

Communicable disease risk assessment and interventions

Cyclone Sidr disaster: Bangladesh

November 2007



**World Health
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For further information, please contact:

Department of Epidemic Pandemic Alert and Response
Information Resource Centre
World Health Organization
1211 Geneva 27
Switzerland

Fax: (+41) 22 791 4285
cdemergencies@who.int

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Giuseppe Annunziata (HAC/ERO); Eric Bertherat (EPR/ERI); Andrea Bosman (HTM/GMP); Claire-Lise Chaignat, (NTD/IVM); Yves Chartier, (PHE/WSH); Claire Chauvin (DGR/POL); Meena Cherian (EHT/CPR); Alice Croisier (EPR/GIP); Alya Dabbagh (FCH/IVB); Katya Fernandez-Vegas (EPR/ERI); Olivier Fontaine, (FCH/CAH); Antonio Gerbare (HTM/HIV); Alexandra Hill (NTD/IVM); Dominique Legros (EPR/DCE); Jayantha Liyanage (SEARO/EPI); Alexandro Loretto (HAC/ERO); David Meddings (NMH/VIP); Angela Merianos (EPR/ARO); Michael Nathan (NTD/VEM); Zinga Jose Nkuni, (HTM/GMP); Asiya Odugleh-Kolev (HSE/WMC); Salah Ottmani (HTM/STB); Heather Papowitz (EPR/DCE); Chen Reis (HAC/ERO); Cathy Roth, (EPR/BPD); Johannes Schnitzler (EPR/ARO); Peter Strebel (FCH/IVB); Zita Weise-Prinzo (NMH/NHD).

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Jorge Alvar (NTD/IDM); Pascale Gilbert-Miguët (GMG/SES); François-Xavier Meslin (HSE/FOS); Benjamin Nkowane, (DGR/POL); William Perea (EPR/ERI); Aafje Rietveld (HTM/GMP); Jos Vandelaer (FCH/IVB).

Preface

The purpose of this technical note is to provide health professionals in United Nations agencies, non-governmental organizations, donor agencies and local authorities working with populations affected by emergencies with up-to-date technical guidance on the major communicable disease threats faced by the cyclone-affected population in Bangladesh.

The endemic and epidemic-prone diseases indicated have been selected on the basis of the burden of morbidity, mortality and epidemic potential in the area, as previously documented by WHO.

The prevention and control of communicable diseases represent a significant challenge to those providing health-care services in this evolving situation. It is hoped that this technical note will facilitate the coordination of activities to control communicable diseases between all agencies working among the populations currently affected by the crisis.

1. BACKGROUND AND RISK FACTORS

Bangladesh is a very low lying, densely populated country, frequently affected by cyclones and floods which annually, cause the internal displacement of one million people. This year the country has had unusually high levels of rainfall. It is home to greater than 2% (140 million, 2005) of the world's population, 36% of which exist below the poverty line (2000) and 38% are less than 15 years old. Bangladesh also hosts approximately 400 000 refugees.

Bangladesh is divided administratively into 6 divisions, 64 districts and 460 upazilas. The cyclone has affected 30 of the districts, mainly in the southern part of the country, as well as offshore islands: nearly all districts have been affected by seasonal floods or cyclone or both, as figures 1 and 2 below indicate.

Cyclone Sidr developed over the Bay of Bengal and made landfall on 15 November 2007 in the coastal areas of Bangladesh with winds of up to 250 Km/hr and associated tidal surges. Due to the complex of deltas on the coast, these tidal surges have penetrated deeply and extensively inland, compounding the already existing problems from seasonal flooding. It is the worst cyclone to affect Bangladesh since 1991.

As of 26 November 2007, the Government of Bangladesh official report indicated that more than seven million people had been affected, of which 3243 have died, 880 people are still missing and 35 000 are injured. These figures could still be conservative and may rise as more remote areas are reached. Disaster preparedness may have had an important mitigating effect as 3.2 million people were evacuated from the coastal areas.

The cyclone has caused severe storm-damage to domestic dwellings (greater than one million have been partially or totally destroyed), roads, communication and other essential service infrastructure (see section 4, Environmental Health in Emergencies, OCHA/UNDP ERI). Such damage will hinder and complicate assessment and response efforts. Access to the public health system which was already suboptimal has also been affected, and the capacity of the surveillance system to detect and respond to epidemics further weakened.

