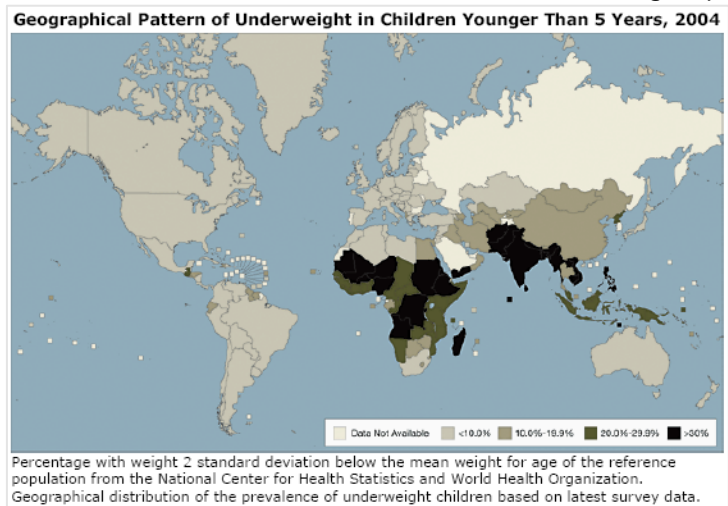


# Communicable diseases and severe food shortage situations

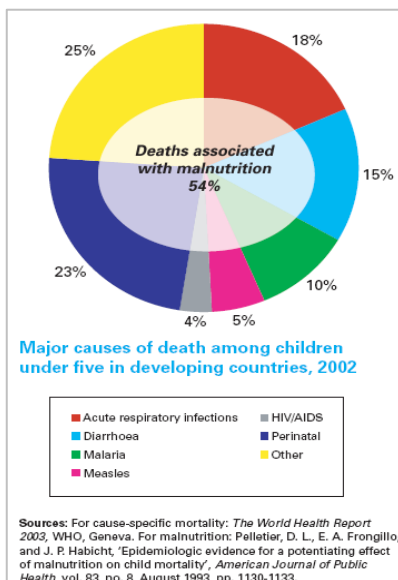
## Malnutrition and communicable diseases

- The combination of communicable diseases (CDs) and malnutrition is the most prevalent public health problem in the world today; together they are responsible for millions of preventable deaths worldwide each year.
- Infants and children are particularly affected. An estimated 13 million deaths occur in this group annually in developing countries: estimates are that the majority of child deaths from infectious diseases in developing countries are attributable to the potentiating effects of malnutrition.
- The relationship is synergistic; malnutrition compromises natural immunity leading to increased susceptibility to infection, more frequent and prolonged episodes, and increased severity of disease.
- Likewise, infection can aggravate or precipitate malnutrition through decreased appetite and intake, malabsorption, nutrient loss or increased metabolic needs.
- In addition, severe malnutrition often masks symptoms and signs of infectious diseases making prompt clinical diagnosis and early treatment very difficult.
- The overall impact of malnutrition on mortality from CDs is formidable; it is therefore crucial that nutritional and CD interventions are integrated.



## Risk factors

- Although environmental factors such as drought or floods or insect invasion play a role, food shortages generally occur due a complex combination of factors. Conflict and civil strife, economic and social change resulting in or aggravating poverty or leading to collapse of basic infrastructure and systems, poor governance, inequalities, as well as inappropriate land management and farming methods can contribute to both short and long term food shortages. HIV/AIDS is also changing economic and social structures in many developing nations.



- These contexts are often associated with population displacement, lack of safe water, poor sanitation, overcrowding, collapse of preventive public health measures such as immunization and vector control, a lack of access to basic health services and poorly trained health staff, which increase the risk of CDs among the affected population.
- Both protein-energy malnutrition and micronutrient deficiency, in turn, increase the morbidity and mortality from CDs, particularly in infants and children.
- Measles, diarrhoeal diseases, acute lower respiratory infections (ALRI) and malaria are largely responsible for the already high morbidity and mortality in infants and children.

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## Prevention of high morbidity and mortality

