HEART
HEALTH & EDUCATION ADVICE & RESOURCE TEAM

Helpdesk Report: Nutrition interventions in developing and fragile contexts with a focus on community interventions and Yemen

Date: 12 September 2014

Query:
1) Produce a report identifying evidence on the efficacy and cost-effectiveness of different interventions (and packages of interventions – focus on multi-sector approaches) to impact malnutrition with a focus on:

Prevention
- Breastfeeding and infant and young child feeding promotion and support
- Water and sanitation facilities (schools, health facilities and communities)
- Hand washing and other sanitation behaviour change communication
- Micronutrient/Iron and folate supplements for pregnant women

Treatment
- Community screening and referral
- Integrated primary health care including integrated management of childhood illnesses (IMCI); community management of acute malnutrition (CMAM);
facility based treatment of severe acute malnutrition (SAM), particularly when; and breastfeeding and infant and young child feeding (link to prevention).

Identify information on community-based models. Evidence should be from Yemen, fragile or developing contexts.

2) Identify information on the policy level and existing country plans and programming (national, donor and NGO) in nutrition in Yemen. Particularly look for information on: coverage of key services and the barriers to utilisation; factors that affect nutrition-related behaviours in different parts of the country; sustainable approaches for delivering quality and effective nutrition services

Content

1. Overview

This was an extensive query to tackle in 3 days. The result is an annotated bibliography covering a selection of key papers identified through a rapid search on the different nutrition interventions. Section 2 includes a number of resources on community-based management with evaluations finding it to be cost effective. Section 7 presents resources to address the second part of this query: information on nutrition intervention activity in Yemen. It includes: summaries of a costing plan from the Scaling Up Nutrition Movement; District-level coverage monitoring reports; a national strategy and integrated response plans from the Yemen Nutrition Cluster; Government guidelines; and evaluation of NGO activity.

2. Community-based management evidence

Evaluation of Community Management of Acute Malnutrition (CMAM). Global Synthesis Report
UNICEF. (2013).
http://www.unicef.org/evaldatabase/files/Final_CMAM_synthesis_FINAL_VERSION_with_ExSum_translations.pdf

The efficacy of the CMAM approach has been demonstrated since 2007 following an endorsement by UN agencies which paved the way for the further expansion of the intervention. CMAM is generally a preventive continuum with four components: 1) community outreach as the basis; 2) management of Moderate Acute Malnutrition (MAM); 3) outpatient treatment for children with Severe Acute Malnutrition (SAM) with a good appetite and without medical complications; and, 4) inpatient treatment for children with SAM and medical complications and/or no appetite.

A key objective, both globally and nationally, of CMAM is progressive integration into the national health system and ultimately complete government ownership. By the end of 2012, governments in 63 countries had established partnerships with UNICEF, WFP, WHO, donors, and NGO Implementing Partners (IPs) for CMAM. The Ministries of Health (MoH) assume leadership and coordination roles and provide the health facilities. Implementation arrangements vary in particular contexts or areas. Most countries implement inter-related interventions such as Infant and Young Child Feeding (IYCF), Integrated Management of Childhood Illnesses (IMCI), Mother Child Health (MCH), as well as micronutrient supplementation.

The internal and external inputs for CMAM include policies, commitment of funds, coordination, and technical support available to the MoH and other IPs. Access to services suggests linkages with formal and informal healthcare and community-based organisations or systems. Access to CMAM supplies includes both essential drugs and ready to use therapeutic or supplementary foods. Service quality requires establishment of guidelines, support and supervision for staff, training, and monitoring and evaluation components. Intended outputs are enhanced community knowledge and practices regarding child nutrition and health, improvements in nutritional status of children under five years of age admitted to CMAM, and reduced morbidity and mortality.

Through CMAM services, UNICEF provides technical guidance to improve the quality and access of SAM treatment, and works toward standardised monitoring and evaluation methods to demonstrate impact of the intervention on SAM. UNICEF produces an annual summary, the “Global SAM Treatment Update" to report on the status of SAM treatment in countries where UNICEF-supported CMAM is implemented.

UNICEF has made significant investments to scale up treatment of SAM through the CMAM approach including procurement of therapeutic foods, medicines, and equipment. UNICEF

currently procures approximately 32,000 MT of RUTF annually which represents an investment of over 100 million dollars. UNICEF also contributes in most countries along with governments and non-governmental IPs to capacity-building and training; establishment of outpatient treatment centres; advocacy, awareness and behaviour change communication; and development of monitoring and information systems.

In recent years, several reviews of CMAM have been conducted; however, there is no evaluation which examines all key aspects of CMAM at both national and global levels. This evaluation is the first to generate evidence on how well the global as well as country level strategies have worked including their acceptance and ownership in various contexts and appropriateness of investments in capacity development and supply components. The process included a comprehensive assessment of CMAM in five countries and drawing synthesised findings and recommendations for governments, UN agencies, NGOs and other stakeholders to use in modifying CMAM policy and technical guidance for both emergency and non-emergency contexts.

Chapter six covers cost efficiency and technical assistance, sustainability of CMAM, and challenges for scaling up (expanding) services to provide access to more children in need. First the chapter presents a cost analysis of CMAM across the five countries, illustrating cost sharing arrangements and cost per beneficiary. This is followed by a discussion of the use of RUTF and basic medicines and supply and delivery systems. Quality and effectiveness of technical assistance by government, UNICEF and IPs is then examined, as well as capacity development and coordination of technical assistance. The chapter concludes with a review of facilitating factors and constraints to increasing access to treatment.

Cost–effectiveness of community-based treatment of severe acute malnutrition in children

Bachmann, M.O. (2010). Expert review of pharmacoeconomics & outcomes research, 10(5), 605-12.
http://files.ennonline.net/attachments/1308/bachmann-ce-of-treating-sam-expert-reviews-2010.pdf

Severe acute malnutrition affects 20 million children aged under 5 years old worldwide. Medical complications and death are common, but nutritional and medical treatment can result in good outcomes. Randomised trials of treatment after in-patient stabilisation have shown community-based treatment to have similar outcomes to hospital-based treatment, at lower cost. Community-based ambulatory treatment, with in-patient care reserved for the most severe cases, is increasingly being implemented in Africa but has not been evaluated in randomised trials.

Community-based treatment programs have shown favourable outcomes. Economic evaluations of community-based treatment have included cost analyses, cost and consequence analyses and decision analyses. Treatment costs have been consistently lower than for institution-based treatment. Costs of ambulatory community-based treatment of severe acute malnutrition have ranged between US$46 to $453 per child, depending on the type of care provided and the costing methods used. Recent studies have reported on costs and outcomes of similar large-scale African programs covering geographically defined populations, with ambulatory care for most children, and initial in-patient stabilisation for the minority with most severe disease. In these studies the costs ranged from US$129 to $201 per child, and mortality rates ranged from 1.2 to 9.2%, depending on length of follow-up. A decision tree model based on such a program in Zambia estimated that community-based treatment of severe acute malnutrition in primary-care centres, with hospital access, cost US$203 per case treated, US$1760 per life saved, and US$53 per disability-adjusted life year gained, compared with no treatment. This latter cost per disability-adjusted life year gained suggests that community-based treatment of severe acute malnutrition is cost effective

compared with other priority health interventions in low-income countries, and compared with such countries' national incomes.

Community Management of Acute Malnutrition. Giving Malnourished Children a Fighting Chance.
World Vision. (2013).
http://www.wvi.org/sites/default/files/CMAMReportFinal%202013WVCanada.pdf

Community Management of Acute Malnutrition (CMAM) works by training volunteers to regularly screen and monitor all young children so cases of malnutrition can be identified early and treated immediately. This leads to more children being treated, faster rehabilitation and fewer deaths. Malnourished children are assessed and placed into one of three types of treatment:

1) Supplementary Feeding Programs (SFPs) which target families of children with moderate wasting but no medical complications.
2) Outpatient Therapeutic Programs (OTPs) which provide home based treatment and rehabilitation for children with severe wasting and no medical complications.
3) Stabilisation Centres (SC) which receive severely wasted children with serious medical complications.

From 2008 to 2013, World Vision Canada implemented CMAM in 20 Area Development Programs (ADPs) in eight countries. One hundred and seven outpatient therapeutic program centres were established as well as supplementary feeding programs and support of stabilisation centres. The average recovery rate of 92% far exceeds the SPHERE international standard of at least 75%.

CMAM programs have also contributed to saving hundreds of thousands of lives during the Horn of Africa drought response in 2012 in Somalia, Ethiopia, Kenya and Tanzania, as well as the cyclical food crisis in the West African countries of Niger, Mauritania, Mali and Chad.

To treat children with severe and moderate malnutrition, CMAM needs to be an integral part of the national primary health care system. World Vision has been instrumental in influencing the governments of Ethiopia, Kenya, Zambia, Burundi and North and South Sudan to include CMAM in their national health care policies.

