nutrition for Growth (N4G) Summit in 2013. It is supported by a wide-ranging group of stakeholders and delivered by an Independent Group of Experts in partnership with a large number of external contributors.

The GNR assembles copious country-level data and other information and highlights the experiences of a large number of countries from Africa, Asia, Europe, Latin America and the Caribbean, North America, and Oceania. It measures progress that each country is making towards the World Health Assembly (WHA) nutrition targets (wasting, anaemia, low birth weight, stunting, breastfeeding and overweight); for this first edition, it was only possible to assess country progress on meeting four of the six WHA indicators (stunting, wasting, overweight, and anaemia). It also presents data on the overlap between nutrition problems, e.g. stunting and wasting, stunting and obesity. The Report goes further than the WHA targets, bringing together 70 nutrition indicators in country-by-country profiles in the following areas: nutrition outcomes, determinants, programme coverage, resources and political commitments. It tracks the specific Nutrition for Growth (N4G) commitments made in London in June 2013.

Some of the report's key findings are as follows.

Investments in nutrition have high returns. Newly calculated benefit-cost ratios for scaling up nutrition interventions in 40 countries (median

16:1) are highly competitive with investments in roads, irrigation, and health.

All countries in the world (with the exception of two), that collect nutrition data experience stunting, anaemia, or adult overweight. Multiple burdens of undernutrition and overweight/obesity are the "new normal"; most countries experience some combination of under-five stunting, anaemia in women of reproductive age, and adult overweight.

The world is not on track to meet any of the six WHA nutrition targets. Globally, little progress is being made in decreasing rates for anaemia, low birth weight, wasting in children under the age of five, overweight in children under five years, and in increasing exclusive breastfeeding rates. More progress has been made in reducing stunting rates in children under five, but not enough to meet the global target under current projections.

Despite a poor global picture, on a country-by-country basis, many countries are making good progress in improving nutrition outcomes.

- Of the 99 countries for which data are available, 68 are on course for at least one of four WHA global targets (31 are not on course for any).
- Out of 109 countries that have data on stunting of children under age five, 22 are on course for meeting the WHA target.
- Out of 123 countries with data on wasting of children under age five, 59 are on course to meet WHA targets. Out of 107 countries with data on overweight of children under age five, 31 are on course.
- Only 5 out of 185 countries with data on anaemia are on course for anaemia reduction.

There is great potential to learn from country experiences, but it is not being exploited because of a lack of country case studies that examine the wide range of factors affecting progress. There are plenty of examples of country-level progress from which to draw inspiration and insight; the GNR makes particular reference to experiences from the Indian state of Maharashtra (where indications are that stunting has declined in under 5's by 10 million), Bangladesh, Brazil, and the United States.

Coverage of nutrition-specific interventions – and national coverage data – is low. Many countries have national coverage data for only three of the 12 key nutrition-specific interventions (vitamin A supplementation, zinc treatment for diarrhoea, and universal salt iodisation). Given the lack of progress on wasting rates, the lack of coverage data for programmes to treat moderate and severe acute malnutrition (MAM and SAM) is a major concern. Geographic coverage is poor, even in countries with very large burdens of SAM. Direct coverage estimates are needed to

properly assess people's access to treatment for both MAM and SAM.

Estimates of undernourishment based on food supply are decreasing but remain high. Access to improved water and sanitation services is steadily improving, although large coverage gaps remain in Eastern, Western, and Middle Africa for water and in Southern and South-Eastern Asia and most regions of Africa for sanitation. Trends in female secondary education enrolment are positive for all regions, although the rate is still just 50% for Africa. Health services are still lacking in Africa and Asia.

The GNR presents data on government expenditures on the related sectors of agriculture, education, health, and social protection; this varies between and within regions. Social protection spending[1] is increasing rapidly in many African and Asian countries. Evidence is limited on how to make interventions that address underlying determinants more nutrition sensitive. The report offers some ideas for agriculture, social protection, education, health, and water, sanitation, and hygiene.

The vast majority of countries do not currently track their financial commitments; spending by donors is clearer than spending by countries. The GNR reports committed[2] and disbursed[3] funding by donors for which data were available. Multi-year commitments may be made in one year but disbursed over several years. There is some variation in how disbursements are reported[4]. Between 2010 and 2012, commitments from 13 donors on nutrition-specific interventions rose by 39%, and disbursements rose by 30%. Nutrition-sensitive donor commitments declined by 14%, but nutrition-sensitive disbursements for the 10 donors that reported data increased by 19%. The percentage of official development assistance disbursed to nutrition in 2012 was just above 1%.

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1. Government outlays on social protection include expenditures on services and transfers provided to individual persons and households (e.g. sickness and disability, old age, survivors, family and children, unemployment, housing, social exclusion) and expenditures on services provided on a collective basis (e.g. government policy, legislation and standards for providing social protection, applied research and development) (Source: UN Statistics Division, http://unstats.un.org/). Source of GNR data: International Food Policy Research Institute (IFPRI). Statistics of Public Expenditure for Economic Development (SPEED) 2014.

2. For all donors, *commitments* represent the total amount reserved by a donor, backed by the appropriation or availability of the necessary funds, to provide a specified amount of resources for the benefit of a recipient country, agency, or non-governmental organisation.

3. Australia, Canada, EU, France, Germany, Ireland, Netherlands, Switzerland, UK, US, Bill and Melinda Gates Foundation, Children's Investment Fund Foundation, World Bank.

4. For example, the EU 2012 total disbursement figure represents all disbursements made against their 2012 commitments, regardless of the year in which they are disbursed. All other donors have reported their disbursements against commitments made in current and previous years.

| **Box 1** | **Essence of the Global Nutrition Report** |

- Notes the truly global nature of malnutrition – nearly every country has crossed the 'red line' on nutrition
- Argues that multiple burdens of undernutrition and overweight/obesity are the "new normal"
- Documents global and country progress - who is on course for what and why
- Argues for stronger nutrition representation in the Sustainable Development Goals (SDGs) and more ambition on SDG targets for 2030
- Makes recommendations on actions to accelerate malnutrition reduction
- Evaluates progress on the N4G commitments – who is on course and who is not
- Identifies key data gaps that need to be filled
- Makes recommendations on how nutrition accountability can be strengthened

Source: Blog post from 10th November 'ICN2: Time for Leadership - in Nutrition and in Accountability': http://www.developmenthorizons.com/2014/11/icn2-time-for-leadership-in-nutrition.html

The Scaling Up Nutrition (SUN) process score approach[5] was noted for being a participatory measurement process that stimulates reflection among stakeholders on how they can strengthen coordinated action on nutrition. Reporting on the 2013 N4G commitments was challenging; the assessment will be strengthened in 2015.

Actions are identified to strengthen accountability in nutrition – civil society actors, national evaluation platforms, community feedback mechanisms and national and international nutrition research programmes all have a role.

There are many gaps in data on nutrition outcomes, programmes and resources. Ensuring all countries can report on the WHA indicators is a priority for governments and UN agencies. Data gaps may be holding back action on anaemia, overweight/obesity, and low birth weight. Gaps holding back scale up and context specific interventions include data on countries' capacity to implement and scale up nutrition actions, programme costs, and financial resource tracking. Not all data gaps need to be addressed by new data, but by better utilisation of existing data.

Almost all countries suffer from high levels of malnutrition. The GNR calls for countries to make a common cause and exploit opportunities to learn from each other.

To access the report and related resources (including 12 technical notes, datasets, country profiles, interactive data maps) visit: **http://globalnutritionreport.org/**

Technical Note 1 provides all data sources and definitions used for the indicators in the Country Profiles and detailed description of some of the data and indicators used.

5   http://globalnutritionreport.org/files/2014/11/gnr14_tn_n4g_11sun_secretariat.pdf

Global Hunger Index Report

The 2014 Global Hunger Index (GHI) report – the ninth in an annual series – presents a multidimensional measure of national, regional, and global hunger in the shape of the Global Hunger Index (GHI). The GHI is produced in a collaborative effort between the International Food Policy Research Institute (IFPRI), Concern Worldwide and Welthungerhilfe. This GHI is a composite measure of hunger that combines three (equally weighted) measures:

- Undernourishment (food supply based)
- Underweight of under 5's (capturing food, care and health), and
- Under 5 mortality rates (capturing the interplay of diet and infection).

The tool is designed to comprehensively measure, analyse, track and record the state of hunger worldwide, highlighting the countries and regions where action is most needed. It is intended to mark country level progress, incentivise and guide action, and strengthen accountability. Global, regional and national trends can be observed and analysed.

According to the 2014 GHI, the state of hunger in developing countries as a group has fallen by 39% since 1990; overall absolute scores have declined from 20.6 in 1990, to 12.5 in 2014. Over the same period, 26 countries reduced their scores by 50% or more. In terms of absolute progress, comparing the 1990 GHI and the 2014 GHI, Angola, Bangladesh, Cambodia, Chad, Ghana, Malawi, Niger, Rwanda, Thailand, and Vietnam saw the biggest improvements in scores.

However, the level of world hunger is still "serious", affecting 805 million people. The global average obscures dramatic differences across regions and countries. Regionally, the highest GHI scores (highest hunger levels) are in Africa south of the Sahara and in South Asia, which have also experienced the greatest absolute improvements since 2005. South Asia saw the steepest absolute decline in GHI scores since 1990; progress in addressing child underweight was the main factor behind this. Levels of hunger are "extremely alarming" or "alarming" in 16 countries, with Burundi and Eritrea both classified as "extremely alarming." Reliable data for the Democratic Republic of the Congo and Somalia, however, are lacking.

This year's report focuses on 'hidden hunger' – also called micronutrient deficiency - that is often overlooked and affects more than an estimated 2 billion people globally. The repercussions of these vitamin and mineral deficiencies are both serious and long-lasting. The GHI shows that progress on some micronutrient deficiencies is worryingly slow. While some success has been made, particularly for Vitamin A supplementation for children under-5 and universal salt iodisation, anaemia reduction is falling far short of the targets (only five out of 185 countries are on course to meet the World Health Assembly (WHA) targets for women of reproductive age[1]). Some of the reasons for the slow progress on anaemia might include:

- Lack of awareness of the magnitude of the problem due to difficulties of accurate measurement and poor understanding that anaemia results not only from poor quality food, but also is a result of parasitic and infectious diseases.
- Lack of awareness of our current slow progress and poor understanding of the economic consequences (e.g. lethargy and fatigue render the workforce less productive).
- It affects women more than men.
- Lack of appropriate platforms to deliver interventions at scale to key target groups.

A number of recommendations are made in the 2014 report as steps to eliminate hidden hunger. In addition to demonstrable political commitment by Government, there is a need to build capacity in nutrition through investment and development of human and financial resources by Governments and multilateral institutions, increased coordination, and transparent monitoring and evaluation. Governments must also create a regulatory environment that values good nutrition, e.g. creating incentives for private sector companies to develop more nutritious seeds or foods. Transparent accountability systems are needed in order to ensure that investments contribute to public health, while standardised data collection on micronutrient deficiencies can build the evidence base on the efficacy and cost effectiveness of food-based solutions.

The GHI 2014 Report and related resources (including interactive maps, data, media content and video) is available at: **http://www.ifpri.org/publication/2014-global-hunger-index**

1   Source: Global Nutrition Report, http://globalnutritionreport.org/

Aid Transparency Index: 'publish what you fund'

Summary of editorial[1]

On October 8th 2014, 'Publish What You Fund' – a not for profit organisation[2] – published an 'Aid Transparency Index' measuring aid transparency amongst the world's leading development organisations. During the past decade, at a series of High Level Forums on Aid Effectiveness in Paris in 2005, Accra in 2008 and Busan in 2011, donors have committed to improve transparency and to publish comparable, comprehensive and timely information, according to the International Aid Transparency Initiative, which provides a practical approach and standards to make data about aid spending accessible.

The 2014 Aid Transparency Index assesses transparency among 68 aid-donor organisations. Overall commitment to transparency and the information published at organisation level and for individual activities are assessed through 39 indicators. Organisations are then ranked and categorised into subgroups ranging from very good to very poor. The UN Development Programme, the UK Department of International Development, and the US Millennium Challenge Corporation rank as the top three donors. GAVI (Global Vaccine Alliance) ranks 4th, the Global Fund 10th, UNICEF 14th and the Gates Foundation 23rd. China takes last place.

According to the report, "progress on implementation continues to be slow and uneven". The report draws specific attention to the fact that more than half of the organisations assessed performed poorly, including major donors such as the French Agency for Development, the German Foreign Office and Norway. Even when published, data about development aid are still difficult to access and use, with most of the information not presented in accessible files such as Excel spreadsheets.

1 Extracts from Lancet editorial. www.thelancet.com vol 384, October 18th, 2014. Pp 1402

2 http://www.publishwhatyoufund.org/

Lack of progress in reducing anaemia among women

Summary of article[1]

Location: *Global*

What we know already: Anaemia is a persistent condition amongst women and children under 5 years of age and prevalent worldwide.

What this article adds: There is a strong causal link between maternal iron-deficiency anaemia and adverse birth outcomes, including maternal death. Consequently, the MDG target to reduce maternal mortality is unlikely to be achieved. A new global anaemia reduction target has been set to stimulate accelerated scaled up multi-level action.

A health-care worker shows a package of prenatal iron-folic acid supplements

According to a short article in the Bulletin of World Health, most of the 1.62 billion people currently affected by anaemia are women or young children. Since 1995, the global prevalence of anaemia among non-pregnant women, pregnant women and children aged less than five years, has fallen only slightly: from 33 to 29%, 43 to 38% and 47 to 43% respectively. Although the corresponding prevalence of severe anaemia has shown more substantial declines over the same period – from 1.8 to 1.1%, 2 to 0.9% and 3.7 to 1.5% respectively, the global prevalence of anaemia only fell by 0.2 to 0.3 percentage points between 1993 and 2013. Anaemia in women – especially among non-pregnant women in central, northern, and western Africa, central Asia and the Middle East and among pregnant women in southern Africa and southern Asia - is a particularly persistent problem.

Although Goal 5A of the Millennium Development Goals (MDGs) was to reduce the maternal mortality ratio[2] by 75% by the end of 2015, this ratio has only fallen by 47% during these two decades. The results of a recent meta-analysis indicated a strong causal link between maternal iron-deficiency anaemia and adverse birth outcomes. A strong association has been found between moderate to severe anaemia at 28 weeks gestation and the severity of intra- and postpartum haemorrhage, which causes 23% of maternal deaths. Goal 5A is not likely to be achieved even in the post-2015 era unless anaemia in women and its underlying causes are addressed more effectively.

The six global nutritional targets set by the World Health Assembly (WHA) in 2012 included a 50% reduction in the number of women of reproductive age affected by anaemia with respect to the estimated number for 2011. It is hoped that the setting of this 2025 target will help to stimulate both the scale up of existing interventions and new concerted, accelerated and sustained multilevel action.

In analysis of national nutrition policies by the World Health Organisation (WHO), iron supplementation for pregnant and non-pregnant women was found to be the micronutrient supplementation measure that was most often implemented at national scale. Such supplementation can be remarkably successful. In north–western Vietnam, a comprehensive programme of iron supplementation and deworming among women of reproductive age resulted in a 48% decrease in prevalence of anaemia among the target group within 12 months.

Much information on the prevalence and consequence of anaemia is available. Anaemia reduction is incorporated in the policy frameworks of many countries and the new global anaemia reduction target should inspire the relevant stakeholders to support the scale-up of effective interventions. Sadly, with time running out, MDG target 5A is unlikely to be achieved in many countries.

1 Branca F, Mahy L and Mustafa T (2014). The lack of progress in reducing anaemia among women: the inconvenient truth. Bulletin of the World Health Organisation 2014; 92.231 | doi:http://dx.doi.org/10.2471/BLT. 14.137810

2 The number of maternal deaths per 100,000 live births
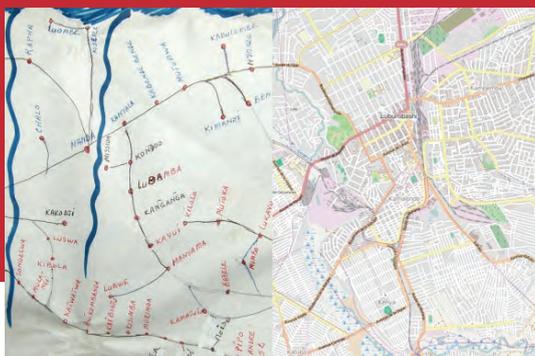
How MSF is mapping the world's medical emergency zones

Summary of news item[1]

The Missing Maps project is a collaboration between MSF, the British and American Red Cross, and the Humanitarian OpenStreetMap Team that aims to create digital maps to log addresses for the "unmapped or undermapped" people of the world, who are often the poorest and most vulnerable. Launched on 7 November 2014, it aims to add an ambitious 200 million people's addresses to the maps in the next two years with the help of volunteers worldwide (see Box 1).

Maps enable teams on the ground to provide a more rapid, more effective, and better planned response to vulnerable communities. Spatial epidemiology is critical to remain alert to and respond to disease outbreaks, such as cholera, as well as improve monitoring for and reaction to cases of less prevalent diseases, such as sleeping sickness. MSF can also create animated maps to show the spatial and temporal nature of a problem, e.g. animated maps were used to demonstrate how interruptions in the Haiti water network could be linked to spikes in cholera which then helped lobby government agencies for immediate, effective repairs to the network. It may be possible to do something similar in west Africa where the Missing Maps project has assisted the Humanitarian OpenStreetMap Team to map huge areas to support the Ebola crisis. The initiative has been well received by mapped communities.

Learn more and sign up to get involved at:
http://www.msf.org.uk/missing-maps-project

[1] How MSF is mapping the world's medical emergency zones. BMJ 2014;349:g7540

Box 1 — How MSF's volunteers make the maps

Mapping involves a few simple steps:

1. Existing satellite images are loaded into OpenStreetMap software, a free world map that can be edited by multiple users (a wiki). It is a similar service to Google maps. Volunteer amateur cartographers, many enlisted through social media (check #MissingMaps on Twitter), can log in from anywhere in the world and use an easy tool to trace the outlines of buildings, roads, parks, and rivers over the satellite image

2. This tracing lacks the names of streets or landmarks so local volunteers, often students or scouts, print out small sections and head out with a pencil to write down the names of streets and buildings

3. Once complete, the maps are scanned back into OpenStreetMap and the labels are added to the map by more volunteers. The world then has free access to a validated map forever.

Anyone can volunteer their services on an individual basis or at sociable and technically supportive "mapathons." At one of the first of such events, hosted by the UK Guardian newspaper in London on 7 November, 80 amateur cartographers along with 100 more remote volunteers, put the inhabitants of Baraka, a town in the Democratic Republic of Congo where malaria and cholera are endemic on the map.

New DG ECHO guidance on IYCF-E programming

In March 2013, the European Commission adopted a Communication on nutrition, which included DG ECHO's Staff Working Document on 'Addressing undernutrition in emergencies'. This further demonstrates the EU's commitment towards nutrition. This policy document clearly acknowledges the increased vulnerability of infants, young children and lactating women and the commitment of the EU to address their specific needs during emergencies.

Enabling adequate feeding and care practices is challenging in humanitarian contexts. Gaps in service provision and support have been identified in recent crises, with likely negative consequences for the nutrition and health of these particular groups. In response, DG ECHO has developed guidance for Infant and Young Child Feeding in Emergency (IYCF-E) programming for its staff and partners. This guidance recalls the fundamentals of IYCF-E and provides practical guidance to ensure that IYCF-E concerns are taken into account across sectors and throughout all stages of humanitarian programming. In acute emergencies, IYCF-E is not about long term behaviour change; it is about immediate practical actions to support mothers so they can breastfeed their children for as long as possible, support safe and appropriate feeding to infants who are not breastfed, help carers and families to provide appropriate complementary food for children, and support the nutrition and well-being of mothers.

The IYCF-E – Guidance for programming is available in English and French on the DG ECHO website **http://ec.europa.eu/echo/en/ what/humanitarian-aid/nutrition**. An Arabic version will be made available soon. A presentation of the guidance is also available in video format.

For further information, contact: Catherine Chazaly, **email: catherine.chazaly@ec.europa.eu** or Sophie Whitney, **email: marie-sophie.whitney@echofield.eu**

Call to Action on improving Water, Sanitation, and Hygiene for Maternal and Newborn Health

Summary of paper[1]

Location: Global

What we know already: Water, sanitation, and hygiene (WASH) may impact maternal and newborn health (MNH).

What this article adds: A recent collaborative paper by WASH and MNH agencies urges action and offers recommendations to accelerate WASH service provision at home and in health care facilities to improve MNH. The Post-2015 development framework is an opportunity for a stronger, more inter-sectoral response. The actions are achievable, the timing is favourable and there is sufficient knowledge to justify action.

A recently published paper by academics and representatives urges action and offers recommendations to accelerate water, sanitation and hygiene (WASH) service provision at home and in health care facilities to improve maternal and newborn health (MNH). Key summary points are:

There is sufficient evidence that WASH may impact MNH to warrant greater attention from all stakeholders involved in improving MNH and achieving universal WASH access.

Enabling stronger integration between the WASH and health sectors has the potential to accelerate progress on MNH; this should be accompanied by improved monitoring of WASH in health care facilities providing MNH services as part of routine national-level monitoring, and at the global level through international instruments.

Global and national efforts to reduce maternal and newborn mortality and morbidity should adequately reflect WASH as a pre-requisite for ensuring the quality, effectiveness, and use of health care services.

The Post-2015 development framework is an opportunity for a stronger, more inter-sectoral response to the MNH challenge, and the goals and targets aimed at maximizing healthy lives and increasing access to quality health care should adequately embed WASH targets and success indicators.

Further implementation research is needed to identify effective interventions to improve WASH at home and in health care facilities, and to impact on MNH in different health system contexts.

An international framework that reflects the complex determinants of MNH must be applied at country level to achieve results. There are lessons to be learned from WASH and education on cross-sectoral action, e.g. from Malawi and Sri Lanka, that can inform health and WASH collaborations.

The World Health Organisation's Essential Environmental Health Standards in Health Care (2008)[2] sets out the essential environmental health standards required for varying levels of health care settings in medium- and low-resource countries. The Standards contain a set of 11 guidelines, with a set of indicators and guidance notes and checklist for assessing the implementation of each guideline.

A comprehensive consultation across the international WASH sector involving more than 100 experts from more than 60 organizations worldwide has resulted in a proposed Water, Sanitation, and Hygiene Target for the Post-2015 Development Framework. The vision is that of universal access to safe drinking water, sanitation, and hygiene. The vision to be achieved by 2030 aims:
1. to eliminate open defecation
2. to achieve universal access to basic drinking water, sanitation, and hygiene for households, schools, and health care facilities
3. to halve the proportion of the population without access at home to safely managed drinking water and sanitation services, and
4. to progressively eliminate inequalities in access.

The emerging consensus on the need for a Universal Health Coverage (UHC) approach presents an important opportunity to bridge the gaps between the WASH sector and the health system and embed WASH in health care services, involving promotive, preventive, curative and rehabilitative/palliative services.

1 Velleman Y, Mason E, Graham W, Benova L, Chopra M, et al. (2014). From Joint Thinking to Joint Action: A Call to Action on Improving Water, Sanitation, and Hygiene for Maternal and Newborn Health. PLoS Med 11(12): e1001771. doi:10.1371/journal.pmed.1001771
2 WHO (2008) Essential environmental health standards in health care. Geneva: WHO.

ACF manual on health system strengthening

A recently produced manual by Action Contre la Faim (ACF) proposes a step by step approach to health system assessment and programming undertaken at district level. This reflects the development in thinking within ACF, whereby universal coverage of severe acute malnutrition (SAM) treatment can only be achieved by ensuring availability and access to treatment at all levels of the health system (including the community level). There is therefore a need to review existing implementation approaches to be increasingly horizontal/process oriented instead of vertical/model oriented. In many countries, SAM treatment programmes now fall under the responsibility and leadership of the Ministry of Health and its sub-national authorities.

