



Screening at MSF ambulatory feeding centre (Crena) in Myria

# Management of moderate acute malnutrition with RUTF in Niger

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Between 2001 and 2005, the Médecins Sans Frontières (MSF) therapeutic feeding programme in Maradi, Niger offered treatment for severe acute malnutrition centred on the use of Ready to Use Therapeutic Food (RUTF) and the outpatient management of all uncomplicated cases. During the malnutrition crisis in 2005, the programme demonstrated its capacity to handle large numbers of patients while maintaining highly satisfactory results. Over 40,000 severely

malnourished children were treated in Maradi region alone, with a cure rate above 90%<sup>1</sup>.

The 2005 crisis in Niger has led to an increased understanding of the problem of malnutrition and how to extend treatment to large numbers of affected children. A national protocol favouring outpatient treatment with RUTF for severe acute malnutrition was adopted in July 2005. For the first time in 2006, the treatment of malnutrition was integrated into the national action plan against food insecurity. The government of Niger, United Nations (UN) agencies and international donors went forward with a plan to treat 500,000 acutely malnourished children during 2006. Nutritional surveillance was added to the early warning system, and Niger has reaffirmed its commitment to reduce child mortality rates as a public health priority. With assistance from the World Bank, the government has moved to implement free health care for children less than 5 years of age and for pregnant women.

The results obtained in 2005 with severe acute malnutrition suggested that the same strategy of outpatient management with RUTF would be of benefit for the treatment of acute malnutrition at earlier stages of presentation. Therefore

in 2006, MSF decided to extend the use of these new therapeutic products and operational strategies to the treatment of moderate acute malnutrition.

## The MSF Programme

In 2006, MSF operated 11 outpatient feeding centres attached to integrated health centres (Centres de Santé Intégrés), along with two inpatient referral feeding units, in two districts of Maradi region with an estimated population of 900,000 people<sup>2</sup>.

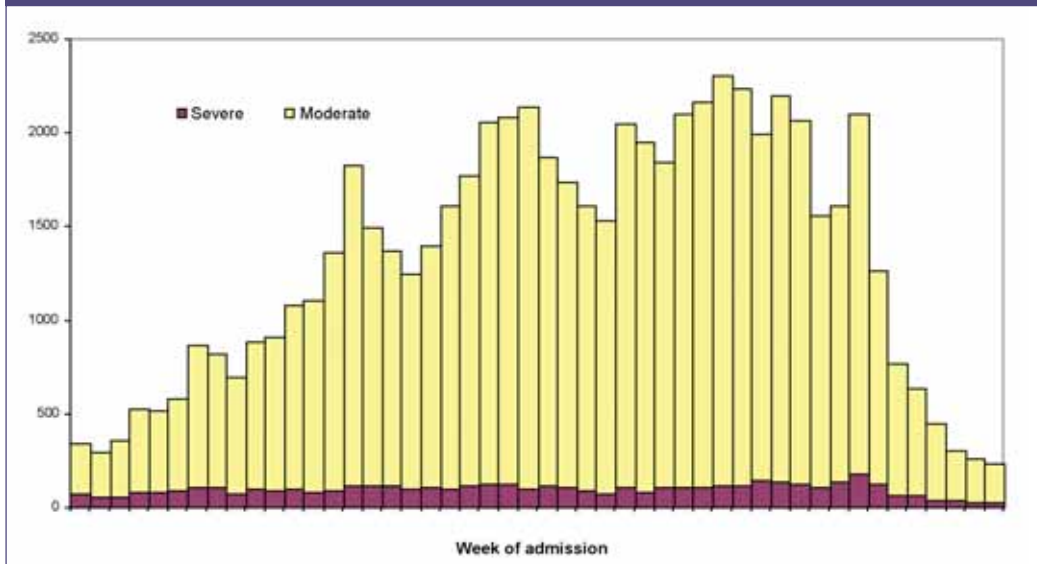
Moderately malnourished children were admitted to these units and treated with the same medical and dietary protocols used for severe acutely malnourished patients (with the exception of no systematic antibiotic treatment at admission). Within the programme, the distinction between moderate and severe acute malnutrition was abandoned in favour of a distinction between complicated and non-complicated acute malnutrition. Children were admitted according to standard criteria for acute

<sup>1</sup> Defourny I, Drouhin E, Terzian M, Tatay M, Sekkenes J, Tectonidis M. Scaling up the treatment of acute childhood malnutrition in Niger. *Field Exchange* 2006; 28: 2-4.