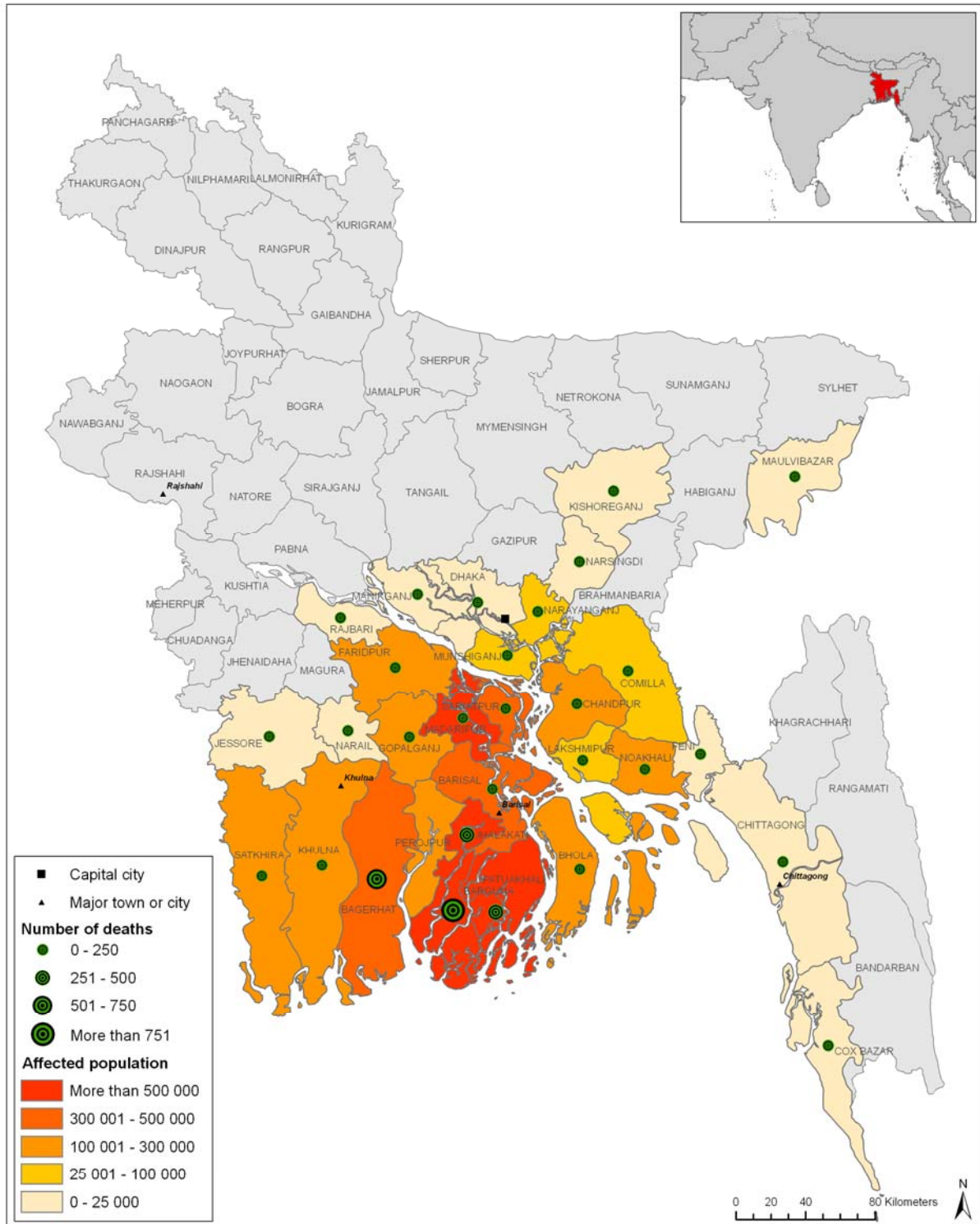
WHO Bangladesh has deployed field teams to Chittagong and Khulna Divisions to assist local health authorities and assess the situation. WHO is also participating in joint UN damage and needs assessments in the most affected areas.

The Government of Bangladesh has announced that relief priorities are providing adequate food, safe drinking-water and shelter to the affected people. Health issues are of major concern in districts affected by the cyclone.

Major health problems in Bangladesh, which could be exacerbated by this crisis, relate to communicable diseases, which still dominate, and malnutrition, especially in children. As of 2004, 48% of children were assessed to be under-weight and at least 20% are vitamin A deficient. Major causes of death overall, in the country, are from respiratory and diarrhoeal diseases.

Figure 1:

Districts of Bangladesh affected by Cyclone SIDR, November 2007

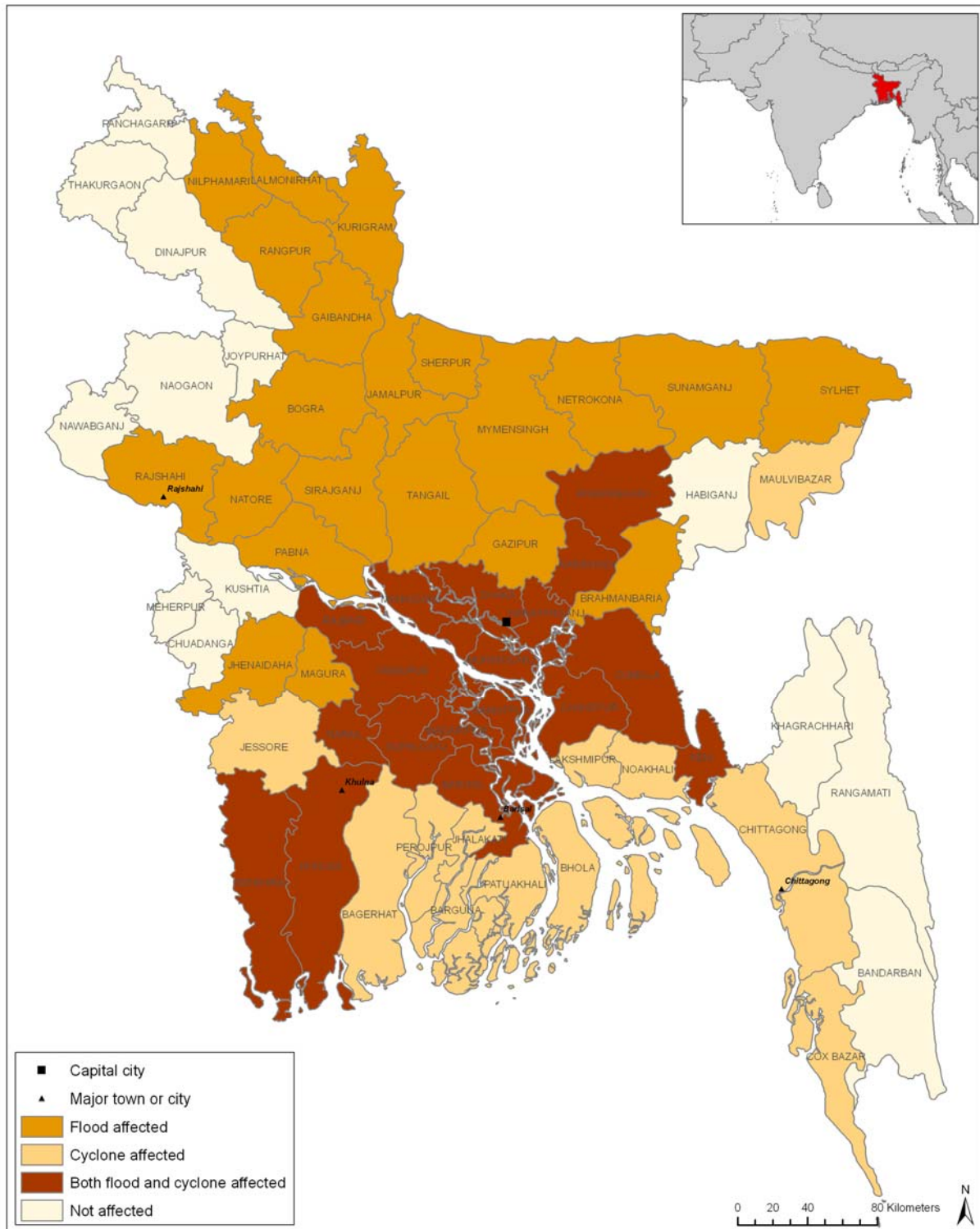


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Figure 2:

Districts of Bangladesh affected by seasonal floods and Cyclone SIDR, 2007



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Risk factors for increased communicable disease burden

1. **Interruption of safe water and sanitation facilities.** The populations displaced by cyclone are at immediate and high risk of outbreaks of **waterborne** and **foodborne diseases**.
2. **Population displacement with overcrowding.** Populations in the affected areas and relief centres are at immediate and high risk from the transmission of **measles** and at increased incidence of **ARI**. Increased risk of **meningitis** transmission is also associated with overcrowding in general. However WHO has no historical background information of meningitis outbreaks in Bangladesh.
3. **Malnutrition and transmission of communicable diseases.** The combination of malnutrition, communicable diseases and natural disaster creates the potential for a significant public health problem. Infants and children are particularly susceptible. Malnutrition compromises natural immunity, leading to more frequent, severe and prolonged episodes of infections. Severe malnutrition often masks symptoms and signs of communicable diseases, making prompt clinical diagnosis and early treatment more difficult.
4. **Vector breeding.** Seasonal flooding, flooding as a result of the cyclone and tidal surges can result in the proliferation of vector breeding sites, increasing the medium-term (weeks to months) risk of **malaria** as well as **dengue** and other endemic arboviruses such as **Japanese encephalitis**.
5. **Poor access to health services** is of immediate concern, as the health infrastructure is lacking in basic facilities and has been overwhelmed and means of transport have been destroyed.

2. PRIORITY COMMUNICABLE DISEASES

2.1 General notes

1. Jaundice and encephalitis. It will be important to consider the differential diagnosis of patients presenting with jaundice and encephalitis due to the increased number of diseases which may present with non-specific jaundice and encephalitis symptoms (e.g. leptospirosis, dengue, Japanese encephalitis).

2. Long incubation periods. Relief workers should be aware that there are endemic diseases in Bangladesh with potentially long incubation periods e.g. visceral leishmaniasis. These may present late once the acute phase of the crisis has passed and national and international relief workers have been repatriated.

3. Wounds and injuries sustained, especially those sustained through navigating floodwaters, displacement of hazards, or by virtue of near drowning are likely to be a risk factor for increased transmission of communicable diseases. Survivors of near drowning may have complications such as aspiration pneumonia. Injuries may also result from being swept by floodwaters through collapsed structures and debris. The management of all injuries may be complicated by greater delays in presenting for care and limited access by skilled personnel to the affected areas. Inadequate **tetanus** vaccination coverage (Third dose 88% reported in Bangladesh) also increases the likelihood of morbidity and mortality from tetanus. For management of wounds see section 3.1, Essential trauma and medical care. For relevant publications, see section 4, Wounds and injuries.

2.2 Waterborne and foodborne diseases

The populations affected by the cyclone in Bangladesh are at **immediate risk** from outbreaks of waterborne and foodborne diseases, particularly **cholera**, **typhoid**, ***Shigella dysenteriae* type 1(Sd1)**. There is increasing evidence of significant antimicrobial resistance including multi-drug resistance (greater than three antimicrobials) in **Sd1** isolates from Bangladesh. For relevant publications see section 4, Diarrhoeal diseases, *Shigella* antimicrobial resistance.

Population displacement, crowding, poor access to safe water, inadequate hygiene and toilet facilities, and unsafe food preparation and handling practices are associated with transmission. Since the onset of the

floods and cyclone, cases of diarrhoea have been reported from the affected areas, and the immediate risk of further cases will remain extremely high.

Cholera is endemic in Bangladesh and transmission was documented prior to the cyclone: between 800 and 1000 cases were being recorded daily at the hospital of the ICDDR B in Dhaka. Usual water sources can become unsafe for drinking for several reasons: the incursion of floodwaters; faecal contamination caused by overflow of latrines, inadequate sanitation and upstream contamination if water sources are interconnected.

Hepatitis A+E background levels of hepatitis are high in Bangladesh but will be exacerbated by the crisis. For relevant publications, see section 4 Hepatitis A and Hepatitis E.

