COMMUNITY-BASED MANAGEMENT OF SEVERE ACUTE MALNUTRITION

A Joint Statement by the World Health Organization, the World Food Programme, the United Nations System Standing Committee on Nutrition and the United Nations Children's Fund

Severe acute malnutrition 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. New evidence suggests, however, that large numbers of children with severe acute malnutrition can 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 severe acute malnutrition 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 and implemented on a large scale, community-based management of severe acute malnutrition could prevent the deaths of hundreds of thousands of children.

Nearly 20 million children under five suffer from severe acute malnutrition

Severe acute malnutrition is defined by a very low weight for height (below -3 z scores[1] of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional oedema. In children aged 6–59 months, an arm circumference less than 110 mm is also indicative of severe acute malnutrition. Globally, it is estimated that there are nearly 20 million children who are severely acutely malnourished.[2] Most of them live in south Asia and in sub-Saharan Africa.

Severe acute malnutrition contributes to 1 million child deaths every year

Using existing studies of case fatality rates in several countries, WHO has extrapolated mortality rates of children suffering from severe acute malnutrition. The mortality rates listed in the table at right reflect a 5–20 times higher risk of death compared to well-nourished children. Severe acute malnutrition can be a direct cause of child death, or it can act as an indirect cause by dramatically increasing the case fatality rate in children suffering from such common childhood illnesses as diarrhoea and pneumonia. Current estimates suggest that about 1 million children die every year from severe acute malnutrition.[3]

The large burden of child mortality due to severe acute malnutrition remains largely absent from the international health agenda, and few countries, even in high prevalence areas, have specific national policies aimed at addressing it comprehensively. With the addition of community-based management to the existing facility-based approach, much more can now be done to address this important cause of child mortality.

Severe acute malnutrition in children can be identified in the community before the onset of complications

Community health workers or volunteers can easily identify the children affected by severe acute malnutrition using simple coloured plastic

Mortality of children with severe acute malnutrition observed in longitudinal studies

Country	Mortality rate
Congo, Democratic Republic of the	21%
Bangladesh	20%
Senegal	20%
Uganda	12%
Yemen	10%

Note: For studies of less than 12 months, rate was adjusted for duration of follow-up.

Sources: *Congo, Democratic Republic of the*: Van Den Broeck, J., R. Eeckels and J. Vuylsteke, 'Influence of nutritional status on child mortality in rural Zaire', *The Lancet*, vol. 341, no. 8859, 12 June 1993, pp. 1491–1495; *Bangladesh*: Briend, A., B. Wojtyniak and M.G. Rowland, 'Arm circumference and other factors in children at high risk of death in rural Bangladesh', *The Lancet*, vol. 2, no. 8561, 1987, pp. 725–728; *Senegal*: Garenne, Michel, et al., 'Risques de décès associés à différents états nutritionnels chez l'enfant d'âge pré scolaire', Etude réalisée à Niakhar (Sénégal), 1983-1983, Paris: CEPED, 2000; *Uganda*: Vella, V., et al., 'Determinants of child nutrition and mortality in north-west Uganda', *Bulletin of the World Health Organization*, vol. 70, no. 5, 17 September 1992, pp. 637–643; *Yemen*: Bagenholm, G.C., and A.A. Nasher, 'Mortality among children in rural areas of the People's Democratic Republic of Yemen', *Annals of Tropical Paediatrics*, vol. 9, no. 2, June 1989, pp. 75–81.

[1] A 'z score' is the number of standard deviations below or above the reference mean or median value.

[2,3] WHO is currently estimating the global number of children suffering from severe acute malnutrition and the number of deaths associated with the condition.

strips that are designed to measure mid-upper arm circumference (MUAC). In children aged 6–59 months, a MUAC less than 110 mm indicates severe acute malnutrition, which requires urgent treatment. Community health workers can also be trained to recognize nutritional oedema of the feet, another sign of this condition.

Once children are identified as suffering from severe acute malnutrition, they need to be seen by a health worker who has the skills to fully assess them following the Integrated Management of Childhood Illness (IMCI) approach. The health worker should then determine whether they can be treated in the community with regular visits to the health centre, or whether referral to in-patient care is required. Early detection, coupled with decentralized treatment, makes it possible to start management of severe acute malnutrition before the onset of life-threatening complications.

Uncomplicated forms of severe acute malnutrition should be treated in the community

In many poor countries, the majority of children who have severe acute malnutrition are never brought to health facilities. In these cases, only an approach with a strong community component can provide them with the appropriate care. Evidence shows that about 80 per cent of children with severe acute malnutrition who have been identified through active case finding, or through sensitizing and mobilizing communities to access decentralized services themselves, can be treated at home.