The aim of the health system assessment is to get a snapshot of the health system and to understand its strengths and weaknesses (diagnosis), in order to determine the priority actions required for the development of a health system strengthening strategy (programming phase).

In 2014, Burkina Faso, Tchad, Senegal, Bangladesh, Afghanistan, Niger, Sierra Leone, Ethiopia missions piloted the method. Two ACF regional trainings took place in 2014 (one in Asia and two in Africa). Based on these experiences and feedback from ACF field teams and partners, the manual and tool box have been updated to make it more user-friendly and better adapted to the field reality. Version 2 remains a pilot; a research project to look at the effectiveness and impact of the method will be developed mid-2015.

Feedback on experiences is welcome, please send to: Yara Sfeir, ACF, **email: ysfeir@actioncontrelafaim.org**

ACF International Network. Health system strengthening. From diagnosis to programming – a step by step approach. Jan 2015. Access the manual at: **http://www.action contrelafaim.org/en/ content/health-system-strengthening-expert-1**
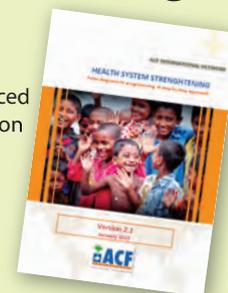
En-net update

By Tamsin Walters, en-net moderator

Over the past four months[1], 32 questions have been posted on en-net, generating 69 responses. Two upcoming trainings have been advertised alongside 47 vacancy announcements.

Several related discussions have occupied en-net around new thinking on implementing Community-based Management of Acute Malnutrition (CMAM) programmes. Triggers for deciding when to start a CMAM programme have been debated, including whether the use of Global Acute Malnutrition (GAM) rates for this purpose remain relevant in the context of Severe Acute Malnutrition (SAM) treatment being integrated into health systems, http://www.en-net.org/question/1489.aspx; the contexts in which moderate acute malnutrition (MAM) and SAM treatment could be temporarily merged, particularly in terms of interchangeable use of products; as well as considerations of how to treat 'complicated MAM' and whether it constitutes its own category, have arisen. Finally, a request was posted for global guidelines, an algorithm or a decision tree to assist decision-making on when to conduct different types of assessments in emergencies (e.g. MIRA, SMART, SQUEAC, RAM) and how to choose the most suitable methodology according to context and information requirements, http://www.en-net.org/question/1495.aspx

During the latter half of 2014, a number of agencies[2] came together to consider simplified and temporary measures to expand their access to malnourished children under exceptional circumstances during emergencies. A draft guidance note was formulated[3] to summarise agency experiences using expanded admissions criteria in Outpatient Therapeutic Feeding Programmes (OTPs) to extend treatment to MAM when Targeted Supplementary Feeding Programs (TSFPs) or an adequate supply of Ready-to-Use Supplementary Food (RUSF) were not available. The draft guidance note includes multiple scenarios, including when TSFPs are available but OTPs are not and RUSF might be substituted for Ready-to-Use Therapeutic Food (RUTF) where the latter is not available, as well as providing a temporary option for treating acute malnutrition when there is neither an OTP or TSFP yet established. Examples from Niger, Pakistan and South Sudan are included. This draft guidance note was discussed at the Global Nutrition Cluster (GNC) meeting in Rome in September 2014, and at the ENN Technical Meeting on Nutrition in Oxford in October 2014. The authors and lead agencies welcome feedback and hope to encourage more inputs to the discussion at http://www.en-net.org/question/1493.aspx

A related discussion on whether children with MAM and medical complications should be treated as inpatients, in a similar manner to SAM children, or whether to treat them according to Integrated Management of Childhood Illness (IMCI) guidelines alongside provision of supplem- entary food, also resurfaced, http://www.en-net.org/question/1364.aspx. It is considered by many experts that the management of illnesses such as pneumonia or diarrhoea in a child with MAM should be no different from their management in any other child, while appropriate supplementary foods can continue to be provided. However, with increasing discussions around the appropriateness of a fixed demar- cation between MAM and SAM and options for merging treatment of MAM and SAM, the distinction between treatment of medical conditions or complications as an inpatient or an outpatient depending on whether a child has severe or moderate acute malnutrition arises again for clarification in the guidance for those working in the field.

Discussions leading to formulation of guidance on ebola virus disease (EVD) and infant and young child feeding, as well as on nutritional support for both adults and children with EVD have been ongoing on en-net since August 2014. The infant feeding and ebola discussion has now been viewed 5,638 times with 68 replies and the nutrition guidance discussion 1,521 times, with 21 replies. Both topics featured in a lunchtime session at the ENN technical nutrition meeting in Oxford in October 2014. The discussions have led to/informed fast track guidance development with ongoing feedback from practitioners sought. The infant feeding challenges have also led to calls for more experiences, data and research and brokered by the ENN, prompted collaboration between CDC Atlanta and a number of operational agencies to undertake field research to answer the most critical questions. More details on both ongoing initiatives are summarised below. Both experiences are good examples of how en-net can link practitioners to policy-makers, catalyse guidance development, and support its dissemination to those who need it.

To join any discussion on en-net, share your experience or post a question, visit www.en-net.org.uk

Contributions from Afia Azim, Jeanette Bailey, Jay Berkley, Nina Berry, Jessica Bourdaire, Andre Briend, Geraldine Fitzgerald, Sibida George, Ted Greiner, Karleen Gribble, Regine Kopplow, Mark Manary, Marie McGrath, Timothy Murungi, Mark Myatt, Martha N, Oscar Serrano Oria, Antony Peter, Fabienne Rousseau, Felicity Savage, Frederich Christian S. Tan, Casie Tesfai, Mija Ververs, Issack Yakub and Jennifer Yourkavitch. There were many 'behind the scenes' contributions from head- quarters, regional and country staff in responding to the ebola technical questions that were posted as collective responses online. In that regard, we acknowledge the significant contributions of Maaike Arts, France Begin and Diane Holland (UNICEF), Cota Vallenas and Zita Weise Prinzo (WHO), Leisel Talley, Carlos Navarro-Colarado and Oleg Bilukha (CDC), Andrew Tomkins (UCL), and extend thanks to all the unnamed regional and government/UN/NGO/country staff who greatly informed the content of the guidance.

Infant feeding and ebola: gaps and guidance

Prompted by the question and subsequent discussion posted on en-net, interim guidance on infant feeding in the context of ebola was rapidly developed by UNICEF, WHO, CDC and ENN through informal consultations involving UNICEF technical advisors at HQ, regional & country levels; WHO Infant and Young Child Feeding and Ebola specialists; CDC Atlanta; Ministry of Health and Social Welfare Liberia and in-country staff working as part of the Ebola response. The latest guidance is available in English and French at: http://www.ennonline.net/infantfeedinginthecontextofebola2014

The en-net discussion remains open at http://www.en-net.org/question/1445.aspx and we welcome feedback to inform a future update; the next version will be integrated into the UN key recommendations on nutrition support in ebola (outlined below).

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[1] From 1st October 2014 to the reporting date of 19th January 2015

[2] International Rescue Committee (IRC), Action Against Hunger (ACF-USA), UNICEF, USAID/Office of Foreign Disaster Assistance (OFDA), Center for Disease Control (CDC), International Medical Corps (IMC), Save the Children

[3] http://www.ennonline.net/cmamexpandedadmissions guidance)

There remain critical gaps in the evidence base to inform policy guidance on infant feeding in the context of EVD. Programming staff report there is little time and opportunity to 'conduct research' in the current Ebola response. However observat- ional data by pro-grammers is needed to understand what is happening to infants and young children and inform guidance. To date, programming questions and experiences have prompted fast tracked interim policy guidance that will continue to be updated quickly. A presentation on the infant feeding and EVD guidance and the critical research gaps (see also Box 1) is available at: **http://www.coregroup.org/resources/webinars/475-ebolaandnutrition**

If you are interested in collaborating on research or harmonising/sharing programme data, please contact: Marie McGrath, ENN, **marie@ennonline.net**

Key recommendations on nutrition support and ebola virus disease

A 'working' guidance note on nutrition support and ebola virus disease (EVD) proposed by an independent consultant and posted on en-net has been fast-tracked by WHO, UNICEF and WFP and having undergone further de-velopment and peer review, is now available at: **http://www.who.int/nutrition/publications/guidelines/nutritional-care_with_ebolavirus/en/**

The '*Nutritional care of children and adults with EVD in treatment centres – Key recommendations*' also applies to community care centres (CCCs) or to other centres where Ebola patients are receiving care and support. The aim is to act as a quick reference to front line healthcare workers involved in nutritional care of EVD patients, particularly in low- and middle-income countries facing this Ebola crisis. These key re-commendations lay out some basic principles of optimal nutritional care for patients with EVD. The application of the recommendations provided may vary with the context and capacity of treatment units.

It will be updated in 6 months' time in-formed by further research and input from technical and operational experts. **Experiences implementing the guidance are sought by UNICEF and WHO to inform the update.**

Please send feedback to: **nutrition@who.int** and **nutrition@unicef.org**

Key areas where information is sought in particular are:

1. Food & nutrition in Ebola Treatment Units (ETUs)
   a) Food & nutrition packages provided (per ETU)
   b) Food & nutrition packages provided per patient (if different packages) – disaggregated by gender, age, severity of disease, etc. of the patients)
2. Food & nutrition intake by patients in ETUs
   a) Kinds of foods best tolerated by EVD patients (disaggregated by gender, age, severity of disease, etc. of the patients)
3. Impact of nutritional status & support in ETUs
   a) Number/percentage of patients with undernutrition (wasting) on admission and on discharge, disaggregated by gender and age
   b) Number/percentage of patients with biochemical abnormalities and micro-nutrient deficiencies, disaggregated by gender and age
   c) Recovery rate disaggregated by nutritional status, gender and age
   d) Duration of recovery, disaggregated by nutritional status, gender and age

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Box 1 Infant feeding in the context of EVD - information required to build the evidence

1. Breastfeeding mothers with EVD
   a) Number of breastfeeding mothers suspected and confirmed with EVD
   b) Number of breastfeeding mothers who survived
2. Breastfed infants and young children
   a) Number of breastfed infants/young children of the EVD suspected/ confirmed mothers, disaggregated by age or age group (newborn (<1m), 1-5m, 6-12m, >12m)
   b) Feeding practice of breastfed infants, after admission of the mother, disaggregated by age or age group
   c) Information about who takes care of the infants/young children after separation from the mother, disaggregated by age or age group
   d) EVD status of the breastfed infants, disaggregated by age or age group
   e) Survival status of breastfed infants, disaggregated by age or age group
3. Breastfeeding mothers with EVD who recovered
   a) Number of breastfeeding mothers who recovered from Ebola and whose breastmilk was tested
   b) Ebola virus presence in tested breastmilk samples, disaggregated by time passed since convalescence
   c) Research question: Is EVD inactivated by flash treatment of breastmilk (it is inactivated by heat treatment)
4. Breastfeeding mothers with EVD who re-established breastfeeding
   a) Number of breastfeeding mothers who recovered from Ebola and who re-established breastfeeding
   b) Nature of support provided to mothers who re-established breastfeeding (qualitative information)

Source: Presentation, prepared by ENN and UNICEF informed by e-net discussion and expert and practitioner consultation, Dec 2014. http://www.coregroup.org/resources/webinars/475-ebolaandnutrition

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Your feedback on Field Exchange, Nutrition Exchange & en-net

Through March and April, the ENN will be conducting feedback surveys on our three core projects: Field Exchange, Nutrition Exchange and en-net.

Please participate by visiting our home page and clicking on the appropriate link (this will take you to an online questionnaire to complete). If you prefer, we can send you a questionnaire by email or talk to you on the phone; contact us at office@ennonline.net or call +44 (0)1865 324996. All responses are anonymised.

Your feedback will contribute to a larger external evaluation of the ENN; every experience counts so please take the time to let us know what you think.

Management of Humanitarian Emergencies course

Registration is now open for the 18th Management of Humanitarian Emergencies – Focus on Children, Women and Families, June 8-12, 2015 in Cleveland, Ohio. This intensive, interactive 5-day course examines the most important problems and priorities in disaster situations as they specifically relate to children, women and families.

For more information and a course brochure, visit **http://casemed.case.edu/cme/** or email **medcme@case.edu** or call 216-983-1239.

Technical briefs on MAM

CMAM Forum

The CMAM Forum has produced a series of technical briefs on moderate acute malnutrition (MAM) written by expert authors:

- *Management of MAM: current knowledge and practice (Annan RA, Webb P, Brown R)* This focuses on current principles and approaches to MAM management, highlighting key constraints, gaps in knowledge and areas still lacking consensus.
- *Preventing MAM through nutrition-specific interventions (Jimenez M, Stone-Jimenez M)* This reviews current practice and evidence on nutrition-specific preventive approaches to MAM.
- *Preventing MAM through nutrition-sensitive interventions (Mucha N)* This examines current evidence, knowledge and practice relating to the prevention of MAM through nutrition-sensitive interventions in various sectors.
- *Standards of evidence for research on 'what works' in the management of MAM (Webb P)* This presents an overview of classic systematic reviews and statistical meta-analyses which form the backbone of scientific assessments of the quality of evidence around public health interventions. It explains how these approaches contribute to current knowledge on the effectiveness of MAM interventions.

All are available in English and French and can be accessed at **www.cmamform.org**

ODI working paper on reframing undernutrition: faecally-transmitted infections

Despite many initiatives to assure food access, and growing economies, high levels of undernutrition persist in much of Asia. It is increasingly suggested that much of this 'Asian enigma' can now be explained by open defecation (OD) combined with population density. The Institute of Development Studies (IDS) has recently produced a working paper that seeks to reframe undernutrition to encompass the typically neglected and often sub-clinical faecally-transmitted infections (FTIs), including environ- mental enteropathy (EE), other intestinal infections, and parasites. They argue that diarrhoea is the "tip of a much larger sub-clinical iceberg".

While the scope of the paper is worldwide, the major focus is on India which has about one third of the stunted children in the world, around 60% of the world's OD, and a wealth of very recent relevant research. How OD and FTIs, poverty and undernutrition reinforce each other is examined in a case study on India.

The working paper has three purposes: to examine how OD, lack of sanitation and hygiene, and FTIs contribute to stunting; to shed light on why this has been a blind spot; and to present new inclusive categories and concepts (the FTIs, see above, and the 5 As, see below) for reframing how undernutrition is perceived, analysed and acted on. The authors highlight that while other countries make rapid progress towards becoming OD free, India remains obstinately stuck, making undernutrition in India one of the great human challenges of the twenty first century. The paper concludes by exploring practical implications of this reframing for research, teaching and training, as well as policy and practice.

The 5 A's: the first two A's – availability and access – are oral, about food intake, while the last three As – absorption, antibodies and allopathogens – are novel categories, anal and internal, about FTIs and what happens inside the body.

Chambers, R. and von Medeazza, G. Reframing Undernutrition: Faecally-Transmitted Infections and the 5 As IDS Working Paper 450. Available from: **http://www.ids.ac.uk/publication/reframing-undernutrition-faecally-transmitted-infections-and-the-5-as**

Contribute to Nutrition Exchange

NUTRITION EXCHANGE

Nutrition Exchange is an annual ENN publication that contains short, easy-to-read articles on nutrition programme experiences and learning, from countries with a high burden of malnutrition and those that are prone to crisis. The next issue of Nutrition Exchange will be published in May 2015 in English, followed by French and Arabic translations. There is still space to contribute original articles! Share your ideas for an article (a paragraph or two) or drafts of articles (approximately 1000 words) with Valerie Gatchell (valerie@ennonline.net) or Carmel Dolan (carmel@ennonline.net). Editorial support is available to assist you develop ideas into publishable articles.

Access all editions of Nutrition Exchange at **http://www.ennonline.net/nex** Nutrition Exchange is free of charge and translated into French and Arabic. Subscribe for soft or hard copies at **http://www.ennonline.net/subscribe/nex**

Report on ENN Technical Meeting on Nutrition

The ENN convened the first 'Technical Meeting on Nutrition' (TMN) in Oxford from October 7th to 9th 2014. The meeting was funded by USAID/OFDA and Irish Aid, with UNHCR, ACF France, World Vision and Concern Worldwide also contributing funds. The meeting was attended by around 120 delegates comprising country representatives, United Nations (UN) agencies, non-governmental organisations (NGOs), donors, academics and independents largely from the nutrition sector; but also some representatives from other sectors including water, sanitation and hygiene (WASH), health and social protection.

The TMN was convened at the request of numerous actors in nutrition and other related sectors and aimed to:

- Provide a forum to address specific technical, programming and policy issues relevant to nutrition in emergencies and high burden contexts
- Share and appraise key research
- Discuss ongoing policy and programme challenges, and
- Provide 'space' for informal technical exchange.

To guide the process, an interagency steering group[1] was established that oversaw the agenda, participant invites, and helped select the abstracts for presentation. An informal Advisory Group

was also established to develop the nutrition sensitive and international architecture/governance elements of the meeting.

The TMN agenda was carefully constructed to ensure the many aspects of nutrition policy, research and programming highlighted in the large number of submitted abstracts could be presented. A total of 41 presentations were delivered in various formats (plenary, market place and parallel sessions; see www.ennonline.net/aboutTMN2014hub for all abstracts and presentations). Time was also given for extensive question and answer sessions after each set of presentations.

The first morning provided a global overview of the current nutrition architecture, including the Scaling Up Nutrition (SUN) movement[2]. This was followed by a session on the links between WASH and nutrition. The second day started with discussions surrounding social protection and nutrition, with a particular focus on cash transfers in emergency situations. This was followed by a presentation by the ENN on the nutrition sector response to the Syria region emergency as captured in a special edition of Field Exchange (issue 48). Following a lively market place session and a structured debate, presentations on the linkages between wasting and stunting were given. The third morning began with three presentations from country delegates, grounding us in the reality of policy and programming at national level. Three parallel sessions on severe acute malnutrition (SAM) followed, allowing time for detailed examination and discussion of important technical issues. The last afternoon was used for group work on three different areas, which participants had identified as warranting more discussion.

A number of themes and learning emerged over the three days and key amongst these were that:

- No country is free from malnutrition; all countries face burdens of under-nutrition or overweight and these often co-exist.
- Nutrition-sensitive spending has intensified, but needs to increase much more if we are to make effective inroads in achieving nutrition outcomes from multi-sectoral programming. Nutrition sensitive work also requires a more solid evidence-base (both for WASH and cash), as well as a greater understanding of the 'how' to implement programming to maximise effectiveness. In the meantime, we need to take something of 'a leap of faith' and use prag-

matic judgement when cast iron evidence is unavailable, to ensure that the current momentum for nutrition is capitalised upon.

- Common and consistent messaging would considerably help in our discussions with other sectors.
- Nutrition specific work requires a more 'holistic' approach, with less 'siloing' in the areas of policy, programming and financing for the various forms of undernutrition (e.g. stunting and wasting).
- There is a potential new window of opportunity in adolescence for linear catch-up growth and more evidence gathering will be important to establish what, how and where efforts should best be targeted, to capitalise upon this opportunity.
- We need more constructive engagement with the private sector.

Three fundamental 'needs' to effect better nutrition outcomes were repeatedly raised during the meeting; strengthened Leadership, Coordination and Accountability.

The ENN hopes that this meeting proves to be the first step in establishing a regular forum where technical, research, programming and policy issues related to nutrition can be discussed. In order to inform any future meeting, TMN participants were invited to complete an evaluation questionnaire. Of the 60 participants who completed these, 16% rated the meeting as excellent, 37% rated the meeting as very good and 32% rated the meeting as good (total of 85% rating as good, very good or excellent). The quality of presentations was also considered good, very good or excellent; 83% for plenary, 91% for market place and 93% for parallel sessions. Ninety per cent of respondents also valued the time given within the agenda for networking.

Respondents also appreciated the efforts to include issues surrounding multi-sectoral programming, and found the country-level presentations particularly interesting. The recurring theme of the need to communicate and coordinate better, both within the nutrition sector and more widely was highlighted, with 86% of respondents considering that a there is a need for a future TMN, with varied ideas about where it should be held and who should host (around three quarters of respondents suggested that the ENN should host it again, with some suggesting co-hosts with various UN or international agencies). Comments for how to improve future meetings included having a broader representation of sectors, development actors and government representatives; providing more opportunities for participation and discussion during the sessions; and more focus on technical issues along with issues of institutional architecture and financing.

For more information see the full meeting report at www.ennonline.net

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[1] The steering group comprised Concern Worldwide, ACF-F, UNICEF, UNHCR, GNC, OFDA, UCL, Canadian Foodgrains Bank, Sun Movement Secretariat (SMS)

[2] http://scalingupnutrition.org/

Linking integrated community case management of sick children and nutrition: experiences and meeting report

On 11-12 December 2014, a meeting of a broad range of stakeholders with experience in nutrition and/or integrated community case management (iCCM) was convened to explore linkages between these two domains of health programming. The objectives were to:

- develop a common understanding of the iCCM and nutrition landscape and identify key lessons and experiences to date
- explore options for strengthening linkages between iCCM and nutrition activities, and identify and prioritise opportunities to support their implementation.

This meeting built on two previous meetings: the iCCM Evidence Review Symposium in Ghana (March 2014) and a meeting in London in May 2014 of a small group of stakeholders.

Box 1 outlines the iCCM/nutrition framework for the meeting. The meeting proceedings centred on the findings of a detailed review of operational experiences and evidence for linkages/integration of iCCM and nutrition[1]. The review identified a wide range of varied country and programme experiences. Some reflected 'linked' programming, e.g. CHW identifies SAM and refers cases for treatment, while others involved a more integrated approach, e.g. the CHW identifies and treats uncomplicated acute malnutrition. There were significant gaps in available evidence on implementation, effectiveness, and cost of linked/integrated iCCM and nutrition.

The review grouped interventions and experiences that linked or integrated iCCM and nutrition into four categories or 'models' that describe what currently exists (not necessarily what should or could exist):

Model 1: Advising on "feeding the sick child" within existing services
Model 2: Linkages with Social and Behaviour Change activities on child nutrition
Model 3: Linkages between iCCM activities and acute malnutrition treatment through assessment and referral
Model 4: Treatment of uncomplicated SAM at community level

Models 1-3 are aspects of nutrition that are already included in the UNICEF/WHO package *(Caring for newborns and children in the community)*. Model 4 is an addition, which requires more testing and evidence.

On the principle that iCCM or iCCM/nutrition is part of a larger system for promoting child health and treating illnesses, five key objectives for integrating iCCM and nutrition were proposed and discussed:

- Improve coverage and quality of services for the sick child, thereby exploiting the synergy between the health issues and ideally resulting in greater reductions in mortality.
- Optimise the preventive aspects of iCCM to maximise its contribution to child nutrition.
- Improve implementation of the UNICEF/WHO package.
- Strengthen linkages between community and facility.
- Link health and nutrition at the institutional level.

Participants identified and ranked research priorities to address knowledge gaps. These largely related to implementation challenges. The top five research questions that emerged were:

1. Does integrating SAM treatment into iCCM improve the coverage of one or all services?
2. What is the additional workload of the CHW and how does that impact on the quality of service delivery?
3. What are the outcomes of treating vs. just referring SAM cases?
4. When adding on SAM, what impact does it have on the other iCCM interventions and quality of care of both the existing iCCM components and nutrition components (e.g. breastfeeding promotion)?
5. How can the OTP protocol be simplified for CHWs, including CHWs with low literacy?

It was recognised that although participants embodied a range of organisations, expertise and knowledge, the list of research questions will need to be examined, refined and vetted by a more representative group before being finalised.