Leptospirosis is a bacterial zoonosis known to occur in Bangladesh. It appears to be increasing worldwide especially as an urban hazard during heavy rains and floods. Infection in humans may occur indirectly when the bacteria comes into contact with the skin (especially if damaged) or the mucous membranes, with moist soil or vegetation contaminated with the urine of infected animals or contaminated water, swimming or wading in floodwaters, accidental immersion or occupational abrasion. Direct infection may occur when in contact with urine or tissues of infected animals or occasionally through drinking of water and ingestion of food contaminated with urine of infected animals and droplet aerosol inhalation of contaminated fluids.

Outbreaks therefore tend to occur in people who work with water and a male predominance has been reported (farmers, fisherman, veterinarians, relief workers, military etc). Increased risk is associated with flooding and the crowding of rodents, wild and domestic animals and humans on shared dry ground.

2.3 Vector-borne diseases

Malaria risk exists throughout the year in Bangladesh. 13 out of 64 administrative districts are high malaria endemic areas. 98% of all malaria cases reported are from these districts, which are mainly located in the border areas of India and Myanmar. Approximately 75% of malaria from these districts is due to *Plasmodium falciparum*. Focal outbreaks occur every year in the 13 epidemic-prone districts. In 2005, the 13 districts reported 37 679 cases of *P. falciparum* and 10 442 *P. vivax* cases, including 501 deaths. The districts endemic for malaria that have been affected by floods and cyclone Sidr are Cox's Bazar, Chittagong, Maulvibazar, Sylhet, Sunamganj, Netrakona, Mymensingh and Sherpur.

There is gross under-reporting of malaria cases as information from communities, NGOs, private hospitals and service providers are not all included in the routine surveillance reports. The country adopted artemisinin-based combination therapy (ACT) in the form of artemether-lumefantrine in 2004 as first-line treatment for confirmed, uncomplicated *P. falciparum* cases. Unconfirmed, uncomplicated cases are treated with a combination of chloroquine plus primaquine, and severe cases (whether confirmed or unconfirmed) with quinine. Reduced sensitivity to chloroquine has also been reported to *P. vivax* in the region.

Main vectors include *Anopheles dirus*, *minimus*, *philippinensis*; all are susceptible to malathion and synthetic pyrethroids.

Populations will be at increased risk of malaria given the extension of vector breeding sites secondary to storm damage. See section 3.5 for specific malaria case management information in Bangladesh .

Dengue fever/Dengue Haemorrhagic Fever (DF/DHF) is a viral disease transmitted by the *Ae. aegypti* mosquito. It is on the increase in South-East Asia. In 2003, 8 out of 11 South-East Asian countries reported Dengue cases; in 2006, 10 out of 11 countries reported cases. Bangladesh reported 100 000 cases in 2005 (SEARO) however the CFR had remained <1% up to 2006. Under current circumstances, health-care facilities and staff will experience increased numbers of patients with injuries and trauma, it will be more difficult to detect early symptoms of Dengue and treat those who progress to DHF. DHF can affect all age groups. The risk of transmission may be increased among people living in inadequate shelters and/or overcrowded conditions, particularly where fresh water is stored in unprotected

water containers and rainfall collects in other artificial containers, allowing mosquito vectors to proliferate. See section 4 for relevant publications on Dengue and DHF.

Japanese encephalitis occurs in the South-East Asia region, transmitted by the *Culex* mosquito which breeds particularly in flooded rice fields and can affect all age groups. The virus circulates in Ardeidae birds (herons, egrets). Pigs are amplifying hosts. Culicines are normally zoophilic (infect mainly animals) but infection spills over into human populations in association with explosive increases of mosquito populations which occur during flooding. Vector control methods and personal protection information can be found in section 3.8.

Leishmaniasis is endemic in Bangladesh and has an incidence of 175/100 000 per year. It is caused by a protozoa which is transmitted from the bite of an infected sandfly and may present in cutaneous or visceral forms (the latter being particularly common in Bangladesh and also known as Kala Azar) after an incubation period of one week to many months. Relief workers should note the potential length of incubation as symptoms may present once they have returned home.

Filariasis is a mosquito-borne parasitic disease causing swelling of the limbs, urogenital organs, breast etc. with long-term disability. In Bangladesh it is endemic in 23 districts, mostly bordering India. About 20 million people are already infected, most of whom are incapacitated.

2.4 Diseases associated with crowding

Population displacement caused by cyclone damage can result in crowding in resettlement areas, raising the risk of transmission of certain communicable diseases. **Measles** (see section below on Vaccine-preventable diseases), **ARI, diphtheria and pertussis** are transmitted from person to person, and risk is increased in situations of forced relocation to shared areas which often have inadequate shelter. Crowding can also increase the likelihood of transmission of meningitis, waterborne and vector-borne diseases.

Tuberculosis (TB) is a major public health problem: Bangladesh is globally ranked 3rd out of 22, TB, high burden countries which account for 80% of global TB cases. In 2005, the estimated number of new TB cases was 322 000, with an incidence of 227 per 100 000 population per year. It is estimated that 66 423 persons died from TB in 2005; the mortality rate was 47 per 100 000 population per year.

Bangladesh adopted and has succeeded in implementing the internationally recommended strategy to control TB called DOTS (Directly observed therapy). DOTS services are provided through the network of the National TB Programme (NTP) and are available in most of the health facilities of the Ministry of Health (99% population coverage).

The case detection rate is still below the 70% global target, though this rate has progressively increased from 17% in 1995. The treatment success rate has increased from 71% in 1995 to 90% in 2004 (the global target for the treatment success rate is 85%).

The prevalence of **multidrug-resistant TB** has not been fully assessed. The prevalence of HIV infection among TB patients is not fully known.

