



CHAPTER 5

Addressing a Neglected Problem

Community-based Management of Acute Malnutrition

JUDITH HODGE AND JESSICA WHITE

SEVERE ACUTE MALNUTRITION (SAM)—extremely low weight for one’s height—is a life-threatening condition affecting mostly children under five years of age. It is caused by a combination of infection, such as diarrheal disease, and poor diets that are inadequate for nutritional needs.¹ SAM is one of the top three nutrition-related causes of death in children under five, according to the *Lancet* 2008 Maternal and Child Nutrition Series.² A child with SAM is 11 times more likely to die than a well-nourished child.³

Recent global estimates suggest that 52 million children suffer from moderate to severe malnutrition, and 17 million of those are estimated to be severely malnourished or wasted, based on national prevalence data (see [Box 5.1](#) for definitions).⁴ Africa is home to 5.6 million children with SAM, but the majority of all moderately (69 percent) and severely (71 percent) wasted children live in Asia: India alone has more than 8 million children with SAM—nearly half of the world’s wasted children.⁵ Moreover, current global estimates may well underestimate the actual annual burden, because they

may miss a sizable proportion of new cases of wasting occurring over time. Depending on the timing of the survey on which they are based, estimates may also miss seasonal peaks.⁶

Despite the size of the problem, until the early 2000s SAM appeared to be a so-called neglected condition: little support went to large-scale treatment programs targeted toward children with SAM. Few countries—even among those with a high prevalence of malnutrition—had a clear national policy for detecting and treating SAM children.⁷ The development and adoption of a new approach—the community-based management of acute malnutrition (CMAM)—was to change the public health nutrition landscape by bringing treatment out of hospitals and into the community.

Dramatic improvements in identifying, rehabilitating, and curing children with SAM have been made in recent years—and CMAM lies at the heart of this story. Although accurate coverage data on the proportion of SAM children receiving treatment are difficult to obtain, global treatment of SAM is estimated to have more than doubled from

1 million children in 2009 to more than 2 million in 2011.⁸ Moreover, policy formulation at the country level has progressed rapidly; by 2012, 95 percent of countries had national guidelines and protocols for acute malnutrition, with 60 countries implementing CMAM programs, and an additional seven countries in the planning stages.⁹ Still, although certain countries have made progress, coverage levels of treatment programs remain low. In the 2013 *Lancet* series, Bhutta et al.¹⁰ estimated that scaling up SAM management to 90 percent coverage through a package of key interventions could save 285,000–482,000 lives annually.

Birth of the CMAM Approach

Until the early 2000s, case-fatality rates for SAM in developing countries had remained unchanged for more than 50 years. About 20–30 percent of children with marasmus (wasting malnutrition) and up to 50–60 percent of children with kwashiorkor (malnutrition with edema) died.¹¹ Children were treated as inpatients in district hospitals or clinics, often based in towns far from where families lived. Treatment involved long stays of between five and eight weeks for both child and carer—difficult for mothers who had other children at home and

whose labor may have been vital to the household's economic survival.¹² These high costs of obtaining transport to treatment centers and being away from home for long periods were barriers to access to care, leading to low coverage.¹³ Admission for treatment was also limited by bed availability, with each center typically treating fewer than 30 cases at a time. Unsurprisingly these centers served only 4–10 percent of the affected population.¹⁴

Over the past 50 years, humanitarian agencies had been scaling up SAM treatment during emergencies (such as Ethiopia's famines in the mid-1970s and mid-1980s) with inpatient feeding centers to care for large numbers of children. While these centers reduced mortality rates among those treated to less than 10 percent, coverage rates were still low, and the infrastructure costs were not sustainable beyond the crisis situation.¹⁵ In addition, given that the majority of acutely malnourished children live outside of the emergency context, this inpatient model, while successful in improving recovery rates, failed to tackle SAM as a public health problem in the wider development context.

Emergencies—A Chance for Change

In the early 2000s, the relief agencies tried a radically new approach, working with national

BOX 5.1 What is acute malnutrition?