Successful CMAM Programming in Tara, Chad to be Scaled Up
World Vision. (2014). Webpage accessed: 7.9.14
http://www.wvi.org/chad/article/successful-cmam-programming-tara-chad-be-scaled

Anecdotal evidence from Chad:

When World Vision Chad began implementing Community-based Management of Acute Malnutrition (CMAM) in Tara, a project area in Tandjile region, the local Traditional Birth Attendants (TBAs) readily engaged with the initiative. The TBAs explain that through their interaction with caregivers in the communities they saw the children looking very sick and after they received the training on CMAM they were so encouraged to have the opportunity to do something about it.

In addition to regularly screening the children and referring those with malnutrition to the CMAM programme, the TBAs asked World Vision for pictures of malnourished children so they can provide education to the mothers about malnutrition and then share information on nutritious complementary food. The TBAs include mothers with well-nourished children in their interactions, encouraging them to continue their good practices and giving them suggestions on how to prevent their children from becoming malnourished.

The CMAM approach relies on strong community participation to achieve the widest possible coverage. Community volunteers screen young children for malnutrition, referring those who require treatment of medical and/or nutritional needs. Volunteers support the Outpatient Therapeutic Programme with distribution of Ready-to-Use-Therapeutic Foods (RUTF), nutrient dense rations which require no preparation and are palatable to young children. Volunteers also follow up with defaulters and with children who recover and are discharged from the programme, to ensure maintenance of improvements in weight and health and provide re-referral if necessary.

TBAs are ideally suited for the CMAM community volunteer role because of their intimate connection with mothers and young children, and their respected position as traditional care providers in the community. The transformation the TBAs in the Tara project are making in their communities is visible in the positive response from mothers, with many women explaining the dramatic improvements in health they have seen in their children.

One woman described the change in her child this way: "My child was just a skeleton and ready to be thrown out, but since I have joined this programme, my child has recovered and is in good health now. My child is getting back to his normal shape."

The mothers also explain that before this interaction with the TBAs and World Vision, they didn't know what to do with their children and they are so thankful that they now feel more confident that they can take care of their children and do not have to sit and watch them slowly fade.

Key issues in the success of community-based management of severe malnutrition
Collins, S., Sadler, K., Dent, N., Khara, T., Guerrero, S., Myatt, M., Saboya, M. & Walsh, A. (2005). WHO Technical Background Paper.
http://www.who.int/nutrition/topics/backgroundpapers_Key_issues.pdf

There are three major factors determining the impact of community-based programs for the treatment of severe acute malnutrition:

1) People must be able to access the service with socio-economic costs that are acceptable to them.
2) Efforts and resources must be put into engaging and mobilising the population to help people understand and accept the service provided.
3) The local primary health care system must have sufficient resources, organisation and supervision to deliver simple outpatient therapeutic protocols with consistently quality.

If programs are designed to satisfy all these basic requirements then cases of severe acute malnutrition tend to present early. If cases present early, they are simple to treat and community-based management has high recovery rates. The outcomes from 20,976 cases of severe acute malnutrition presenting to 21 Community-based Therapeutic Care (CTC) programmes implemented in Malawi, Ethiopia North & South Sudan, between 2001 – 2005, indicate that community-based programs can attain excellent rates of recovery and coverage. These programs achieved recovery rates of 78.1% and mortality rates of 4.3%. Coverage rates were approximately 73%. 74% of the severely malnourished children who presented were treated solely as outpatients.

Initial data indicate that these programs are affordable with the costs-effectiveness of emergency CTC programs varying between $12 and $132 / year of life gained. This high cost effectiveness of CTC programs is due to the precise targeting of resources towards severely

malnourished children who are at a high risk of dying and compares favourably with other mainstream child survival interventions as such as vitamin A provision.

Cost-effectiveness of the community-based management of severe acute malnutrition by community health workers in southern Bangladesh
Puett, C., Sadler, K., Alderman, H., Coates, J., Fiedler, J.L. & Myatt, M. (2012). Health Policy and Planning, 28 (4), 386-399.
http://heapol.oxfordjournals.org/content/28/4/386.abstract

This study assessed the cost-effectiveness of adding the community-based management of acute malnutrition (CMAM) to a community-based health and nutrition programme delivered by Community Health Workers (CHWs) in southern Bangladesh. The cost-effectiveness of this model of treatment for severe acute malnutrition (SAM) was compared with the cost-effectiveness of the 'standard of care' for SAM (i.e. inpatient treatment), augmented with community surveillance by CHWs to detect cases, in a neighbouring area.

An activity-based cost model was used, and a societal perspective taken, to include all costs incurred in the programme by providers and participants for the management of SAM in both areas. Cost data were coupled with programme effectiveness data. The community-based strategy cost US$26 per disability-adjusted life year (DALY) averted, compared with US$1344 per DALY averted for inpatient treatment. The average cost to participant households for their child to recover from SAM in community treatment was one-sixth that of inpatient treatment. These results suggest that this model of treatment for SAM is highly cost-effective and that CHWs, given adequate supervision and training, can be employed effectively to expand access to treatment for SAM in Bangladesh.

'Sometimes they fail to keep their faith in us': community health worker perceptions of structural barriers to quality of care and community utilisation of services in Bangladesh
Puett, C., Alderman, H., Sadler, K. & Coates, J. (2013). Maternal and Child Nutrition.
http://onlinelibrary.wiley.com/doi/10.1111/mcn.12072/abstract;jsessionid=4817281D521CE1F8398D29F7A1B57710.f01t04

Community Health Workers (CHWs) have strong potential to extend health and nutrition services to underserved populations. However, CHWs face complex challenges when working within weak health systems and among communities with limited abilities to access and utilise CHW services. It is crucial to understand these challenges to improve programme support mechanisms.

This study describes the results of qualitative investigations into CHW perceptions of barriers to quality of care among two groups of workers implementing community case management of acute respiratory infection, diarrhoea and severe acute malnutrition in southern Bangladesh. The authors explored systemic barriers to service delivery, pertaining to communities and health systems, which limited the usefulness and effectiveness of CHW services. Focus group discussions (n = 10) were conducted in March 2010. Discussions were analysed for themes related to CHWs' work challenges. Findings highlight several perceived barriers to effective service provision, including community poverty constraining uptake of recommended practices, irregular supplies of medicine from the health facility and poor quality of care for CHW referrals sent there.

This study further documents interactions between demand-side and supply-side constraints including the influence of health system resource constraints on community trust in CHW services, and the influence of community resource constraints on the utilisation and effectiveness of CHW services. By documenting service delivery challenges from the

perspective of the frontline workers themselves, this article contributes evidence to help identify appropriate support mechanisms for these workers, in order to develop scalable and sustainable CHW programmes in countries with under-resourced public health care infrastructure.

Long term mortality after community and facility based treatment of severe acute malnutrition: analysis of data from Bangladesh, Kenya, Malawi and Niger
Bahwere P, Mtimuni A, Sadler K, Banda T and Collins S, (2012). Journal of Public Health and Epidemiology Vol. 4(8), pp. 215-225
http://www.academicjournals.org/article/article1379674854_Bahwere%20et%20al.pdf

This paper brings together data from 4 countries - Bangladesh, Kenya, Malawi and Niger - and reviews the data from four cohorts reporting on long term survival of children discharged from therapeutic feeding programmes. It demonstrates the improved long and short term survival of kids treated through the CMAM approach. The Mortality Rate Ratio (MRR) calculated by dividing the observed deaths after discharge from a therapeutic feeding programme, by expected deaths was used to compare survival of 1,670 children. Data showed that the survival of children who defaulted from the programmes was worse than that of those who were discharged cured. It also showed that children treated at home was better than those treated as inpatient. The study suggests that Community-based Therapeutic Care should be included in the package of interventions with high potential for accelerating the progress towards reaching Millennium Developmental Goal four, to reduce child mortality.

Does greater workload lead to reduced quality of preventive and curative care among community health workers in Bangladesh?
Puett, C., Coates, J., Alderman, H., Sadruddin, S., & Sadler, K. (2012). Food and Nutrition Bulletin, 33 (4), 273-287.
http://www.cmamforum.org/Pool/Resources/Does-greater-workload-lead-to-reduced-qual-care-CHW-Bangladesh-2012.pdf

Background:
Community Health Workers (CHWs) perform a range of important tasks; however, limited evidence is available regarding the association between their workload and the quality of care they provide.

Objective:
To analyse the quality of preventive and curative care provided by two groups of CHWs with different workloads in southern Bangladesh.

Methods:
One group of CHWs provided preventive care in addition to implementing Community Case Management (CCM) of acute respiratory infection and diarrhea, and another group additionally treated Severe Acute Malnutrition (SAM). Preventive care was measured by case management observation at a routine household visit. Curative care was measured by case scenarios. Qualitative methods were used to contextualise CHWs' performance by examining their perceptions of challenges related to their workload. A total of 338 CHWs were assessed.