The treatment is to feed children a ready-to-use therapeutic food (RUTF) until they have gained adequate weight. In some settings it may be possible to construct an appropriate therapeutic diet using locally available nutrient-dense foods with added micronutrient supplements. However, this approach requires very careful monitoring because nutrient adequacy is hard to achieve.

In addition to the provision of RUTF, children need to receive a short course of basic oral medication to treat infections. Follow-up, including the provision of the next supply of RUTF, should be done weekly or every two weeks by a skilled health worker in a nearby clinic or in the community.

Community-based management of severe acute malnutrition can have a major public health impact

With modern treatment regimens and improved access to treatment, case-fatality rates can be as low as 5 per cent, both in the community and in health-care facilities. Community-based management of severe acute malnutrition was introduced in emergency situations. It resulted in a dramatic increase of the programme coverage and, consequently, of the number of children who were treated successfully – yielding a low case-fatality rate. The same approach can be used in non-emergency situations with a high prevalence of severe acute malnutrition, preventing hundreds of thousands of child deaths when applied at scale.

Ready-to-use therapeutic foods

Children with severe acute malnutrition need safe, palatable foods with a high energy content and adequate amounts of vitamins and minerals. RUTF

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are soft or crushable foods that can be consumed easily by children from the age of six months without adding water. RUTF have a similar nutrient composition to F100, which is the therapeutic diet used in hospital settings. But unlike F100, RUTF are not water-based, meaning that bacteria cannot grow in them. Therefore these foods can be used safely at home without refrigeration and even in areas where hygiene conditions are not optimal.

When there are no medical complications, a malnourished child with appetite, if aged six months or more, can be given a standard dose of RUTF adjusted to their weight. Guided by appetite, children may consume the food at home, with minimal supervision, directly from a container, at any time of the day or night. Because RUTF do not contain water, children should also be offered safe drinking water to drink at will.

The technology to produce RUTF is simple and can be transferred to any country with minimal industrial infrastructure. RUTF cost about US$3 per kilogram when locally produced. A child being treated for severe acute malnutrition will need 10–15 kg of RUTF, given over a period of six to eight weeks.

Community-based management of severe acute malnutrition in the context of high HIV prevalence

The majority of HIV-positive children suffering from severe acute malnutrition will benefit from community-based treatment with RUTF. However, experience shows that rates of weight gain and recovery are lower among these children than among those who are HIV-negative, and their case-fatality rate is higher. The lower weight gain is probably related to a higher incidence of infections in children who are HIV-positive.

Given the overlap in presentation of severe acute malnutrition and HIV infection and AIDS in children, especially in poor areas, strong links between community-based management of severe acute malnutrition and AIDS programmes are essential. Voluntary counselling and testing should be available for children with severe acute malnutrition and for their mothers. If diagnosed as HIV-positive, they should qualify for cotrimoxazole prophylaxis to prevent the risk of contracting *Pneumocystis* pneumonia and other infections, and for antiretroviral therapy when indicated. At the same time, children who are known to be HIV-positive and who develop severe acute malnutrition should have access to therapeutic feeding to improve their nutritional status.

Ending severe acute malnutrition

Prevention first…

Investing in prevention is critical. Preventive interventions can include: improving access to high-quality foods and to health care; improving nutrition and health knowledge and practices; effectively promoting exclusive breastfeeding for the first six months of a child's life where appropriate; promoting improved complementary feeding practices for all children aged 6–24 months — with a focus on ensuring access to age-appropriate complementary foods (where possible using locally available foods); and improving water and sanitation systems and hygiene practices to protect children against communicable diseases.

…but treatment is urgently needed for those who are malnourished

Severe acute malnutrition occurs mainly in families that have limited access to nutritious food and are living in unhygienic conditions, which increase the risk of repeated infections. Thus, preventive programmes have an immense job to do in the

context of poverty, and in the meantime children who already are suffering from severe acute malnutrition need treatment.

In May 2002, the Fifty-Fifth World Health Assembly endorsed the Global Strategy for Infant and Young Child Feeding, which recommends actively searching for malnourished infants and young children so they can be identified and treated. The development of the community-based approach for the management of severe acute malnutrition should provide a new impetus for putting this recommendation into practice. It is urgent, therefore, that this approach, along with preventive action, be added to the list of cost-effective interventions to reduce child mortality.