The World Health Organization (WHO) classifies acute malnutrition (also known as wasting) in children as severe or moderate, according to WHO growth standards¹⁶:

- » Severe acute malnutrition (SAM) is visible severe wasting—that is, very low weight-for-height—in children 6–60 months old. It may or may not occur with nutritional edema (a form of swelling caused by insufficient intake of certain nutrients). One way of measuring it is mid-upper-arm circumference (MUAC); a MUAC of less than 115 millimeters indicates SAM.¹⁷
- » Moderate acute malnutrition (MAM) is moderate wasting, indicated by a MUAC greater than or equal to 115 millimeters and less than 125 millimeters.¹⁸
- » Global acute malnutrition (GAM) is the combined prevalence of severe and moderate acute malnutrition in a population. A prevalence of 10–14 percent is classified as serious, and a rate of more than 15 percent is considered an emergency.



Panos/D. Telemans

Training community members to measure a child's mid-upper-arm circumference improves timely identification of children at risk of acute malnutrition.

governments in Ethiopia and Malawi to move treatment of SAM from inpatient hospitals and feeding centers into community-based programs in resource-poor settings.¹⁹ NGOs, donors, and governments, in collaboration with other relevant authorities, were willing to depart from existing protocols, often because of the urgency of the situation and the inadequacy of existing approaches.²⁰

The community-based approach, or CMAM, trained volunteers and mothers to detect SAM early by using plastic strips to measure children's mid-upper-arm circumference (MUAC). By actively finding cases and training community members to refer themselves, CMAM allowed for more timely presentation of cases at new, more decentralized outpatient clinics. More serious cases were referred to inpatient care (see [Box 5.2](#) for more detail on the

CMAM model). Evidence suggests that most children with SAM—more than 85 percent in most settings—can be treated as outpatients through CMAM programs.²¹ The other key innovation underpinning CMAM was the development of ready-to-use therapeutic foods (RUTFs) for use in treatment in the community (see [Box 5.3](#) for more information). As a result of this approach, people presented for treatment at a time when their condition was still treatable at home.

The outcomes for CMAM were impressive. The Sphere project, a joint project of the International Red Cross and Red Crescent Movement and other nongovernmental organizations, specifies internationally recognized standards for humanitarian responses related to food and nutrition. It calls for a recovery rate of more than 75 percent, a death

BOX 5.2 The CMAM model

The CMAM approach has three main components²²:

1. **Community outreach and mobilization:** Community members screen and actively find cases of children with SAM by measuring mid-upper-arm circumference (MUAC).
2. **Outpatient therapeutic program (OTP):** Children with SAM who have no medical complications are referred to an OTP. The program monitors the child's response to treatment and provides additional medical treatment as required before sending children home with enough ready-to-use therapeutic food to last until the following visit, allowing recovery to take place in the community.
3. **Inpatient care:** Children with SAM who have medical complications and/or poor appetite are referred for inpatient treatment at a health facility. These children are also linked to an OTP to allow them to be discharged and undergo continued treatment within the community when possible.

In some countries, there is a fourth CMAM component: supplementary feeding for children with moderate acute malnutrition (MAM). Children identified with MAM during community outreach and mobilization are referred to a supplementary feeding program where the family receives food rations.

rate of less than 5 percent, and a default rate of less than 15 percent (default occurs when a beneficiary is admitted to a program but leaves without being formally discharged).²³ Among 23,511 severely malnourished children treated from 2001 to 2005 in 21 community-based programs in Ethiopia, Malawi, and Sudan, death rates were 4.1 percent, recovery rates were 79.4 percent, and default rates were 11.0 percent. Moreover, 74 percent of these children were treated solely as outpatients.²⁴

Global Endorsement

In 2007, based on evidence from operational research, CMAM was officially endorsed by the United Nations and the World Health Organization.²⁵ Global endorsement paved the way for international agencies, donors, and governments to begin scaling up CMAM programming at the national level and to start viewing community-based management of SAM as integral to routine health activities.²⁶ While direct action by NGOs remains critical in a number of humanitarian contexts, a child suffering from SAM today is more likely to be treated by national health staff in a government health facility than by any other service provider.²⁷