The main *challenges* to implementing iCCM and nutrition activities identified included: poorly functioning supply chains for ready to use therapeutic food (RUTF), vertical funding streams, lack of standardised nutrition indicators in health information systems and across organisations, inadequate coordination mechanisms for implementation and funding, need for a common agenda/business case/theory of change for integrated iCCM and nutrition, lack of operational guidelines for implementing iCCM and community based management of acute malnutrition (CMAM), lack of an advocacy plan for the integration of iCCM and nutrition, weak health systems, and low utilisation of health services.

Conclusions

There was consensus that the operational linkages between iCCM and community-based nutrition interventions are feasible and necessary, and are likely to provide benefits to both activities. The review of experiences revealed the limited number and types of experiences, as well as the scarcity of available evidence. A number of research questions need to be explored in order to guide the way forward. There is evidence that CHWs can provide high-quality care for childhood illness and for SAM, as well as high-quality advice on nutrition behaviours. The conditions under which these actions can be carried out remain to be defined, as does the best mix of iCCM and nutrition-related actions and the supports needed to carry them out. Participants agreed to identify and set up a governance mechanism for a group that will take forward the work discussed during this meeting, most likely a Nutrition sub-group within the iCCM Task Force.

The meeting report is available at: **http://www.coregroup.org/storage/documents/Linking_Integrated_Community_Case_Management__Nutrition_NYC_Meeting_Report.pd**f

The review 'Linking nutrition and (integrated) community case management: a review of operational experiences' is available at **http://www.coregroup.org/storage/documents/Linking_Nutrition__integrated_Community_Case_Management.pdf**

Box 1   iCCM and nutrition

The meeting situated iCCM within the broader framework of community-based infant and child health actions outlined in a three-part package, Caring for newborns and children in the community, developed by WHO and UNICEF. This UNICEF/WHO package includes:

Caring for the sick child in the community (iCCM) **http://www.who.int/maternal_child_adolescent/documents/imci_community_care/en/**, Caring for the newborn at home **http://www.who.int/maternal_child_adolescent/documents/caring_for_newborn/en/**, and Caring for the child's healthy child growth and development **http://www.who.int/maternal_child_adolescent/documents/care_child_development/en/**

To date, implementation of the UNICEF/WHO community health worker (CHW) package has focused mainly on iCCM. iCCM is intended to prevent child deaths in settings where there is poor access to care in health facilities. It provides guidance, training materials, and job aids for CHWs to identify, treat, and/or refer children with diarrhoea, pneumonia, and malaria. Screening and referral of severe acute malnutrition (SAM) is also included, and a red mid upper arm circumference (MUAC) reading is one of the key danger signs.

Since iCCM is focused on sick children, the nutrition component in the UNICEF/WHO protocol is limited to: 1) advice on feeding during and after illness and 2) SAM identification and referral. The other two parts of the package, caring for the newborn at home and caring for the child's healthy growth and development, include counselling and promotion related to optimal infant and young child feeding practices.

Views..........

ICN2 – from promises to action: ACF's perspective

By Samuel Hauenstein Swan and Alex Wijeratna

Samuel Hauenstein Swan is Senior Policy & Research Advisor at Action Against Hunger International, in charge of policy positioning on hunger, food and nutrition security. He directs ACF's research strategy and ensures policy coherence and practical field uptake.

Alex Wijeratna is an independent writer and author of Action Against Hunger's recent report, *Action to Improve Nutrition, Making ICN2 Count over the next decade and beyond*. He has written extensively on food and nutrition issues, including for ActionAid, Caritas, Friends of the Earth and the Fairtrade Foundation.

Jointly organised by the Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO), the Second International Conference on Nutrition (ICN2) in Rome brought together some 2,200 participants, including Member States delegates, United Nations (UN) representatives, non-governmental organisations (NGOs), research groups, the private sector and civil society. FAO Director General, José Graziano da Silva, encouraged "Governments to lead the way for better nutrition for all," while UN Secretary-General, Ban Ki-moon, called for ambitious national nutrition commitments to be made. His promise, in turn, was that "the UN system pledges to do all that it can to provide effective support" to eradicate malnutrition around the globe in the next decade. The delegates then adopted, as expected, the 'Rome Declaration on Nutrition[1]' and an accompanying 'Framework for Action[2]', which includes 60-plus voluntary policy recommendations for governments to incorporate into their national policies and investment plans.

Given that these recommendations are not legally binding, the question is will these promises largely evaporate after the spotlight of the conference has been switched off, or will they be taken forward in ways that will make ICN2 a turning point for nutrition? What are the next steps for the UN, donors, community groups and civil society organisations? This article summarises ACF's report, *Action to Improve Nutrition, Making ICN2 count over the next decade and beyond*[3]. The report assesses the outcome of ICN2 and presents additional key actions that ACF believes must be carried through into implementation of the proposed 'Decade of Action on Nutrition' in order to successfully guide, improve and enhance National Plans of Action for Nutrition (NPANs).

With over 800 million people currently going to bed hungry, 162 million children suffering from stunting, approximately 800,000 babies dying every year because they are not optimally breastfed, over two billion suffering from micronutrient deficiencies and 1.4 billion overweight, it is no wonder José Graziano Da Silva said in his opening speech to member states, "I hope that during this conference you will announce targets that go beyond the internationally agreed goals."

His hopes were largely unmet; there were very few new government commitments proclaimed during this conference. Despite not living up to this expectation, the ICN2 did add momentum and deliver some significant shifts in the global nutrition architecture. The first success of the ICN2 was that the Member States, WHO, FAO, other key UN agencies and civil society have, for the first time, publicly and jointly assumed their duty and commitment to accelerate nutrition-specific and nutrition-sensitive policies into effective national actions. The second success is that it joined up people, bringing together sectors and institutions that do not normally meet in the same forums. The ICN2 was not only about achieving alignment over the assessment of the problems, but also about agreeing on their solutions. The third gain from the conference was that delegates and policy-makers found overlaps in their visions for solutions. Statements from the member states and UN organisations confirmed that the solutions come in many forms. Most of all it was striking that success on tackling nutrition, more often than not, is the result of multiple sector interventions and approaches.

From a civil society perspective, it was an achievement to have galvanised over 150 organisations to participate in a pre-conference and agree on one joint declaration. Never before have grassroots peasants groups, artisanal fishing communities, anti-hunger NGOs and many others come together in this way on malnutrition, affirming a common goal. The path to achieve a shared vision was not always smooth; too many pressing issues perpetuate the nutrition crisis. Civil society and social movements are engaged in delivering a vibrant multitude of local level interventions, and to summarise these is virtually an impossible task. To champion a set of priorities might be seen as no big deal in itself nor is the joint declaration the final judgement about what is needed; however, the trust built during the process is essential to 'join the dots' towards joint future advocacy efforts for a better, more accountable and responsive global governance system for improved nutrition, food and health.

The ICN2's attainments are still far too weak to be sufficient to guarantee the success of a 'Decade of Action' on nutrition, but they are essential stepping stones to get there. In the few months since the meeting, both the WHO and FAO have reaffirmed their commitment made in the outcome documents of this conference. Most prominent gains include the tabling of the call for the 'Decade of Action on Nutrition' at the UN General Director's level, the creation of an anticipated 'Action for Nutrition Trust Fund ' to mobilise much needed resources to finance nutrition initiatives and the commitment by both WHO and FAO to step up their support to countries in establishing comprehensive nutrition strategies and enable effective programming and monitoring.

In summary, we believe ICN2 galvanised an unprecedented engagement on malnutrition; the onus is now on affected governments to urgently review, cost and assess the recommended policies and actions in relation to national needs, conditions and priorities, and decide – informed by the ongoing and active participation of civil society, social movements and those most affected by malnutrition – on the additional action to be taken in national policies and investment plans. ACF's Action for Nutrition report outline the direction we propose to go as an NGO, in 2015 and beyond, from the nutrition perspective.

In the coming years, governments, UN bodies, NGOs and civil society must maximise support, involvement and, indeed, ownership of policies, from their inception to implementation; this is key to safeguard the attainments we have been part of securing over the past year and a half. This future journey must start with WHO and FAO but must lead quickly to all five UN organisations on hunger and nutrition (WHO, FAO, UNICEF, World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD)), spread to Member States and rapidly reach populations most affected by nutrition. One of the first tests for the legacy of ICN2 will be integrating the vision and commitments of the ICN2 into the Post-2015 Development Agenda later this year and supporting the agreement of a new global goal on food and nutrition security and related targets that will sustainably eradicate malnutrition in all its forms by 2025.

For more information, contact:
Samuel Hauenstein Swan, email: **s.hauenstein-swan@actionagainsthunger.org.uk**

1   The Declaration is available at: http://www.fao.org/3/a-ml542e.pdf
2   The Framework for Action is available at: http://www.fao.org/3/a-mm215e.pdf
3   http://www.actionagainsthunger.org.uk/publication/action-improve-nutrition-making-icn2-count-over-next-decade-and-beyond

Field Articles

By Ivan R. Molton, Rukang Chikomb, Marie Chilembe, Alice Rowe, Rodolph Rowe and Chingambu Tshiseng

Ivan Molton is an Associate Professor in the Department of Rehabilitation Medicine at the University of Washington, Seattle, USA. His role in the programme included selecting and measuring treatment outcomes, performing statistical analysis of efficacy data, and sharing results.

Rukang Chikomb grew up in the village of Musumba, and is now a pilot for UMC aviation ministry, and Director of Southern Wings of The Morning based in Lubumbashi. He served as pilot, interpreter, and chief logistics and personnel coordinator for the nutrition programme.

Marie Chilembe works primarily in the Obstetrics division at Samuteb Hospital in Musumba, DRC. For the current nutrition project, she served as the Supervising Nurse, and as an on-the-ground staff trainer and project manager.

Alice Rowe has worked with non-profit groups serving in DRC for more than 10 years. Along with her husband, she serves as the programme coordinator, focusing mainly on US-Congo shipping and travel logistics and communication.

Rodolph Rowe has advocated for African children for more than a decade, including serving on the Board of the United Methodist Church's Hope for the Children of Africa programme. His work in DRC includes helping with the ongoing development of girls' and boys' orphanages in Kinshasha, as well as serving as a programme coordinator for the Masumba childhood nutrition programme.

Chingambu Tshiseng is a public relations manager for the Southern Congo Wings of the Morning programme based in Kapanga. He served as key interpreter, and materials/finance coordinator for the Musumba nutrition programme.

Fish are one of the only local sources of protein in Masumba

Efficacy of a community-embedded RUTF programme to treat childhood malnutrition in Kapanga, DRC
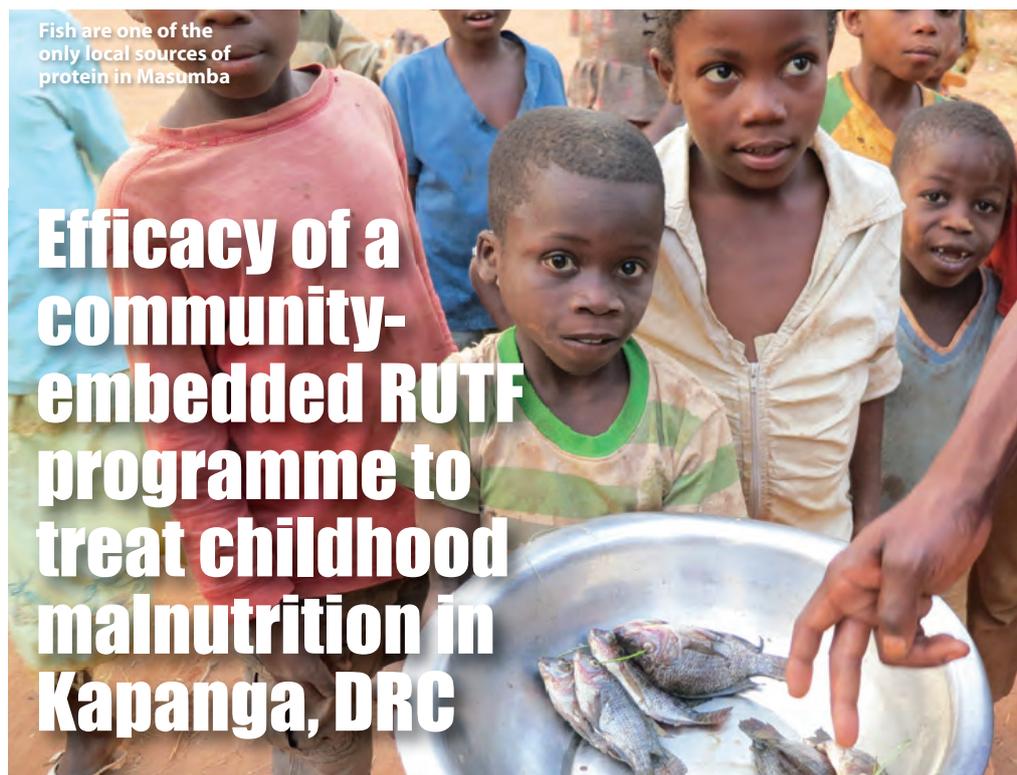
Ivan Molton, DRC, 2013

Location: *Democratic Republic of Congo (DRC)*

What we know already: Severe acute malnutrition is prevalent in the DRC. Sustainable community-based management is hampered by dependence on external inputs, such as trained staff and supply of ready-to-use therapeutic foods (RUTF).

What this article adds: The feasibility and efficacy of a small-scale, community-based and managed childhood RUTF programme in the Kapanga valley region of the DRC was investigated. Non-standard entrance criteria (visible signs) and target population (0-13 years) were decided by the local programme leads. On balance, challenges (logistics, inaccessibility, one-third did not meet standard admission criteria) were outweighed by success (moderate weight gain rate for two-thirds of admissions using locally sourced product).

The programme resulted in considerable improvement in approximately two-thirds of participants suffering from MAM or SAM, using local leadership and a product that was primarily locally sourced

Background

Childhood malnutrition remains a significant problem for world health, affecting an estimated 99 million children under the age of 5 worldwide[1]. One region in which malnutrition is endemic is the Democratic Republic of Congo (DRC). The First and Second Congo Wars (1996-2007) led to the death of as many as six million civilians,[2,3] the total destruction of most essential infrastructure, and an external debt equalling approximately 900% of annual exports[4,5]. As a result, there has been a significant decline in agricultural production across the DRC, especially in subsistence crops like cassava, plantain, and maize.6 Sixty two percent of the Congolese population are below the age of 15, and an estimated 44-48% of these experience chronic malnutrition and stunting[6,7]. Clinically, severe acute malnutrition (SAM) is evidenced in approximately 6% of rural Congolese children, with markers

1   2012 Join child malnutrition estimates - levels and trends. 2012.
2   Coghlan B, Brennan RJ, Ngoy P, et al. Mortality in the Democratic Republic of Congo: a nationwide survey. Lancet. Jan 7 2006;367(9504):44-51.
3   Coghlan B, Ngoy P, Mulumba F, et al. Update on mortality in the Democratic Republic of Congo: results from a third nationwide survey. Disaster Med Public Health Prep. Jun 2009;3(2):88-96.
4   Bank W. World Development Indicators 2009. Washington, D.C.: The World Bank; 2009.
5   UNDP. D.R. Congo Human Development Report. New York, NY: United Nations Development Programme; 2007.
6   Kandala NB, Madungu TP, Emina JB, Nzita KP, Cappuccio FP. Malnutrition among children under the age of five in the Democratic Republic of Congo (DRC): does geographic location matter? BMC Public Health. 2011;11:261.
7   UNICEF. The state of the world's children. New York, NY: UNICEF; 2007.

A local nurse prepares the peanut butter/vitamin mixture

Programme location and goals

This project's broad objective was to evaluate the feasibility and efficacy of a small-scale, community-based childhood RUTF programme in the Kapanga valley region of the DRC. This involved creating an RUTF production and delivery system that was almost entirely staffed and managed by the local population, with goals established through dialogue with local village leadership. It was our hope that this community-embedded approach might be scalable and sustainable, with the local population taking control of the nutritional needs of their own small region.

Kapanga is a rural territory (district) in the northwest corner of the Katanga province, with a population of about 120,000 inhabitants in a land area of 32,000 km². One of the poorest territories in the region, there is almost no electricity and it is often inaccessible due to the deterioration of the roads and lack of railroads. This pilot project took place in Musumba village, which is a rural centre in Kapanga and home to approximately 45,000 individuals. The population lives primarily off small-scale subsistence farming and river fishing, with the majority of daily calories coming from consumption of dried and ground cassava root flour. This makes for a diet high in carbohydrates but with little protein, fat, or essential minerals and paediatric SAM is highly prevalent.

Testing the RUTF programme
Timeline and procedure

In June of 2011, two US volunteers arrived in Musumba, and worked with village leaders to select a group of nine individuals to manage the RUTF programme. The 'Nutrition Team' was provided with training and equipment to produce the RUTF, including two hand operated Omega Grinders (www.compatibletechnology .org), a 4 gallon stainless steel mixer (manufactured by Cabelas, USA), and a paediatric spring scale. One local experienced nurse was trained to identify children at risk for severe malnutrition in the community. After training, the US team

worked with the DRC Nutrition Team to coordinate delivery of locally sourced peanuts, milk powder, and sugar from Lubumbashi. All members of the Nutrition Team were paid a salary of $10US per month, an amount recommended by village leadership and consistent with the local economy. Two local individuals were selected to serve as leaders for the programme, as they were tri-lingual, literate, and could provide regular reports to the US team.

Following this training, the Nutrition Team was provided with a 12 month supply of a multi-vitamin powder (described below), and left to administer the programme on their own. Quarterly reports (including child height/weight data, budget, and status of supplies), were sent to the US team via an air courier (a local Aviation Mission Fellowship pilot who made infrequent trips to the village for other reasons and was willing to photocopy and email hand written reports from his base in Lubumbashi). The US team was also available to help remotely with problem-solving and logistics as needed, and returned in June of 2012 and June of 2013 to monitor progress and address problems.

Programme admission criteria

In order to maximize local participation and a sense of ownership in the programme, the US team did not dictate entrance criteria to the programme. Rather, entrance criteria were established through iterative discussion with the local Nutrition Team. Although the US team provided education on standard assessment measures, such as mid-upper arm circumference (MUAC) and weight-for-height, the nurses on the local Nutrition Team stated a strong preference to rely on observable clinical indicators of malnutrition. The US team therefor provided education regarding observable signs of SAM, including prominent bones, skinny limbs, hair changes (scanty, light), skin changes (loose skin on lifting, baggy around buttocks), a large, protuberant belly, and/or the presence of nutritional oedema. Nurses were also trained to collect child height/weight data for outcomes measurement.

such as oedema present in 10%[8]. In periods following civil unrest, rates of paediatric SAM in DRC have climbed as high as 23%[9].

One approach to treating SAM is through ready-to-use therapeutic foods (RUTF). Unfortunately, the availability of commercial RUTF in rural and impoverished regions is often limited, due to the relatively high cost of Western brands, or to local policies that prohibit importation of foreign food products[10]. In response to these challenges, there have been recent calls for innovative, sustainable, effective programmes that utilise locally obtainable food products in the production of RUTF[11], and that rely upon a community-based therapeutic care model to deliver RUTF[12,13]. Ideally, such programmes would include RUTF preparations derived exclusively from local food sources, and could be produced with local labour in a village setting using minimal technology[14,15].

A 3 day supply of RUTF is provided to five underweight children

8   Porignon D, Katulanya I, Elongo L, et al. The unseen face of humanitarian crisis in eastern Democratic Republic of Congo: was nutritional relief properly targeted? J Epidemiol Community Health. Jan 2000;54(1):6-9.

9   Public health impact of Rwandan refugee crisis: what happened in Goma, Zaire, in July, 1994? Goma Epidemiology Group. Lancet. Feb 11 1995;345(8946):339-344.

10 Enserink M. Nutrition science. The peanut butter debate. Science. Oct 3 2008;322(5898):36-38.

11 Dibari F, Diop el HI, Collins S, Seal A. Low-cost, ready-to-use therapeutic foods can be designed using locally available commodities with the aid of linear programming. J Nutr. May 2012;142(5):955-961.

12 Collins S. Changing the way we address severe malnutrition during famine. Lancet. Aug 11 2001;358(9280):498-501.

13 Brown KH, Nyirandutiye DH, Jungjohann S. Management of children with acute malnutrition in resource-poor settings. Nat Rev Endocrinol. Nov 2009;5(11):597-603.

14 Lin CA, Manary MJ, Maleta K, Briend A, Ashorn P. An energy-dense complementary food is associated with a modest increase in weight gain when compared with a fortified porridge in Malawian children aged 6-18 months. J Nutr. Mar 2008;138(3):593-598.

15 Manary MJ. Local production and provision of ready-to-use therapeutic food (RUTF) spread for the treatment of severe childhood malnutrition. Food Nutr Bull. Sep 2006;27(3 Suppl):S83-89.

The US team suggested limiting the programme to children between 6-59 months of age. However, this decision was rejected by village leaders. Again, because sustainability and local ownership was essential, the US team worked with village leaders to set a maximum cut off age (of 13 years) for entrance into the programme. For purposes of this report, separate efficacy analyses were conducted for children below and above the age of 5 years. The decision to allow the Nutrition Team this degree of control over entrance criteria reflected a need for balance between local ownership and programme efficacy.

RUTF delivery and composition

Children in the programme received a seven day quantity of the RUTF during each of four weekly visits with Nutrition Team staff, for a total supplementation period of 28 days. The RUTF product in the present trial consisted of 27.5% locally grown peanuts, as well as 27.5% milk powder, 27.5% sugar and 17.5% vegetable oil purchased in Lubumbashi, DRC. The powdered multivitamin for the RUTF included vitamins A and B, folic acid, iodine, iron, magnesium, potassium and zinc, and made up 1.5% of total RUTF volume. After grinding and mixing, 100 grams of this RUTF was designed to contain approximately 558 calories, 37.1g crude fat, and 13.9g protein. However, lack of local electricity or access to a nutritional analysis laboratory made on-site nutritional testing of the product unfeasible.

Results

Programme participants

Overall, 145 children participated in the programme between May 2012 and May 2013, having been identified on the basis of presence of clinical indicators described above. Of the 145 children who started the programme, 126 completed it (making for a completion rate of 88.7%), and the average number of days in the programme was 34.5. Defaulters were more likely to be girls than boys ($\chi2 = 3.6$, p = 0.06) and to have lower weight at study entry (9.7kg

vs. 11.4kg; t = -2.1, p<0.05). There were no other significant demographic predictors of study non-completion. Based on height/weight and age data collected by nursing staff, at baseline, 43.2% of these 126 children met WHO criteria for severe acute malnourishment [weight-for-height score (WHZ) of <-3], and an additional 21.6% were moderately acutely malnourished (WHZ <-2 but ≥-3).

As a consequence of the Nutrition Team's reliance on clinical observation, more than one third of the children who entered the programme (35.2%) had WHZ scores from 0 to -2, meaning that they were underweight but not acutely malnourished according to WHO criteria. These children were excluded from statistical analyses for purposes of programme evaluation. No child had a WHZ score above 0 at baseline. In all cases, children who continued to meet criteria for MAM or SAM after programme completion were allowed to re-enter the programme, although their follow-up data are not yet available for analysis.

The final sample for analysis therefore included 83 children who completed the four week programme, and met criteria for either MAM or SAM at baseline. These children were more likely to be boys (69.9%) than girls (30.1%), with an average age of 5.3 years (ranging from 6 months to 13 years).

Outcomes selection

To determine the efficacy of the RUTF programme, we tested the following outcomes via independent and pairwise t-tests, using SPSS version 20.0:
1. WHZ before and after the programme
2. Percentage of children meeting SAM criteria at baseline who did not meet this criteria at programme completion, and
3. Rate of weight gain in grams per kg per day.

Programme efficacy

Efficacy below age 5 years: Forty-nine children in the programme were below five years of age; the average age was 3.5 years, and most (71.4%)

The ingredients store cupboard

were boys. The average WHZ score on study entry for this group was -2.57, with 43% meeting anthropometric criteria for MAM and 57% meeting criteria for SAM. Mean weight gain during the programme for these children was 1.8kg (SD =1.05), or 20.1% of pre-programme weight; this change was statistically significant (t=12.1, p<0.001). Mean rate of weight gain was 6g per kg per day.