In the acute phase of this emergency, one of the main problems is the interruption of anti-TB treatment provision. It is therefore important to ensure uninterrupted access to treatment for these patients during the acute phase of an emergency. Given that there is a functioning NTP network, it is important that a strong collaboration be established with the NTP services. Other aspects of TB control can be addressed once emergency and basic health care have been re-established.

The recent guideline on TB care and control in refugee and displaced populations highlights, on pages 95–97, the TB control issues that should be considered in the situation of a natural disaster (see section 4, Tuberculosis).

Plague has not been reported in Bangladesh and areas in Myanmar and India in which the disease is endemic do not border Bangladesh.

2.5 Vaccine-preventable diseases and routine immunization coverage

Measles. Currently measles incidence is reportedly low in Bangladesh, as a result of a successful nationwide catch-up vaccination campaign for children 9 months–10 years of age in 2006 and a strong routine immunization programme (81% coverage with the first dose of measles vaccine by cluster survey in 2004). Bangladesh has not reported a measles outbreak in 2007. Vaccination coverage may be insufficient to prevent transmission among populations of cyclone affected areas, especially among cohorts born since the campaign. By comparison many rubella outbreaks have been detected. See section 3.7 on recommendations for Immunization.

Tetanus has a high case–fatality rate of 70–100% and is globally under-reported. The incubation period is usually 321 days. Bangladesh is one of the high risk countries. In these circumstances wounds and injuries should be viewed with a high index of suspicion. *Clostridium tetani* spores, present in the soil, infect trivial, unnoticed wounds, lacerations and burns.

Appropriate management of injured survivors should be implemented as soon as possible to minimize future disability and to avert avoidable death following disasters. It was observed in Aceh, that a shorter incubation period is associated with severe disease and a worse prognosis. Health-care workers operating in disaster settings should be alerted by the occurrence of cases of dysphagia and trismus, often the first symptoms of the disease.

Maternal and neonatal tetanus, and its symptoms, is of particular concern, as only 13% of mothers are attended by health-care staff at delivery.

For management see section 3.1, Essential trauma and medical care and for relevant publications see section 4, Wounds and injuries, WHO Integrated Management for Emergency and Essential Surgical Care toolkit and the Aceh Epidemiology Group.

Polio is not currently endemic in Bangladesh. However a virus importation from northern India in 2006 led to an outbreak (18 cases) which is now considered controlled following several vaccination rounds. If populations have been displaced across national borders due to the cyclone and floods, there is a risk of new importation of wild polio virus when they return weeks to months later, which may go undetected if the surveillance system is compromised. For relevant publications, see section 4, Polio, Recommended standards for polio surveillance.

Table 1. Routine vaccination coverage at one year of age, 2006, Bangladesh

Antigen	% coverage*
(BCG) bacille Calmette–Guérin	96
Diphtheria–pertussis–tetanus, 3rd dose	88
Hepatitis B, 3rd dose	88
MCV (measles-containing vaccine)	81
Polio, 3rd dose	88

* Official country estimates reported to WHO/UNICEF, as of 23/11/2007 Summary

2.6 Other risks

- i. **Chronic disease.** Patients with chronic disease may experience an interruption of routine supply of medication.
- ii. **Skin infections.** Infections occur not only due to crowding but also because of a lack of water and therefore reduced hygiene. These are known as 'water-washed' diseases and include miscellaneous diarrhoeas, skin/wound infections and infestations (e.g. scabies).

- iii. Sexually transmitted infections (STIs) including human immunodeficiency virus (HIV).** When an emergency develops, people may be subjected to situations that substantially increase their exposure. Risk factors include massive displacement of people from their homes; women and children left to fend for themselves; prevalence of domestic violence; social services overwhelmed or destroyed; and a lack of means to prevent HIV infection, such as clean needles, safe blood transfusions and availability of condoms. The overall prevalence in the population is estimated to be 0.1%, with 11 000 people (of whom 1400 are women) living with the virus. Bangladesh has a concentrated **HIV** epidemic, mainly affecting commercial sex workers, their clients and injecting drugs users. The emergency response should ensure a minimum package of HIV prevention, treatment and care services, including the strengthening of standard precautions, with the provision of gloves, sterile needles and syringes and safe waste disposal management in health services. Additional services should include provision of condoms, education and prevention messages, and post-exposure prophylaxis for occupational exposure and for survivors of rape. Needle and syringes exchange programmes should be maintained. Efforts should be made to ensure that HIV/AIDS patients receiving ART do not have their treatment interrupted and to provide ART for prevention of pregnancy related HIV transmission. For relevant publications, see section 4, Gender and Gender based violence and HIV/AIDS.
- iv. Environmental risks** may exist from damaged industrial facilities (chemical, radiological) and drinking-water contaminated with arsenic has been previously documented. HCWs should bear in mind that patients' symptoms may be consistent with such causes. See section 4, Environmental Health in Emergencies, UNEP/OCHA Environmental Risk Identification.
- v. Avian influenza (A/H5N1)** has re-emerged in Bangladesh with reports from poultry farms during 2007. No human cases have been reported.

Table 2. Summary of risk of communicable diseases in flood-affected populations

Communicable disease	Of immediate concern following floods	Of concern in weeks to months following floods
Cholera/Typhoid/Shigellosis	+++	++
Acute respiratory tract infections	+++	++
Measles	+++	++
Tetanus	+++	+
Malaria	++	+++
Hepatitis A & E	++	+
Leptospirosis	+	-/+
Leishmaniasis (visceral + cutaneous)	+	++
Japanese encephalitis	+	+
Tuberculosis	+	+
Dengue fever	+	++
Meningitis	+	-/+
Poliomyelitis	-	+
HIV/AIDS/STI	+	++

Key: - = no risk + = low risk ++ = moderate risk +++ = high risk

3. IMMEDIATE INTERVENTIONS FOR COMMUNICABLE DISEASE CONTROL

3.1 Essential trauma and medical care

Priority must be given to providing emergency medical and surgical care to people with injury-related conditions and to the provision of psychosocial support to communities.