The transition to a community-based approach continues to deliver success: a recent review found that the CMAM model performed consistently well in a variety of contexts, achieving high recovery rates (more than 90 percent) and low rates of death (less than 2 percent) and default (less than 10 percent).²⁸ Despite increased treatment in Africa south of the Sahara (which accounts for 80 percent of all children treated for SAM),²⁹ less than 15 percent of the global SAM population is currently receiving treatment.³⁰ Reducing the overall burden of wasting globally will require that key high-burden countries in South Asia—particularly India—commit to launching CMAM services at scale and that current and future CMAM programs strengthen their links with wider stunting-reduction efforts.³¹

A Story of Three Countries: CMAM in Ethiopia, Malawi, and Niger

In Ethiopia, Malawi, and Niger, it was the onset of a large-scale nutrition emergency—when programs identified large numbers of children with SAM—that provided an opportunity to introduce CMAM

pilots or to scale up existing ones. These three early adopters of the community-based approach have all achieved high geographic coverage of SAM treatment: in Malawi, an estimated 84 percent of health care facilities deliver SAM treatment; in Niger, 78 percent; and in Ethiopia, 75 percent.³² Each country has charted a different path to success, facing challenges in attempting to scale up while addressing issues of cost and capacity.³³

From Start-up to National Level: CMAM's Beginnings and Scale-up

Both Ethiopia and Niger have a long history of recurrent droughts and frequent food insecurity, but Malawi's food crisis of 2001/2002 took policy makers by surprise. The country had been considered food secure for a number of years and was even exporting agricultural products, such as beans and maize.³⁴ A sharp shortfall in the maize harvest in 2001/2002 led to widespread hunger and a food emergency. Initiated in response to the 2001 crisis, CMAM was driven from the start by champions within the Ministry of Health who had been convinced of its potential impact by NGOs and international experts.³⁵ Although NGOs played a major role in supporting CMAM scale-up in Malawi, it was the district health officers who demanded CMAM programs in their districts following a 2004 Ministry of Health workshop presenting successful results from two district pilots, including death rates of 1.7 percent.³⁶

Further impetus for expanded CMAM coverage in Malawi was provided by another food emergency in 2005. Rates of global acute malnutrition reached 6.2 percent in the country and surpassed 10 percent in four districts.³⁷ In 2006 the community-based model was adopted as a national strategy. Between 2004 and 2013, program performance rates exceeded the recommended Sphere standard of 75 percent of treated children recovered from acute malnutrition.³⁸ Today, Malawi has

achieved the highest level of CMAM scale-up of any country. Following a process of gradual scale-up and integration into the primary-health-care system, Malawi now has programs in all 28 districts and health facilities, 98 percent of hospitals provide inpatient care (100 of 102), and 82 percent of health centers act as OTPs (512 of 624).³⁹ This scale-up likely contributed to the dramatic declines in under-five mortality rates in Malawi, from 174 deaths per 1,000 live births in 2000 to 71 deaths per 1,000 live births in 2012.⁴⁰

In Ethiopia, CMAM programs started relatively slowly. They were first piloted in 2000 in two sites, but a drought and food crisis in 2002–2003



Panos/S. Torfinn

A child at a refugee camp in Kenya eats Plumpy'Nut, a nutritious peanut-based paste that has revolutionized care for acutely malnourished children.

served as a catalyst for scale-up. NGOs shifted from therapeutic feeding centers for treatment of SAM into community-based management of wasting.⁴¹ Initially, coverage was low, with a maximum number of 24,600 admissions in 44 inpatient units.⁴² Between 2004 and 2008, inpatient facilities and OTPs in Ethiopia were scaled up to 165 hospitals and health centers. Until 2008, there was a period of slow expansion when OTPs were established and ran parallel to the national health system rather than integrated, in contrast to Malawi, although both countries depended heavily on external resources and expertise.⁴³