Results:
CHWs managing cases of SAM worked significantly more hours than the other group (16.7 Â± 6.9 hours compared with 13.3 Â± 4.6 hours weekly, $p < .001$) but maintained quality of care on curative and preventive work tasks. Effectively treating cases of SAM appeared to motivate CHWs.

Conclusions:

This was one of the first trials adding the treatment of SAM to a CHW workload and suggests that adding SAM to a well-trained and supervised CHW's workload, including preventive and curative tasks, does not necessarily yield lower quality of care. However, increased workloads had consequences for CHWs' domestic life, and further increases in workload may not be possible without additional incentives.

Emergency Nutrition Update Issue 15 - Spotlight on Emergency Nutrition Capacity Building.
World Vision. (2013).
http://www.wvi.org/sites/default/files/ENU%20Issue%2015%20Oct%202012-March%202013.pdf

This issue includes:

- Advice on designing an effective CMAM capacity building strategy. It provides a costing for CMAM capacity building.
- Experience in West Africa describing the need for building staff capacity in nutrition programming.
- Details of CMAM database capacity building.

Community-based management of severe acute malnutrition
WHO, WFP, UNSCN and UNICEF. (2007).
http://www.unicef.org/media/files/Community_Based__Management_of_Severe_Acute_Malnutrition.pdf

Severe Acute Malnutrition (SAM) remains a major killer of children under five years of age. Until recently, treatment has been restricted to facility-based approaches, greatly limiting its coverage and impact. However, in recent years a community based approach has been developed which allows large numbers of children with SAM to be treated in their communities without being admitted to a health facility or a therapeutic feeding centre.

The community-based approach involves timely detection of SAM in the community and provision of treatment for those without medical complications with ready-to-use therapeutic foods or other nutrient-dense foods at home. If properly combined with a facility-based approach for those malnourished children with medical complications or below six months and implemented on a large scale, community-based management of SAM can prevent the deaths of hundreds of thousands of children.

3. Breastfeeding interventions

Community interventions to promote optimal breastfeeding. Evidence on early initiation, any breastfeeding, exclusive breastfeeding, and continued breastfeeding.
IYCN Project. (2012). USAID.
http://www.iycn.org/files/IYCN_Literature_Review_Community_Breastfeeding_Interventions_Feb_121.pdf

The essential findings in this review are that community programs vary widely, but there are some comparable elements and selected consistent findings. The following general findings are supported by this analysis of the literature:

1) Programs that are either built upon the shoulders of existing breastfeeding programs, or are integrated into other accepted interventions, appear to perform better than single-purpose programs that are introduced in isolation.

2) A wide variety of program approaches are seen in the community; those that emerge from the community, or in which there is active involvement of community-based change agents, appear to have greater impact.

3) The content and quality of the training and supervision of community workers makes a significant difference.

All studies included a positive impact on the breastfeeding variable under study, although not all achieved statistical significance. The least likely variables to show change were 'any breastfeeding' and 'duration of any breastfeeding'. Early initiation and exclusive breastfeeding appeared to be very responsive to community efforts in developing country settings where ambient breastfeeding levels and duration may already have been substantial. The impacts that seemed to be greatest among the interventions that built upon established clinical programs had been carefully and fully incorporated into other accepted health or nutrition packages, or were part of comprehensive interventions that also included substantive political will, the health system, targeted nutrition interventions, and/or social marketing/behaviour change.

Promotion of exclusive breastfeeding is not likely to be cost effective in West Africa. A randomized intervention study from Guinea-Bissau
Jakobsen, M.S, Sodemann, M., Biai, S., Nielson, J. & Aaby, P. (2008). Acta Paediatrica, 97(1), 68-75.
http://www.ncbi.nlm.nih.gov/pubmed/18053000

Aim:
To evaluate the impact of promotion of exclusive breastfeeding on infant health in Guinea-Bissau, West Africa, where mortality rates are high, breastfeeding is widely practiced but exclusive breastfeeding is rare.

Method:
At the Bandim Health Project in Guinea Bissau, West Africa, a birth cohort of 1721 infants were randomised to receive health education: promotion of exclusive breastfeeding for the first 4-6 months of life according to WHO recommendations at the time of the study. All children were followed from birth to 6 months of age.

Results:
Introduction of both water and weaning food was significantly delayed in the intervention group. However no beneficial health effects of the intervention were found; there was no reduction in mortality in the intervention group compared with the control group (mortality rate ratio: 1.86 (0.79-4.39)), weight at 4-6 months of age was significantly lower in the intervention

group (7.10 kg vs. 7.25 kg; Wilcoxon two-sample test: p=0.03). There was no difference in diarrhoea morbidity and hospitalisation rates.

Conclusion:
Although mothers were sensitive to follow new breastfeeding recommendations, it had no beneficial impact on infant health in this society with traditional, intensive breastfeeding. There seems to be little reason to discourage local practices as long as there are no strong data justifying such a change.

Peer support and exclusive breastfeeding duration in low and middle-income countries: a systematic review and meta-analysis
Sudfeld, C. R, Fawzi, W. W., Lahariya, C. (2012). PLoS One; 7(9)
http://www.ncbi.nlm.nih.gov/pubmed/23028810

This systematic review and meta-analysis examined the effect of peer support on duration of exclusive breastfeeding (EBF) in low and middle-income countries (LMICs). Eleven randomised controlled trials utilising peer support in LMIC were reviewed and assessed for quality. Peer support was shown to significantly decrease the risk of discontinuing exclusive breastfeeding compared to the control groups.

A complex breastfeeding promotion and support intervention in a developing country: study protocol for a randomized clinical trial
Nabulsi, M., Hamadeh, H., Tamim, H., Kabakian, T., Charafeddine, L., Yehya, N., Sinno, D., & Sidani, S. (2014). BMC Public Health, 14 (36).
http://www.biomedcentral.com/1471-2458/14/36

Breastfeeding has countless benefits to mothers, children and community at large, especially in developing countries. Studies from Lebanon report disappointingly low breastfeeding exclusivity and continuation rates. Evidence reveals that antenatal breastfeeding education, professional lactation support, and peer lay support are individually effective at increasing breastfeeding duration and exclusivity, particularly in low-income settings. Given the complex nature of the breastfeeding ecosystem and its barriers in Lebanon, we hypothesise that a complex breastfeeding support intervention, which is centred on the three components mentioned above, would significantly increase breastfeeding rates.

Exclusive breastfeeding is a cost-effective public health measure that has a significant impact on infant morbidity and mortality. In a country with limited healthcare resources like Lebanon, developing an effective breastfeeding promotion and support intervention that is easily replicated across various settings becomes a priority. If positive, the results of this study would provide a generalisable model to bolster breastfeeding promotion efforts and contribute to improved child health in Lebanon and the Middle East and North Africa (MENA) region.

Effect of postnatal home visits on maternal/infant outcomes in Syria: a randomized controlled trial
Bashour, H.N., Kharouf, M.H., Abdulsalam, A.A., El Asmar, K., Tabbaa, M.A., Cheikha, S.A. (2008). Public Health Nurse, 25(2), 115-25.
http://www.ncbi.nlm.nih.gov/pubmed/18294180

Objective:
Early postpartum home visiting is universal in many Western countries. Studies from developing countries on the effects of home visits are rare. In Syria, where the postpartum period is rather ignored, this study aimed to assess whether a community-based intervention

of postnatal home visits has an effect on maternal postpartum morbidities; infant morbidity; uptake of postpartum care; use of contraceptive methods; and on selected neonatal health practices.

Design:
A randomised controlled trial was carried out in Damascus. Three groups of new mothers were randomly allocated to receive either 4 postnatal home visits (A), one visit (B), or no visit (C).

Sample:
A total of 876 women were allocated and followed up.

Intervention:
Registered midwives with special training made a one or a series of home visits providing information, educating, and supporting women.

Results:
A significantly higher proportion of mothers in Groups A and B reported exclusively breastfeeding their infants (28.5% and 30%, respectively) as compared with Group C (20%), who received no visits. There were no reported differences between groups in other outcomes.

Conclusions:
While postpartum home visits significantly increased exclusive breastfeeding, other outcomes did not change. Further studies framed in a nonbiomedical context are needed. Other innovative approaches to improve postnatal care in Syria are needed.

It should be noted that the political situation has changed in Syria though the findings of this paper are still interesting.

4. Sanitation interventions

Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children
Dangour, A.D., Watson, L., Cumming, O., Boisson, S., Che, Y., Velleman, Y., Cavill, S., Allen, E. & Uauy, R. (2013). Cochrane Database of Systematic Reviews; 8
http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009382/pdf

In low-income countries an estimated 165 million children under the age of five years suffer from chronic undernutrition causing them to be short in height and 52 million children suffer from acute undernutrition causing them to be very thin. Poor growth in early life increases the risks of illness and death in childhood. The two immediate causes of childhood undernutrition are inadequate dietary intake and infectious diseases such as diarrhoea.

