

*ABC of conflict and disaster***Public health in the aftermath of disasters**

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This is the fourth in a series of 12 articles

In the aftermath of disasters, public health services must address the effects of civil strife, armed conflict, population migration, economic collapse, and famine. In modern conflicts civilians are targeted deliberately, and affected populations may face severe public health consequences, even without displacement from their homes. For displaced people, damage to health, sanitation, water supplies, housing, and agriculture may lead to a rapid increase in malnutrition and communicable diseases.

Fortunately, the provision of adequate clean water and sanitation, timely measles immunisation, simple treatment of dehydration from diarrhoea, supplementary feeding for the malnourished, micronutrient supplements, and the establishment of an adequate public health surveillance system greatly reduces the health risks associated with the harsh environments of refugee camps.

Critical public health interventions**Environmental health**

Overcrowding, inadequate hygiene and sanitation, and the resulting poor water supplies increase the incidence of diarrhoea, malaria, respiratory infections, measles, and other communicable diseases. A good system of water supply and excreta disposal must be put in place quickly. No amount of curative health measures can offset the harmful effects of poor environmental health planning for communities in emergency settlements. Where camps are unavoidable, appropriate site location and layout and spacing and type of shelter can mitigate the conditions that lead to the spread of disease.

Water supply and sanitation

Adequate sources of potable water and sanitation (collection, disposal, and treatment of excreta and other liquid and solid wastes) must be equally accessible for all camp residents. This is achieved by installing an appropriate number of suitably located waste disposal facilities (toilets, latrines, defecation fields, or solid waste pick-up points), water distribution points, availability of soap and bathing and washing facilities, and effective health education.

The United Nations High Commissioner for Refugees (UNHCR) recommends that each refugee receive a minimum of 15-20 litres of clean water per day for domestic needs. Adequate quantities of relatively clean water are preferable to small amounts of high quality water. Provision of lidded buckets to each family, chlorinated just before they are distributed and again each time they are refilled, is a labour intensive but effective preventive measure that can be instituted early in an emergency.

Latrine construction should begin early in the acute phase of an emergency, but initial sanitation measures in a camp may be nothing more than designating an area for defecation that is segregated from the source of potable water. Construction of one latrine for every 20 people is recommended.

Vector control

The control of disease vectors (mosquitoes, flies, rats, and fleas) is a critical environmental health measure.



The Indonesian city of Banda Ache, Sumatra, after the devastating tsunami on 26 December 2004

Priorities for a coordinated health programme for emergency settlements

- Protection from natural and human hazards
- Census or registration systems
- Adequate quantities of reasonably clean water
- Acceptable foods with recommended nutrient and energy composition
 - Where it is difficult to ensure that vulnerable groups have access to rations or where high rates of malnutrition exist, supplementary feeding programmes should be established
- Adequate shelter
- Well functioning and culturally appropriate sanitation and hygiene systems (such as latrines and buckets, chlorine and soap)
- Family tracing (essential for mental health)
- Information and coordination with other vital sectors such as food, transport, communication, and housing monitoring and evaluation, for prompt problem solving
- Medical and health services



Survivors of the tsunami in Meulaboh, Sumatra, crowd around a US Navy helicopter delivering food and water. Helicopter was often the only means of reaching the worst affected regions

Shelter

The World Health Organization recommends 30 m² of living space per person—plus the necessary land for communal activities, agriculture, and livestock—as a minimum overall figure for planning a camp layout. Of this total living space, 3.5 m² is the absolute minimum floor space per person in emergency shelters.

Communicable disease control and epidemic management

Malnutrition, diarrhoeal diseases, measles, acute respiratory infections, and malaria consistently account for 60-95% of reported deaths among refugees and displaced populations. Preventing high mortality from communicable disease epidemics in displaced populations relies primarily on the prompt provision of adequate quantities of water, basic sanitation, community outreach, and effective case management of ill patients allied to essential drugs and public health surveillance to trigger early appropriate control measures. Proper management of diarrhoeal diseases with relatively simple, low technology measures can reduce case fatality to less than 1%, even in cholera epidemics.

Immunisation

Immunisation of children against measles is one of the most important (and cost effective) preventive measures in affected populations, particularly those housed in camps. Since infants as young as 6 months old often contract measles in refugee camp outbreaks and are at increased risk of dying because of impaired nutrition, measles immunisation programmes (along with vitamin A supplements) are recommended in emergency settings for all children from the ages of 6 months to 5 years (some would recommend up to 12-14 years). Ideally, measles immunisation coverage in refugee camps should be greater than 80%. Immunisation programmes should eventually include all antigens recommended by WHO's expanded programme on immunisation (EPI).

Controlling the spread of HIV/AIDS

The massive threat posed by HIV infection and allied sexually transmitted diseases, such as syphilis, is exacerbated by civil conflict and disasters. HIV spreads fastest during emergencies, when conditions such as poverty, powerlessness, social instability, and violence against women are most extreme. Moreover, during complex emergencies control activities, whether undertaken by national governments or by other international and national agencies, tend to be disrupted or break down altogether.

Education, health, poverty, human rights and legal issues, forced migration and refugees, security, military forces, and violence against women are only some of the factors related to HIV transmission that must be considered. The *Guidelines for HIV/AIDS interventions in emergency settings*, elaborated by WHO, UNHCR, and UNAIDS Joint United Nations Programme on HIV/AIDS, is an important resource and must be disseminated and implemented in the field.