<sup>2</sup> Système National d'Information Sanitaire, Gouvernement de Niger. 2005.



**Figure 1** Weekly admissions of children, MSF therapeutic nutrition programme, Maradi region, Niger, 2006



**Table 1** Outcomes for acute moderate malnutrition cases

	Cure	Death	Default	Non-respondent	Transfer	Total
Non-complicated	49,517	50	1,729	60	5	51,361
	96.4%	0.1%	3.4%	0.1%	0.0%	
Complicated	7,514	182	278	335	28	8,337
	90.1%	2.2%	3.3%	4.0%	0.3%	
<b>Total</b>	<b>57,031</b>	<b>232</b>	<b>2,007</b>	<b>395</b>	<b>33</b>	<b>59,698</b>
	95.5%	0.4%	3.4%	0.7%	0.1%	

**Table 2** Average length of stay for malnourished children in a therapeutic feeding unit in Maradi, Niger, 2006

Length of Stay (days)	Mean	CI 95%
Moderate	31.4	[31.3; 31.6]
Severe	42.6	[41.8; 43.4]
<b>Total</b>	<b>32.1</b>	<b>[32.0; 32.3]</b>

**Table 3** Daily weight gain for malnourished children in a therapeutic feeding unit in Maradi, Niger, 2006

Weight Gain (g/kg/days)	Mean	CI 95%
Moderate	5.3	[5.25; 5.32]
Severe	8.0	[7.81; 8.23]
<b>Total</b>	<b>5.4</b>	<b>[5.40; 5.47]</b>

malnutrition: weight-for-height (W/H) ratio < 80% of the NCHS median, and/or mid-upper arm circumference (MUAC) < 110 mm and/or bilateral pitting oedema. Complicated acute malnutrition was defined as acute malnutrition accompanied by anorexia and/or severe pathology. Complicated cases were admitted to one of the two inpatient units for stabilisation. All non-complicated cases were admitted directly to weekly follow-up care in one of the 11 outpatient feeding units, and were referred to inpatient units only if they developed complications during the course of their treatment. As in 2005, Plumpy'nut® (1,000 kcal/day) was used as the RUTF offered to all outpatients. Although the protocol did not distinguish between severe and moderate malnutrition (using complicated and non-complicated acute malnutrition classifications instead), data were collected and are presented here in terms of moderate and severe, to facilitate analysis and for the sake of clarity.

An admitted child was considered cured after maintaining a W/H ratio > 80% (NCHS reference) on two consecutive visits. Upon discharge, patients were given an additional week of RUTF treatment as well as a 25-kg ration of fortified blended flour (Unimix) and 5 litres of cooking oil.

**Results**

Results were analysed by using individual-based data from MSF programme monitoring, by means of a database comprised of information from individual treatment cards. A total of 64,733 children were admitted for acute malnutrition in the MSF nutritional programme in 2006 (Figure 1). Of these, 92.5% (59,880) were children with moderate malnutrition, and 7.5% (4,853) were children with severe malnutrition. Of the children admitted, 93.1% were less than 36 months of age, a trend consistent with past years. Readmission rates were 8.9% for moderate and 4.2% for severe cases. Of the children, 89.6% of moderate and 58.2% of severe cases were admitted directly into outpatient care. A total of 10,651 children (8,389 moderate and 2,262 severe) spent at least part of their treatment in an inpatient centre.

Analysis of results for 59,698 moderate malnourished children showed a cure rate of 95.5%, death rate of 0.4%, and default rate of 3.4% (Table 1).

Average length of stay was 31.4 days (Table 2), and average daily weight gain was 5.28g/kg body weight/day (Table 3). Approximately 75% of children had a W/H ratio > 85% of the NCHS reference median on discharge.

For the 4,796 severe cases discharged, the cure rate was 81.3%, death rate 3.0%, and default rate 10.3%. Average length of stay was 42.6 days, and average daily weight gain 8 g/kg body weight/day.