Looking only at children who met criteria for SAM at baseline, we see that the programme resulted in recovery for 14 (50%; WHZ > -2), and improvement to MAM for another 7 (25%; WHZ <-2 but ≥-3). Seven of these children (25%) continued to meet criteria for SAM after programme completion.

Efficacy above age 5 years: In total, 34 children over the age of five years completed the programme. A total of 67.6% were boys, mean age 7.8 years and mean BMI 11.4 (WHZ = -2.9). Of

The nutrition team uses hand grinders to prepare the peanut mixture

16 Mamidi RS, Kulkarni B, Radhakrishna KV, Shatrugna V. Hospital based nutrition rehabilitation of severely undernourished children using energy dense local foods. Indian Pediatr. Aug 2010;47(8):687-693.

17 Ciliberto MA, Sandige H, Ndekha MJ, et al. Comparison of home-based therapy with ready-to-use therapeutic food with standard therapy in the treatment of malnourished Malawian children: a controlled, clinical effectiveness trial. Am J Clin Nutr. Apr 2005;81(4):864-870.

18 Patel MP, Sandige HL, Ndekha MJ, Briend A, Ashorn P, Manary MJ. Supplemental feeding with ready-to-use therapeutic food in Malawian children at risk of malnutrition. J Health Popul Nutr. Dec 2005;23(4):351-357.

19 Nackers F, Broillet F, Oumarou D, et al. Effectiveness of ready-to-use therapeutic food compared to a corn/soy-blend-based pre-mix for the treatment of childhood moderate acute malnutrition in Niger. J Trop Pediatr. Dec 2010;56(6):407-413.

20 Jilcott SB, Ickes SB, Ammerman AS, Myhre JA. Iterative design, implementation and evaluation of a supplemental feeding program for underweight children ages 6-59 months in Western Uganda. Matern Child Health J. Mar 2010;14(2):299-306.

21 WHO/UNICEF. WHO child growth standards and the identification of severe acute malnutrition in infants and children. 2009.

these 34 children, 79.4% met criteria for SAM and 20.6% for MAM. Mean weight gain during the programme was 2.0kg (SD =1.9kg), or 17.2% of body weight, at a rate of 5.11g per kg per day. This weight change represented a 1.87 point increase in average BMI, and was statistically significant (t = 6.2, p < 0.001).

Of the 27 children over age five who met criteria for SAM at baseline, 12 (44.4%) recovered and six (22.2%) improved to MAM. Nine children (33.3%) continued to meet criteria for SAM after the programme.

Differences in efficacy by age group: There were no significant differences between children under 5 and those over 5 in terms of percentage weight gain (20.1% vs. 17.2%; t = 0.92, p = 0.36) or in rate of weight gain, expressed in grams per kg per day (6.0 vs 5.1; t = 0.91, p = 0.39).

Summary and conclusions

This programme tested a community-embedded model to deliver RUTF to malnourished children in a remote setting in the DRC. To our knowledge, this is one of the first programmes in the DRC in which the production and delivery of RUTF was administered entirely by members of the local population with minimal external support, and in close collaboration with village leadership and regional tribal elders. With the exception of a brief period of training from outside staff, supplies, and ongoing monitoring, the programme was entirely community-embedded and managed by the local people.

Data from this programme would suggest that the approach was effective, with an average weight gain (collapsed across ages) of 1.9kg over a 35 day period, at the average rate of 5.6g per kg per day. This weight gain would be considered moderate, and is within the range of other reports of RUTF efficacy, including those of hospital based nutritional rehabilitation in India[16], and of community and home-based trials in Malawi,[17,18] Niger[19] and Uganda[20]. Perhaps more importantly, approximately half of the children suffering from SAM at admission

Children in the programme interested in a WHO height for weight chart

Ivan Molton, DRC, 2013

to the programme met WHO community discharge criteria[21] (WHZ ≥-2) 30 days later, with an average percentage weight gain (18.9%) consistent with WHO recommendations of 15-20%.

Technical challenges and lessons learned

The community-embedded approach described here is designed to maximize local ownership and sustainability. However, such an approach naturally brings with it unique challenges and is an iterative process. For example, the decision of the local Nutrition Team to rely on clinical evaluation by a nurse to determine malnutrition created a high false positive rate for study entry. Nearly one third of the individuals who entered the programme did not meet WHO standards for acute malnutrition and although still underweight, were not the individuals for whom the programme was designed (nor were they included in the analyses described here). From one perspective, RUTF is a highly specialised food formulated for treating SAM, and the decision to treat these children may have drawn resources away from those who could most benefit from it. From another perspective, the freedom for the local Nutrition Team nurses to use their own clinical judgment brought with it a greater sense of partnership and collaboration, and it could be argued that a high false positive rate is better than a high false negative rate in

treating rural malnutrition. However, now that the data are available, the US will provide the local Nutrition Team with feedback about the breakdown of children entering the programme, and will modify the entrance requirements to employ standard measures such as MUAC. We also hope to get a better estimation of the geographical coverage of the programme, to determine areas of unmet need.

Aside from these programmatic issues, the location of this intervention brought with it a slew of technical challenges. Masumba village is incredibly remote - during the dry season, it is a two week trip by truck from the nearest major city. This distance created a significant barrier in terms of supplies and communication to monitor progress. The isolated nature of this village, including a lack of electricity or fuel for generators, limited our ability to perform ongoing quality control of the product in the field. Aflatoxin in peanuts is a serious concern in the DRC, and ongoing training of staff to minimize this risk through proper sorting, storage, and worker hygiene is essential.

There are also significant systems challenges to working in the DRC. Due to systemic corruption, negotiation with governmental agencies in DRC is very nearly impossible, and significant losses in materials can occur in transit. There are also strong political sentiments associated with foreign aid. Poorly designed US and French attempts over the past century to create infrastructure have led to a pervasive mistrust of external solutions. Local involvement and buy-in, especially from tribal leadership in this region, was essential to the success of our pilot programme.

Despite these challenges, we consider this trial programme to be a success. The programme resulted in considerable improvement in approximately two-thirds of participants suffering from MAM or SAM, using local leadership and a product that was primarily locally sourced. As future refinements are made to the programme, we are hopeful that these data will show improvement as we are better able to identify and serve children in need of nutritional intervention.

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The Masumba Nutrition Team in Masumba, Katanga, DRC

Ivan Molton, DRC, 2013

Gentleman volunteer for training in MUAC and oedema assessment

RAM-OP: A rapid assessment method for assessing the nutritional status, vulnerabilities, and needs of older people in emergency and development settings

By Pascale Fritsch (HelpAge International), Katja Siling (VALID International), and Mark Myatt (Brixton Health)

Dr Pascale Fritsch is an experienced public health specialist. Since April 2011, she is Health and Nutrition Adviser with the HelpAge International Emergency Team, providing technical guidance and building evidence of the vulnerability of older people in humanitarian situations, in the health and nutrition sectors.

Mark Myatt is a consultant epidemiologist. His areas of expertise include surveillance of communicable diseases, epidemiology of communicable diseases, nutritional epidemiology, spatial epidemiology, and survey design. He is currently based in the UK.

Katja Siling is a survey consultant and epidemiologist with experience in applying qualitative and quantitative methods for data collection in Africa and Asia. She is currently based in Johannesburg, SA.

Location: *Ethiopia*

What we know already: Older people are a neglected group in humanitarian responses. There is a need for a simple, cheap, and rapid tool to assess the nutrition and other needs of older people in humanitarian situations.

What this article adds: A prototype Rapid Assessment Method for Older People (RAM-OP) was compared with the SMART method in a pilot in an urban/peri-urban setting in Ethiopia. RAM-OP survey results were comparable to the SMART survey at about two-thirds of the cost. Suggested changes to the RAM-OP method will be piloted in subsequent field trials.

Introduction

Older people are a neglected group in humanitarian responses, even as their numbers grow as life-expectancy increases in much of the developed and developing world. This neglect is particularly obvious in the nutrition sector where the overwhelming majority of activities target children and / or women of childbearing age. Older people are vulnerable to malnutrition but their nutritional status and needs are very seldom assessed and almost never addressed. There is a need for a simple, cheap, and rapid tool to assess these (and other) needs and to enable humanitarian actors to advocate, plan, and deliver relevant and comprehensive responses for older people.

In January 2014, HelpAge International, Valid International, and Brixton Health funded by the Humanitarian Innovation Fund (HIF) began developing a novel method for assessing the nutritional and other needs of older people in emergency and development settings. The Rapid Assessment Method for Older People (RAM-OP) is intended to offer a simple, rapid, low cost, accurate, and reliable survey method for assessing the nutritional status, vulnerabilities, and needs of older people.

The RAM-OP method will use a two-stage spatial sample with a small (e.g. m = 16 clusters) and spatially even first-stage sample and a small (i.e. n < 200) overall sample. Modern computer-intensive data analysis procedures will be used. All of the computer-intensive data analysis procedures required will be performed by free and open-source data analysis software that is currently under development. Guidelines, articles, and training material will be produced. The focus of the work developing RAM-OP is on older people but elements of the work will also be applicable for assessing the nutritional status, dietary diversity, infant and young child feeding (IYCF) practices, food security and other indicators in other populations.

The first field trial of the RAM-OP method was undertaken in Kolfe Keranyio, a sub-city of Addis Ababa (Ethiopia) in February and March 2014. Testing involved performing two surveys using the SMART method and a prototype RAM-OP method simultaneously in the same population and comparing the two surveys in terms of resource requirements and survey results. This article describes key elements of the RAM-OP method and the results of the first field trial of the method. The field trial reported here is for an urban/ peri-urban population. A second trial in a rural setting in sub-Saharan Africa is planned.

Survey setting

Kolfe Keranyio is a sub-city of Addis Abba with a population of about 430,000 persons according to the 2007 Ethiopian census. About 7.4% of the population of Kolfe Keranyio are aged fifty years and older. The sub-city hosts a mix of communities

Figure 1 Simplified EA map for census EA 03-004-40 (RAM-OP Cluster 209)

Simplified EA map for census EA 03-004-40 (RAM Cluster 209)

Key
- ○ Drain / sluice
- ✕ Public tap
- ▱ Housing compound
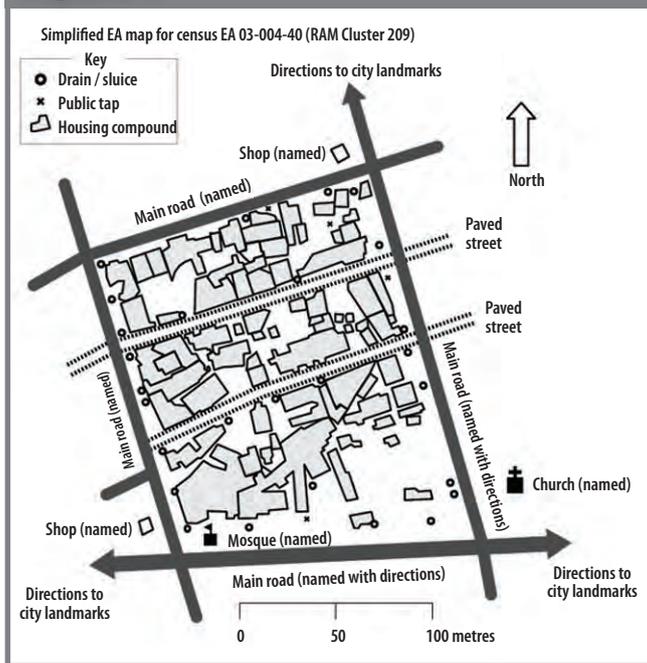
(i.e. from the very poor to the very affluent in both Muslim and Christian faith communities). Housing densities and types vary from dense urban and peri-urban shanties, suburban villa and apartment developments, and peri-urban smallholdings.

The sub-city is divided into administrative districts which were called "kebele" in 2007 but are now called "woreda". These administrative

Box 1 Classic and PROBIT estimators of GAM prevalence

The estimate of GAM made from the SMART survey data used the classic estimator:

$$\text{prevalence} = \frac{\text{number of respondents with MUAC} < 210 \text{ mm}}{\text{total number of respondents}}$$

The estimate of GAM made from the RAM-OP survey data used a PROBIT estimator. This is a *model-based* approach. The PROBIT function is also known as the inverse *cumulative distribution* function. This function converts parameters of the distribution of an indicator (e.g. the mean and standard deviation of a *normally distributed* variable) into cumulative percentiles. This means that it is possible to use the normal PROBIT function with estimates of the mean and standard deviation of indicator values in a survey sample to *predict* (or *estimate*) the proportion of the population falling below a given threshold. For example, for data with a mean MUAC of 256 mm and a standard deviation of 28 mm the output of the normal PROBIT function for a threshold of 210 mm is 0.0502 meaning that 5.02% of the population are predicted (or estimated) to fall below the 210 mm threshold.

Both the classic and the PROBIT methods can be thought of as estimating area:

CLASSIC : Mean = 256, SD = 28
210 mm
Empirical distribution of MUAC
Shaded area = 28 / 545 = 5.14% of total area under curve

PROBIT :Mean = 256, SD = 28
210 mm
Theoretical distribution of MUAC
Shaded area= 5.02% of total area under curve

The principal advantage of the PROBIT approach is that the required sample size is usually smaller than that required to estimate prevalence with a given precision using the classic method.

The PROBIT method assumes that MUAC is a normally distributed variable. If this is not the case then the distribution of MUAC can be transformed towards normality. This was done with data from the RAM-OP survey reported here.

districts are further divided into smaller contiguous and non-overlapping areas called "enumeration areas" (EAs). These EAs were used for the 2007 census and form the basis for budget allocation and service planning by national, city, and district governments.

The current population size and the number of households in each EA were estimated from the 2007 census. Detailed large-scale maps of EAs were available. Figure 1 shows a simplified EA map. The availability of population data and usefully detailed maps led to us choosing census EAs as the primary sampling unit (PSU) for the RAM-OP and SMART surveys reported here.

Sampling

Sample sizes were calculated using standard formulae to achieve a 95% confidence interval of plus or minus two percentage points on a 5% estimate for global acute malnutrition (GAM) assuming a design effect of 1.5. The overall sample size required for the RAM-OP survey was $n = 192$. The overall sample size required for the SMART survey was $n = 684$. For RAM, $m = 20$ clusters of $n = 12$ older people; for SMART, $m = 30$ clusters of $n = 23$ older people. The difference in the required sample sizes was due to RAM-OP using a more efficient estimator for GAM than the estimator used by SMART (see Box 1 for details of the different approaches). The required sample size for the RAM-OP survey was increased to $n = 240$ for this field trial because this was the first use of the RAM-OP method (all previous experience with RAM type surveys had been in children aged between six and fifty-nine months and children aged between zero and twenty-three months) and the first use of RAM in an urban setting.

Both surveys used two-stage cluster sampling:

First stage samples

In first stage sampling for the SMART survey, 30 PSUs (EAs) were selected using population proportionate sampling (PPS) from a complete list of EAs in the survey area.

In first stage sampling for the RAM-OP survey, 20 PSUs (EAs) were selected systematically from a complete list of EAs in the survey area sorted by administrative district. This procedure, known as *implicit stratification*, should select a sample that is reasonably evenly distributed across the survey area. This also tends to spread the sample properly among important sub-groups of the population such as

urban/peri-urban, administrative districts, ethnic/religious sub-populations, and socio-economic groups.

Figure 2 shows a map of Kolfe Keranyio with PSUs (EAs) selected for the SMART and the RAM-OP survey marked. Both samples are evenly distributed across the survey area. This is due to the reasonably uniform distribution of the populations of potential PSUs. In settings where potential PSUs had widely varying populations, the SMART sample would have been concentrated in the most populous PSUs (EAs).

Second stage samples

The second stage sample (i.e. for selection of the respondents in each sampled PSU) for both surveys was taken using systematic household sampling. The sampling intervals were calculated before the start of the surveys based on the average EA population size and the target sample size for each survey. Every second household was selected for the SMART survey. Every fourth household was selected for the RAM-OP survey.

The availability of detailed EA maps (see Figure 1) facilitated the location of PSUs and PSU boundaries.

The final sample size for the RAM-OP survey was $n = 320$. This is considerably (i.e. one-third) larger than was intended. The final sample size for the SMART survey was $n = 569$. This is somewhat smaller (i.e. by about one-sixth) than was intended. Oversampling is a waste of resources. Under-sampling raises both ethical concerns and (potentially) political problems. Problems of over-sampling and under-sampling would not have occurred using a within-PSU quota sample (i.e. taking a fixed number of persons from each PSU). It is envisaged that future field trials of the RAM-OP method will use a within-PSU quota sample as is done in expanded programme on immunisation (EPI) surveys and was done in the original SMART methodology and 30 by 30 cluster method.

Positive feedback on the sampling methods used was provided by members of the SMART team via the online forum en-net (www.en-net.org).

Survey implementation

Permissions to carry out the surveys were obtained from all relevant national and local bodies. Woreda health departments provided local guides to assist in location of PSUs and to liaise with community leaders and other agency personnel (e.g. the police).
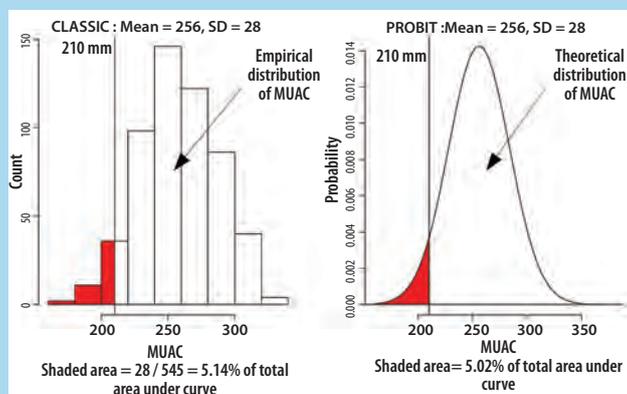
Figure 2 — Map of Kolfe Keraniyo showing PSUs selected for the RAM-OP and SMART surveys

Legend:
- PSU in SMART sample
- PSU in RAM-OP sample
- Potential PSU (not sampled)

Box 2 — Example of indicator creation script (K6 short form psychological distress score)

```
###########################################################################
#                                                                         #
#  K6 : Short form psychological distress score                           #
#                                                                         #
#  The K6 (and K10) score is described in :                               #
#                                                                         #
#    Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek, DK, Normand SLT,  #
#    et al. (2002). "Short screening scales to monitor population prevalences  #
#    and trends in non-specific psychological distress". Psychological     #
#    Medicine, 32(6), 959-976                                             #
#                                                                         #
###########################################################################

###########################################################################
#                                                                         #
#  Recode data to account for DON'T KNOW, REFUSED, NA, and MISSING VALUES  #
#                                                                         #
#  NOTE : This will score DON'T KNOW, REFUSED, NA, and MISSING as 5 (NONE) #
#                                                                         #
svy$wb2 <- recode(svy$wb2, "6:9=5")
svy$wb3 <- recode(svy$wb3, "6:9=5")
svy$wb4 <- recode(svy$wb4, "6:9=5")
svy$wb5 <- recode(svy$wb5, "6:9=5")
svy$wb6 <- recode(svy$wb6, "6:9=5")
svy$wb7 <- recode(svy$wb7, "6:9=5")

###########################################################################
#                                                                         #
#  Reverse the coding scheme used on survey questionnaire                  #
#                                                                         #
svy$wb2 <- 5 - svy$wb2     # Nervous
svy$wb3 <- 5 - svy$wb3     # Hopeless
svy$wb4 <- 5 - svy$wb4     # Restless
svy$wb5 <- 5 - svy$wb5     # Depressed
svy$wb6 <- 5 - svy$wb6     # Everything too much effort
svy$wb7 <- 5 - svy$wb7     # Worthless

###########################################################################
#                                                                         #
# Create K6 score as the sum of individual item scores                    #
#                                                                         #
K6 <- svy$wb2 + svy$wb3 + svy$wb4 + svy$wb5 + svy$wb6 + svy$wb7

###########################################################################
#                                                                         #
#  Apply case-definition for serious psychological distress(i.e. K6 > 12)  #
#                                                                         #
K6Case <- recode(K6, "0:12=0; 13:hi=1")
```

The four-day training for data collectors included training on the objectives of the surveys, the survey questionnaire, survey indicators, sampling methodology, field procedures, MUAC (mid upper arm circumference) measurement (with standardisation), and field testing.

Seven teams of two enumerators were recruited, three teams for RAM, four teams for SMART. The survey teams were supervised by HelpAge International's Humanitarian Health and Nutrition Adviser (PF), assisted by two experienced epidemiologists from Brixton Health (MM) and Valid International (KS). The two surveys were completed in eight days. A total of $n = 889$ people aged between 50 and 102 years (self-reported) were sampled.

The main challenges in the field were related to logistics. Seven teams shared two vehicles and a lot of time was wasted waiting in traffic and dropping each team off at their designated PSU. In addition, the mobile phone network coverage was very poor and once the teams finished, it was often difficult for them to get in touch with drivers to be taken to another PSU. These issues delayed the survey and each team was able to complete, on average, only one PSU per day. If each team had their own vehicles or better communications had been available, then each team would have been able to sample two PSUs per day. This would have shortened the duration of both surveys by half. Also, the survey questionnaire was in English and wasn't translated into local languages. Translation and making sure that everyone understood the meaning of

the questions was extensively practiced during the training, however it is evident from results that there were some issues and inconsistencies in the way questions were translated by different enumerators. For the next pilot, the questionnaires will be translated into the local language in order to ensure data quality and consistency.

Data entry and checking

The data for both surveys were entered into identically structured EpiData v3.10 databases by dedicated data-entry staff. Interactive checks for range and legal values were applied. All data were double-entered and validated (verified) using a record-by-record and variable-by-variable comparison. Errors and discrepancies were resolved by consulting data-collection forms. Any errors that could not be resolved resulted in obviously or potentially erroneous values being censored (i.e. set to missing).

Data management

Data management consisted of creating indicators from the collected survey data. This was done for both the SMART and RAM-OP data using the same purpose-written scripts. Scripts were written using the R Language for Data Analysis and Graphics and managed using the R-AnalyticFlow scientific workflow system. This approach allowed for modular development of data-management and data-analysis code and provided tools for the documentation, testing, and debugging of scripts. Box 2, for example, shows the contents of a workflow node that was used to calculate the K6 (Kessler six item psychological distress score) indicator [K6].

Data related to survey costs were collected and entered into an OpenOffice Calc spreadsheet.

Data analysis

Analysis of survey data consisted of estimating proportions and means for a variety of indicators. The SMART survey data were analysed using the Taylor Linearised Deviation approach, as implemented in the CSAMPLE module of Epi-Info, to calculate confidence intervals for proportions and means [TLD]. The RAM-OP survey data were analysed using a blocked weighted bootstrap estimator:

Blocked: The block corresponds to the primary sampling unit (PSU) or cluster.

Weighted: The RAM-OP sampling procedure does not use population proportional sampling to weight the sample prior to data collection as is done with SMART type surveys. This means that a posterior weighting procedure is required. We used a "roulette wheel" algorithm (see Figure 3) to weight (i.e. by population) the selection probability of PSUs in bootstrap replicates.