Water, sanitation and hygiene (WASH) interventions are frequently implemented to reduce infectious diseases; this review evaluates the effect that WASH interventions may have on nutrition outcomes in children. The review includes evidence from randomised and non-randomised interventions designed to (i) improve the microbiological quality of drinking water or protect the microbiological quality of water prior to consumption; (ii) introduce new or improved water supply or improve distribution; (iii) introduce or expand the coverage and use of facilities designed to improve sanitation; or (iv) promote handwashing with soap after defecation and disposal of child faeces, and prior to preparing and handling food, or a combination of these interventions, in children aged under 18 years.

The authors identified 14 studies of such interventions involving 22,241 children at baseline and nutrition outcome data for 9,469 children. Meta-analyses of the evidence from the cluster-randomised trials suggests that WASH interventions confer a small benefit on growth in children under five years of age. While potentially important, this conclusion is based on relatively short-term studies, none of which is of high methodological quality, and should therefore be treated with caution. There are several large, robust studies underway in low-income country settings that should provide evidence to inform these findings.

Child undernutrition, tropical enteropathy, toilets, and handwashing
Humphrey, J. (2009). The Lancet 374: 1032–35
http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60950-8/fulltext

This report suggests that a key cause of child undernutrition is a subclinical disorder of the small intestine known as tropical enteropathy, caused by faecal bacteria ingested in large quantities by young children living in conditions of poor sanitation and hygiene. The author proposes that the primary causal pathway from poor sanitation and hygiene to undernutrition is tropical enteropathy and not diarrhoea as is often assumed.

The author concludes that interventions focused on gut microbial populations and improved drinking water quality might be important, together with continued efforts to improve infant diets and that prevention of tropical enteropathy, which afflicts almost all children in the developing world, will be crucial to normalise child growth. Provision of toilets and promotion of handwashing after faecal contact could reduce or prevent tropical enteropathy and its adverse effects on growth.

Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health
Prüss-Üstün, A., Bos, R., Gore, F. & Bartram, J. (2008). World Health Organization, Geneva, Switzerland
http://whqlibdoc.who.int/publications/2008/9789241596435_eng.pdf

This document summarises the evidence and information related to water and health, encompassing drinking-water supply, sanitation, hygiene, and the development and management of water resources. It collects the ingredients that support policy decisions, namely the disease burden at stake, the effectiveness of interventions, their costs and impacts, and implications for financing. It finds that one tenth of the global disease burden is preventable by achievable improvements in the way we manage water. Cost-effective, resilient and sustainable solutions have proven to alleviate that burden. Water-related improvements are crucial to improve health and nutritional status in a sustainable way.

Interventions to improve disposal of human excreta for preventing diarrhoea
Clasen, T.F., Bostoen, K., Schmidt, W.P., Boisson, S., Fung, I.C.H., Jenkins, M.W., Scott, B., Sugden, S. & Cairncross, S. (2010). Cochrane Database of Systematic Reviews, Issue 6.
http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007180.pub2/pdf/standard

In low-income countries, diarrhoea among young children is a major cause of death and disease, and is often the result of exposure to human faeces. This review found that in low-income settings, among the estimated 2.6 billion people who lack basic sanitation. The evidence suggests that excreta disposal interventions are effective in preventing diarrhoeal diseases. However, major differences among the studies, including the conditions in which they were conducted and the types of interventions deployed, as well as methodological deficiencies in the studies themselves, make it impossible to estimate with precision the protective effective of sanitation against diarrhoea.

5. Supplement interventions

Multiple-micronutrient supplementation for women during pregnancy, intervention review
Haider, B. & Bhutta, Z. (2012). The Cochrane library.
http://apps.who.int/rhl/reviews/CD004905.pdf

This review looks at the evidence for multiple micronutrient supplementation of pregnant women and the effect on birth outcomes. This paper was a key resource of data for the updated Lancet series 2013 on this topic. Micronutrient deficiencies are known to interact and a greater effect may be achieved by multiple supplementation rather than single nutrient supplementation, although interactions may also lead to poor absorption of some of the nutrients.

Overall, the data in this review showed that multiple-micronutrient supplementation reduced the number of LBW and SGA babies when compared with iron and folic acid supplements, no supplementation or a placebo. The authors conclude that whilst multiple micronutrients have been found to have a significant beneficial impact on SGA and LBW babies, more evidence is required to guide a universal policy change and to suggest replacement of routine iron and folate supplementation with a multiple micronutrient supplement. They also suggest that future research should examine the effects on mortality and morbidity and assess the effects of different combinations and dosages of micronutrients.

In an update of this review, a new trial which shows reduction in preterm births with no adverse effects and the authors conclude that overall, these findings support the potential replacement of iron-folate supplements in pregnancy with multiple micronutrients in populations at risk of deficiency and agree that further evidence is needed to guide a universal policy change.

Vitamin A supplementation every 6 months with retinol in 1 million pre-school children in north India: DEVTA, a cluster-randomised trial
Awasthi, S., Peto, R., Read, S., Clark, S., Pande, V., Bundy, D.; & DEVTA (Deworming and Enhanced Vitamin A) team (2013). The Lancet, Apr 27; 381(9876):1469-77
http://www.ncbi.nlm.nih.gov/pubmed/23498849

This paper presents evidence from a trial on periodic Vitamin A supplementation and the effect on related eye health, disease and mortality. The trial was set in India.Over the 5 year period for which it was conducted, it included 2 million children, aged between 1-6 years old. The methodology was rigorously designed, with children randomly allocated within clusters (neighbouring blocks) to receive either Vitamin A (as retinol in oil) every 6 months, Albendazole (a de-worming drug whose effects were assessed in a separate study), both or neither. The analysis compares those clusters receiving Vitamin A (both with and without Albendazole) with those clusters not receiving Vitamin A.

The main outcome of interest was the effect on mortality, however data was also collected to look at serum retinol (a marker of Vitamin A deficiency), eye health, such as bitots spots and night blindness and other related diseases (measles and diarrhoea). The results showed a significant reduction in severe deficiency in the group receiving Vitamin A, and a reduction of 50% in eye problems.

However, the main outcome of interest, mortality, showed no statistically significant reduction. This finding came as a surprise as previous smaller trials have showed a reduction in mortality of anything up to 30%. The authors conclude that this finding does not necessarily prove that Vitamin A has no beneficial effect on mortality, but that possibly the benefits are less than previously believed.

Vitamin A supplementation for preventing morbidity and mortality in children from 6 months to 5 years of age
Imdad, A., Herzer, K., Mayo-Wilson, E., Yakoob, M. Y., & Bhutta, Z. A. (2010). Cochrane Database of Systematic Reviews
http://www.ncbi.nlm.nih.gov/pubmed/21154399

Vitamin A deficiency increases vulnerability to a range of illnesses including diarrhoea, measles, and respiratory infections. These are leading causes of mortality among children in low and middle income countries, where risk of infection and risk of mortality can be compounded by coexisting undernutrition. The bioavailability of vitamin A in fruit and vegetables is lower than once believed, and it is difficult for children to fulfil their daily requirements through plant foods alone. Consequently, vitamin A deficiency is common among children whose families cannot afford eggs and dairy products. This review studies the effects vitamin A supplementation in 43 randomised trials and shows that supplementation reduces all cause mortality by 24 per cent and diarrhoea related mortality by 28 per cent in children aged 6-59 months.

Effect of provision of daily zinc and iron with several micronutrients on growth and morbidity among young children in Pakistan: a cluster-randomised trial
Soofi, S. Cousens, S. Iqbal, S. et al. (2013). The Lancet; 382
http://www.ncbi.nlm.nih.gov/pubmed/23602230

This paper presents the results of a cluster randomised trial into the effects on morbidity of the provision of zinc, iron and micronutrients on young Pakistani children. Iron and other micronutrients in powder form are recommended as a strategy to prevent childhood nutritional anaemia and other micronutrient deficiencies. This study focuses on the effects of provision of two micronutrient powder formulations, with or without zinc, administered between 2008 and 2011. It was found that micronutrient powder administration was associated with lower risk of iron-deficiency anaemia at 18 months compared with the control group. Also compared with the control group, children receiving micronutrient powder without zinc gained an extra 0.31 cm between 6 and 18 months of age and children receiving micronutrient powder with zinc an extra 0.56 cm). Strong evidence was found of an increased proportion of days with diarrhoea and increased incidence of bloody diarrhoea) between 6 and 18 months in the two micronutrient powder groups, and reported chest indrawing.

Incidence of fever or admission to hospital for diarrhoea, respiratory problems, or fever did not differ between the three groups. These results suggest that the use of micronutrient powders reduces iron-deficiency anaemia in young children, but that the excess burden of diarrhoea and respiratory morbidities associated with micronutrient powder use and the very small effect on growth recorded suggest that a careful assessment of risks and benefits must be done in populations with malnourished children and high diarrhoea burdens.