**Discussion**

In the past few years, thanks to the introduction of RUTF and the deployment of outpatient strategies, significant progress has been made in the treatment of severe acute malnutrition. However, the standard treatment of moderate acute malnutrition with fortified blended flours has continued to show disappointing results<sup>3</sup>. This failure is problematic because, although severe malnutrition has a higher relative risk of mortality, the much larger numbers of moderate malnutrition means that the population-attributable risk of malnutrition to mortality is much higher in this group<sup>4</sup>. As stated in Yip and Scanlon more than 10 years ago, "there is no question the most severely malnourished children suffer the most, but they may not be contributing to most of the suffering"<sup>5</sup>. Furthermore, although the treatment of severe malnutrition is improving, it is still more difficult to treat than moderate malnutrition. Treating malnutrition earlier is more effective, less risky to the patient and less costly.

The results obtained by MSF in Maradi confirm the efficacy of RUTF in the treatment of moderate acute malnutrition. Weight gains recorded were considerably higher than those obtained in classic supplementary feeding programmes (SFPs) using fortified blended flours. Default rates were also atypically low compared with standard SFPs. Combined with the large numbers of affected children recruited, this outcome suggests that parents are convinced of the superior effectiveness of RUTF in the treatment of acute malnutrition. Once again, as in previous years in MSF feeding programmes in Niger, tens of thousands of mothers were given the role of the prime therapeutic caregiver for their malnourished children.

Moreover, despite the continuous expansion, and therefore better coverage, of services for the severe acutely malnourished in Maradi since 2002, for the first time since the programme was opened in 2001, no detectable peak in numbers admitted during the hunger gap period was observed (Figure 1). Admissions of severe cases remained stable and at unusually low levels throughout the year. This finding strongly suggests that the management of the large numbers of moderate acutely malnourished with RUTF successfully prevented the development of severe acute malnutrition in the covered population.

In the countrywide nutritional survey conducted in November 2006 by the government of Niger, UNICEF and the World Food Programme, the prevalence of global acute malnutrition (GAM) in Maradi stood at 6.8%, with 0.6% severe acute malnutrition (SAM), compared with the national averages of 10.3% and 1.4%, respectively. For the first time, the Maradi region, which previously had amongst the highest rates of severe and global acute

<sup>3</sup> Navarro-Colorado C. A retrospective study of emergency supplementary feeding programmes. ENN/SC UK, 2007.

<sup>4</sup> Pelletier DL. The relationship between child anthropometry and mortality in developing countries: implications for policy, programs and future research. J Nutr 1994; 124: 2047S-2081S.

<sup>5</sup> Yip R, Scanlon K. The burden of malnutrition: a population perspective. J Nutr 1994; 124: 2043S-2046S.

malnutrition in the country, had become at the end of 2006, the region with the lowest rates of acute malnutrition. The results of the nutritional survey, and the lack of increase in severe malnutrition during the hunger gap, provide strong evidence for a major impact on the nutritional status of young children in Maradi subsequent to the widespread use of RUTF.

The nutritional crisis in Niger in 2006 was notable for the unprecedented numbers of young children treated for severe acute malnutrition. The nutritional situation in 2006 was not of the same magnitude, but it is clear that the numbers of children affected by acute malnutrition even in a 'good' year is extremely high. For example, 26,000 children less than 3 years old from the Guidam Roudji district of Maradi were admitted for acute malnutrition in the MSF programme in 2006. This number represented well over half the estimated 43,500 children of that age believed to be living in this one district of Maradi.

Despite the success of the MSF programme in 2006, the individual therapeutic treatment of tens of thousands of children requires significant resources and would clearly be a daunting task for an already overstretched, understaffed and underfunded health care system in one of the poorest countries of the world. With such large numbers of young children affected by acute malnutrition in rural areas of Niger each year, it would make sense to go one step further and consider effective preven-

tive alternatives. In May 2007, MSF began implementing a new programme targeting all children younger than 36 months with a new ready-to-use nutritional supplement designed to prevent malnutrition. This supplement is being delivered through monthly distributions rather than through therapeutic feeding units. The hope is that this strategy will significantly reduce the incidence of acute malnutrition amongst the young children of the rural poor in Maradi.