Injury-related conditions account for many of the health-care needs among those requiring medical attention in the immediate aftermath of the event. Falling structures have inflicted crush injuries, fractures, and a variety of open and closed wounds. Appropriate medical and surgical treatment of these injuries is vital to improving survival, minimizing future functional impairment and disability and ensuring as full a return as possible to community life. In order to prevent avoidable death and disability, field health personnel dealing with injured survivors should observe the following basic principles of trauma care.

- Patients should be **categorized by severity** of their injuries and treatment prioritized in terms of available resources and chances for survival. The underlying principle of triage is allocation of resources in a manner ensuring the greatest health benefit for the greatest number.
- **Open wounds must be considered as contaminated** and should not be closed. Debridement of dead tissue is essential which, depending on the size of the wound, may necessitate a surgical procedure undertaken in appropriate (e.g. sterile) conditions. Any associated involvement of organs, neurovascular structures, or open bone fractures will also necessitate appropriate surgical care.
- After debridement and removal of dead tissue and debris, wounds should be dressed with sterile dressings and the patient scheduled for **delayed primary closure**.
- Patients with open wounds should receive **tetanus prophylaxis**. Antibiotic prophylaxis or treatment will likely be indicated.
- Wherever possible, search and rescue workers should be equipped with **basic protective gear** such as footwear and leather gloves to avoid puncture wounds.
- **HIV post-exposure prophylaxis (PEP)** kits should be available to health-care workers, rescue and safety workers in case of accidental exposure to contaminated blood and body fluids.

3.2 Water and sanitation

Ensuring uninterrupted provision of safe drinking-water is the most important preventive measure in reducing the risk of outbreaks of waterborne diseases.

- UNHCR, WHO and SPHERE recommend that each person be supplied with **at least 15–20 litres** of clean water per day.
- Free **chlorine is the most widely and easily used**, and the most affordable of the drinking-water disinfectants. It is also highly effective against nearly all waterborne pathogens.
 - For point-of-use or household water treatment, the most practical forms of free chlorine are liquid sodium hypochlorite, sodium calcium hypochlorite and bleaching powder.
 - The amount of chlorine needed depends mainly on the concentration of organic matter in the water and has to be determined for each situation. After 30 minutes, the residual concentration of active chlorine in the water should be 0.5 mg/litre, which can be determined by using a simple field test kit.
- The provision of appropriate and sufficient water containers, cooking pots and fuel can reduce the risk of cholera and other diarrhoeal diseases by ensuring that water storage is protected and that food is properly cooked.
- Key messages on hygiene should be promoted to sensitize communities to the relevant health risks.
- In addition, **adequate sanitation facilities** should be provided in the form of latrines or designated defecation areas.

3.3 Shelter and site planning

- Wherever possible, shelters for the displaced or homeless must be positioned with sufficient space between them and, in accordance with international guidelines (UNHCR), aimed at preventing diseases related to overcrowding, such as measles, ARI, diarrhoeal diseases, TB and vector-borne diseases.
- In shelter sites and when distributing food, particular attention and protection should be given to women and unaccompanied minors. Women should be included in planning and implementation of shelter and food distribution activities.
- Waste should be disposed in a pit, away from shelters and protected from rodents to reduce the exposure of the population to rodents and other vectors of disease.

3.4 Management of Malnutrition

- Bacterial infections are very common in severely malnourished children on initial admission to hospital. Clinical management of severely 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. It is important that the phases and principles of management of severely malnourished children are followed as outlined in WHO guidelines (see section 4).
- Infants born into populations affected by the emergency should normally be exclusively breastfed from birth to 6 months of age. The aim should be to create and sustain an environment that encourages frequent breastfeeding for children up to 2 years of age. The quality, distribution and use of breast milk substitutes at emergency sites should be strictly controlled. Infants who are not breastfed are vulnerable to infection and to developing diarrhoea. See guidelines section 4.
- Bangladesh has low rates of exclusive breast feeding (36% of infants less than 6 months of age are exclusively breastfed). Exclusive breastfeeding should be promoted. Milk powder supplies usually increase in emergency situations, which tends to further exacerbate the low percentage of exclusive breast feeders. The distribution of breast milk substitutes (such as milk powder) needs to be strictly controlled so there is no "spill over" and further reduction in exclusive breastfeeding. Only infants who have no access to breast milk need an adequate supply of appropriate breast milk substitutes.
- Populations dependant on food aid need to be given a food ration that is adequate in terms of quantity and quality (covering macro- and micronutrient needs). Infants from 6 months onwards and older children need hygienically prepared, and easy-to-eat and digestible foods that nutritionally complement breast milk. Regular assessments of households' access to food (including costs in the market) need to be undertaken and emergency food aid needs to be adapted accordingly.
- After the acute phase of the emergency, efforts should be made to improve household access to food in a more sustainable way (e.g. seed distribution, land/crop management, income generation activities) and to institute appropriate child feeding and caring practices, including diversifying diets and improved hygiene. It is important to emphasize that poor hand hygiene exacerbates the spread of diarrhoeal diseases, even in the presence of adequate nutrition.