In 2008, though, a sea change in Ethiopia's policy environment led to a period of rapid expansion. Another drought, compounded by increases in food prices, caused a spike in SAM cases. The Federal Ministry of Health decided to rapidly scale up CMAM, making it a key component of the country's National Nutrition Strategy and its Health Sector Development Plan, which guides investment in the health sector.⁴⁴ After 2008, the government, with support from development partners, extensively decentralized treatment services to trained health extension workers (frontline health workers) based in health posts to ensure wider access to, and coverage of, services to treat SAM.⁴⁵ In the four years between 2008 and 2011, the number of children treated for SAM rose 12-fold to 230,000. During 2013—a year of good harvest—a total of 267,500 children were admitted for therapeutic care (250,000 to OTPs and 17,500 to inpatient care). Results continually exceed Sphere standards, with a recovery rate of 86 percent reported for 2014. As of 2013, more than 10,000 facilities offered CMAM services.⁴⁶ This mass decentralization of treatment services may well have contributed to Ethiopia's dramatic decline in child mortality: between 2000 and 2012, mortality rates for children under five fell by more than half, from 146 to 68 deaths per 1,000 live births.⁴⁷

Niger, which ranked 187th out of 187 countries in the 2014 UN Human Development Index,⁴⁸ has been plagued for years by high levels of malnutrition due to drought, recurring food crises, poor feeding practices, and inadequate access to health services. In 2005, nutrition surveys showed that in several regions the prevalence of global acute malnutrition was above the emergency threshold of 15 percent, triggering a major emergency response by the government and the international community.⁴⁹ Before this, treatment of SAM had been restricted mainly to NGO programs outside of Ministry of Health facilities.⁵⁰ The 2005 emergency catalyzed the development of national CMAM guidelines by the government. The CMAM approach in Niger included treatment of children not only with SAM but also with MAM, in contrast to Ethiopia and Malawi, which used CMAM to treat SAM exclusively. Once the guidelines had been developed, many NGOs rapidly expanded community-based services, but the result was a patchwork of CMAM programs with varying degrees of quality and staff training.⁵¹ Government-run facilities continued to operate using the traditional approach, treating all cases as inpatients. However, the CMAM approach gained momentum in Niger following a government directive calling for all stakeholders involved in managing SAM to integrate their operations into the national health system and waiving health service fees for children under five and pregnant women.⁵² In 2011, the launch of the newly elected president's "3N" initiative (Nigériens Nourish Nigériens) heralded a new era for nutrition—and was a far cry from the days when aid agencies were expelled from the country for daring to admit the existence of a food crisis.⁵³

Niger has moved from a position of negligible nutrition programming in 2005, when the whole country had only one therapeutic feeding center, to treating 1 million children with acute

malnutrition—both SAM and MAM—in 2014.⁵⁴ In 2010, Niger was again faced with food insecurity following a poor 2009 rainy season, adding further impetus for scale-up. During this crisis, 330,000 children aged 6–59 months were treated for SAM (with a further 257,000 treated for MAM). By 2011, inpatient care for SAM was available in all 50 national, regional, and district hospitals, 772 of the 850 integrated health centers offered OTP services, and both inpatient and OTP treatment exceeded the minimum Sphere standard for recovery.⁵⁵ These centers also offer treatment for children with MAM with a range of products, including traditional fortified blended flour. Although the country's under-five mortality rate halved from 227 to 114 deaths per 1,000 live births between 2000 and 2012,⁵⁶ and significant progress has been made in Niger's ability to treat acutely malnourished children, prevalence of acute malnutrition remains high.

Success Factors and Challenges to Sustainability

In all three countries, increased political commitment to tackling malnutrition has galvanized adoption of the CMAM model. For both Malawi and Niger, this commitment is linked to initiatives at the very top level. In Malawi, the Office of the President/Cabinet assumed responsibility for coordinating nutrition in 2005, and in Niger, the Prime Minister's Office took over leadership of emergency nutrition response in 2011, although the Ministry of Health retains responsibility for managing acute malnutrition (both SAM and MAM). In Ethiopia, the government ensured that nutrition became a cross-cutting issue with its multisectoral approach and National Nutrition Strategy (2008), in which CMAM was embedded. It was, however, Ethiopia's push to decentralize treatment services to health extension workers at the community level that facilitated the rapid scale-up of the community-based approach to SAM.⁵⁷