Preventive zinc supplementation in developing countries: impact on mortality and morbidity due to diarrhoea, pneumonia and malaria
Yakoob, M. Y., Theodoratou, E., Jabeen, A., et al. (2011). BMC Public Health, 13 (11).
http://www.ncbi.nlm.nih.gov/pubmed/21501441

Zinc deficiency is common in children in developing countries and can contribute to decreased immunity and increased risk of infection. Preventive zinc supplementation in healthy children can reduce mortality due to common causes like diarrhoea, pneumonia and other respiratory infections and malaria. This review assessed 18 studies from developing countries and found that preventative zinc supplementation reduced the incidence or diarrhoea by 13 per cent and pneumonia by 19 per cent.

Multiple Micronutrient Nutrition: Evidence from History to Science to Effective Programs. Workshop Proceedings: 2nd World Congress of Public Health, Portugal, 2010
Thurnham, D.I. 2010. Sight and Life.
http://www.sightandlife.org/fileadmin/data/Magazine/2012/26_1_2012/multiple_micronutrient_nutrition.pdf

Key messages to emerge from the workshop:

- Multiple micronutrient (MMN) supplements have been introduced to overcome drawbacks in single micronutrient supplementation to improve diets.
- Main nutrients of interest are vitamin A, iron, zinc, folate and vitamin B_{12}.
- Evidence for the existence of other micronutrient deficiencies is largely circumstantial and based on the knowledge that many people in developing countries exist on very poor diets.
- Randomised controlled trials in pregnant and lactating women have largely shown poor responses to MMN supplements, compared to iron and folate.
- The poor response by women is partly due to the fact that all women routinely receive iron and folate supplements. The lack of macronutrients may also dilute any benefit from the supplements.
- The use of micronutrient powders (MNP) in emergency situations has given variable results; however, this may be due to the unsuitability of the biomarkers used.
- A comprehensive guide on the use of biomarkers for programmers is needed.
- More experimental work is advised before programs are started.
- New work on the genetic polymorphisms affecting the activity of the enzyme converting β-carotene to vitamin A has shown the existence of potentially important ethnic differences.
- Most micronutrient interventions to date have been delivered using the “health” platform.
- Three other delivery platforms exist: market-based, agriculture and social protection. However, much information is still needed for their successful implementation.
- The World Health Organization (WHO) is systematically collecting micronutrient statistics and program results to provide an international database for programmers.

6. General evidence on nutrition interventions

Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?
Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., Black, R. E. Lancet Nutrition Interventions Review Group; Maternal and Child Nutrition Study Group. (2013). Lancet. 382(9890):452-77.
http://www.ncbi.nlm.nih.gov/pubmed/23746776

Since the review of interventions in 2008, many have been implemented at scale and the evidence for effectiveness of nutrition interventions and delivery strategies has grown. This paper is a comprehensive update of direct interventions and assesses emerging new evidence for delivery platforms. Data is modelled to study the effect on lives saved and cost of scaling up these interventions in the 34 highest burden countries. The analysis suggests the current total of deaths in children younger than 5 years can be reduced by 15 per cent if populations can access ten evidence-based nutrition interventions at 90 per cent coverage.

These ten interventions are: Folic acid, multiple micronutrient, calcium and balanced energy-protein supplementation for pregnant and women of reproductive age; promotion of exclusive breastfeeding, complimentary feeding, vitamin A supplementation, preventative zinc supplementation and management of moderate and severe acute malnutrition for infants and children. The estimated total additional annual cost involved for scaling up access to these ten direct nutrition interventions in the 34 countries with the highest burden of undernutrition is $9·6 billion per year. Investing in these interventions to reduce maternal and child undernutrition, especially through community engagement and delivery strategies that can reach the segments of the population at greatest risk can make a great difference. The greatest progress can be made if these strategies are linked to nutrition-sensitive approaches—i.e., women's empowerment, agriculture, food systems, education, employment, social protection, and safety nets.

Hunger and Malnutrition, Copenhagen Consensus
Hoddinott, J., Rosegrant, M. & Torero, M. (2012)
http://www.copenhagenconsensus.com/sites/default/files/hungerandmalnutrition.pdf

The Copenhagen Consensus is a project that establishes priorities for global welfare. It was set up in 2004 by gathering some of the world's greatest economists to improve prioritisation of the numerous problems the world faces and the process has been repeated every four years. The expert panel's task was to create a prioritised list of solutions to the ten greatest challenges, showing the most cost-effective investments. This is a way to identify the areas of spending which could achieve the most good, and to bring more attention to them. It is also a way of identifying areas where there isn't enough research, or where the benefits are not as big as might be assumed. The third Copenhagen Consensus 2012 Expert Panel found investments to reduce hunger and undernutrition to have powerful positive benefits, both intrinsically and instrumentally. In particular, bundled micronutrient interventions to fight hunger and improve education was found to be the most desirable of 16 investments worth making.

Scaling Up Nutrition, what will it cost?
Horton, S., Shekar, M., McDonald, C., Mahal, A. & Krystene Brooks, J. (2010). World Bank
http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf

Despite the evidence suggesting that nutrition interventions have the potential to have a positive impact in health and education and on preserving human capital in crises-stricken countries for generations to come, official development assistance for nutrition remains minimal. This report estimates the cost of scaling up a minimal package of 13 proven nutrition interventions from current coverage levels to full coverage of the target populations in the 36 countries with the highest burden of undernutrition. These countries account for 90 per cent of all children whose growth has been stunted by inadequate nutrition. Adding another 32 smaller high-burden countries with levels of stunting and/or underweight exceeding 20 per cent would increase these cost estimates by 6 per cent. It states that undernutrition imposes a staggering cost worldwide, both in human and economic terms. It is responsible for the deaths of more than 3.5 million children each year (more than one third of all deaths among children under 5) and the loss of billions of dollars in forgone productivity and avoidable health care spending. Individuals lose more than 10 per cent of lifetime earnings, and many countries lose at least 2–3 per cent of their gross domestic product to undernutrition. The current economic crisis and its potential impact on the poor make investing in child nutrition more urgent than ever to protect and strengthen human capital in the most vulnerable developing countries.

The 13 direct nutrition interventions selected for this costing exercise that have demonstrated effectiveness in many countries by reducing child mortality, improving nutrition outcomes, and protecting human capital are categorised into one of three groups: i) Behaviour change interventions; ii) Micronutrient and deworming interventions; and iii) Complementary and therapeutic feeding interventions. It was concluded that an additional US$10.3 billion from domestic and donor resources for the proposed scale-up. Investments in micronutrient supplementation and fortification were found to have the lowest unit cost (a cost per child per year of about US$5) and to have high cost-effectiveness (US$10 per disability-adjusted life year for vitamin A supplementation, and US$73 per disability-adjusted life year for therapeutic zinc supplementation) and high benefit cost ratios (8:1 for iron fortification of staples; 30:1 for salt iodization). These micronutrient interventions are also known to work well, even when capacities are constrained. Complementary feeding for children 6–23 months of age is more expensive, between US$40 and US$80 per child per year. Complementary feeding programs have had only a modest effect on deaths.

The most costly intervention per child is treatment of severe acute malnutrition (SAM), at US$200 per child treated, which has a cost-per-death averted of US$1,351, corresponding to around US$41 per disability-adjusted life year saved. The reason this intervention is the last priority relates to weak national capacities and delivery systems, as well as the high cost and implementation difficulties of scaling it up. However, when the scale-up becomes tractable with enhanced capacities, this is a high-priority intervention to save lives. Conditional cash transfers can provide additional demand-side support to nutrition interventions, although research on them is currently lacking. Conditional cash transfers are not an alternative to nutrition interventions; rather they can be complementary. Transfers set up to be social safety nets for the poor, for example, can require the use of critical nutrition services, thereby increasing demand for them.

Nutrition interventions in Marial Lou, Tonj County, South Sudan Compared with the Niger nutrition outcomes
Anita, S. (2007). MSF Evaluation Report.
Not available online.

The evaluation unit in Vienna (MSF-Austria) was requested to analyse the different nutritional strategies implemented in Marial Lou over the past years (2003 – 2006) in terms of appropriateness, effectiveness and efficiency, and, to identify recommendations for future similar contexts. After presenting the first results, the evaluator was requested to extend the analysis of outcome data to those of the Niger nutrition program 2005 and 2006, for better comparison of results. Hence this report focuses mainly on the Marial Lou evaluation; data and issues concerning Niger are, however, included within the chapters on effectiveness and efficiency and considered in the final conclusions and recommendations.

In 1997, MSF-CH established Maria Lou hospital (Bahr el Ghazal, South Sudan) with the aim to respond to humanitarian emergencies, with a particular focus on nutrition crisis in a timely and effective manner and to ensure that all malnourished children identified are provided with high quality of nutritional care in the nutrition ward and –centres. The malnourished children received the best care possible in the context and the “newest” available nutritional food supplies (e.g. Plumpy Nut, F75) on the market.