3.5 Case management

- Heightened community awareness of the need for **early treatment** and reinforcement of **proper case management** are important in reducing the impact of communicable diseases. The use of **standard treatment protocols** in health-care facilities with agreed-upon first-line drugs is crucial to ensure effective diagnosis and treatment for ARI, the main epidemic-prone diseases (including cholera, dysentery, typhoid, dengue and DHF, hepatitis, leishmaniasis, leptospirosis, measles, malaria, and meningitis) and STIs.
- Standard **infection control practices** in accordance with national protocols should also be in place.
- The national treatment guidelines for **malaria** is as follows:
 - for uncomplicated cases:

- not laboratory-confirmed: chloroquine plus primaquine;
- laboratory-confirmed falciparum malaria: artemether–lumefantrine;
- laboratory-confirmed vivax malaria: chloroquine plus primaquine;
- For severe cases: quinine x 7 days.
- **Tetanus**: appropriate management of injured survivors should be implemented as soon as possible to minimize future disability and to avert avoidable death following disasters.
- Provision of anti-**TB** treatment must be ensured for TB patients who were previously receiving treatment in the affected areas. Their treatment must not be interrupted and should be provided in line with the directives of the national TB control programme (NTP) services. All aspects of TB case management should also follow the NTP directives. The drugs used to treat the disease, such as rifampicin or streptomycin, must not be used for the treatment of other illnesses.

3.6 Surveillance/early warning and response system

The purpose of the surveillance/early warning and response system is to detect disease outbreaks and monitor endemic diseases. Rapid detection of cases of epidemic-prone diseases is essential to ensure rapid control. The surveillance or early warning and response system should:

- focus on the **priority epidemic-prone communicable diseases** most likely to occur in the flood-affected population;
- be simple to use, uniform in style and include **standard case definitions** and reporting forms (see section 5 for WHO case definitions);
- include **preparedness plans** for outbreak response, including outbreak investigation kits and an adequate stockpile of supplies for interventions;
- complement **existing surveillance structures** and ensure prompt investigation of reports of epidemic-prone diseases;
- be sensitive to unusual emerging and re-emerging communicable diseases of major public concern;
- identify key **laboratories** for prompt diagnosis and confirmation of the main communicable disease threats, as well as protocols for transport and tracking of specimens;
- ensure that data is forwarded to the local ministry of health authorities and the WHO office.

3.7 Immunization

- In crowded or camp settings, vaccination using a **measles-containing vaccine**, together with **vitamin A supplementation**, as an immediate priority health intervention (at least 20% of children are vitamin A deficient). All children aged 6 months to 14 years should receive measles vaccine, regardless of previous vaccination or disease history, with Vitamin A supplementation for children aged 6 months to 59 months. However because of the successful measles catch up campaign in 2006 and current low incidence of cases in Bangladesh, priority could be given to vaccinate children in areas with low vaccination coverage and to vaccinate children born since January 2005.
- Outside of crowded or camp settings, a single suspected measles case is sufficient to prompt the immediate implementation of activities to control measles. Measles vaccine, together with vitamin A, should be made available immediately to all unvaccinated infants and children aged 6 to 59 months. Infants and children whose vaccination status is uncertain should also receive measles vaccine.
- If rubella transmission is detected, consideration should be given to vaccinating women of childbearing age (aged 15–35 years). The vaccine of choice is **combined measles–rubella vaccine**.
- Given the threat of reintroduction of **poliomyelitis** into the area, every opportunity should be taken, if feasible, to give **OPV** (oral poliovirus vaccine) to all children aged <5 years.
- When the situation stabilizes, vaccinations routinely offered by the national immunization programme should be made available to all infants, pregnant women and other people as part of the provision of basic emergency health-care services.
- Although vaccine can be used to control outbreaks in certain circumstances, **hepatitis A** vaccine is not recommended to prevent outbreaks in the affected population. Vaccination efforts should always be supplemented by health education and improved sanitation.
- Mass **tetanus vaccination** programmes to prevent disease are not indicated. Wounds or lacerations may occur from objects submerged in floodwaters. Tetanus boosters may be indicated

for previously vaccinated people who sustain wounds or other lacerations (e.g. clean-up workers) depending on their tetanus immunization history.

- **Typhoid vaccination**, in conjunction with other preventive measures, may be useful to control typhoid outbreaks depending on local circumstances.
- **Oral cholera vaccines (OCV)**. The decision to use OCV in emergency-affected populations should be guided using a recently published WHO risk assessment tool. However, current recommendations state that OCV should not be used once an outbreak has started or if basic public health priorities are not covered.
- Special attention should be paid to the safe management and disposal of waste from immunization activities to prevent the transmission of blood-borne pathogens.

3.8 Vector control and personal protection

- Insecticide-treated bednets, preferably long-lasting insecticide-treated bednets, should be made available, with priority given to pregnant women and children aged <5 years.
- Indoor residual spraying should be instituted at the earliest opportunity.
- Refuse must be collected and appropriately disposed of to discourage rodent vector breeding.
- Water storage containers should be enclosed or covered with mosquito-proof lids.

3.9 Health education: basic messages

In the current crisis in Bangladesh, it may not be possible to implement all of the following recommendations. More detailed practical advice is available in section 4 Diarrhoeal diseases in the Guidelines for Control of Shigellosis.

Safe water

- Even if it looks clear, water can contain germs.
- Add drops of chlorine to the water, or boil, before drinking.
- Keep drinking-water in a clean, covered pot or bucket or other container with a small opening and a cover. It should be used within 24 hours of collection.
- Pour the water from the container – do not dip a cup into the container.
- If dipping into the water container cannot be avoided, use a single cup or other utensil with a handle and which is attached to the container.

Promote good hygienic practice

- Wash hands with soap, ash or lime:
 - before cooking, before eating and before feeding children;
 - after using the latrine or cleaning children after they have used the latrine;
 - wash all parts of hands – front, back, between the fingers and under the nails.
- Minimum of 250 g of soap should be available per person per month.
- Use the latrine to defecate.
- Keep latrines clean.
- Promote recommended respiratory etiquette.