Ministry of Health Support

In Malawi, the push to scale up came from advocates of CMAM within the Ministry of Health from the outset, whereas in Ethiopia and Niger adoption by the health ministries was more gradual. In Niger, the Ministry of Health has taken the lead in managing the expansion of CMAM through the work of its Nutrition Directorate, with NGOs supporting the program in terms of surge capacity and quality assurance.⁵⁸ All three countries have benefited from dedicated services underpinning CMAM delivery, though this is most developed in Malawi, whose CMAM Advisory Service provides advice on scale-up, integration, and quality service delivery. NGOs have played a crucial role by offering technical support and helping expand CMAM services, but the extent of their combined coverage is unlikely to ever match that of a government health service—even an underresourced one—over time.⁵⁹

Yet only Malawi's government has committed to take over the financing of the CMAM program by developing a costed CMAM operational plan for integrating the approach into Ministry of Health services—a stand-out success compared with other countries.⁶⁰ Niger's Ministry of Health has yet to integrate nutrition into its annual planning or budgeting, leaving NGOs to fund doctors and nurses who work in the field, and UNICEF picks up the bill for 80 percent of RUTFs.⁶¹ Like many other countries, Ethiopia has relied on short-term funding from donors in “non-emergency” periods. As a result, it has scaled up CMAM and integrated it into the national health system without a central plan.⁶² Costed plans like Malawi's are particularly important because treatment of SAM is often relegated to emergency budgets rather than being seen as part of routine health care.

Reducing CMAM Costs

Local production of RUTF is one way governments can reduce the cost of CMAM programs, although

there are caveats to this approach (see [Box 5.3](#) on RUTF). Both Malawi and Ethiopia have established facilities to produce therapeutic food locally in conjunction with NGOs. Two companies in Malawi produce RUTF locally and even supply Zambia's CMAM program.⁶³ Ethiopia produces less, and it also faces challenges related to its lack of logistical capacity to store and transport large quantities of RUTF and difficulties forecasting the need for therapeutic food. During the 2009 food emergency, stock-outs were a serious problem, with a wait of up to eight weeks for supplies from France.⁶⁴ Niger has established in-country RUTF production, but the Ministry of Health reports that a key threat to the sustainability of the program is the difficulty of sustaining adequate supplies of expensive therapeutic products.⁶⁵

Weak Health Systems

All three countries face challenges in supervising and monitoring CMAM treatment because of their generally weak health systems. This weakness is especially pronounced in the community component, where outreach to identify those most at risk of malnutrition remains limited, particularly in Niger. Unlike Ethiopia, Malawi and Niger rely on a network of volunteers that is often undermined by retention problems. CMAM programs struggle to maintain high-quality care in all treatment centers; in Niger, the decentralization of services is hindered by the limited capacity of the health system at the health-post level.⁶⁶ Even with Ethiopia's measures to extend its health services, NGOs have raised concerns about supervision structures; monitoring has revealed quality issues and a need to give health extension workers more training to ensure that they are fully competent with CMAM protocols.⁶⁷ However, better use of data from monthly CMAM reporting at both the district and federal level in

Ethiopia enabled organizations to detect an increasing trend in CMAM admissions and to distribute CMAM supplies to the most affected areas during the 2010/2011 emergency in a timely response.⁶⁸

Lessons Learned and Looking Forward

The move from centralized, inpatient care for SAM to a community-based model was arguably one of the most important paradigm shifts in public health nutrition within the past decade.⁶⁹ Countries such as Ethiopia, Malawi, and Niger that have adopted the CMAM approach have all relied on political will to enable scale-up. Engaging the ministries of health in these countries was critical to success, particularly in the handover from NGO-run pilots to national programs, and so was the recognition that SAM is a broad problem outside of emergencies that needs to be built into health and nutrition plans. But until governments are able to incorporate the cost of the program into their health budgets, CMAM sustainability remains vulnerable to changes in donor priorities. To date, Malawi is the only case study country to address this. In countries with high caseloads like Ethiopia and Niger, this goal may remain out of reach until the incidence of wasting declines countrywide.