The main outcome indicators (average weight gain, -length of stay and mortality rate) in the Marial Lou interventions were within reference values in most of the years. The added value of the new approach (A-TFC) so far can primarily be seen in the bigger coverage, better assistance and much easier access for the beneficiaries; and this is very much confirmed by the satisfaction expressed by mothers. An increase in the number of children admitted (severely- and moderately malnourished) can be seen, after the decentralised approach was taken in 2005 and 2006.

The defaulter rate did not show a huge difference between the years but were during all interventions above the reference value (TFC: > 10.0 % and decentralised approach: > 15.0 %). It seems that within the BeG context a slightly higher defaulter rate has to be accepted. Referring to outcome reports of “Valid international” (supporting nutritional actors in South Sudan) similar defaulter rates are reported within the decentralised approaches in the BeG context (between 15.4 and 17.3 %). The rate reached its highest and unaccepted extent in 2005 (52.2 %), which had an influence in the recovery rate. The main factors were the difficult access for both parties (nutrition team and beneficiaries) and the limited mobilisation beforehand.

Assessing coverage of the interventions is difficult, because accurate population figures are not available, and the survey results with its first beneficiary estimation changes within the following months. Also the number of estimated beneficiaries was based on the total area surveyed, although the MSF nutrition facilities were not allocated so to cover the same area. Hence it cannot be assumed that all mothers would have been able to find the service within their radius to walk on foot.

In overall the nutritional outcome indicators on e.g. recovery- and defaulter rate, and average weight gain and -length of stay, were good in the Niger intervention. The defaulter rates decreased to a level far below the reference value, as the first emergency months passed and both parties (beneficiaries and nutrition team) entered a kind of routine. The main concern is the high mortality rate within the CRENI (2006: 6.6 % and 2006: 8.9 %); especially close to the Nigerian border. The team invested in quality improvements of medical care and in health education to minimise the use and increase the awareness of traditional medicine.

The average weight gain and -length of stay within the CRENI / I-TFC set up in 2006 shows no significant differences with the one of Marial Lou.

The main difference did appear in the costs of transport-freight-storage between 2005 and 2006. The costs increased enormous as the food supplies had to be transported with aircrafts. The investment into a new tractor in 2005 brought an available resource in 2006. The nutrition teams could not count on available local human resources. Each year the team had to invest first in trainings. The training costs were of small expenses but a lot of training effort and supervision was needed. This situation limited the handover of more and defined responsibilities to the local staff within the distribution points.

Before implementing an A-TFC, the highly dispersed population and the prevalence of severe acute malnutrition within the intervention radius and its seasonal morbidity burden of the under-5 year old children has to be considered. The hypothesis made that the more children are admitted and followed within a decentralised TFC approach the cheaper it is, could not be confirmed with the Niger intervention. The operating expenses in 2005 (e.g. infrastructure, nutrition items, medicine, construction and logistical material, human resources) required massive investments in the first emergency months. 2006, the costs could be minimised for approximately one third.

It will be a future challenge to define a good balance between the decentralised set up, the needed resources and costs.

Protecting child health and nutrition status with ready-to-use food in addition to food assistance in urban Chad: a cost-effectiveness analysis
Puett, C., Salpéteur, C., Lacroix, E., Houngbé, F., Aït-Aïssa, M., & Israël, A. (2013). Cost Effectiveness and Resource Allocation, 11:27.
http://www.resource-allocation.com/content/11/1/27

Despite growing interest in use of lipid nutrient supplements for preventing child malnutrition and morbidity, there is inconclusive evidence on the effectiveness, and no evidence on the cost-effectiveness of this strategy.

A cost effectiveness analysis was conducted comparing costs and outcomes of two arms of a cluster randomised controlled trial implemented in eastern Chad during the 2010 hunger gap by Action contre la Faim France and Ghent University. This trial assessed the effect on child malnutrition and morbidity of a 5-month general distribution of staple rations, or staple rations plus a ready-to-use supplementary food (RUSF). RUSF was distributed to households with a child aged 6–36 months who was not acutely malnourished (weight-for-height > = 80% of the NCHS reference median, and absence of bilateral pitting edema), to prevent acute malnutrition in these children. While the addition of RUSF to a staple ration did not result in significant reduction in wasting rates, cost-effectiveness was assessed using successful secondary outcomes of cases of diarrhea and anemia (hemoglobin <110 g/L) averted among children receiving RUSF.

Total costs of the program and incremental costs of RUSF and related management and logistics were estimated using accounting records and key informant interviews, and include costs to institutions and communities. An activity-based costing methodology was applied and incremental costs were calculated per episode of diarrhea and case of anemia averted.

Adding RUSF to a general food distribution increased total costs by 23%, resulting in an additional cost per child of 374 EUR, and an incremental cost per episode of diarrhea averted of 1,083 EUR and per case of anemia averted of 3,627 EUR.

Adding RUSF to a staple ration was less cost-effective than other standard intervention options for averting diarrhea and anemia. This strategy holds potential to address a broad array of health and nutrition outcomes in emergency settings where infrastructure is weak and other intervention options are infeasible in the short-term. However, further research is needed to establish the contexts in which RUSF is most effective and cost-effective in preventing acute malnutrition and morbidity among vulnerable children, compared to other options.

What works? Interventions for maternal and child undernutrition and survival
Bhutta, Z. A., Ahmed, T., Black, R. E., Cousens, S., Dewey, K., Giugliani, E., Haider, B.A., Kirkwood, B., Morris, S.S., Sachdev, H.P. & Shekar, M. (2008). Lancet 371, (9610): 417-40.
http://www.sciencedirect.com/science/article/pii/S0140673607616936

Authors reviewed interventions that affect maternal and child undernutrition and nutrition-related outcomes. These interventions included promotion of breastfeeding; strategies to promote complementary feeding, with or without provision of food supplements; micronutrient interventions; general supportive strategies to improve family and community nutrition; and reduction of disease burden (promotion of handwashing and strategies to reduce the burden of malaria in pregnancy).

The review showed that although strategies for breastfeeding promotion have a large effect on survival, their effect on stunting is small. In populations with sufficient food, education about complementary feeding increased height-for-age Z score by 0.25 (95% CI 0.01–0.49),

whereas provision of food supplements (with or without education) in populations with insufficient food increased the height-for-age Z score by 0.41 (0.05–0.76).

Management of severe acute malnutrition according to WHO guidelines reduced the case-fatality rate by 55% (risk ratio 0.45, 0.32–0.62), and recent studies suggest that newer commodities, such as ready-to-use therapeutic foods, can be used to manage severe acute malnutrition in community settings.

Effective micronutrient interventions for pregnant women included supplementation with iron folate (which increased haemoglobin at term by 12 g/L, 2.93–21.07) and micronutrients (which reduced the risk of low birthweight at term by 16% (relative risk 0.84, 0.74–0.95).

Recommended micronutrient interventions for children included strategies for supplementation of vitamin A (in the neonatal period and late infancy), preventive zinc supplements, iron supplements for children in areas where malaria is not endemic, and universal promotion of iodised salt.

A cohort model was used to assess the potential effect of these interventions on mothers and children in the 36 countries that have 90% of children with stunted linear growth. The model showed that existing interventions that were designed to improve nutrition and prevent related disease could reduce stunting at 36 months by 36%; mortality between birth and 36 months by about 25%; and disability-adjusted life-years associated with stunting, severe wasting, intrauterine growth restriction, and micronutrient deficiencies by about 25%. To eliminate stunting in the longer term, these interventions should be supplemented by improvements in the underlying determinants of undernutrition, such as poverty, poor education, disease burden, and lack of women's empowerment.

7. Nutrition policy, programmes and planning in Yemen

Planning and costing for the acceleration of actions for nutrition: experiences of countries in the Movement for Scaling Up Nutrition
SUN. (2014).
http://scalingupnutrition.org/wp-content/uploads/2014/05/Final-Synthesis-Report.pdf

This document includes costing of a country plan for Yemen. The nutrition plan was created and costed with the National Government. The plan does not incorporate nutrition-related activities currently being performed by NGOs. The plan includes activities which are nutrition-specific, nutrition sensitive, and governance strengthening. The nutrition plan covers 2013. The plan does not include a monitoring and evaluation framework matching individual activities to specific measurable outcomes.

Costs are calculated at the national government level. Costs for activities are estimated by programme component.

The nutrition costs in Yemen are compiled from three plans: the National Nutrition Strategy (NNS) (one year plan for 2013-2014); the National Agriculture Sector Strategy (NSS) (five year plan for 2012-2016); and the National Fisheries Strategy (NFS) (four year plan for 2012-1015). The National Nutrition Strategy (NNS) encompasses nine large-scale interventions relating to: child undernutrition, low birthweight, maternal under-nutrition, rickets, anaemia, vitamin A, iodine and zinc deficiency, school nutrition and nutrition for emergency situations. The plan incorporates costings for humanitarian and emergency needs, basic services to citizens, and to develop specific programs to address malnutrition. While the plans overlap, only a one year period (2013-2014) includes costs from all plans.