A total of m PSUs are sampled *with-replacement* from the survey dataset where m is the number of PSUs in the survey sample. Individual records within each PSU are then sampled *with-replacement*. A total of n records are sampled with-replacement from each of the selected PSUs where n is the number of individual records in a selected PSU. The resulting collection of records *replicates* the original survey in terms of both sample design and sample size. A large number

Field Article

Lady being interviewed during the survey

Figure 3 — The blocked weighted bootstrap used to make estimates from RAM-OP data

Data are collected using a two-stage cluster design:
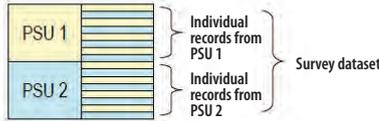
PSUs are selected from the survey dataset *with-replacement* and with probability proportional to population size using a *roulette wheel* algorithm:

Wheel is rotated

Largest PSU has the largest share of the 'roulette wheel'

Selection

Smallest PSU has smallest share of the 'roulette wheel'

PSUs are selected *with-replacement* and proportional to population size:

| 3 | 5 | 3 | 1 | 2 |

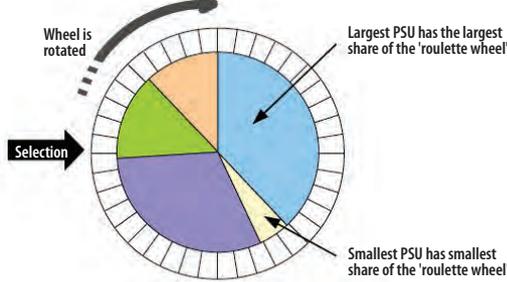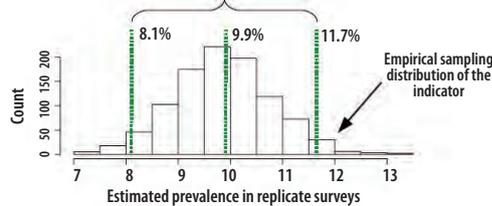Individual records are selected *with-replacement* from within each PSU to create a *replicate* survey. The estimator is applied to the replicate survey and the result recorded. This process is repeated many times. The estimate of the indicator value is made from the distribution of the results from each replicate survey which is the *empirical sampling distribution* of the indicator:

Estimate and 95% confidence interval from 50th, 2.5th, and 97.5th percentiles of the empirical (i.e. observed) sampling distribution of the indicator

Empirical sampling distribution of the indicator

Box 3 — Methods used for between survey comparisons of estimates of indicator levels

Comparisons between the results from both surveys were performed using a *two-sample z-test*.

The *z-test* was calculated using the standard errors (SE) reported by the *CSAMPLE* module of *EpiInfo* for the SMART survey data and calculated from estimates of indicator levels for the RAM-OP survey data:

$$SE = \frac{UCL - LCL}{2 \times 1.96}$$

where *LCL* and *UCL* are the 95% upper and lower confidence limits of the bootstrap estimates made from the RAM-OP survey data. Standard errors were pooled:

$$SE_{Pooled} = \sqrt{SE^2_{SMART} + SE^2_{RAM-OP}}$$

and the *z-test* calculated as:

$$z = \frac{|P_{SMART} - P_{RAM-OP}|}{SE_{Pooled}}$$

Where P_{SMART} and P_{RAM-OP} are the point estimates from the SMART and RAM-OP survey data.

95% confidence intervals on the differences between indicator levels the SMART and RAM-OP surveys were also calculated:

$$95\% \ CI = |P_{SMART} - P_{RAM-OP}| \pm 1.96 \ x \ SE_{Pooled}$$

Sixty between survey comparisons were performed in the work described here.

Without *correction for multiple comparisons* the probability of finding at least one significant test at the *p* < 0.05 significance level is approximately:

$$P_{Positive \ test} = 1 - (1 - 0.05)^{60} = 0.9539$$

even when all of the differences are actually non-significant.

At the *p* < 0.05 significance level we would expect to find three significant results in sixty tests even when all of the differences are actually non-significant.

To avoid these *false positives* results whilst maintaining the *p* < 0.05 significance level the critical value for *p* should be reduced from *p* < 0.05 to:

$$P < 1 - (1 - 0.05)^{1/60} = 0.0009$$

This is known as the *Šidák Correction* [SC]. This corrected critical value for *p* should be treated with caution as the correction is intended only to reduce the number of *false positive* results and does so at the cost of increasing the number of *false negative* results with a consequent reduction in statistical power.

of replicate surveys are taken (the work reported here used $r = 3999$ replicate surveys). The required statistic (e.g. the mean of an indicator value) is applied to each replicate survey. The reported estimate consists of the 50th (point estimate), 2.5th (lower 95% confidence limit), and the 97.5th (upper 95% confidence limit) percentiles of the distribution of the statistic across all replicate surveys. The bootstrap procedure is outlined in Figure 3. The bootstrap approach is computer-intensive but allows estimation of the sampling distribution of almost any statistic using only simple computational methods.

Comparisons between the results from the SMART and RAM-OP surveys were performed using the *two-sample z-test*. 95% confidence intervals on the difference between indicator levels estimated from the SMART and RAM-OP surveys were also calculated. See Box 3 for details of the methods used.

Data related to survey costs were analysed using an OpenOffice Calc spreadsheet.

Results

Table 1 shows the estimates of indicator levels from each survey and between survey comparisons for a selection of indicators for which data were collected. The indicators shown in Table 1 were selected as examples of:

- Means of a single continuous variable (i.e. age, MUAC).
- Means of a single discrete variable (i.e. household size, meal frequency from 24 hour recall).
- Means of multi-variable discrete scales or scores (i.e. dietary diversity from 24 hour recall, K6 psychological distress scale).
- Proportions for indicators calculated from a single variable (i.e. lives alone, has a source of income).

Proportions for indicators calculated from multiple variables (i.e. consumes one or more foods rich in vitamin A, previously screened using MUAC or for bilateral pitting oedema).

The final row of Table 1 shows the results for global acute malnutrition (GAM) based on the case definition

MUAC < 210 mm. The estimated prevalence was 4.39% for SMART and 2.09% for RAM-OP. The SMART result is calculated using a classic prevalence estimator. The RAM-OP result is calculated using a PROBIT estimator. See Box 1 for details of these two approaches. Estimates from the SMART and RAM-OP surveys were not significantly different from each other. It is likely, however, that the observed difference would have been smaller had we used longer MUAC straps. We used MUAC straps that could not measure MUACs above 350 mm. All MUAC measurements above 350 mm were treated as MUAC = 350 mm. This occurred for approximately 6% of respondents. The likely effect of this truncation of higher MUAC values would be to have created a small negative bias in the PROBIT estimate of GAM. The next RAM-OP pilot will use MUAC straps capable of measuring MUACs up to about 500 mm.

All estimates of indicator levels made from the RAM-OP survey data were made with useful precision. The next RAM-OP pilot will reduce the RAM-OP sample size to $n = 192$ collected from $m = 16$ PSUs taking a fixed size (quota) sample from each PSU.

All of the comparisons presented in Table 1 were not significant at either the p < 0.05 or the corrected p < 0.0009 levels (see Box 3). This was not the case for thirteen of the sixty calculated indicators. All of these thirteen indicators were based on non-validated question sets. For example, low vision and blindness (significant at p = 0.0105) was assessed by self-report rather than by a formal assessment of visual acuity. No significant differences were found between the surveys for any indicator calculated in a standard manner from data collected using standardised questions-sets or from purely quantitative measurements. The next RAM-OP pilot will use tested and standardised techniques for all indicators.

Table 2 shows the costs for the SMART and RAM-OP surveys reported here. The RAM-OP survey was cheaper than the SMART survey in proportion to the number of clusters

Table 1 — Estimates of indicator levels from each survey and between survey comparisons for a selection of indicators

Indicator	Units	Type*	SMART Estimate	LCL	UCL	SE	RAM-OP Estimate	LCL	UCL	SE	Difference	Pooled SE	LCL	UCL	z**	p**
Age	years	C1	63.081	62.159	64.004	0.4707	63.49	62.3373	64.4793	0.5464	-0.409	0.7212	-1.8225	1.0045	0.5671	0.5706
MUAC	mm	C1	269.961	265.094	274.827	2.4829	267.6719	264.4384	270.6311	1.5798	2.2891	2.9429	-3.4789	8.0571	0.7778	0.4367
HH size	count	D1	5.449	5.209	5.689	0.1224	5.6303	5.3459	5.9086	0.1435	-0.1813	0.1887	-0.5511	0.1885	0.9609	0.3366
Meal frequency	count	D1	2.71	2.635	2.785	0.0383	2.7791	2.6557	2.9174	0.0668	-0.0691	0.0769	-0.2199	0.0817	0.898	0.3692
Dietary diversity	score	D2	5.981	5.795	6.166	0.0946	6.1792	5.9815	6.3754	0.1005	-0.1982	0.138	-0.4688	0.0724	1.4358	0.151
K6	score	D2	6.188	5.189	7.187	0.5097	6.0924	5.5803	6.5725	0.2531	0.0956	0.5691	-1.0198	1.211	0.168	0.8666
Living alone***	Y/N	P1	0.0316	0.0218	0.0415	0.005	0.0364	0.0189	0.057	0.0097	-0.0048	0.0109	-0.0262	0.0167	0.4358	0.663
Personal income***	Y/N	P1	0.8383	0.7658	0.9108	0.037	0.906	0.8518	0.947	0.0243	-0.0677	0.0442	-0.1544	0.019	1.5298	0.1261
Vitamin A rich foods***	Y/N	P2	0.6362	0.566	0.7064	0.0358	0.6607	0.5728	0.7382	0.0422	-0.0245	0.0553	-0.133	0.084	0.4427	0.658
Screened***	Y/N	P2	0.0018	-0.0017	0.0052	0.0017	0.003	0	0.0101	0.0026	-0.0012	0.0031	-0.0073	0.0049	0.3983	0.6904
GAM***, ****	Y/N	MIX	0.0439	0.0274	0.0605	0.0084	0.0209	0.0051	0.0434	0.0098	0.023	0.0129	-0.0022	0.0483	1.7858	0.0741

* Type of indicator : C1 for the mean of single continuous variable, D1 for the mean of a single discrete variable, D2 for the mean of a multi-variable discrete scale or score, P1 for a proportion calculated from a single variable, P2 for a proportion calculated from multiple variables, MIX for mixed methods (see text).

** Two-sample z-test (see Box 3 for details of calculations of the z-test, 95% CIs, and the corrected p-value).

*** These results are presented as proportions (multiply by 100 to convert these results to percentages).

**** Results are for a classic estimator (SMART) and a PROBIT estimator (RAM-OP). See Box 1.

sampled. In the work reported here, the RAM-OP survey cost about two thirds that of a broadly equivalent SMART survey. It is hoped that the number of PSUs could be reduced further (i.e. from m = 20 to m = 16 PSUs) which should reduce the costs of a RAM-OP survey to about half that of an equivalent SMART survey. The use of smaller within-PSU samples may bring further savings by allowing data to be collected from more PSUs per day.

Conclusions

The field trial reported here suggested changes to the RAM-OP method which will be piloted in subsequent field trials. These include:

- Taking a fixed size (quota) sample from each PSU.
- Further use of standardised question sets and measure methods.
- Strict forward and backward translation of survey instruments and other survey documents.
- Better logistics and communications.

- Use of MUAC tapes capable of measuring MUACs up to 500 mm.

We will also test a wider range of food-security indicators and make better use of data collected for the purposes of assessing dietary diversity.

In the field trials reported here the RAM-OP survey provided comparable results to the SMART survey at about two-thirds of the cost of the SMART survey. Larger (i.e. up to 50%) cost savings may be possible. We will test whether savings of this magnitude can be made in subsequent field trials of the RAM-OP method.

For more information, contact: Mark Myatt, email: **mark[at]brixtonhealth.com**

The authors will be available to answer questions and provide support on using RAM-OP [the single coverage estimator] on the Assessment [Coverage assessment] forum on EN-NET, **http://www.en-net.org.**

Inzaieano Latif, Ethiopia, 2014

Gentleman being interviewed during the survey

Table 2 — Estimated costs for SMART and RAM-OP surveys

Activity	Item	Unit	Cost / Unit	RAM-OP Units	Cost	SMART Units	Cost	Difference* RAM-OP – SMART
Training	person-days (survey team & data entry staff)	person-day	$18.00	36	$648.00	44	$792.00	-$144.00
	person-days (national assistant supervisor)	person-day	$36.00	4	$144.00	4	$144.00	$0.00
	person-days (international survey manager)	person-day	$582.00	4	$2328	4	$2328	$0.00
	Venue hire	days	$117.00	4	$468.00	4	$468.00	$0.00
	Refreshments	person-day	$5.00	44	$220.00	52	$260.00	-$40.00
	Handouts, manual, &c.	sheets	$0.10	200	$20.00	240	$24.00	-$4.00
	Stationery (notepads, pens, &c.)	lump sum			$40.00		$50.00	-$10.00
Survey	Survey enumerators	person-day	$21.00	40	$840.00	80	$1,680.00	-$840.00
	Data-entry staff	person-day	$21.00	5	$105.00	9	$189.00	-$84.00
	National assistant supervisor	person-day	$42.00	5	$210.00	10	$420.00	-$210.00
	International survey manager	person-day	$582.00	6	$3,492.00	11	$6,402.00	-$2,910.00
	Translators & local guides	person-days	$21.00	10	$210.00	16	$336.00	-$126.00
	Vehicles with drivers (survey teams)	vehicle-day	$70.00	5	$350.00	16	$1,120.00	-$770.00
	Vehicles with drivers (supervisory staff)	vehicle-day	$70.00	6	$420.00	10	$700.00	-$280.00
	Fuel purchased	lump sum			$400.00		$600.00	-$200.00
	Photocopying of questionnaires	sheet	$0.10	2560	$256.00	4800	$480.00	-$224.00
	Purchase of population data / maps	enumeration area	$67.30	20	$1,346.00	30	$2,019.00	-$673.00
	MUAC tapes	tape	$0.25	16	$4.00	20	$5.00	-$1.00
Other	Communications	lump sum			$20.00		$30.00	-$10.00
	Flights	flight	$900.00	1	$900.00	1	$900.00	$0.00
Total					**$12,420.00**		**$18,947.00**	**-$6,526.00**

*Negative values indicate that RAM-OP was less expensive then SMART, zero value indicate no difference in cost between RAM-OP and SMART, positive values (not present in this study) indicate RAM-OP was more expensive than SMART.

SPRING's mission is to strengthen global and country efforts to scale up high-impact nutrition practices and policies. SPRING provides state-of-the-art technical support focused on preventing stunting and maternal and child anaemia in the first 1,000 days, linking agriculture and nutrition, and creating social change and behaviour change through communication. SPRING's mission supports two major US Government initiatives: Ending Preventable Child and Maternal Deaths and Feed the Future.

For this issue of Field Exchange, the ENN interviewed Carolyn Hart (Project Director, above left) and Anuradha Narayan (Director, Global Initiatives, above right) from SPRING for the agency profile slot. SPRING is a partnership initiative between the John Snow Inc, Research and Training Institute, Inc[1] (JSI) and four US based international non-governmental organisations (INGOs) (Helen Keller International (HKI), Save the Children US (SC US), The Manoff Group, and the International Food Policy Research Institute (IFPRI). SPRING is a five-year USAID-funded global health programme. JSI is a public health consultancy firm and is the lead agency for SPRING.

Carolyn has held various positions in JSI for over 30 years, focusing for most of the past 15 years in the area of public health supply chains. Her Masters was in Public Health Policy and Management. She has worked mainly on global programmes and in short-term capacities in over 20 countries and lived and worked in Thailand for a local NGO. Carolyn has served as Project Director of SPRING for a little over one year.

Anuradha studied nutrition and worked with SC US for nine years, including a stint as a technical advisor for the southern Africa region. This involved a lot of support for emergency programming. She subsequently worked on large-scale food security and nutrition programmes in Bangladesh and then joined HKI as Deputy Regional Director for East and Southern Africa. Anuradha has been with SPRING for three and a half years.

SPRING/Uganda, in collaboration with the European Union, USAID, UNICEF, and Community Connector, supports the Uganda government's launch of Scaling Up Nutrition (SUN) on February 23, 2013 in the Southwest region of Uganda.

Name:	SPRING (Strengthening Partnerships, Results and Innovations in Nutrition Globally)
Address:	JSI Research & Training Institute, Inc., 1616, Fort Myer Drive 16th Floor. Arlington, VA 22209, USA
Email:	info@spring-nutrition.org
Website:	www.spring-nutrition.org
Established:	2011 (5 year USAID funded project)
Director:	Carolyn Hart
No. of HQ staff:	45
No of staff worldwide:	175

SPRING was established by USAID as a five-year programme in 2011 with a 200 million dollar ceiling[2]. The four agencies partnering with JSI have various and complementary areas of nutrition expertise. The programme is centrally funded, i.e. from Washington, but also receives funding from USAID missions in countries. SPRING now has established programmes in seven countries (Bangladesh, Ghana, Haiti, Mali, Kyrgyz Republic, Nigeria, and Uganda) staffed by 175 people (mostly nationals and with a wide variety of professional skills, including nutrition, medical, food security and health and programme management). Many of these staff are embedded in the four partner organisations. There are a further 45 staff in Washington D.C. The programme was not set up to serve the needs of any particular country but rather to be a technical partner to USAID and respond to USAID mission requests from countries that want to implement nutrition programmes. The dual mandate of SPRING is i) to develop and improve country-specific approaches to scaling up nutrition programming and ii) to connect evidence and programme learning to best practice, in order to improve and monitor nutrition programming, policies and outcomes. SPRING hopes to be able to learn from individual country experiences and foster inter-country learning, and global exchange of experience.

Over the first two and a half years of their programme, SPRING has coalesced around four broad thematic areas of work. One area of work is catalysing 'social and behaviour change' through communications, which can involve anything from training for community health workers (CHWs) for interpersonal communication, to use of mass media in community-based programmes. SPRING is working with a group called Development Media International (DMI) using local radio in Burkina Faso to promote nutrition messaging. SPRING is particularly interested in how context makes a difference to social behaviour change approaches. DMI and

[1] John Snow Incorporated is a 40 year old public health company established to bring management solutions to the public health space in the US and internationally. It has a profit and non-profit arm, the latter being the JSI Research and Training Institute Inc. JSI has over 2,500 staff in over 40 countries.

[2] SPRING is a USAID-funded cooperative agreement. It is not a corporate entity that can receive additional funding, although funding can be raised and channelled through SPRING partner organisations.

its partners in Burkina Faso have been conducting a randomised controlled trial (RCT) to see whether the radio communication programme has had a direct impact on child mortality and SPRING will extend this to include nutrition-related behaviours. SPRING has also been working with a group called Digital Green in India in the area of social behaviour change in order to address complex behaviour affecting nutrition.

A second area of work involves micronutrient programming, particularly around prevention of anaemia. Here, the SPRING approach is broad-based, multisectoral, i.e. not just around food and nutrition but including other sectors like water, sanitation and hygiene (WASH), health, and livelihoods. They are currently supporting three countries to undertake an analysis of the causal chains around anaemia.

A third area of work relates to the linkages between agriculture and nutrition, i.e. nutrition-sensitive programming, and how this can be operationalised. SPRING is looking at numerous models of integrating nutrition and agriculture in USAID priority countries and also trying to better understand the behaviour of actors along the value chain in order to understand how this impacts nutrition.

A fourth and final area of work relates to food and health systems. This is more conceptual and involves consideration of what changes at system level will lead to better implementation of nutrition interventions. Work is ongoing in Nepal and Uganda where SPRING is looking at how integrated plans are translated at district level.

ENN asked Carolyn and Anuradha to highlight what they felt were SPRING areas of success to date. They both highlighted the mass media and interpersonal communication work around behaviour change, although qualifying this by saying it is hard to show lasting impact in only three years. They also felt that their work on linking agriculture and nutrition is critically important. They described how the multi-million dollar Presidential initiative 'Feed the Future' has focused mainly on increasing agricultural production and less so on addressing nutrition (although this is part of its dual mandate and the original intention of the initiative). SPRING's work now directly supports the link and started with the design of three global meetings to bring together Agriculture and Health Officers to explore links between the two key sectors and ensure that agricultural programmes positively impact nutrition. A framework adapted from IFPRI was used to centre the discussions and Feed the Future is now embracing this "Ag-Nutrition Pathways" as part of how they approach their work.

The discussion then moved onto what they both thought were the major challenges in the nutrition sector. Apart from the four thematic areas outlined above, Carolyn sees the biggest challenge as the disconnection between food systems and nutrition needs of families and communities and the fact that not enough people talk about this. Anuradha cited the fact that the nutrition community just tends to talk amongst themselves, and that there aren't adequate multi-stakeholder/sector platforms – especially between private and public sector organisations. She also felt that SPRING may not have used the collective voice of its partnership to the best effect as of yet. Carolyn noted that it is difficult to be both an implementing agency and an advocate. They therefore need to find allies with complementary skills. SPRING is now entering a programme phase where they have to extract and connect learning from country experiences and pull this together with some of the work they have been doing at global level. They need to switch "from doing to knowledge management." The trouble is that their five-year programme doesn't give a lot of time for this. Every country has a performance monitoring plan and these data will soon be scrutinised. A key question will be "are we learning the same thing in any number of countries and are there better ways to do business?"

Anuradha is very keen to reach out to multiple partners to share information and learning, which is why links with organisations like ENN will become increasingly important.

ENN then asked how SPRING sees itself fitting into the 'nutrition architecture'. Carolyn responded by saying that SPRING is the eyes, ears, legs, and hands of USAID in terms of nutrition programme implementation, providing critical technical support and learning. SPRING is playing a critical role in implementing USAID's Multi-Sectoral Nutrition Strategy (2014 – 2025) which aims to reduce chronic malnutrition. Anuradha added that having multiple partners can be challenging at times but this is more than offset by the fact that they all have different skill sets and complementary experience. She re-emphasised that their role in linking nutrition and agriculture is unique and will be critical to the nutrition sector in the long term.

We finished off the interview with a question often asked in this agency profile slot – "how would you describe the culture and way of working within SPRING?" Carolyn replied that it is very collegial, building systems as the work proceeds, and not overly bureaucratic. Anuradha added to this by saying that working on a project like SPRING requires a strong understanding of how an influential donor like USAID operates in the field of nutrition and to be able to respond to that effectively.

Binata Mahanta, a rural farmer in Bhandariposi Village Odisha, India, feeds her 2 year old daughter with complementary foods she learned about during a SPRING-Digital Green community video screening on infant and young child feeding practices.

SPRING is country-driven: we understand country and even district level contexts, and that the countries are driving their own agendas and informing the global agenda.

We are thought leaders: we are leaders in, or dedicated to advancing, our four global focus areas, and promoting evidence-based programming at all levels.

We are committed: to improving lives and holding ourselves accountable for the work that we do at the household, community, district, and national level.

We are catalytic: developing tools, guidance, and knowledge; sharing these to drive positive change.

Building a case for causality through the NCA approach in Satkhira, Bangladesh

Focus group discussions on feeding practices, Enayetpur, Bangladesh

Marijka van Klinken, ACF, Bangladesh

Marijka van Klinken, Matthew Parnaby, Paulina Acosta and Julien Chalimbaud

Marijka van Klinken was the NCA Analyst conducting this study. She holds an MSc of Public Health Nutrition from LSHTM. She coordinated a field research project for ENN and worked for FAO Somalia.

At the time of the study, **Matthew Parnaby** was the Nutrition Head of Department at ACF in Bangladesh. Matthew holds an MSc in Public Health and is an experienced Medical and Nutrition professional working with ACF, MSF, CDC (Northern Territory Australia), and ECHO.

Paulina Acosta is a regional advisor on Mental Health and Care Practices with ACF. She holds a master's degree in intercultural psychology and she previously worked in various roles in mental health and psychosocial programmes in South Sudan, Darfur and Bangladesh with ACF; in Palestine, Central African Republic and Papua New Guinea with MSF and in Lebanon with Handicap International.

Julien Chalimbaud is the Link NCA project coordinator at ACF France for the past four years. He has 15 years of domestic and overseas experience in Food Security and Nutrition.

Location: *Bangladesh*

What we know already: The prevalence of child and maternal undernutrition is persistently high in Bangladesh and is multi-causal.