Progress on reducing wasting depends not only on scaling up interventions to treat SAM, but also on the strength and effectiveness of prevention strategies, such as promotion of improved infant and young child feeding, promotion of good hygiene and sanitation, and better social protection policies and programs (for more information on these interventions, see Chapters 3, 7, and 8). Looking forward, one priority is to better integrate activities for preventing wasting with treatment of MAM, particularly through incorporating MAM treatment within the community-based approach.

BOX 5.3 Ready-to-use therapeutic foods: The Plumpy’Nut debate

Ready-to-use therapeutic foods (RUTFs) are energy-dense, micronutrient-enhanced pastes made from peanuts, milk powder, oil, sugar, and vitamin and mineral supplements. Developed for therapeutic feeding of children suffering from SAM, RUTFs contain the necessary nutrients for recovery, have a long shelf-life, are safe to use without refrigeration (there is limited risk of bacterial growth since the product is oil-based with low water activity), and can be used in combination with breastfeeding and other appropriate infant and child feeding practices.⁷⁰ By providing a therapeutic food that is safe to use in outpatient settings, RUTFs revolutionized the treatment of SAM, but their production and use are also subject to controversy.⁷¹

Before the development of RUTFs, children with SAM were admitted to inpatient facilities and treated with a strict regimen of specialized therapeutic milk. However, it was difficult for children in areas with limited health infrastructure—often in the most marginalized populations—to reach these treatment facilities and remain there for the entire treatment period, which was often several weeks. When RUTFs were adopted for treating SAM, outpatient care expanded and coverage of CMAM increased dramatically: in 2011, about 1.96 million SAM children (10 percent of the estimated 20 million suffering globally) were treated with RUTFs.⁷²

The predominant RUTF product, Plumpy’Nut, was invented by scientist André Briend and is produced by the France-based company Nutriset. Until 2002, Nutriset was the only producer of Plumpy’Nut, at a cost of approximately US\$3,500 per ton, not including the cost of transporting the product from Europe.⁷³ The high cost of Plumpy’Nut—which accounts for about half of all CMAM costs—resulted in a push for local production, not only to reduce costs but also to contribute to the local economy. But this move has been challenging. So far, Nutriset has patented Plumpy’Nut in about 35 countries, where local producers must essentially operate as local franchises for the French company. The development community has argued that these patents keep the cost of production prohibitively high. Nutriset claims that the patents protect the quality of the product and the interests of local producers because if more advanced economies were to produce RUTFs, they risk flooding the market and pushing local producers out of business.⁷⁴

Moreover, producing RUTFs locally is not always cheaper than purchasing imports. In addition to facing patent difficulties, local producers can find it hard to source ingredients. Milk powder is expensive and often not locally available; for local producers in Malawi, for example, imported milk powder represents more than half of the cost of the product.⁷⁵ And peanuts can be contaminated with aflatoxin. In turn, the quality control procedures necessary to ensure a safe product can drive up the cost of production.⁷⁶

Despite these challenges, local production of RUTFs is increasing. In 2012, local production met 27 percent of need, and African-produced RUTFs represented 45 percent of the total RUTFs purchased by UNICEF, the world’s largest RUTF purchaser and distributor.⁷⁷ Nevertheless, the procurement of commercially or locally produced RUTFs is still almost exclusively financed by development agencies. In fact, in 73 percent of countries operating CMAM programs, UNICEF still provides 100 percent of the RUTFs. This overreliance on development partners raises questions about the sustainability of scaled-up support.⁷⁸

In addition to criticism surrounding the cost and production of RUTFs, there are also concerns about the use of RUTFs over traditional local foods. For example, India banned the import of Plumpy’Nut in 2009 over concerns that importing packaged foreign foods could result in dependence on a “product”—rather than locally available foods—for treatment. Alternative RUTF recipes produced from locally available foods could greatly reduce the cost of production and make local production, even

(Box 5.3 continued)

at a subnational level, more feasible.⁷⁹ Recent evidence has also found no discernable difference in treatment outcomes between RUTFs and local foods (in this instance, flour porridge).⁸⁰

Despite the ongoing controversy over production, cost, and appropriateness of RUTFs, the product has undeniably contributed immensely to the scaling up of CMAM and the treatment of millions of children worldwide.