The total cost from the three overlapping plans is approximately US$177 million. This is equivalent to a per capita annual cost of over US$6. A large percentage of the costs are for management of acute malnutrition. The costs are estimated at 10–20 per cent below the actual requirement, and represent priority interventions in 71 target districts in accordance with the cooperation plan with the Ministry of Health for the transitional period (2013 - 2014). The associated costs assume that human resources for implementation are available on the ground.

Costs over 5 years:

- US$188 million for nutrition-specific intervention. Over half is allocated to the treatment of acute malnutrition.
- US$589 million for nutrition-sensitive approaches. The majority is allocated to nutrition-sensitive approaches.
- US$499 million for strengthening governance to implement nutrition-specific and nutrition-sensitive approaches. Efforts are targeted at information management and coordination and system capacity building.

Yemen's approach to scaling up nutrition will focus on large-scale investment in all sectors that can contribute to improving nutrition – including improving access to food, drinking water, sanitation, hygiene, education, social protection, livelihoods and quality health services. The Government of Yemen will scale up implementation of its Nutrition and Food Security Strategy.

An in-depth examination of domestic and external funding streams to cover the costs of the National Nutrition Strategy is planned to estimate the funding gap.

SQUEAC REPORT. Sana'a, Beni Matar, Sanhan and Belad Al-Ros: Yemen
Coverage Monitoring Network. (2013). Coverage Monitoring Network.
http://www.cmamforum.org/Pool/Resources/SQUEAC-Report-Yemen-Sanna-Dec-2012.pdf

This investigation was conducted in Sana'a Governorate, Beni Matar, Sanhan and Belad Al-Ros Districts in 12 facilities and their corresponding catchment areas. The objective of the survey was to assess access and coverage and identify barriers to program's service uptake of the Outpatient Therapeutic Programme (OTP).

Results/Conclusions:

- OTP coverage was 34% (prior result). There are three facilities with almost no admission. Owing to this and other factors the investigation did not continue to stage two and three. However, after addressing the key recommendations outlined below it is recommended to continue the investigation after six months.
- The default rate is unacceptably high (58%). Moreover, most of the defaulters have defaulted on their first and subsequent second and third visits. This shows the programme has a very poor performance. Further, by design there is no strategy to follow up and readmit children. Therefore; the programme should put a follow up and defaulter tracing strategy to improve its performance and coverage of the programme. The default level and the reasons of default have a potential to affect the programmes sustainability in the long run.
- CMAM (Community management of acute malnutrition) is an outreach treatment model where by the community directly participate in screening and treatment. In this programme community engagement is minimal and this has created a lack of ownership. The programme should design a community mobilisation strategy whereby community volunteers be based within the community and conduct screening and follow up. Involving Sheiks and traditional leaders will solve the ownership problem.

- Anti-NGO agitation: There is an anti NGO sentiment. Its sources should be investigated and dealt with for the integration of the programme.
- There is a wide spread report of Plumpy'nut causing diarrhoea. This has significantly contributed to a high default level. MoH and partners should take this seriously and provide a solution.
- Distance is found to be a barrier to accessing the programme. Physical and logistical barriers should be overcome by providing services close to where the target population lives. Having mobile teams can help boost coverage and address the problem of non-coverage due to distance. An interesting observation during the investigation was found in one community where there is a newly built health facility in the community but it has not started providing services. The households from this village have to travel to a faraway facility to receive care and treatment for malnutrition. This particular village has a very high caseload and the investigations also revealed that children had died (n=2) in the past two months. Father and mother Focus Group discussions revealed that child death is common in the village and its surrounding vicinity. Therefore, opening outreach programme at this facility will help the programme to improve access to care for this community. In similar fashion, ways should be devised to get the program closer to the affected community i.e. Mobile clinics.
- Being a patriarchal society, women are not allowed to travel alone to far away distances. Because of this many have defaulted or opted not to attend the programme. Social and cultural barriers to access are overcome through understanding the sociocultural milieu in which CMAM programmes operate. Reducing socio-cultural barriers also requires that people understand the services that are available to them and participate in developing and implementing programmes. This is vital in order to ensure that issues of importance to potential clients, such as the location of sites and the organisation of services at the site, are factored into programme design. During the investigation mothers highly and repeatedly recommended that the program be tailored towards their situation. For instance, they have said that the facilities should find a way for people from the same village to have similar OTP days. This is because they can travel together and they can share the cost of travel.

Coverage assessment. Location: Al-Qanawis, Hodeidah, Yemen
Coverage Monitoring Network. (2013).
http://www.coverage-monitoring.org/wp-content/uploads/2013/11/SQUEAC-Report_Al-Qanawis_Yemen.pdf

With the support of UNICEF grants, SCI in close collaboration with MOPHP has been implementing emergency nutrition interventions in four districts namely Aluhyah, Al Qanawis, Al Meghlaf, and Al Tuhaita located in Hodeidah Governorate since October 2012. The program is intended to benefit acutely malnourished children and pregnant and lactating mothers. The components of this program include outpatient therapeutic program (OTP) for severe acute malnutrition (SAM) without complications, stabilisation centre (SC) for SAM with medical complications, targeted supplementary feeding programs (TSFP) for moderate acute malnutrition (MAM) and community outreach activities

The objectives of this assessment were to determine the coverage of the out-patient therapeutic program (OTP) in Al-Qawanis district of Hodeidah, to identify barriers and boosters to coverage and to build the capacity of SCI and partner's staffs so that coverage assessment can be done regularly as part of program monitoring system.

Findings from the assessment indicated 61.6 per cent (CI 50.9%-71.0%) point coverage for OTP. OTP coverage is above SPHERE minimum standard for rural setting and the program displayed some clear strengths and good practices. The main reason for this level of

coverage is due to decentralised CMAM services, strong community mobilisation network and community participation. This decentralisation has contributed to better access, rapid distribution of rations and decreased waiting times in OTP for beneficiaries. They are also disseminating key messages of malnutrition and CMAM periodically by community outreach workers. The major barriers to coverage were distance and inadequate community mobilisation in some villages. Median MUAC on admission was 11 cm which indicates early case finding and admission in the program. Median length of stay for cured children was 6 weeks but some children had stayed for more than 12 weeks. There were very few defaulters and main reason for this was because COWs carried RUTF to the homes of absent SAM children.

Programs should focus on community sensitisation especially in faraway villages. Coordination with local governments and UNICEF should be strengthened for adequate supply of RUTFs, routine medicines and rearrangement of some catchment areas to nearby OTPs. The waiting area should be safe and mass screening should be conducted quarterly to increase coverage of the program.

Coverage assessment. Tai'z governorate, Republic of Yemen
Coverage Monitoring Network. (2013).
http://www.coverage-monitoring.org/wp-content/uploads/2014/01/Final-IMC-YemenTaizSQUEACREPORT-Nov-2013.pdf

IMC in collaboration of MoPHP, is implementing a CMAM program in 15 facilities of Tai'z governorate to address the high rates of malnutrition. This coverage investigation was done to monitor and evaluate progress of the CMAM intervention, identify barriers to good coverage, and provide recommendations to reform the program to deliver better quality services and to ensure that all the children who need to be treated for acute malnutrition are enrolled and being treated in this program.

This investigation did not provide an estimate of program coverage due to several reasons including insecurity. But investigations at stage one found that:

1) Train Staff in CMAM: Program performance indicators for default and cure rates falls short of SPHERE minimum standard (Cure rate significantly below 75% and default rate significantly above the 15% threshold). The program needs to: clarify admission and discharge criteria with all program and health staff as well as community nutrition volunteers and other referrers; improve defaulter follow up; record exact location of new admission to facilitate follow-up and defaulter tracing; and establish and implement a system of defaulter follow-up. The finding from the OTPs records indicate that the quality of CMAM training provided was inadequate, furthermore the currently used MOPHP records are not informative and was not designed in accordance with staff capacity.
2) Integrate Treatment of Acute Malnutrition (AM) into the Health System: The MOPHP should integrate acute malnutrition treatment as part of routine health activities and health staff should have AM treatment included in their job description rather than the job of the volunteer or the implementing NGO.
3) Put the Community Back in CMAM Programing: The role of the community and their understanding of this program is very poor. The services are too far from the beneficiaries in some areas; misconceptions about the program are detrimental to the successful treatment of children; and cultural barriers that are not taken into consideration are causing high defaulting. Two important barriers to accessing CMAM services to consider are limited mobility of women given the local culture as well as the mountainous terrain that create significant logistical challenges for both beneficiaries and the success of the programme. Thus CMAM services should be brought closer to the beneficiaries. This can be done by increasing the number and

geographical spread of OTP sites; providing mobile outreach; providing intensive community outreach to explain CMAM services and dispel any misconceptions about the program; and ensuring that the program is culturally sensitive to the needs and gender issues of the population.