What this article adds: A structured method for conducting nutrition causal analysis (NCA) has been developed by ACF called the Link NCA. It identifies plausible causes of undernutrition in a local context to inform programming. In Bangladesh, seasonal factors (e.g. waterlogging), poor food quality and diversity, and maternal care were recognised risks by the community, however structural and societal factors (e.g. distrust in the health system, misinformation) negatively influence practice. Some perceived risk factors (side-effects of pesticides) are not addressed by any programmes. Involvement of local stakeholders and multi-sectoral representatives are key to the process.

Bangladesh, originally known as the "basket case" of Asia, has stunned all critics with the impressive gains on poverty reduction, reducing the national levels of poverty by one-third in the last decade[1]. In addition, it has shown the possibility of implementing widespread countrywide programmes, including birth control and basic education[2]. However, despite impressive reductions in maternal and child mortality, the prevalence of child and maternal undernutrition continues to remain persistently high, with recent figures as high as 41.4% stunting and 15.1% of wasting[3].

ACF-International (ACF-INT) has worked in Bangladesh since the cyclone Sidr emergency response in 2007 and in Satkhira district since 2011 in response to the flooding emergency and resulting waterlogging. In the 18 most vulnerable unions of Satkhira district, ACF-INT has implemented a comprehensive nutrition programme, along with a psychosocial component aimed at increasing the effectiveness of the treatment, as well as assisting behaviour change and reinforcing positive child and maternal care practices. Due to the consistently high rates of undernutrition in Satkhira, ACF-INT started a detailed investigation into the socio-cultural and economic causes of undernutrition, using the recently developed Nutrition Causal Analysis (NCA) mixed methodology which triangulates quantitative and qualitative information, to identify plausible causes of undernutrition in a local context[4] (see Box 1).

The objective of the NCA is not to demonstrate statistically causal association or infer one main cause, but rather, to build up a case for multi-sectorial causality, based on different sources of information, using

1   Jolliffe Dean, Sharif Iffath, Gimenez Lea, Ahmed Faizuddin, 2013. Bangladesh - Poverty assessment: assessing a decade of progress in reducing poverty, 2000-2010. Bangladesh development series; paper no. 31. Washington DC; World Bank.
2   Bangladesh: Innovation for Universal Health Coverage. The Lancet Global Health Series, vol. 382, no. 9906, Nov. 2013
3   National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. Bangladesh Demographic and Health Survey 2011. Dhaka, Bangladesh and Calverton, Maryland, 2013.
4   Guidelines for conducting a Nutrition Causal Analysis. ACF, 2014. Under publication.

Box 1 Link NCA project

A nutrition causal analysis (NCA) is a method for analysing the multi-causality of undernutrition, as a starting point for improving the relevance and effectiveness of multi-sectoral nutrition security programming in a given context.

In order to strengthen the analytical foundation on which its programmes are built, Action Contre la Faim (Action Against Hunger) invested in the development of a structured method for conducting nutrition causal analysis called the Link NCA. To be actionable by operational stakeholders, the Link NCA needed to be *Structured, Local* (to be adapted to specific local communities) and *Operationally feasible*. ACF formed a multidisciplinary scientific committee[5] of researchers and technical experts to propose such a method that was tested in Bangladesh, Zimbabwe (2011) and Burkina Faso (2013).

The Link NCA is a structured, participatory, holistic study, based on the UNICEF causal framework, intended to build evidence-based consensus around the plausible causes of undernutrition in a local context. The Link NCA links stakeholders across sectors; links risk factors and undernutrition to identifying pathways; links different sources of information to build evidence-based consensus around the plausible causes of under-nutrition and links the causal analysis to a programmatic response.

OFDA is currently funding a two years programme to scale up the use of the LINK NCA with two main components:
1) Implementing five Link NCAs in three priority countries in partnership with IMC, CONCERN, ACF USA and ACF France. The objective is to learn more lessons from these field experiences especially by supporting the operational response phase.
2) Building a technical unit to provide technical support and training to any organisation willing to conduct Link NCA studies. The objective is to promote the method through awareness centered on a dedicated Link NCA website. Any organisation implementing a Link NCA can receive the technical expertise and necessary training.

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Figure 1 An excerpt of the local conceptual model highlighting major and important risk factors

Risk Factor Classification
Major
Important
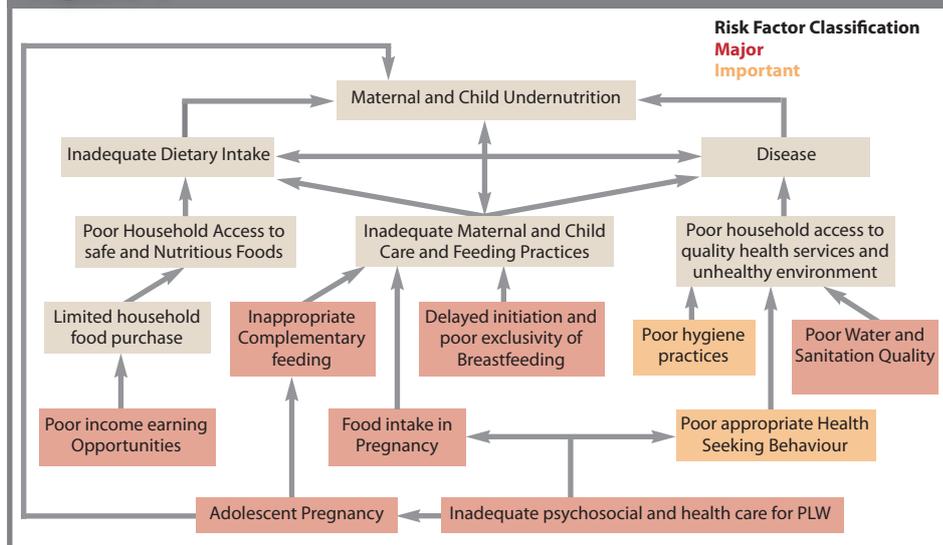
a clear structured approach of five steps:
(1) *Designing the NCA* using secondary data information to formulate draft hypotheses for the case of causality for undernutrition.
(2) *Identifying hypotheses of risk factor of causality* using the UNICEF conceptual framework as a basis, and creating a local hypothetical model together with stakeholders[6].
(3) *Gathering evidence of causality*, through qualitative and quantitative methods, using a data collection plan. In this instance, qualitative data collection was done through Focus Group Discussions (FGDs), participant observation, transect walks and key informant interviews (KII) in each of the four selected villages[7]. A one-day interview with key informants of the village was conducted followed by three days of FGD's related to Nutrition; Food Security; Health, water, sanitation and hygiene (WaSH); and Mental Health and Care Practices (MHCP). Case histories of malnourished and positive deviant cases of children were also conducted. Quantitative data collection was through two main surveys - a Food Security Livelihoods and WaSH in-depth survey conducted in October 2013, and an integrated SMART survey conducted in January 2014. Questions on the risk factors for undernutrition were included in the SMART household questionnaire.
(4) *Analysis and triangulation* of the information collected to formulate a comprehensive understanding of the immediate, underlying and basic risk factors for undernutrition.
(5) *Building a consensus* around the findings, through the participatory ranking of "relative importance" of the risk factors to undernutrition together with the stakeholders and communities.

The nutrition situation in Satkhira is currently classified as serious according to the WHO scale (global acute malnutrition (GAM) prevalence: 13.8%), with underweight and stunting prevalence remaining at very high and high levels (30% and 29%) respectively[8]. The perception of risk factors to undernutrition in the community related primarily to poor food quality and diversity, resulting from poor land access and cultivation due to the increased frequency of waterlogging (prolonged flooding). Poor maternal care, especially during pregnancy, also featured strongly in the communities' perception of what causes undernutrition, with purposeful reduction of food intake in the 3rd trimester noted as a reason for low birth weight and underweight children.

Only 44.4% of children aged 6-23 months consumed an acceptably diverse diet (>4 food groups) and 66.7% children aged 6-59 months reported an illness in the preceding two weeks, reflecting a worrying dietary intake and disease prevalence. Detailed analysis found that co-morbidities had a significant negative effect on wasting and underweight indicators.

Through qualitative, quantitative and secondary level enquiry, along with the validation of a wide range of experts, a number of risk factors for malnutrition were identified. Figure 1 demonstrates an excerpt of the local conceptual model drawn, highlighting the major and important risk factors only[9].

From the qualitative component, it was interesting to note that some of the risk factors were well understood by the communities, but social, cultural or economic constraints prevented

5   The group was composed of Dr. J.Coates, Dr H Young, Sr Y Martin-Prevel, S Jaspers, K Ogden, and a group of senior technical experts from ACF.
6   A wide-range of experts was gathered from local and international NGO's, as well as UN agencies. These were: UNICEF, FAO, WFP, Save the Children, PCI, Solidarite International, Hellen Keller International, World Vision, TMSS, Uttaran, Shushilan and ACF-INT. Government representatives were invited but were unfortunately unable to attend.
7   A random selection of four villages was drawn from the 30 randomly sampled SMART clusters.
8   SMART Survey January 2014 in ACF working areas of Satkhira district, ACF-International, 2014.
9   For a full diagram, refer to the full NCA Satkhira report, ACF, 2014

positive behaviours from being practiced. Societal and cultural influence had a marked impacted on maternal care practices, and any programmes tackling behavioural change in this field would need to take this into account. For example, early marriages, and the ensuing early age of pregnancies, was highlighted by all as being a major risk factor by both the communities and quantitative findings. The average age of first pregnancy was given as 18 years, with 16 being the average age of first marriage. However, results from the qualitative work indicate an earlier age, suggesting potential bias in the responses given in the quantitative feedback. While all members of society noted that early pregnancies would likely have a negative impact on child and maternal care, societal pressures kept this practice alive.

Other risk factors were found to emanate from misconceptions, arising from fears that have been propagated by stories within the community. These misconceptions perpetuated behaviours that were a major risk factor to undernutrition. Behaviour such as decreasing food intake, especially in the final trimester, which were initially hypothesised to derive from a desire to decrease the size of child at birth were also discovered to arise from a fear of caesarean sections. In the quantitative component, 54.6% of women were found to decrease food intake during pregnancy. Health advice during pregnancy was regularly sought from traditional birth attendants, who advised decreased food intake, especially during the 3rd trimester. The preference of home births, alongside a distrust of the public health care system, and the prohibitive costs of private health care (doctors tend to prescribe caesarean sections too often in order to generate higher incomes), further drive women to decrease food intake in their last trimester.

While the Bangladesh government has invested a lot of effort on the health structure, the entrenched mistrust in community health structures, with allegations of corruption and inappropriate services, remains a worry. This was noted as being an important risk factor, fuelling inappropriate health seeking behaviour resulting in access to inappropriate messages, especially for child and maternal care.

Seasonal impacts such as waterlogging played a pervasive role in the perception of risk factors for undernutrition in the communities. The impact of waterlogging permeated all spheres in the community, affecting income and food security indicators, rendering water and sanitation facilities inaccessible, increasing time spent on household tasks and leading to deteriorating care practices in the community.

The community believes that some risk factors are not being addressed through any programmes. For example, a major worry for the health of the community is that the increased use of pesticides, chemical fertilisers and formalin, which are recognised as being instrumental in increasing production, are detrimental to the quality of the food produced. This should not be overlooked and may sustain negative practices.

Programme orientation recommendations

From the NCA, it was concluded that structural as well as societal changes needs to occur in the ACF-INT working areas in order for there to be a holistic approach to tackling undernutrition. Conversations with the community have highlighted the multi-faceted causes of undernutrition in the area and several community recommendations will require a concerted effort on the part of the government to tackle structural changes. For ACF-INT programmes, the NCA findings demonstrate the need for a more integrated approach to project planning and implementation. Some highlighted recommendations that arose from the NCA were as follows:

- Strengthen MHCP programmes to work with communities in Satkhira to identify positive practices to reinforce and facilitate behaviour change at the household level and increase awareness of child and maternal care practices. Complementary feeding before 6 months of age is a strong practice in Satkhira and in Bangladesh in general. Specific programming to reinforce practical understanding about appropriate timing of transition from exclusive breastfeeding to complementary breastfeeding is necessary and should include infants aged 3 to 6 months in the target group.
- Strengthen nutrition sensitive programming being delivered through community clinics, including pre- and post-natal check-ups and maternal nutrition advice.
- Improve health access behaviour of pregnant women, increasing their knowledge on appropriate supplementation during pregnancy and tackling the barriers they face.
- Increase the knowledge of traditional birth attendants to reinforce appropriate maternal nutrition advice, to reduce low birth weight and limit adverse misconceptions surrounding maternal nutrition, health and childbirth.
- Strengthen access to quality water and sanitation facilities, including community education campaigns to highlight hygiene behavioural practices.

Limitations and lessons learned

There are limitations to the NCA approach. Firstly, in order to triangulate the data, information is collected from a variety of sources, each with its own inherent bias. Risk factors highlighted do not always conform to clear cut-offs and guidelines by the public health community, especially those on the basic level of the UNICEF conceptual framework. These are also the hardest to test quantitatively, resulting in a reliance on qualitative sources. These difficulties also extended to scientific evidence, where some causal associations were clearly underpinned by robust studies whereas others were not. This led to some difficulty confirming the hypotheses for certain risk factors.

At the community level, understanding of the links between food intake and malnutrition were clear whereas there was less clarity around care practices. This required additional time, which was not always available, to explore some of these causes.

While efforts were made to include a wide group of technical experts, due to various time constraints and levels of insecurity, it was not possible to get representatives from each sector at the initial technical workshop. To ensure the development of local and context specific hypothesis during initial workshops, great efforts were made to have local level experts and key stakeholders present.

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Discussions on feeding infant and young child feeding practices, Bangladesh

Marijka van Klinken, ACF, Bangladesh

Woman in front of a manyatta (a Masai or Samburu settlement)

Kristy Manners, Kenya, 201477

Field Article

By Kristy Manners, Muriel Calo, Imelda Awino and Jacob Korir

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Muriel Calo was Senior Food Security and Livelihoods Advisor in ACF's New York office at the time of writing. She has a decade of domestic and international experience working on food security and livelihood issues in vulnerable settings, supporting ACF-USA country programmes in East Africa and Asia.

Imelda Awino is the Regional SMART Coordinator, former Head of the Nutrition Department in ACF-USA Kenya Mission.. She has previously worked as nutrition surveillance programme manager and nutritionist in ACF Kenya and South Sudan Missions, and for the Kenya Ministry of Health and GIZ in various nutrition related capacities.
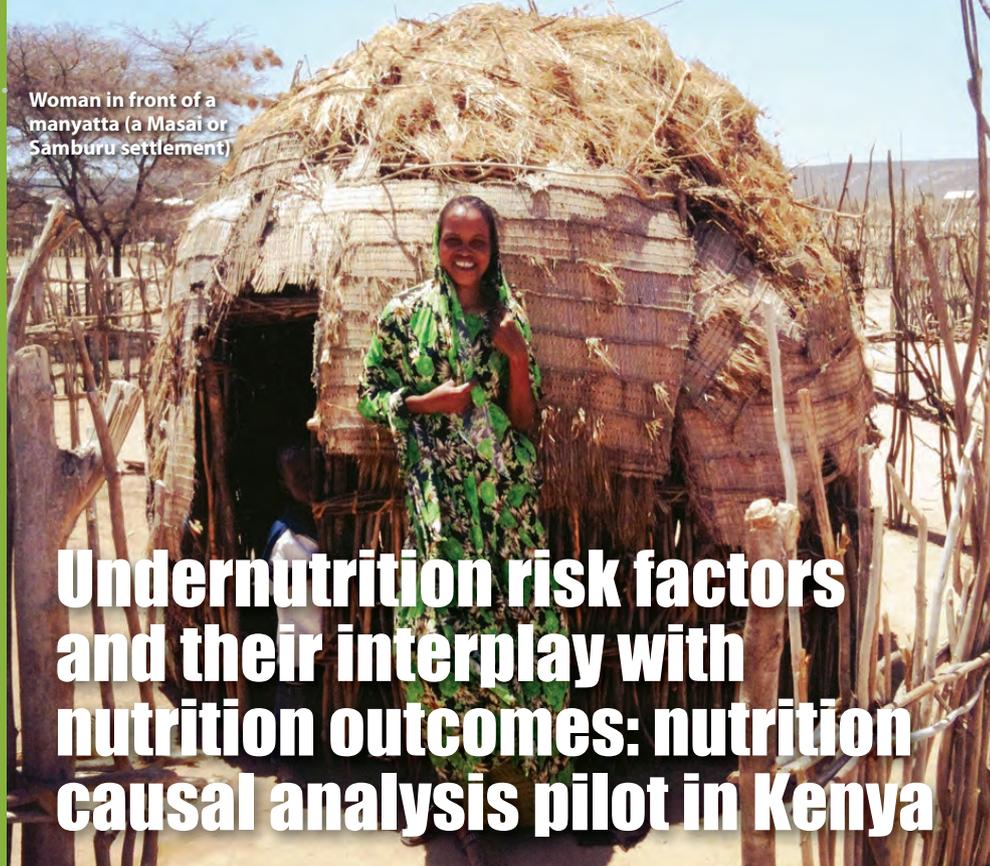
Jacob Korir is Deputy Head of the Nutrition Department in ACF-USA Kenya Mission and has over 5 years' experience in nutrition and health programming. He previously worked for World Vision Somalia, Kenya Medical Research Institute and Christian Child Care International in various health and nutrition capacities.

Undernutrition risk factors and their interplay with nutrition outcomes: nutrition causal analysis pilot in Kenya

Location: *Kenya*

What we know already: Acute and chronic malnutrition rates remains prevalent in Isiolo County, Kenya despite international and national initiatives. Understanding contributing factors to undernutrition and their interplay in a given context can inform advocacy and help direct interventions.

What this article adds: ACF conducted a Nutrition Causal Analysis in Isiolo County, Kenya using a new participatory methodology. All stakeholders concurred on major causal factors underpinning acute malnutrition (high child morbidity, poor access to safe household water and to appropriate age-specific foods). Increased women's workload was an important consequence of drought effects - and sometimes of interventions - to the detriment of child and maternal health. Communities suggested insightful solutions to address risks.

Isiolo County lies in the semi-arid and arid lands (ASAL) of Kenya. Action Against Hunger |ACF International (ACF) has been operating in most parts of Isiolo County (Garbatulla and Merti Sub-Counties) for a number of years. Programmatic adjustments by government and non-governmental organisations (NGOs) following on from the findings of regular quantitative surveys and surveillance data have contributed to decreased acute malnutrition prevalence below the Horn of Africa pre-crisis level. Adjustments have included strengthening of local and national capacities (Ministry of Health, National Drought Management Authority); scaling up health and nutrition outreach to ensure that services reach remote areas not covered by facilities; scaling up Maternal, Infant and Young Child Nutrition interventions; linking beneficiaries to Food Security and Livelihoods interventions and creating synergies with WASH (waster, sanitation and hygiene) interventions; strengthening nutrition and food security information systems to prompt timely humanitarian response; on the job training; mentorship and advocacy. However, prevalence of acute and chronic malnutrition has since plateaued at around 10% and 20% respectively[1]. There was therefore great interest from stakeholders to understand further the causal pathways of malnutrition so as to be able to provide recommendations to county stakeholders and develop more effective programmes to curb malnutrition.

Nutrition Causal Analysis (NCA) approach and method

The core objective of a Nutrition Causal Analysis (NCA) study is to understand the risk factors of undernutrition and their interplay with nutrition outcomes for a given study population. The generic method and history of this approach is described in Box 1 of the accompanying article on Bangladesh (see page 74).

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[1] ACF Integrated Surveillance report for Garbatulla and Merti sub-counties, October 2013

ACF conducted an NCA study in Isiolo County, Kenya in late 2013 using this newly developed methodology. The NCA study had the objectives of: i) identifying the main causes of wasting in Isiolo County; ii) understanding the local seasonal and historical pathways to wasting; iii) developing local causal models for acute malnutrition[2]; and iv) using these results to support advocacy on causes of wasting.

The qualitative inquiry approach to primary data collection was used to complement already existing sources of information and to develop an 'emic' (local) definition and understanding of undernutrition. It was also used to characterize food security, health and care practice in the community and explore local perceptions of the causes of poor food security, heath and care, as well as identify seasonal and historical trends and understand how the community prioritises risk factors related to undernutrition.

Adaptation of the ACF NCA survey methodology to the Isiolo County context involved a participatory process with community, county and national stakeholders including government ministries. Methods included secondary data review, key informant interviews, focus group discussions and an iterative analytical process based on consultations with key stakeholders. Key steps included:

1. **Identifying risk factors and establishing causal 'pathways of malnourishment'** for acute malnutrition/wasting through a literature review; formulation and preliminary rating of factors during an initial technical expert workshop.
2. **Gathering evidence of causality** through a qualitative inquiry conducted during four weeks of intensive fieldwork, where communities ranked priority risk factors of acute malnutrition.
3. **Rating causal factors** according to their relative contribution to undernutrition in a final stakeholder workshop, based on literature review, international scientific sources, quantitative survey results, analysis of seasonality; ranking by communities and technical experts.
4. **Validating results** through a participatory and consensus-driven process where initial hypothesised risk factors were revised and validated in accordance with qualitative inquiry results and confidence notes[3] delivered.

The sample was stratified into Pastoral, Agropastoral and Labour/charcoal livelihood groups so results could be disaggregated by population groups with potentially different sets of underlying causality for undernutrition. Four villages or study sites were selected in the three Sub-Counties of Isiolo County (Isiolo, Garbatulla and Merti).

Key findings

Findings showed that high child morbidity, linked to inadequate access to safe water for household use coupled with poor access to appropriate age-specific foods, including milk in the dry season, are the three major causal factors underpinning acute malnutrition in Isiolo County. This was agreed by communities, technical experts and other critical stakeholders and is reflected in the high confidence of stakeholders in these three major risk factors identified through the NCA process. Findings also confirmed that the impacts of recurrent drought are increasing women's workload in significant and detrimental ways and in turn affecting maternal health and care of young children. This was reflected across the other major causal factors identified in the study process.

While the three livelihood groups under study have unique features affecting the health and nutrition of their community, many of the risk factors to acute malnutrition that have been prioritised are very similar across the groups. Findings from the fieldwork indicated that acute malnutrition typically occurs during the dry season or during droughts, peaking at the commencement of rains, and is linked to seasonal reductions in access to and consumption of milk. However, with increasing recurrence of droughts, increasingly sporadic rainfall and unreliable climatic patterns, communities are having less time to recover during these "typical" peaks. As a result, other risk factors are becoming more important than just the availability of milk during the dry seasons. For example, as water shortages are occurring more frequently, disease and women's workload are increasing. The community raised concerns that the health of their animals and families are not as strong as previously. They attribute it to recurrent droughts and the cycle of poverty as they cannot recover the number of animals to sustain them as before. Thus, though wasting is considered by technical experts to be the major area of concern as regards undernutrition in Isiolo County, stunting is also emerging as an area of concern to experts as well as the community, as recurrent shocks lead to chronic afflictions and long term problems.

Table 1 summarises the main results, presenting the twelve major risk factors identified in the NCA study. It illustrates preliminary ratings given to individual risk factors in the initial technical expert workshop[4], classification of risk factors into categories based on field in-

Table 1 — Summary of major risk factors to causes of acute malnutrition

MAJOR RISK FACTORS	Preliminary rating from initial workshop*	Rating based on field investigation findings**	Rating change based on deliberation in final workshop**	Confidence note from final workshop***
1. High childhood morbidity	3.6	MAJOR		3
2. Inadequate quantity and diversity of age-specific foods	3.8	MAJOR		3
3. Access to safe water for household use	3.7	MAJOR		3
4. Inadequate access to food	3.6	MAJOR		2.9
5. Poor or fluctuating stability (climatic, market prices, conflict, economic, political)	3.4	MAJOR		2.9
6. Inadequate access to milk and animal products during dry seasons (inc. extended dry)	3.9	MAJOR		2.9
7. Inadequate coverage of latrines	3.2	MAJOR		2.9
8. Distance and access to water is taking a large proportion of women's time and duties	3.3	MAJOR		2.9
9. Domestic duties are not reduced during pregnancy and lactation of women	3.1	MAJOR		2.9
10. Poor availability of foods	3.7	MAJOR		2.8
11. Caregivers spending inadequate time with the U5 child (psychosocially and nutritionally)	3.1	MAJOR		2.8
12. Access to water for livelihood use	3.5	IMPORTANT	MAJOR	2.6

* 1= minor contributor to undernutrition, 5= major contributor to undernutrition.
** major, important, minor, rejected, untested *** 1=low, 3=high

[2] A **local causal model** is a set of interlinked risk factors and pathways posited to underlie a particular form of undernutrition. Linkages between individual pathways together constitute a local causal model.