What countries can do

Countries can save children's lives by:

1. Adopting and promoting national policies and programmes that:
   - Ensure that national protocols for the management of severe acute malnutrition (based, if necessary, on the provision of RUTF) have a strong community-based component that complements facility-based activities.
   - Achieve high coverage of interventions aimed at identifying and treating children in all parts of the country and at all times of the year through effective community mobilization and active case finding.
   - Provide training and support for community health workers to identify children with severe acute malnutrition who need urgent treatment and to recognize those children with associated complications who need urgent referral.
   - Establish adequate referral arrangements for children suffering from complicated forms of severe acute malnutrition so they can receive adequate inpatient treatment.
   - Provide training for improved management of severe acute malnutrition at all levels, involving an integrated approach that includes community- and facility-based components.
2. Providing the resources needed for management of severe acute malnutrition, including:
   - Making RUTF available to families of children with severe acute malnutrition through a network of community health workers or community-level health facilities, preferably by encouraging the local food industry to produce RUTF in settings where families do not have access to appropriate local foods.
   - Ensuring funding to provide free treatment of severe acute malnutrition because affected families are often among the poorest.
3. Integrating the management of severe acute malnutrition with other health activities, such as:
   - Preventive nutrition initiatives, including promotion of breastfeeding and appropriate complementary feeding, and provision of relevant information, education and communication (IEC) materials.
   - Activities related to the Integrated Management of Childhood Illness at first-level health facilities and at the referral level, and initiating such activities where they do not exist.

WHO, WFP, SCN, UNICEF and other partners will support these actions by:

- Mobilizing resources to support implementation of these recommendations.
- Facilitating the local production or procurement of RUTF for countries with a high prevalence of severe acute malnutrition in communities where access to nutrient-dense foods is limited.
- Supporting the development and evaluation of nutrition rehabilitation protocols based on local foods in countries where poor families have access to nutrient-dense foods.
- Working with governments and the private sector, including non-governmental organizations, to rapidly disseminate these recommendations and build capacity for their implementation.
- Conducting operations research to refine protocols of community-based management of severe acute malnutrition.
- Jointly implementing expanded community-based programmes to combat severe acute malnutrition in major humanitarian emergency situations.

Technical annex

Ready-to-use therapeutic foods

Ready-to-use therapeutic foods (RUTF) are high-energy, fortified, ready-to-eat foods suitable for the treatment of children with severe acute malnutrition. These foods should be soft or crushable and should be easy for young children to eat without any preparation. At least half of the proteins contained in the foods should come from milk products.

Nutritional composition

Moisture content	2.5% maximum
Energy	520–550 Kcal/100 g
Proteins	10%–12% total energy
Lipids	45%–60% total energy
Sodium	290 mg/100 g maximum
Potassium	1,110–1,400 mg/100 g
Calcium	300–600 mg/100 g
Phosphorus (excluding phytate)	300–600 mg/100 g
Magnesium	80–140 mg/100 g
Iron	10–14 mg/100 g
Zinc	11–14 mg/100 g
Copper	1.4–1.8 mg/100 g
Selenium	20–40 µg
Iodine	70–140 µg/100 g
Vitamin A	0.8–1.1 mg/100 g
Vitamin D	15–20 µg/100 g
Vitamin E	20 mg/100 g minimum
Vitamin K	15–30 µg/100 g
Vitamin B1	0.5 mg/100 g minimum
Vitamin B2	1.6 mg/100 g minimum
Vitamin C	50 mg/100 g minimum
Vitamin B6	0.6 mg/100 g minimum
Vitamin B12	1.6 µg/100 g minimum
Folic acid	200 µg/100 g minimum
Niacin	5 mg/100 g minimum
Pantothenic acid	3 mg/100 g minimum
Biotin	60 µg/100 g minimum
n-6 fatty acids	3%–10% of total energy
n-3 fatty acids	0.3%–2.5% of total energy

Note: Although RUTF contain iron, F100 does not. The composition of F100 can be found in *Management of Severe Malnutrition: A manual for physicians and other senior health workers*, World Health Organization, Geneva, 1999 (available online at <http://www.who.int/nutrition/publications/en/manage_severe_malnutrition_eng.pdf>).

Safety: The food should be free from objectionable matter. It must not contain any substance originating from microorganisms or any other poisonous or deleterious substances, including anti-nutritional factors, heavy metals or pesticides in amounts that may represent a hazard to health.