- Mortality from CDs among those exposed to ongoing food shortages is largely preventable.
- Primary prevention, through provision of safe and adequate food/water/sanitation, appropriate shelter and site planning, immunization of vulnerable populations, institution of vector control measures and health education on hygiene/hand-washing, and prevention of CDs as well as dietary and feeding practices (including food storage and preparation), can greatly reduce morbidity and mortality from CDs in undernourished and malnourished populations.
- All households should have adequate quantity and quality of safe food. Regular assessments of the nutritional status of vulnerable populations and of food security are necessary to calculate the caloric, protein and micronutrient needs of potential food aid, monitor household access to food (including costs in the market), food intake/feeding habits and agricultural practices.
- In acute emergencies, where food requirements are initially unknown, a mean daily per capita intake of 2100 Kcal and 46g of protein is recommended (for a developing country profile). This can be achieved through food aid via general food distributions (fresh foods preferable but often fortified, blended foods) and targeting of severely and moderately malnourished children for therapeutic and supplementary feeding respectively. Community education is crucial in order to increase awareness and facilitate access of populations to these services.
- Although the risk of death is higher in those with severe malnutrition, most malnutrition-related deaths occur in those with mild-moderate malnutrition. In order to increase child survival, it is crucial that food aid interventions include supplementary feeding programmes for moderately malnourished populations.
- In addition, efforts should be made towards improving household access to food (e.g. seed distribution, land/crop management, income generation activities) and instituting appropriate child feeding and caring practices including diversifying diets.
- In order to prevent deaths from epidemic-prone diseases, CD and nutritional surveillance should be linked: nutritional assessments, supplementary feeding centre (SFC) and therapeutic feeding centre (TFC) information should also include simple CD surveillance data to assess disease trends and allow early warning of outbreaks. In addition, outbreak preparedness and response plans, including identification of laboratory networks and pre-positioning of adequate medications and supplies, should be instituted in collaboration with key partners.
- Early diagnosis and appropriate case management can also limit mortality from CDs - appropriate case definitions and treatment protocols must be available in health centres and staff trained in their use.
- Nearly all severely malnourished children have bacterial infections when first admitted to hospital. Many have multiple infections and infection of the lower respiratory tract is particularly common. Instituting efficient emergency triage assessment and treatment averts high death rates which often occur within 24 hours of admission. Using the *priority signs* described in the integrated management of childhood illness (IMCI) guidelines, children with severe malnutrition can be easily identified for prompt assessment and treatment. Clinical management of malnourished patients, including fluid management, must be thorough, carefully monitored and supervised. Common problems encountered in severe malnutrition include hypothermia, hypoglycaemia, dehydration and electrolyte disturbances. Table 1 summarizes some useful laboratory tests for CD management in malnutrition. It is important that the phases and principles of management of severely malnourished children are followed as outlined in the *Management of the child with a serious infection or severe malnutrition* guidelines.



**Table 1: Summary of laboratory features for CD management in severe malnutrition**

Test	Result and significance
<b>Useful tests</b>	
Blood smear microscopy and rapid diagnostic tests (RDT)	Presence of malaria parasites or initial positive rapid diagnostic test is indicative of infection (RDT may stay positive 2-3 weeks after clearance of parasites and cannot be used for treatment follow-up)
Haemoglobin or packed cell volume	Haemoglobin of <40g/l or packed cell volume <12% is indicative of severe anaemia
Urine microscopy and culture	Presence of bacteria on microscopy (or >10 leucocytes per high-power field) is indicative of infection
Stool microscopy	Presence of blood is indicative of dysentery Presence of <i>Giardia</i> cysts or trophozoites is indicative of infection
Chest X-ray	Pneumonia causes less shadowing of the lungs in malnourished children than in well-nourished children Vascular engorgement is indicative of heart failure Bones may show rickets or fractures of the ribs
Skin test for tuberculosis	Often negative in children with tuberculosis or those previously vaccinated with BCG vaccine
<b>Tests that are of little or no value</b>	
Serum proteins	Not useful in management but may guide diagnosis
Test for HIV	Should not be done routinely; recommended protocols must be observed
Electrolytes	Rarely helpful and may lead to inappropriate therapy

Adapted from: Management of severe malnutrition: A manual for physicians and other senior health workers. World Health Organization, 1999.

- Key public health interventions must be instituted for the most prevalent CDs in undernourished or malnourished populations:
  - **Measles:** Malnourished children are at particularly high risk of complications and death following an attack of measles. The disease can trigger acute protein-energy malnutrition and worsen vitamin A deficiency. Measles morbidity and mortality in malnourished populations is easily preventable with vaccination targeting those aged 6 months through 14 years. Vitamin A supplementation is necessary in those under 5 years of age as it minimizes the complications of measles such as blindness, pneumonia and diarrhoea.
  - **Malaria:** Severely malnourished with malaria infection may have no fever, or be hypothermic. Symptoms of malaria infection usually only show up once the child regains weight. All severely malnourished children must be screened routinely for the presence of malaria parasites *on admission to a TFC, and weekly thereafter* until discharge. The decision to treat a severely malnourished child for malaria is usually based on a positive laboratory test only. Initial diagnosis can be made using either a rapid diagnostic test (RDT) or microscopy. Because RDT-based on detection of HRP-II antigens remain positive for 2–3 weeks after parasites have been cleared from the patient's bloodstream, follow-up screening of treated patients must be done with microscopy. TFCs therefore require access to quality malaria microscopy. The risk of further infections should be reduced by protecting all patients in TFCs from dusk till dawn with insecticide-treated mosquito nets (ITNs), and making ITNs available to take home on discharge. Children with moderate malnutrition will have symptoms of malaria in the same way as patients whose nutritional status is normal, so there is no need to screen these children for malaria in the absence of symptoms. Supplementary feeding programmes should distribute ITNs (preferably long lasting variety) to every child on enrolment.
  - **Diarrhoeal diseases:** Providing safe water and improved sanitation, and community education on food safety in the household (see WHO 5 keys to safer food) is essential for reducing the occurrence of diarrhoeal diseases. In addition to prevention and prompt treatment of dehydration, the most important measure in the treatment of diarrhoeal diseases in children under five is to ensure continued feeding, including breastfeeding,

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during and after the diarrhoeal episode. Zinc supplementation for 10-14 days for children with acute diarrhoea (20mg daily and 10mg for infants under 6 months) can reduce the severity of the episode and prevent further occurrences in the next 2-3 months.