[3] The **confidence note** is an indication of how reliable a risk factor is considered to be, based on the perceived strength of information gathered for that risk factor and the number of pathways through which it operates. It is generated during the final stakeholder workshop where risk factor ratings are debated and stakeholders assign a confidence note for each studied risk factor; this is later averaged across the group to validate final results. The confidence note has three levels: *high* (participant is convinced by the rating, based on the quality of the process and the coherence of the information collected as well as her/his technical and field experience); *medium* (participant is fairly convinced by the rating although some points require clarification); and *low* (participant is not convinced by the rating and has doubts about the quality of the process and/or about the information collected. Or: key information is missing).

[4] During the initial technical expert workshop, participants considered 39 different risk factors pertaining to undernutrition and delivered a **preliminary rating** on a scale of 1 to 5, five illustrating a major effect on acute malnutrition, one illustrating minimal/no effect. Factors were subsequently grouped by thematic area. The highest rated risk factors reveal that *infant and young child nutrition (IYCN), child and maternal health, water, and maternal education* were considered major contributors to U5 and maternal malnutrition in the study area.

vestigation findings (major/important/minor/untested/rejected) and final confidence notes assigned by stakeholders in the last stage of the process[5].

Conclusions

The agreed major factors underlying acute malnutrition reflect the impact that recurrent drought is having on the economic capacity of communities (loss of livestock, vulnerability to food price hikes, reduced access to food and markets), as well as on access to water (loss of livestock, splitting of families for migration, increased workload of women, hygiene and sanitation, disease). These factors, underpinned by women's increasing workload, are having a detrimental effect on the care of U5 children and maternal health.

Ongoing social transformation is resulting in families placing increased value on education compared to other generations. However, impact on households is mixed. On a positive note, literacy levels and knowledge of nutrition, health and hygiene are increasing and girls are being kept longer in school to help prevent early pregnancies. However, families split as men migrate, due to the increased tendency of communities to settle in order to keep their children in school (as a result of low numbers of mobile schools), and to counteract the effects of livestock depletion

from recurrent droughts through diversification of livelihoods (agriculture, labour/charcoal). Splitting of families has, in turn, led to increased workload of mothers as they work in the shamba (homestead) or burn charcoal, and longer distances travelled for pasture and water for livestock; consequently there is more limited access to milk and meat for children and women.

Ultimately, the workload of women is recognized by both men and women in communities to have increased dramatically: working in the shamba or burning charcoal, collecting water, conducting normal domestic duties, and caring for children. With inadequate time to care and feed children properly, and with reduced access to milk for children, poor nutritional status of children is compounded.

Recommendations

The UNICEF Conceptual Framework illustrates that the causes of malnutrition are multi-factorial and that all three levels (basic, underlying and immediate causes) are vital to ensuring a healthy outcome for mother and child. Depending on the mandate of an organisation or a government agency, programming often aims to address the immediate and underlying causes and assumes that the impact of the programme towards reducing undernutrition has directly been achieved by their single-pronged approach. This approach

may overlook the vital needs for, and role of, advocacy for policy change, infrastructure support and provision of basic services.

Through the field study of this NCA, it was evident that often what are believed to be appropriate interventions, for example, increasing food security or educational knowledge, may in fact be affecting the care of a child in a detrimental way, e.g. increased maternal workload, dividing families to keep children in school, etc. Although household and community food security may be improved on one level, the workload of a woman may be increased through this strategy. Programming and strategies often neglect the importance of the workload of women who bear much of the family responsibilities, and rarely if at all, make the reduction of women's workload an explicit objective.

Communities proposed a number of insightful solutions to address the risk factors for acute malnutrition that were shared with county level actors and included in the report[6]. ACF also developed a detailed county plan which is being used as a key advocacy tool and the county is keen for the plan to be accomplished. However, there is a clear need better to streamline this process so that there can be a joint effort towards

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5   See footnote 3 regarding confidence note rating.

| **Figure 1** | **Summary Isiolo County Local Causal Model** |

identification of solutions rather than two parallel processes that may not always align and therefore translate into a clear and coherent action plan. A response analysis module has been added into the guidelines to support follow-up. Many of the community solutions required external input; this is where investment of time would be valuable to come up with solutions that involve local resources, organisations, mobilisation, etc. Interestingly, the village site that had never received any outside aid came up with the most solutions and which involved minimal external assistance.

With limited budgets, it is even more vital to involve the community from the outset in any decision-making. For this reason, to follow through from the information sharing at community level and the wealth of solutions proposed by communities, a Participatory Vulnerability and Capacity Analysis (PVCA) would be appropriate whereby communities design their own plans for longer term disaster risk reduction, resilience and nutrition security for integration into other local and county level planning processes. The NCA also provides the platform to advocate to the government and agencies to collaborate further with these communities in supporting them in this process.

In line with key findings of the study, an Isiolo County NCA Dissemination Workshop held in January 2014 provided a forum for multi-sectorial groups at county level to enrich proposed community solutions with key recommendations around reducing the workload of women and minimising the splitting of families.

Lessons learned

In addition to gathering evidence of causality and identifying risk factors for malnutrition, the NCA process was also used as a learning platform to improve future NCAs. Below is a synopsis of key lessons learned:

- **Involve government ministries and other key stakeholders.** Government ministries and other stakeholders from a range of technical areas should be fully engaged in every step of the process to ensure a thorough understanding of the process and a capacity to follow-up on findings. In this NCA, government was involved; However, ACF would seek more representation from other sectors outside nutrition in future NCAs.

- **Start from the bottom up to minimise divergence between expert conclusions and community priorities.** While major risk factors identified by both community and experts aligned fairly well, there is a need to engage communities early in the identification of their priorities, risks and solutions to avoid divergence with priorities set by donors, governments and agencies. This approach will allow for proactive agreement on final causal models that reflect both local priorities and expert opinion.

- **Explore the possibility of using the NCA to examine causal factors driving undernutrition as a whole.** Opportunities to compare NCA outcomes in similar contexts that focus on just wasting or just stunting should be seized to understand whether there is continuity or coherence between the risk factors driving different kinds of undernutrition. A new review of evidence[7] suggests that the current programmatic and policy divide between wasting and stunting may be losing its relevance and, ultimately, contributing to the lack of nutritional impact seen in responses that address only one part of the undernutrition problem. The NCA can be used as a tool to gain a better understanding of the relationship between the factors driving both wasting and stunting.

- **Limit the number of risk factors under study.** The number of risk factors affects the time required in workshops, length of primary data collection, amount of data to analyse, report length and time required for presentation. Selection of a limited number of key risk factors would allow greater depth of understanding on the most important determinants of undernutrition.

- **Use the formative research approach of the qualitative inquiry to link other sources of nutrition information available at local and national levels with local priorities.** While quantitative survey information is valuable, it only paints half of the picture. Formative research can support the development of a culturally sensitive definition of undernutrition and can be the basis for elaborating more effective behaviour change strategies around key risk factors, for example. This ensures accountability of expert opinion and action, as well as improved ownership and effectiveness of change processes at every level.

- **Enhance uptake of recommendations through community dialogue and stakeholder engagement.** While the primary objective of the NCA is the analysis of causes, the study should also be paired with a discussion of solutions and analysis of response options so as to leave communities with some direction and motivation regarding how they can address locally identified problems. This response analysis can also lead into a community mobilisation and planning process at a later stage. Similarly, other key actors at local and national level need to be guided in next steps to enhance the uptake and impact of NCA findings.

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The full length report on which this article is based is available at: http://www.actionagainsthunger.org/publication/2014/02/kenya-nutrition-causal-analysis-qualitative-inquiry

Women in a focus group discussion during Nutrition Causal Analysis data collection

Kristy Manners, Kenya, 2013

6   Some of these were: creation of women's groups (businesses e.g. beading, community children's crèche, communal water boiling, communal domestic animals for milk, forming markets through buying/selling of goods and livestock); creation of youth groups for funding of businesses; grants to restock livestock; training on market development to develop livestock and agriculture produce markets to reduce the need to travel; ; educate children on farming; teach men about the importance of responsibility sharing; training on budgeting and time management skills e.g. cooking in morning before going to collect water or burn charcoal. See also the main report, p58. http://www.actionagainsthunger.org/publication/2014/02/kenya-nutrition-causal-analysis-qualitative-inquiry

7   ENN 2014. Technical Briefing Paper: The relationship between wasting and stunting: policy, programming and research implications. Available at: http://www.ennonline.net/waststuntreview2014

Informal group discussion in a SQUEAC assessment

Aziz Goza

A single coverage estimator for use in SQUEAC, SLEAC, and other CMAM coverage assessments

**By Safari Balegamire
(VALID International),
Katja Siling
(World Food Programme),
Jose Luis Alvarez
(Coverage Monitoring Network),
Ernest Guevarra
(VALID International),
Sophie Woodhead
(Coverage Monitoring Network),
Alison Norris
(VALID International),
Lionella Fieschi
(VALID International),
Paul Binns
(VALID International),
and Mark Myatt
(Brixton Health)**

Location: *Global*

What we know already: There are two different estimators of coverage (point coverage and period coverage) using current coverage assessment methods. Selection of the appropriate estimator can be difficult in multi-district surveys and where contextual information is not readily available. Coverage assessed using different estimators is not comparable.

What this article adds: A new single coverage estimator is proposed that is a measure of overall programme performance. It can be used with existing survey tools and calculated using previous coverage data. Uncertainty remains regarding the mean length of an untreated SAM episode (included in the calculation); work is ongoing in this regard. The authors recommend the proposed single coverage estimator should be used in preference to using either the point or period coverage estimators.

Introduction

This article has been prompted by the number of support requests received from SQUEAC and SLEAC practitioners regarding the two different estimators of coverage (i.e. point coverage and period coverage, see definitions below) in current use. Both of these estimators can be calculated using data from any of the currently used coverage assessment methods (i.e. CSAS, SQUEAC, SLEAC, S3M) but often produce very different results. The SQUEAC and SLEAC technical reference encourages investigators to select and report only the most appropriate estimator, with the choice of the most appropriate estimator being informed by the context:

- If the programme has good case-finding and recruitment, short lengths of stay, and low levels of defaulting then the period coverage estimator is likely to be the most appropriate estimator.
- If the programme has poor case-finding and recruitment, long lengths of stay due to late presentation and/or late admission, and high levels of defaulting then the point coverage estimator is likely to be the most appropriate estimator.

Selection of the most appropriate coverage estimator for a programme has proved difficult in multi-district (e.g. national) SLEAC surveys. It is unlikely that one estimator is appropriate for all sub-programmes, and collecting the contextual information needed to select the estimator appropriate to each sub-programme may not be feasible. Even when contextual information is collected, the use of different estimators makes it difficult to make between sub-programme comparisons. Reporting both point and period coverage estimates is a potential solution but this tends to confuse policy makers and has, on occasion, generated resistance to survey results.

This article presents a new single coverage estimator that does not require new survey tools to be developed and tested and can be used with current survey tools and data from previous coverage surveys so as to ensure continuity and comparability.

Coverage estimators

The two coverage estimators in current use are calculated as follows:

$$Point\ coverage = \frac{C_{in}}{C_{in} + C_{out}}$$

and:

$$Period\ coverage = \frac{C_{in} + R_{in}}{C_{in} + R_{in} + C_{out}}$$

where:

C_{in} = Current SAM cases in the programme

C_{out} = Current SAM cases **not** in the programme

R_{in} = Recovering SAM cases in the programme

Achieving high levels of coverage requires:

- Timely case-finding and recruitment. This maximises the proportion and number of cases of *uncomplicated* SAM admitted to the programme. This leads to high cure rates and short lengths of stay, which in turn leads to good impressions of the programme in the beneficiary population, early treatment seeking, and low levels of defaulting.
- Good retention from admission to cure. Defaulting is associated with poor response to treatment and negative outcomes after defaulting, which leads to poor impressions of the programme in the beneficiary population, poor recruitment and late treatment seeking.

These and other factors often interact with each other in complex ways (see Figure 1).

The two coverage estimators in current use focus on case-finding, recruitment, and retention:

- Point coverage reflects the ability of a programme to find and recruit cases. The point coverage estimator does not account for recovering cases and so does not directly reflect the programme's ability to retain cases from admission to cure. This means that it may give a misleading (i.e. downwardly biased) picture of programme performance. This is a particular problem with programmes that recruit cases very soon after they meet programme admission criteria and are likely to be treating large numbers of recovering cases. In these programmes, the point coverage estimator will "penalise" good performance.
- Period coverage is intended to reflect the ability of a programme to find, recruit, and retain cases. The period coverage estimator does directly reflect the programme's ability to retain cases from admission to cure but tends to overestimate programme performance because the denominator does not include recovering cases that are not in the programme. The period coverage estimator also overestimates programme performance when cases are retained in a programme after meeting the criteria for being discharged as cured.

An estimator of coverage that does include both recovering cases that are in the programme and recovering cases that are not in the programme and, thus, provides an unbiased estimator of overall programme performance is:

$$Single\ coverage = \frac{C + R_{in}}{C_{in} + R_{in} + C_{out} + R_{out}}$$

where:

R_{out} = Recovering SAM cases **not** in the programme

The problem with this estimator is that R_{out} (i.e. the number of recovering cases that are not in the programme) is unknown and may be difficult to collect accurately. A survey might (e.g.) find a moderate acute malnutrition (MAM) case that was not in the programme but it would not be easy to ascertain, except in the case of a defaulter, whether this case had previously been a SAM case and was now a recovering SAM case. Also, we know that the active and adaptive case-finding procedure used in many CMAM coverage surveys is *optimally biased* to find SAM cases not MAM cases. It could be argued that the MAM cases that we do find using active and adaptive case-finding are likely to be recovering SAM cases. This assumption would not, however, be tenable with house-to-house and door-to-door screening which is often used when case-finding in urban and camp settings. The situation may, however, be complicated by the presence of nutrition programmes distributing lipid nutrient supplements (LNS) such as NutriButter®, Plumpy'Doz™, or Plumpy'Sup™. Despite these complications it may be possible to create a simple instrument to divide MAM cases into "MAM never SAM" and "MAM previously SAM". Such an instrument need only be accurate "on-average".

It may also be possible to address the problem of estimating the number of recovering cases not in the programme (R_{out}) using a simple mathematical model. This article explores the latter approach. The advantage of this approach is that the single coverage estimator could be applied to data from previous coverage surveys allowing comparability of coverage estimates over time and would require no changes to be made to existing methods and tools.

A simple mathematical model

If we assume that incidence and coverage do not change very rapidly over time (i.e. little or no change over a period of less than about two months) then we can also assume that:

$$\frac{C_{in} + C_{out}}{C_{in}} \approx \frac{R_{in} + k \cdot R_{out}}{R_{in}}$$

where k is a correction factor (more on this below).

We can express R_{out} (the *unknown* variable) in terms of the known variables:

$$\frac{C_{in} + C_{out}}{C_{in}} \approx \frac{R_{in} + k \cdot R_{out}}{R_{in}}$$

$$R_{in} \times \frac{C_{in} + C_{out}}{C_{in}} \approx R_{in} + k \cdot R_{out}$$

$$R_{in} \times \frac{C_{in} + C_{out}}{C_{in}} - R_{in} \approx k \cdot R_{out}$$

$$\frac{1}{k} \times \left(R_{in} \times \frac{C_{in} + C_{out}}{C_{in}} - R_{in} \right) \approx R_{out}$$

To avoid having a division by zero in the case of a survey finding no current SAM cases in the programme being assessed we would use:

$$R_{out} \approx \frac{1}{k} \times \left(R_{in} \times \frac{C_{in} + C_{out} + 1}{C_{in} + 1} - R_{in} \right)$$

Table 1 — Apply the single coverage estimator to example data

	Source	Survey data	Point coverage	Period coverage	Preferred estimator*	Single coverage estimate
1	FANTA (p105)**	$C_{in} = 0$ $C_{out} = 2$ $R_{in} = 34$	0%	94.4%	Period	$R_{out} \approx \left\lfloor \frac{1}{3} \times \left(34 \times \frac{0+2+1}{2+1} - 34 \right) \right\rfloor - 22$ $Coverage = \frac{0 + 34}{0 + 34 + 2 + 22} = 58.6\%$
2	FANTA (p105)**	$C_{in} = 3$ $C_{out} = 9$ $R_{in} = 22$	25%	73.5%	Point	$R_{out} \approx \left\lfloor \frac{1}{3} \times \left(22 \times \frac{3+9+1}{3+1} - 22 \right) \right\rfloor - 16$ $Coverage = \frac{3 + 22}{3 + 22 + 9 + 16} = 50.0\%$

* The estimator indicated as being the most appropriate by analysis of SQUEAC data.
** The data used in these examples is presented and discussed on page 105 of: Myatt M, Guevarra E, Fieschi L, Norris A, Guerrero S, Schofield L, Jones D, Emru E, Sadler K, Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) / Simplified Lot Quality Assurance Evaluation of Access and Coverage (SLEAC) Technical Reference, Food and Nutritional Technical Assistance III Project (FANTA-III), FHI 360 / FANTA, Washington, DC, October 2012. Available from: http://www.fantaproject.org/monitoring-and-evaluation/squeac-sleac

Fractions of cases can be removed by rounding to the nearest whole number using simple truncation (i.e. rounding towards zero):

$$R_{out} \approx \left\lfloor \frac{1}{k} \times \left(R_{in} \times \frac{C_{in} + C_{out} + 1}{C_{in} + 1} - R_{in} \right) \right\rfloor$$

This leaves us with the problem of deciding a suitable value for the correction factor (k). A reasonable candidate for k is the ratio of the mean length of an untreated episode to the mean length of a CMAM treatment episode. Suitable values might be:

Parameter	Value	Notes
Mean length of an *untreated* episode	7.5 months**	This value is commonly used when estimating future programme case-loads from prevalence estimates*.
Mean length of a *successful* treatment episode	2.5 months** (i.e. about 10 weeks)	This value can be estimated from routine programming monitoring data (already collected and calculated in SQUEAC assessments). A value of 2.5 months could be used in the absence of better information or when the validity of routine programme monitoring data is suspect, such as when defaulters are recorded as being cured or when cases are retained in a programme after meeting the criteria for being discharged as cured.

* The value of 7.5 months for the mean untreated episode length is from: Garenne M, Willie D, Maire B, Fontaine O, Eeckels R, Briend A, Van den Broeck J, *Incidence and duration of severe wasting in two African populations*, Public Health Nutrition, 2009;12(11);1974-1982. Available from http://www.ncbi.nlm.nih.gov/pubmed/19254427
** These values are expressed using the same summary statistic (i.e. the mean) and the same unit of measurement.

Using these values gives:

$$k = \frac{7.5}{2.5} = 3$$

and:

$$R_{out} \approx \left\lfloor \frac{1}{3} \times \left(R_{in} \times \frac{C_{in} + C_{out} + 1}{C_{in} + 1} - R_{in} \right) \right\rfloor$$

Applying the model

Applying the model requires two steps:
1. Calculate R_{out} using a reasonable estimate for k with C_{in}, C_{out}, and R_{in} from survey data.
2. Estimate coverage using the single coverage estimator.

To illustrate this process we will apply our model to some familiar example data (see Table 1).

The inclusion of recovering cases means that the single coverage estimate is mathematically constrained to return a coverage estimate that is greater than or equal to the point coverage estimate. In both of the examples shown in Table 1, the single coverage estimate is higher than the point coverage estimate. The underestimation present in the point coverage estimate has, to some extent, been corrected.

The inclusion of recovering cases that are not in the programme means that the single coverage estimator is mathematically constrained to return a coverage estimate that is less than or equal to the period coverage estimate. In both of the examples shown in Table 1, the single coverage estimate is lower than the period coverage estimate. The overestimation present in the period coverage estimate has, to some extent, been corrected.

We would use the process illustrated in Table 1 with data from simple coverage estimation surveys using (e.g.) the CSAS or S3M survey designs.

Using the single coverage estimator with data from SQUEAC hypothesis testing surveys or SLEAC surveys requires applying the standard LQAS decision rules with d or d_1 and d_2 calculated from n which is the denominator of the single coverage estimator (see Table 2).

Using the single coverage estimator in final-stage SQUEAC surveys requires specifying the numerator and denominator of the single coverage estimator as the *likelihood* (survey) data. Figure 2, for example, shows a Bayesian beta-binomial conjugate analysis performed using the

Table 2 Applying the single coverage estimator to example data (SLEAC) with coverage thresholds of p1 = 20% and p2 = 50%

	Source	n*	d_1	d_2	Covered	Coverage class
1	FANTA (p105)	0+34+2 +22=58	$\left\lfloor 58 \times \frac{20}{100} \right\rfloor = 11$	$\left\lfloor 58 \times \frac{50}{100} \right\rfloor = 29$	34	HIGH
2	FANTA (p105)	3+22+9 +16=50	$\left\lfloor 50 \times \frac{20}{100} \right\rfloor = 10$	$\left\lfloor 50 \times \frac{50}{100} \right\rfloor = 25$	25	MODERATE

* The denominator for the single coverage estimator. The data and calculations for each n are shown in Table 1.

Aziz Goza

Working with survey data using the computer

Figure 1 Factors interacting to create a high coverage programme
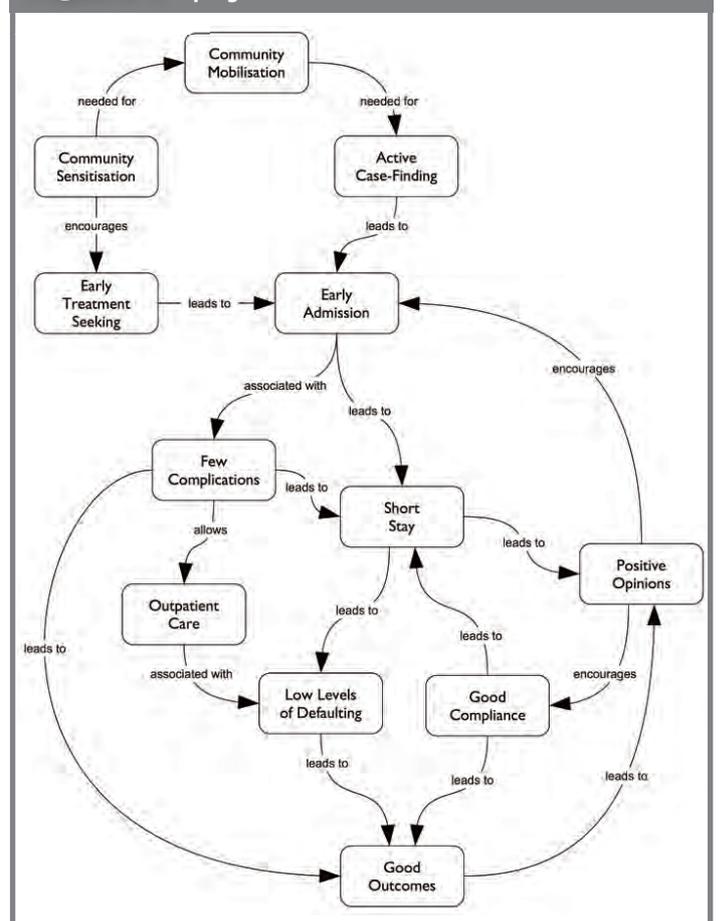
BayesSQUEAC calculator with data from the first example in Table 1 with a *Beta(14, 8)* prior. In this case the numerator is:

$$Numerator = C_{in} + R_{in} = 0 + 34 = 34$$

and the denominator is:

$$Demoninator = C_{in} + R_{in} + C_{out} = 0+34+2+22=58$$

We also applied the point coverage, period coverage, and single coverage estimators to sixty-four surveys from SQUEAC assessments (i.e. SQUEAC stage three likelihood surveys) undertaken between 2009 and 2014 by the Coverage Monitoring Network (CMN) and VALID, assessing the coverage of CMAM (predominantly SAM treatment) programmes operating in Afghanistan, Angola, Bangladesh, Burkina Faso, Cameroon, Chad, Djibouti, Ethiopia, Haiti, Ivory Coast, Kenya, Mali, Mauritania, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, and Sudan. All three estimates were calculated using the conjugate prior used for the original surveys. The single coverage estimates were calculated using k = 3 when calculating Rout for all surveys. Figure 3 shows a scatter-plot of the point coverage and period coverage estimates against the single coverage estimates calculated from each of the sixty-four surveys. All of the plotted points for the point coverage estimates lie on or above the line of equality (if no correction is made then all of the plotted points will fall on this line). This is consistent with the single coverage estimator correcting the tendency towards underestimation of the point coverage estimator. All of the plotted points for the period coverage estimates lie on or below the line of equality (if no correction is made then all of the plotted points will fall on this line). This is consistent with the single coverage estimator correcting the tendency towards overestimation of the period coverage estimator.