Management of dead bodies

One of the commonest myths associated with disasters is that cadavers represent a serious threat of epidemics. This is used as justification for widespread and inappropriate mass burial or cremation of victims. As well as being scientifically unfounded, this practice leads to serious breaches of the principle of human dignity, depriving families of their right to know something about their missing relatives. It is urgent to stop propagating such disaster myths and obtain global consensus on the appropriate management of dead bodies after disasters.



Tents erected to accommodate the local population displaced by a volcanic eruption in Cape Verde. Such mass movement of people into temporary accommodation can pose the greatest threat to life after a disaster: in this case a cholera outbreak developed

Factors influencing disease transmission after disasters

- Pre-existing disease (such as cholera, measles, typhus)
- Immunisation rates
- Concentration of population
- Damage to utilities, contamination of water or food
- Increased disease transmission by vectors—breeding sites, lack of personal hygiene, interruption of control programmes



Uniforms of the Naval Environmental Preventive Medicine Unit being sprayed with mosquito repellent in preparation for deployment to Indonesia to help the humanitarian effort. The unit provides water quality testing, bug spraying, and treatment of illnesses in the tsunami survivors

Ten critical emergency relief measures

- Rapidly assess the health status of the affected population
- Establish disease surveillance and a health information system
- Immunise all children aged 6 months to 5 years against measles and provide vitamin A to those with malnutrition
- Institute diarrhoea control programmes
- Provide elementary sanitation and clean water
- Provide adequate shelters, clothes, and blankets
- Ensure at least 1900 kcal of food per person per day
- Establish curative services with standard treatment protocols based on essential drug lists that provide basic coverage to entire community
- Organise human resources to ensure one community health expert per 1000 population
- Coordinate activities of local authorities, national agencies, international agencies, and non-governmental organisations

Nutrition

Undernutrition increases the case mortality from measles, diarrhoea, and other infectious diseases. Deficiencies of vitamins A and C have been associated with increased childhood mortality in non-refugee populations. Because malnutrition contributes greatly to overall refugee morbidity and mortality, nutritional rehabilitation and maintenance of adequate nutritional levels can be among the most effective interventions (along with measles immunisation) to decrease mortality, particularly for such vulnerable groups as pregnant women, breast feeding mothers, young children, handicapped people, and elderly people. However, the highest nutritional priority in refugee camps is the timely provision of general food rations containing ideally 2100 kcal (8.8 MJ) per person per day and that include sufficient protein, fat, and micronutrients.

Maternal and child health (including reproductive health)

Maternal deaths have been shown to account for a substantial burden of mortality among refugee women of reproductive age. Maternal and child healthcare programmes may include health education and outreach; prenatal, delivery, and postnatal care; nutritional supplementation; encouragement of breast feeding; family planning and preventing spread of sexually transmitted diseases and HIV; and immunisation and weight monitoring for infants. Giving women who are heads of households the responsibility for distribution of relief supplies, particularly food, ensures more equitable allocation of relief items.

Medical services

Experience shows that medical care in emergency situations should be based on simple, standardised protocols. Conveniently accessible primary health clinics should be established at the start of the emergency phase. WHO and other organisations, such as Médecins Sans Frontières, have developed basic, field tested protocols for managing common clinical problems that are easily adaptable for emergency situations. Underlying these basic case management protocols are what have been termed "essential" drug and supply lists. Such standard treatment protocols and basic supplies are designed to help health workers (most of whom will be non-physicians) provide appropriate curative care and allow the most efficient use of limited resources.

Public health surveillance

Emergency health information systems are now routinely established to monitor the health of populations affected by complex humanitarian emergencies. Crude mortality is the most critical indicator of a population's improving or deteriorating health status and is the indicator to which donors and relief agencies most readily respond. It not only indicates the current health state of a population but also provides a baseline against which the effectiveness of relief programmes can be measured. During the emergency phase of a relief operation, mortality should be expressed as deaths/10 000/day to allow for detection of sudden changes. In general, health workers should be extremely concerned when mortality in a displaced population exceeds 1/10 000/day or when it exceeds 4/10 000/day in children aged less than 5 years old.

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The photographs of Banda Ache, Meulaboh, and of uniform spraying were supplied by the US Navy and were taken by Photographer's Mate Airman Patrick M. Bonafede, Photographer's Mate Airman Jordon R Beesley, and Photographer's Mate Second Class Jennifer L Bailey respectively. The photographs of nutritional assessment in Somalia were supplied by Brent Burkholder, Centers for Disease Control and Prevention.



Nutritional assessment team in refugee camp, Somalia, 1993 (left) and use of Salter scales to determine protein energy malnutrition ("wasting") in young child (right)



Emergency health clinic run by Liberian Red Cross for citizens displaced by renewed civil war in downtown Monrovia, Liberia, 1996

Further reading

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The ABC of conflict and disaster is edited by Anthony D Redmond, emeritus professor of emergency medicine, Keele University, North Staffordshire; Peter F Mahoney, honorary senior lecturer, Academic Department of Military Emergency Medicine, Royal Centre for Defence Medicine, Birmingham; James M Ryan, Leonard Cheshire professor, University College London, London, and international professor of surgery, Uniformed Services University of the Health Sciences (USUHS), Bethesda, MD, USA; and Cara Macnab, research fellow, Leonard Cheshire Centre of Conflict Recovery, University College London, London. The series will be published as a book in the autumn.

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