- **Tuberculosis:** Although not a leading cause of mortality during the emergency phase, tuberculosis often emerges as a critical problem once measles and diarrhoeal diseases have been adequately controlled. Tuberculosis, often in combination with HIV/AIDS, is common in malnourished populations. The consequent immune system dysfunction can both enhance susceptibility to tuberculosis infection and the progression of disease. Malnourished populations, especially malnourished children of all ages, are considered to be at particular risk of developing severe active tuberculosis. Case-finding among TB suspects through sputum-smear microscopy and appropriate treatment of TB patients in line with the requirements of the DOTS strategy should be developed.
- **HIV:** People with HIV have increased energy and micronutrient requirements, and are particularly susceptible to malnutrition. With malnutrition, HIV-infected individuals have an increased risk of opportunistic infections and death. Furthermore, malnourished individuals with HIV have increased nutritional requirements and feeding programmes must take this into account.

### Further reading/references

1. Communicable disease control in emergencies – A field manual (WHO 2005).  
<http://www.who.int/infectious-disease-news/IDdocs/whocds200527/whocds200527full.pdf>
2. The management of nutrition in major emergencies (WHO 2000).  
<http://whqlibdoc.who.int/publications/2000/9241545208.pdf>
3. Communicable diseases in complex emergencies:  
[http://www.who.int/infectious-disease-news/IDdocs/Lancet\\_CDs\\_complex\\_emergencies.pdf](http://www.who.int/infectious-disease-news/IDdocs/Lancet_CDs_complex_emergencies.pdf)
4. Food and nutrition needs in emergencies (WHO/UNICEF/FAO/WFP 2003).  
<http://whqlibdoc.who.int/hq/2004/a83743.pdf>
5. Ensuring optimal feeding for infants and children during emergencies (WHO 1999).  
[http://whqlibdoc.who.int/hq/2004/9241546069\\_summary.pdf](http://whqlibdoc.who.int/hq/2004/9241546069_summary.pdf)
6. Scurvy prevention and control in major humanitarian emergencies (WHO 1999).  
[http://whqlibdoc.who.int/hq/1999/WHO\\_NHD\\_99.11.pdf](http://whqlibdoc.who.int/hq/1999/WHO_NHD_99.11.pdf)
7. Thiamine deficiency and its prevention and control in major humanitarian emergencies (WHO 1999).  
[http://whqlibdoc.who.int/hq/1999/WHO\\_NHD\\_99.13.pdf](http://whqlibdoc.who.int/hq/1999/WHO_NHD_99.13.pdf)
8. Pellagra and its prevention and control in major humanitarian emergencies (WHO 2000).  
[http://whqlibdoc.who.int/hq/2000/WHO\\_NHD\\_00.10.pdf](http://whqlibdoc.who.int/hq/2000/WHO_NHD_00.10.pdf)
9. WHO/UNICEF joint statement (acute diarrhoea, zinc supplementation) 2004:  
[http://www.who.int/child-adolescent-health/New\\_Publications/CHILD\\_HEALTH/Acute\\_Diarrhoea.pdf](http://www.who.int/child-adolescent-health/New_Publications/CHILD_HEALTH/Acute_Diarrhoea.pdf)
10. Management of severe malnutrition: A manual for physicians and other senior health workers (WHO 1999).  
[http://www.who.int/nut/documents/manage\\_severe\\_malnutrition\\_eng.pdf](http://www.who.int/nut/documents/manage_severe_malnutrition_eng.pdf)
11. Management of the child with a serious infection or severe malnutrition:  
[http://www.who.int/child-adolescent-health/publications/referral\\_care/Referral\\_Care\\_en.pdf](http://www.who.int/child-adolescent-health/publications/referral_care/Referral_Care_en.pdf)
12. World Health Organization Roll Back Malaria(RBM) department: Malaria and Malnutrition  
[http://www.who.int/malaria/docs/malaria\\_and\\_malnutrition.pdf](http://www.who.int/malaria/docs/malaria_and_malnutrition.pdf)
13. World Health Organization: Diarrhoea:  
<http://www.who.int/topics/diarrhoea/en/>
14. WHO Five Keys to Safer Food:  
<http://www.who.int/foodsafety/consumer/5keys/en/index.html>
15. Ensuring food safety in the aftermath of natural disasters:  
[http://www.who.int/foodsafety/foodborne\\_disease/emergency/en/print.html](http://www.who.int/foodsafety/foodborne_disease/emergency/en/print.html)

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