Treating Children Suffering From Acute Malnutrition
Operation Mercy Yemen. (2014). Webpage accessed: 7.9.14. Page last updated: 20.1.14
http://www.mercy.se/en/projects/yemen/item/343-treating-children-suffering-from-acute-malnutrition

Operation Mercy Yemen launched a pilot nutrition intervention project that works in coordination with the local government health office to focus on areas of acute malnutrition.

At the beginning of June 2013, Operation Mercy completed the nutrition intervention in the first of their targeted sub-district reaching 130 acute malnutrition cases in the area. This included (1) treatment with basic medications and therapeutic food (2) hygiene and nutrition education for the parents and (3) monthly food baskets for the families.

Operation Mercy Yemen trained eight community health volunteers (CHVs) from the area. They are continuing to visit homes in their villages and refer malnourished children to the nearest health centre. Each time the mobile clinic team visited their areas to do screenings and treatment the CHVs observed and assisted. Now they are continuing to be voices for improved health in their areas, even after Operation Mercy have moved on.

The Ministry of Health and UNICEF have commended the programme.

(More details: http://www.mercy.se/en/projects/yemen/item/302-combating-malnutrition-for-healthier-villages-in-yemen)

National Social Protection Monitoring Survey in Yemen. Baseline analytical report.
International Policy Centre. (2013).
https://drive.google.com/folderview?id=0B69Edc4774R1akI1WG8tRnBOeFE&usp=drive_web

The National Social Protection Monitoring Survey (NSPMS) has two key objectives, the first is to establish a social protection and living conditions monitoring system that will provide routine data on how poor and vulnerable populations are coping in Yemen; and the second is to provide evidence on the impact of the public cash transfer programme administered by the Social Welfare Fund (SWF). Such evidence is key for future child-sensitive, as well as, human rights based social protection programming. The NSPMS provides national data on health, nutrition, water and sanitation, education, child protection, food security, social protection programmes, work and income, production and assets. This is of great value given the scarcity of data in Yemen, as the most recent DHS, HBS, and MICS were conducted in 1997, 2005, and 2006, respectively.

The Maternal and Child Health section of the report includes data on child nutrition, infant and young child feeding practices and maternal nutrition. The report finds the situation of Yemeni children is critical by WHO standards, with NSPMS findings of global acute malnutrition in 15.9 per cent of children under five years old and nearly half of all children (49.1 per cent) with chronic malnutrition. These findings corroborate those from the CFSS survey in 2011 that found 13 per cent of children with global acute malnutrition and 47 per cent with chronic malnutrition (WFP, 2012). Malnutrition is associated with area of residence, mother's education, wealth quintiles, morbidity with diarrhoea and the nutritional status of the mother. Infant feeding practices were very poor. The duration of exclusive breastfeeding is shorter than recommended, with only 10 per cent of infants below six months of age receiving

exclusively breastfed. Most infants aged 6–23 months received complementary foods after six months, although with low diet diversity (less than four food groups).

The NSPMS found that 21.3 per cent of mothers of children under five years old were malnourished and was associated with the child's nutritional status.

Micro Plans for Multi-sector Response
Yemen Nutrition Cluster. (2013).
https://sites.google.com/site/yemennutritioncluster/documents/micro-plans-for-multi-sector-response

Yemen nutrition cluster integrated response plans for Abyan, Aden, Hajja, Hodeida, Rayma and Taiz.

Plan tables outline outcomes, activities, outputs, locations, managing agencies and costs for different nutrition interventions for each region.

Final Evaluation of Integrated Emergency Programme in Yemen (2012-13)
Bhattacharjee, A., Handal, S., Day, C., Saeed, A., Alshalali, A., & Salah, A. (2013). CARE International.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/285377/Integrated-Emergency-Programme-Yemen.pdf

Three Integrated Emergency Response Programme (IERP) Consortium Partners (CPs) – namely Save the Children Yemen (SCY), Adventist Development and Relief Agency (ADRA) and Islamic Relief in Yemen (IRY) - have worked in the area of nutrition, with SCY providing a range of services including Community Management of Acute Malnutrition (CMAM), nutrition education and capacity building of health authorities in management of malnutrition, while ADRA and IRY have focused on nutritional education and awareness of communities through volunteers and health workers.

Nutrition section conclusions:

- The nutritional interventions have created strong awareness on breastfeeding and infant feeding practices in the communities, and this is reportedly leading to changes in practices in some communities.
- The effective duration of nutrition education and CMAM programmes has been about five months as most activities undertaken by IRY and SCY started in November, 2012.
- SCY's work on CMAM in collaboration with UNICEF and health authorities has proven to be a cost-effective model for dealing with malnutrition in some of the deprived areas of the country, although at this stage there is no realistic plan in place to sustain this at the end of IERP funding.
- Overall, the nutrition component of IERP was delivering outputs as intended in the logframe.

Nutrition cluster strategy 2012/ Yemen
Yemen Nutrition Cluster. (2012).
http://educationcluster.net/nutrition/wp-content/uploads/sites/4/2013/09/Nutrition-cluster-strategy-2012.pdf

Yemen Nutrition Cluster is a coordination mechanism which aims to ensure coherent, strategic and effective emergency nutrition responses, working with national and international partners on agreed priorities. The Cluster focuses on coordination, capacity building,

emergency preparedness, assessment and response, and improving coverage of emergency nutrition programs. On this website Nutrition Cluster partners and other stakeholders can find relevant information to support their nutrition and related activities.

This strategy covers:

- Background and need analysis
- Strategic planning aims and objectives
- Coordination strategy
- Critical path analysis
- Proposed programming
- Log frame
- Nutrition cluster members list
- Assessment, monitoring and evaluation
- Scenarios
- Legal framework
- Exit/Handover
- Preparedness and contingency measures

Scaling Up Nutrition, Yemen
Scaling Up Nutrition. (2014). Webpage accessed: 10.9.14
http://scalingupnutrition.org/sun-countries/yemen

Resources from the Scaling Up Nutrition (SUN) Movement. SUN is a unique Movement founded on the principle that all people have a right to food and good nutrition. It unites people—from governments, civil society, the United Nations, donors, businesses and researchers—in a collective effort to improve nutrition.

Within the SUN Movement, national leaders are prioritising efforts to address malnutrition. Countries are putting the right policies in place, collaborating with partners to implement programmes with shared nutrition goals, and mobilising resources to effectively scale up nutrition, with a core focus on empowering women.

Malnutrition in Yemen: Developing an Urgent and Effective Response
Chatham House and UNICEF. (2011). Chatham House.
https://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Middle%20East/0211yemen_summary.pdf

This paper is a summary of discussions that took place during a workshop held at Chatham House in February 2011. The workshop aimed to ensure that food security and malnutrition are urgently incorporated as top priorities on the policy agendas of the Yemeni government and its international partners. Organised in partnership with UNICEF Yemen, the workshop brought together a key group of stakeholders concerned with malnutrition and food security including representatives from governments, donors, NGOs and international organisations, along with some external experts.

There are a number of political obstacles blocking the path to improved food security in Yemen, and consensus still needs to be built around the best plan of action. However all participants agreed that action was urgently needed, and the meeting's plenary session identified a number of key recommendations and specific initiatives that should be taken.

Interim Guidelines for Community-based Management of (Severe & Moderate) Acute Malnutrition - Version 1.0
Yemen Ministry of Public Health and Population Primary Health Care Sector Nutrition Department. (2013). UNICEF.
https://docs.google.com/file/d/0B69Edc4774R1dklsMnIyNG9naU0/edit?pli=1

These interim guidelines were produced in collaboration with government, academics and NGOs.

This document covers:

- The burden of acute malnutrition
- Principles of the Community-based Management of Acute Malnutrition (CMAM)
- CMAM in the Context of Yemen (Operational practices to date, policy framework, and community-based integrated services)
- Community outreach
- Management of Moderate Acute Malnutrition (MAM)
- Outpatient Care for the Management of Severe Acute Malnutrition (SAM) without Medical Complications in Children 6-59 months
- Inpatient Care for the Management of SAM with Medical Complications for Children 6-59 Months
- Inpatient Care for the Management of SAM in Older Age Groups
- Monitoring and Evaluation

8. Additional information

Author
This query response was prepared by **Laura Bolton**

Contributors
Kate Culver, Concern
Jessica Meeker, IDS
David Weakliam, Public Health Medicine HSE
Silke Pietzsch, Action Against Hunger
Andrew Hall, Save the Children
Sandra Bauer, MSF
Ros Tamming, Concern

programmes in education, health and nutrition. The HEART services are provided by a consortium of leading organisations in international development, health and education: Oxford Policy Management, CfBT, FHI360, HERA, the Institute of Development Studies, IPACT, the Liverpool School of Tropical Medicine and the Nuffield Centre for International Health and Development at the University of Leeds. HEART cannot be held responsible for errors or any consequences arising from the use of information contained in this report. Any views and opinions expressed do not necessarily reflect those of DFID, HEART or any other contributing organisation.