### Conclusion

Results obtained by MSF in Maradi in 2006 prove that RUTF is an effective treatment for moderate acute malnutrition. The large numbers treated and the low numbers of defaulters are indicative of the strong participation and adherence of the mothers and families of these children. The treatment of acute malnutrition at an earlier stage reduced admissions for severe acute malnutrition and eliminated the usual rise in severe cases during the hunger gap period.

Considering the well-documented association of acute malnutrition with child mortality, it is highly likely that the effective treatment of acute malnutrition, or its effective prevention, using newly developed nutrient-dense RUTF, will have a major impact on mortality of young children amongst the poorest populations of the world.

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## Field testing LQAS to assess acute malnutrition prevalence

### Summary of published research<sup>1</sup>

In emergency settings, the prevalence of global acute malnutrition (GAM) needs to be assessed quickly, accurately and often repeatedly, to determine when and where to start and stop humanitarian aid. The most common approach for assessing GAM is a two-stage 30 x 30 cluster survey – which can be time-consuming and expensive. Alternative, less time-consuming and resource-intensive approaches are needed. One of the most frequently used quality control statistical methods in international health is Lots Quality Assurance Sampling (LQAS). Cumulative binomial probabilities are used in LQAS analyses to detect if a critical threshold has been reached for an indicator. To design an LQA sampling plan, the threshold of interest for an indicator, e.g. GAM prevalence, and tolerable statistical error are defined a priori.

A recently published article examines three adaptations of LQAS to assess GAM and other child-level indicators in food-insecure settings.

Computer simulations confirmed that small clusters instead of a simple random sample could be used for LQAS assessments of GAM. Three LQAS designs were developed (33 x 6, 67 x 3, sequential design)<sup>2,3</sup>, to assess GAM thresholds of 10, 15 and 20%. The designs were field-tested simultaneously with a 30 x 30 cluster-survey in Siraro, Ethiopia during June 2003. Using a nested study design, anthropometric, morbidity and vaccination data were collected on all children 6-59 months in sampled households. Hypothesis tests about GAM thresholds were conducted for each LQAS design. Point estimates were obtained for the 30 x 30 cluster-survey and the 33 x 6 and 67 x 3 LQAS designs. In order to collect data for the study, 15 interviewers were hired and trained. Teams used an odometer to record the distance travelled from the base camp to the first cluster for each work-day and used a stopwatch to record the time required to complete each survey.

Hypothesis tests showed GAM as < 10% for the 33 x 6 design and GAM as > or = 10% for the 67 x 3 and sequential designs. Point estimates for the 33 x 6 and 67 x 3 designs were similar to those of the 30 x 30 cluster-survey for GAM (6.7%, Confidence Interval (CI) = 3.2-10.2%; 8.2%, CI = 4.3-12.1%, 7.4%, CI = 4.8-9.9%, respectively) and all other indicators. The CIs for the LQAS designs were only slightly wider than the CIs for the 30 x 30 cluster-survey, yet the LQAS designs required substantially less time to administer.

The study concluded that the LQAS designs provide statistically appropriate alternatives to the more time-consuming 30 x 30 cluster-survey. However, additional field-testing is needed using independent samples rather than a nested study design, which was the most critical limitation of the study. Ideally, data for each design should be sampled independently to allow for stricter comparison of results between designs.

Despite this limitation, the authors concluded that LQAS designs can contribute to the methodological toolkit of humanitarian agencies.

<sup>1</sup> Deitchler M et al (2007). A field test of three LQAS designs to assess the prevalence of acute malnutrition. *Int J. Epidemiology*. Advance access published May 21st, 2007, pp 1-7. The article is available free from <http://ije.oxfordjournals.org/cgi/content/abstract/dym092v1>

<sup>2</sup> Thirty-three clusters with six children in each, sixty seven clusters with three children in each, etc.

<sup>3</sup> A Retrospective Study of Emergency Supplementary Feeding Programmes. Dr Carlos Navarro-Colarado. June 2007. ENN and SC UK. Available at <http://www.ennonline.net/research/>



MUAC measurement of a child in a camp for displaced Chadians, Koukou, Tchad



Mother and child in Dakoro, Niger, where MSF focused on the problem of acute seasonal malnutrition

Valerie Babize/MSF, Tchad, 2007

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