Maximum toxin levels

Aflatoxin level	5 ppb maximum
Microorganism content	10,000/g maximum
Coliform test	negative in 1 g
Clostridium perfringens	negative in 1 g
Yeast	maximum 10 in 1 g
Moulds	maximum 50 in 1 g
Pathogenic Staphylococci	negative in 1 g
Salmonella	negative in 125 g
Listeria	negative in 25 g

The product should comply with the Recommended International Code of Hygienic Practice for Foods for Infants and Children of the Codex Alimentarius Standard CAC/RCP 21-1979 (available at <http://www.codexalimentarius.net/download/standards/297/CXP_021e.pdf>). All added mineral salts and vitamins should be on the Advisory List of Mineral Salts and Vitamin Compounds for Use in Foods for Infants and Children of the Codex Alimentarius Standard CAC/GL 10-1979 (available at <http://www.codexalimentarius.net/download/standards/300/CXG_010e.pdf>).

The added minerals should be water-soluble and should not form insoluble components when mixed together. The food should have a mineral composition that will not alter the acid base metabolism of children with severe acute malnutrition. In particular, it should have a moderate positive non-metabolizable base sufficient to eliminate the risk of metabolic acidosis. The non-metabolizable base can be approximated by the formula: estimated absorbed millimoles (sodium + potassium + calcium + magnesium) - (phosphorus + chloride). The mineral mix recommended for F100 by WHO is an example of a mineral mix with a suitable positive non-metabolizable base.

Information on producing RUTF locally is available at <http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/CBSM/tbp_4.pdf>.

References

Ciliberto, Michael A., et al., 'Comparison of home-based therapy with ready-to-use therapeutic food with standard therapy in the treatment of malnourished Malawian children: A controlled, clinical effectiveness trial', *The American Journal of Clinical Nutrition*, vol. 81, no. 4, 2005, pp. 864–870.

Collins, Steve, 'Changing the way we address severe malnutrition during famine', *The Lancet*, vol. 358, 11 August 2001, pp. 498–501.

Collins, Steve, and Kate Sadler, 'Outpatient care for severely malnourished children in emergency relief programmes: A retrospective cohort study', *The Lancet*, vol. 360, 7 December 2002, pp. 1824–1830.

Collins, Steve, et al., 'Management of severe acute malnutrition in children', *The Lancet*, vol. 368, no. 9551, 2 December 2006, pp. 1992–2000.

Diop, El Hadji Issakha, et al., 'Comparison of the efficacy of a solid ready-to-use food and a liquid, milk-based diet for the rehabilitation of severely malnourished children: A randomized trial', *The American Journal of Clinical Nutrition*, vol. 78, no. 2, August 2003, pp. 302–307.

Gross, Rainer, and Patrick Webb, 'Wasting time for wasted children: Severe child undernutrition must be resolved in non-emergency settings', *The Lancet*, vol. 367, no. 9517, 8 April 2006, pp. 1209–1211.

Manary, Mark J., et al., 'Home based therapy for severe malnutrition with ready-to-use food', *Archives of Disease in Childhood*, vol. 89, June 2004, pp. 557–561.

Navarro-Colorado, Carlos, and Stéphanie Laquière, 'Clinical trial of BP100 vs F100 milk for rehabilitation of severe malnutrition', *Field Exchange*, vol. 24, March 2005, pp. 22–24, <http://www.ennonline.net/fex/24/Fex24.pdf>, accessed January 2007.

Prudhon, Claudine, et al., 'WHO, UNICEF, and SCN Informal Consultation on Community-Based Management of Severe Malnutrition in Children', SCN Nutrition Policy Paper No. 21, *Food and Nutrition Bulletin*, vol. 27, no. 3 (supplement), 2006, available at <http://www.who.int/child-adolescent-health/publications/NUTRITION/CBSM.htm>, accessed January 2007.

Sandige, H., et al., 'Home-based treatment of malnourished Malawian children with locally produced or imported ready-to-use food', *Journal of Paediatric Gastroenterology and Nutrition*, vol. 39, no. 2, August 2004, pp. 141–146.

World Health Organization and UNICEF, *Global Strategy for Infant and Young Child Feeding*, WHO, Geneva, 2003, <http://www.who.int/nutrition/publications/gs_infant_feeding_text_eng.pdf>, accessed January 2007.

World Health Organization, *Management of Severe Malnutrition: A manual for physicians and other senior health workers*, WHO, Geneva, 1999, <http://www.who.int/nutrition/publications/en/manage_severe_malnutrition_eng.pdf>, accessed January 2007.

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