Conclusions

The proposed single coverage estimator provides a measure of overall programme performance with respect to coverage which has face validity, corrects the biases of the point and period coverage estimators, can be applied to data from previous coverage surveys, and requires no change to existing coverage assessment methods and tools.

The single coverage estimator may be used for tracking coverage over time using historical and current coverage survey data. Coverage estimates will need to be calculated using the single coverage estimator with all data. This will usually be possible as most coverage survey reports include the relevant data.

Uncertainty remains regarding the mean length of an untreated SAM episode. Work on estimating this for the purposes of estimating programme caseloads in typical emergency and development contexts is currently being done by MSF and Epicentre. The mean length of a successful treatment episode should, whenever possible, be estimated from programme data. The default mean length of a successful treatment episode used in this article (i.e. ten weeks) should be reviewed using programme data and revised accordingly.

The proposed single coverage estimator should be used in preference to using either the point or period coverage estimators.

For more information, contact: **Mark Myatt, email: mark[at]brixtonhealth.com**

Measuring MUAC during case-finding in a SQUEAC survey

Figure 2 — Using the single coverage estimator in SQUEAC for the first example shown in Table 1 with a *Beta(14, 8)* prior
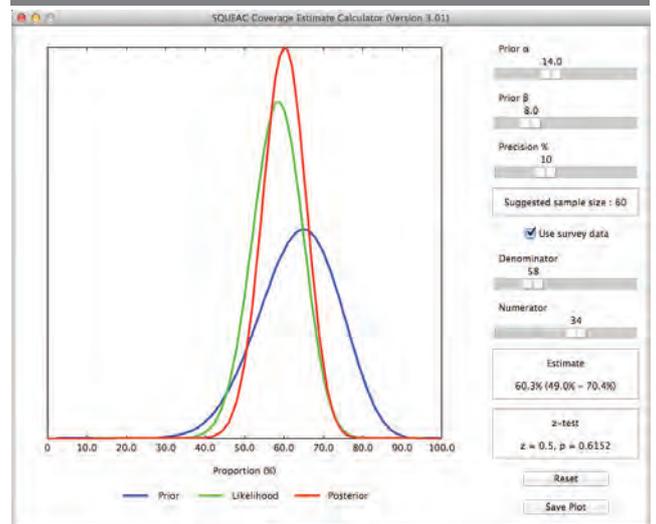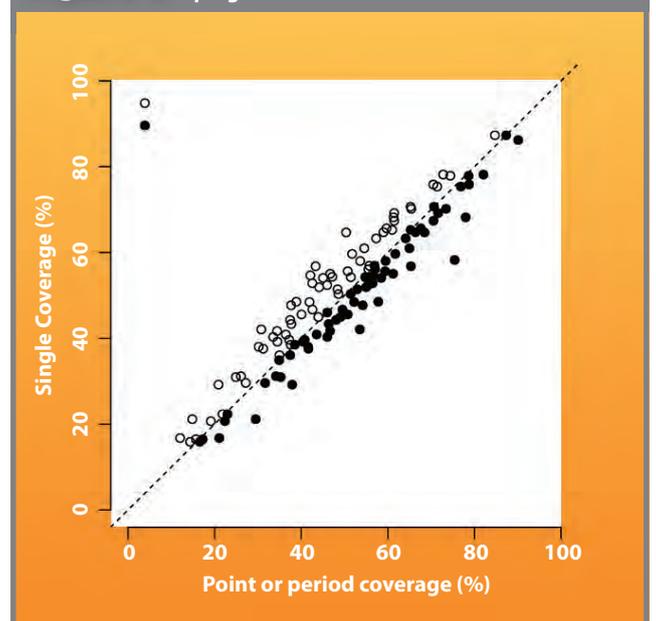

Working on a SQUEAC concept map

A survey tally sheet from a SLEAC survey

Figure 3 — Factors interacting to create a high coverage programme

Field Article

By Sophie Woodhead, Jose Luis Alvarez Moran, Anne Leavens, Modibo Traore, Anna Horner, Saul Guerrero

Based within the ACF-UK Operations Team, Sophie Woodhead coordinates all activities and research projects under the Coverage Monitoring Network. She has supported a number of coverage trainings in West, East and Central Africa as well as in Asia.

Jose Luis Alvarez Moran is a Public Health Epidemiologist with a PhD in Humanitarian Medicine and International Health. He is currently Senior Technical Advisor for Action Against Hunger UK, but has also worked with Terre des hommes and local NGOs monitoring and evaluating nutrition programmes in Mali, Benin, Philippines, Haiti and Pakistan.

Anne Laevens is UNICEF CMAM (IMAM) specialist in Bamako. She holds a Master in Public Health in Developing Countries from the London School of Hygiene and Tropical Medicine. She has 14 years of experience working in nutrition and health projects in emergency, post conflict and development

Modibo Traore is a Nutrition Specialist at WAHO/ECOWAS Nutrition Department in Bobo Dioulasso, Burkina Faso. He obtained his Ph.D in nutrition from Université Laval, Canada. He has a great amount of experience on nutrition research and health disease control, spanning 17 years.

Anna Horner is Nutrition Manager with UNICEF Mali in Bamako. She holds a Master in Public Health Nutrition from the London School of Hygiene and Tropical Medicine. She has been working in public health nutrition since 2003.

Saul Guerrero is Director of Operations at Action Against Hunger (ACFUK). Prior to joining ACF, he worked for Valid International Ltd. in the research, development and roll-out of CTC/CMAM. He has worked in over 20 countries in Africa and Asia.

The coverage survey underway

Measuring coverage at the national level in Mali

Beatriz Perez Bernabé,Mali, 2014

Location: *Mali*

What we know already: Indirect national estimates of coverage of SAM treatment programmes are usual; there are few large scale/national coverage surveys to provide direct estimates.

What this article adds: In 2014, UNICEF, the Mali Ministry of Health and the CMN collaborated to implement a national scale assessment (SLEAC) of SAM treatment coverage in Mali. The overall point coverage level was estimated at 22.3%; sub-national coverage was heterogeneous. Lack of malnutrition awareness and programme awareness were the reasons most frequently reported for not accessing services. Those who were aware of both but did not attend gave reasons of distance and lack of money. A national workshop identified strategies to increase access, learning mechanisms to share programming experiences and further qualitative research in low coverage areas. Engaging government throughout increased planning and preparation time but was essential to ensure committed follow up action.

Over the last two years, the demand for national coverage information for severe acute malnutrition (SAM) treatment services has increased dramatically. This demand has come from national governments, United Nations (UN) bodies, and non-governmental organisations (NGOs), who recognise the need to measure programme quality and the barriers to access. Many donors have also recognised the importance for services to gain a better understanding of their treatment coverage, and actively encourage their programmes to reflect upon this. Whilst indirect national estimates are often available, based on estimated malnutrition prevalence data and admission reports, there are few countries that have direct estimations available. National or large scale coverage estimates do exist, however Nigeria and Sudan are indeed the only examples. Whilst in Sudan, the Simple Spatial Sampling (S3M) Methodology was used, the Nigerian government and Bureau of Statistics carried out a Simplified LQAS[1] Evaluation of Access and Coverage (SLEAC) in collaboration with Action Against Hunger and Valid International.

In 2014, UNICEF approached the Coverage Monitoring Network (CMN)[2] for support in the implementation of a national scale assessment of SAM treatment coverage in Mali. Results showed coverage to be low at a national level, demonstrating the need for improved programming and scaling up of treatment provision. Moreover the exercise also provided clear recommendations that have since enabled UNICEF and the Ministry of Health (DNS)) to take decisive action to improve access to SAM services in the country.

Why did we do it?

UNICEF has supported the Government of Mali to scale up access to SAM treatment, with all operational health centres in the country providing SAM treatment services by 2014. The number of SAM cases admitted and treated in the integrated management of acute malnutrition (IMAM) programme in Mali has increased steadily since 2011, with notable increases in 2013, which can be seen in Figure 1. Whilst services are increasingly available and

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1   Lot Quality Assurance Sampling
2   http://www.coverage-monitoring.org/

Figure 1 — National SAM treatment admissions, 2011-2013
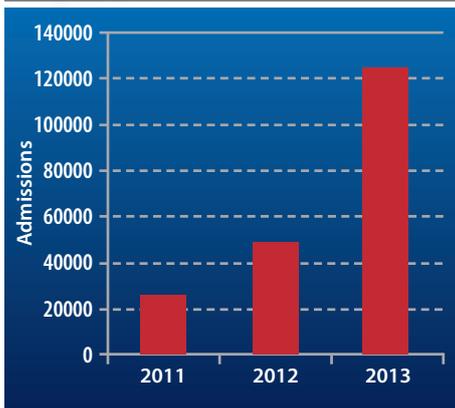
clearly being utilised, levels of access must be evaluated against levels of need to understand why some areas may have high uptake and others low, as lessons can be learned from both scenarios. Where service uptake is low, it is particularly important to understand what barriers the population is facing so that measures can be taken to address those barriers, with lessons learned shared and disseminated to other areas.

Since the creation of the CMN, there has been increased interest in improving the accuracy of coverage data and this interest has grown to a desire for direct coverage estimates at the national level. Direct coverage estimates are able to demonstrate the proportion of children that treatment services are successfully reaching, as well as providing additional information on the barriers experienced in reaching the service. In 2014, the CMN partnered with UNICEF Mali in the implementation of a national coverage survey to help assess the performance of IMAM services in country and to inform future endeavours to ensure that treatment services are available to all[3].

What did we do?
From April to June 2014, the CMN engaged with UNICEF to carry out a national coverage assessment. The survey was conducted across seven of nine regions in Mali, with the exception of the regions of Kidal and Gao, where the security conditions did not permit data collection at the time of the survey. The survey provided a detailed spatial representation of treatment coverage, with information at the 'Cercle' level, the administrative division into which regions are divided.

The SLEAC method was selected as the most appropriate survey method adapted to the national Malian context, as it is designed to estimate coverage over wide areas. SLEAC is intended for use in programmes delivering IMAM services over multiple or large services delivery areas, such as national or regional programmes delivering IMAM services in health districts through primary healthcare centres. The method classifies programme coverage for a service delivery unit, such as a health district. A SLEAC survey identifies the category of coverage (e.g. 'low coverage' or 'high coverage') that describes the coverage of the service delivery unit being assessed. The classification method is derived from a simplified LQAS classification technique that provides two-tier or three tier classifications. In this survey, a three-tier classification method was used in an effort to distinguish very high coverage service delivery units and very low coverage service delivery units from areas of moderate coverage.

The survey was implemented jointly by CMN, UNICEF and national counterparts, mainly the Division of Nutrition (DN) but also the Ministry of Health (DNS) and The National Institute of Statistics (INSTAT). Enough time was dedicated for planning, coordinating and communicating with the national counterparts in order to ensure capacity building and ownership. The results of the various stages of the planning were explained extensively and the participation of the national counterparts was sought in all stages of the planning, even if at times, making the process slower. The different stages of the joined planning involved the presentation of the SLEAC methodology to the national counterparts, the elaboration of a detailed budget, the elaboration and submission of a survey protocol to the ethical committee, the selection and training of data collectors, the supervision of field data collection and the collation and analysis of data. Even if making the planning process slower and the preparation phase longer, this capacity building process was essential to engender ownership by the national government and engage them in the recommendations that came out of the survey, which need national authorities' commitment for implementation at large scale.

What came out of it?
Based on a three tier classification of high (>50%), moderate (between 20% and 50%), and low (<20%), the survey found that 4% (n=2) of the 48 assessed Cercles had high, 46% (n=22) had moderate and 33% (n=16) had low point coverage levels. Coverage estimations could not be made for eight of the 48 surveyed Cercles because of a low sample size found during data collection. Figure 2 demonstrates the spatial spread of coverage across Mali.

The overall point coverage level was estimated at 22.3% (95% CI = 16.7%, 27.6%). Despite the fact that across the country coverage was found to be heterogeneous, providing an overarching estimate was deemed to be appropriate and relevant for advocacy purposes in order to demonstrate the need for increased response to SAM in country. At regional level, all the estimates fell below the SHPERE minimum standard of coverage for selective feeding programmes in rural settings (<50%).

The carers of children who met Outpatient Therapeutic Programme (OTP) admission criteria but were not enrolled were referred to the nearest health facility, and also interviewed about the reasons for their child not being in the programme. In total, 894 carers (all the non-covered cases) were interviewed. Table 1 gives an overview of the responses.

Lack of awareness about malnutrition, followed by lack of awareness of the programme, were the reasons most frequently reported. One third of carers (33%, 302/894) did not consider their child as sick and amongst those that did, over half (53%, 316/592) did not consider their child

Figure 2 — Spatial distribution of SAM treatment coverage in Mali

Legend
- N/A
- Low coverage
- Moderate coverage
- High coverage

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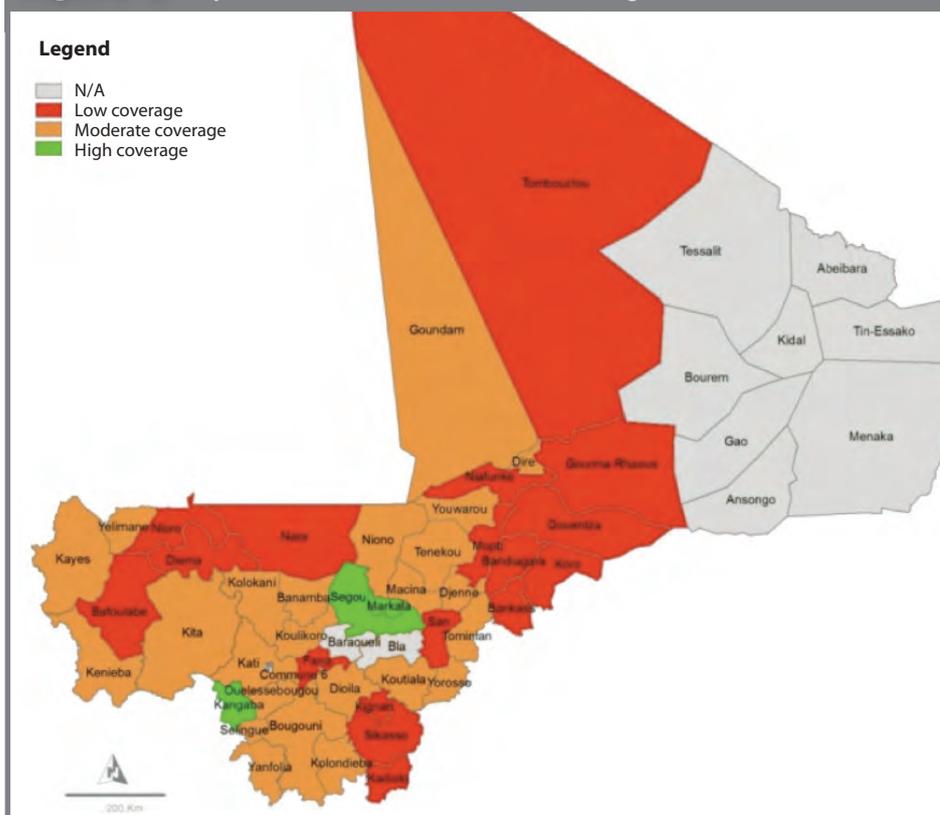
[3] The main investigator for this piece of work was Melaku Begashaw.

was malnourished. Amongst those that recognised their child was malnourished, half (50%, n=138/276) did not know where their child could be treated. This demonstrates that increased engagement with communities is needed in order to improve access, health seeking behaviour and eventual uptake of IMAM services in Mali.

Among those who knew their child was sick/malnourished and who knew where they could find treatment (n=138), major reasons at the community level were linked to distance to the health facility (n=31) and lack of money (n=21). Further data regarding distance was collected. In rural settings, median distance to travel to the nearest health facility varied from 7.5km to 15.5km. Those in Ségou travel on average half the distance compared with those in Mopti. In Bamako, the distances are very small but the time can be longer. At community level, other reasons evoked by carers concerned social norms, cultural beliefs and status of women (husband refusal, carer busy, alternative health practitioners, etc).

Finally, at programme level, various factors related to the organisation and quality of the OTP programme, which accounted for 44 of the answers provided, appear to highly influence, directly or indirectly, non-attendance. These include disrespect of admission and discharge criteria and admission to the wrong programme, rejection, Ready to use Therapeutic Food (RUTF) stock-out and lack of information provided to the beneficiaries (age of admission, appetite test, expected length of stay etc.).

The results of the survey were shared with a wide range of nutrition partners through a national workshop, providing a forum to analyse and discuss the results and ways forward. This forum was able to identify a set of activities related to increasing uptake of malnutrition treatment services, including more detailed qualitative research in five areas of low coverage identified by the SLEAC survey, which will lead into appropriate strategies of community mobilisation. The workshop participants also decided to set up a technical coverage group, where partner NGOs involved in supporting IMAM together with the government partners will share experiences and lessons learned on boosters, strategies that work and solutions to barriers that could be replicated at larger scale. Finally, partner NGOs committed to continue to monitor coverage following the national SLEAC through the implementation of annual SQUEAC surveys at health district level. In order to achieve this, capacity building and training of NGO and government partners will be organised with the technical assistance of CMN.

The experience of conducting a first national level coverage survey in Mali also allowed for significant learning around the process of implementing a large-scale survey of this type. Lessons learned included the need to allow sufficient time for planning, coordination and communicating with the national counterpart, especially when the country requires approval of the survey protocol by an ethical committee; the need to ensure very detailed, country specific

and accurately costed logistics planning before the survey; the importance of ensuring the survey is fully planned and organised with the national counterpart and in the local language; and the need to conduct the survey during the period of high SAM rates to ensure sufficient sample size. It is also critical to ensure that all methodological questions are resolved, including the use of mid upper arm circumference (MUAC) only versus MUAC and weight-for-height for the survey in a country where admission criteria in the OTP programme include both MUAC and weight-for-height and the methodological issues around the inclusion of moderate acute malnutrition (MAM) coverage in the survey. The possibility of assessing MAM coverage together with SAM coverage was considered for one region at the initial stages of the survey planning at WFP's request. However, the idea was abandoned considering the already numerous logistical and methodological challenges encountered during the survey implementation.

What next?

The results of the survey were used to identify priority areas for reinforcing programming, as well as for advocacy activities to increase support for nutrition to the health authorities, donors and the international community in general.

In most of the regions surveyed, the primary reason for non-attendance was found to be lack of awareness of acute malnutrition, of child illness and/or that IMAM services are available through the health system. Furthermore, a significant number of barriers were also identified relating not only to the supply but the demand for services. This is consistent with findings from similar assessments carried out in IMAM services around the world. In an effort to better understand the nature of awareness-related barriers and to explore alternative mechanisms for addressing it, further understanding of the existing social and community structures needs to be obtained in a systematic manner. In areas of low coverage, it is essential that more detailed data be gathered in order to be able to effectively modify programming to the context. In this regard, based on the results, the Government of Mali and UNICEF are in the process of establishing a qualitative research project in five areas of low coverage identified by the SLEAC in order to further investigate the barriers and boosters to coverage. The overall objective of the research project is to implement, document and evaluate qualitative investigations to further explore the reasons for non-attendance in the community with a view to adapt programmes and build a stronger community mobilisation strategy to achieve higher levels of access to treatment services.

For more information, contact Sophie Woodhead, email: **s.woodhead@actionagainsthunger.org.uk**

Table 1	Reasons given by carers for non-attendance (national figures)		
Reasons given by carers for non-attendance		**Number of carers interviewed (n)**	**Number of times mentioned (n)**
Demand side barriers			
Lack of awareness about malnutrition	Child is not considered as sick	894	302
	Amongst those who considered the child as sick, child not recognised as malnourished	592*	316
Amongst those who recognised the child as sick/malnourished, lack of awareness of the programme		276*	138
Reasons given by carers who recognised their child as sick/malnourished and who were aware of the programme but still did not attend (n=138*)			
Distance		138	31
Lack of money[4]		138	21
Husband refusal		138	10
No other person to take care of children		138	6
Carer busy/ high opportunity costs		138	4
Alternative Health Practitioners preferred		138	4
Defaulted due to travel		138	2
Programme organisation/quality			
Previous rejection and fear of rejection		138	15
Child refused RUTF or RUTF did not help		138	9
RUTF stock out		138	8
Lack of programme information		138	6
Inter-programme interface problems (admissions in the wrong programme)		138	6
Other[5]			16

*Sample size calculations: 894-302=592; 592-316=276; 276-138=138

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[4] Not exclusively related to transport

[5] Reasons unrelated to programme organisation such as mother sick, mother ashamed, security problem, discharged as non-responder, condition not serious, prefer traditional doctor.

A survey team checking questionnaires during the rapid asessment surey of older people in Ethiopia (see field article this issue)

Participants and facilitators at the Save the Children IYCF-E training in Istanbul, Turkey, September/October, 2014 (see news article)

Contributors for this issue:

Thanks for the pictures to:

Cover

The Emergency Nutrition Network (ENN)

grew out of a series of interagency meetings focusing on food and nutritional aspects of emergencies. The meetings were hosted by UNHCR and attended by a number of UN agencies, NGOs, donors and academics. The Network is the result of a shared commitment to improve knowledge, stimulate learning and provide vital support and encouragement to food and nutrition workers involved in emergencies. The ENN officially began operations in November 1996 and has widespread support from UN agencies, NGOs, and donor governments. The ENN enables nutrition networking and learning to build the evidence base for nutrition programming. Our focus is communities in crisis and where undernutrition is a chronic problem. Our work is guided by what practitioners need to work effectively.

- We capture and exchange experiences of practitioners through our publications and online forum
- We undertake research and reviews where evidence is weak
- We broker technical discussion where agreement is lacking
- We support global level leadership and stewardship in nutrition

Field Exchange is one of the ENN's core projects. It is produced in print and online three times a year. It is devoted primarily to publishing field level articles and current research and evaluation findings relevant to the emergency food and nutrition sector.

The main target audience of the publication are food and nutrition workers involved in emergencies and those researching this area. The reporting and exchange of field level experiences is central to ENN activities. The ENN's updated strategy (following mid-term review in 2013) is available at
www.ennonline.net

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The opinions reflected in Field Exchange articles are those of the authors and do not necessarily reflect those of their agency (where applicable).

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