Water sources

- Do not defecate or urinate in or near a source of drinking-water.
- Do not wash yourself, your clothes, or your pots and utensils in the source or the site dedicated for fetching drinking-water (stream, river or water hole).
- Open wells must be covered when not in use to avoid contamination.
- Buckets used to collect water should be hung up when not in use – they must not be left on a dirty surface.
- The area surrounding a well or a hand pump must be kept as clean as possible.
- Do not allow refuse and stagnant water to collect around a water source.

Avoid mosquito bites

- Sleep under an insecticide-treated bednet.

- Make sure your house or tent/shelter has been properly sprayed with insecticide during the transmission season.
- Wear protective clothing at times when mosquitoes and other biting insects are active.
- Stay indoors when outdoor biting mosquitoes are most active.
- Use insect repellents and mosquito coils if available.
- Remove, destroy or empty small rain-filled containers near the house or tent/shelter.

Safe food

- The risk of disease transmission through food preparation can be minimized by adhering (as closely as practicable) to the following recommendations.
- Water should be considered to be contaminated and made safe through boiling or treatment with chlorine before it is consumed or used in food.
- Safe food is particularly important for infants, pregnant women and the elderly who are most susceptible to foodborne diseases.
- Keep clean: wash hands and sanitize equipment used for food preparation, and keep people with symptoms of disease away from food preparation areas.
- Separate raw and cooked food and never use the same equipment for raw foods and foods that are ready-to-eat, unless such equipment has been sanitized.
- Cook thoroughly until food is steaming hot, and eat cooked food immediately.
- Use safe water to cook vegetables, and peel fruits that are eaten raw; discard damaged (flooded), spoiled or mouldy food.
- “COOK IT – PEEL IT – OR LEAVE IT”.
- Do not allow sick animals or animals found dead to enter the food chain.

Seek treatment early

- Early diagnosis and treatment diarrhoea (within 24 hours of onset).
- Diagnosis and treatment of high or prolonged fever
- If diarrhoea, a solution of oral rehydration salts made with safe (boiled or chlorinated) water should be consumed and treatment sought at a health centre.

4. RELEVANT PUBLICATIONS

WHO headquarters/WHO Regional Office for South-East Asia (SEARO) guidelines

Disease control in humanitarian emergencies (DCE), WHO/HQ

http://www.who.int/diseasecontrol_emergencies/en/

Communicable Disease Surveillance and Response, WHO/SEARO

<http://www.searo.who.int/en/section10/section369.htm>

Health Action in Crises department (HAC), WHO/HQ

<http://www.who.int/hac/en/>

Child health in emergencies

<http://www.who.int/child-adolescent-health/publications/pubemergencies.htm>

Dengue

Dengue haemorrhagic fever: diagnosis, treatment, prevention and control

<http://www.who.int/csr/resources/publications/dengue/Denguepublication/en/>

Guidelines for treatment of dengue fever and dengue haemorrhagic fever in small hospitals

http://w3.whosea.org/LinkFiles/Dengue_Guideline-dengue.pdf

Dengue haemorrhagic fever: early recognition, diagnosis and hospital management: an audiovisual guide for health-care workers responding to outbreaks. (WHO/CDS/EPR/2006.4).

Diarrhoeal diseases

Acute diarrhoeal diseases in complex emergencies: critical steps:

http://www.who.int/cholera/publications/critical_steps/

Cholera outbreak: assessing the outbreak response and improving preparedness:

http://www.who.int/cholera/publications/cholera_outbreak/

First steps for managing an outbreak of acute diarrhoea:

http://www.who.int/cholera/publications/first_steps/

Guidelines for the control of shigellosis, including epidemics due to *Shigella dysenteriae* type 1:

<http://www.who.int/topics/cholera/publications/shigellosis/>

Shigella antimicrobial resistance

Increasing spectrum in antimicrobial resistance of Shigella isolates in Bangladesh: resistance to azithromycin and ceftriaxone and decreased susceptibility to ciprofloxacin. [Rahman M](#), [Shoma S](#), [Rashid H](#), [El Arifeen S](#), [Baqui AH](#), [Siddique AK](#), [Nair GB](#), [Sack DA](#). *J Health Popul Nutr*. 2007 Jun; 25(2):158-67. Laboratory Sciences Division, ICDDR,B GPO Box 128, Dhaka 1000 (Mohakhali, Dhaka 1212), Bangladesh. mahbur@icddr.org

Environmental health in emergencies

http://www.who.int/water_sanitation_health/hygiene/emergencies/en/

<http://ochaonline.un.org/News/OCHANewsCentre/SituationReports/tabid/1094/Default.aspx>

Food safety

Ensuring food safety in the aftermath of natural disasters

http://www.who.int/foodsafety/foodborne_disease/emergency/en/

Hepatitis A

<http://www.who.int/csr/disease/hepatitis/whocdscsredc2007/en/>

Hepatitis E

<http://www.who.int/csr/disease/hepatitis/whocdscsredc200112/en/>

<http://www.who.int/mediacentre/factsheets/fs280/en/>

Gender & Gender-Based Violence

IASC Guidelines for Gender-based Violence Interventions in Humanitarian Settings (2005)

http://www.humanitarianinfo.org/iasc/content/products/docs/tfgender_GBVGuidelines2005.pdf

IASC Gender Handbook in Humanitarian Action Women, Girls, Boys and Men Different Needs – Equal Opportunities (2006)

[http://www.humanitarianinfo.org/iasc/content/documents/subsidi/tf_gender/IASC%20Gender%20Handbook%20\(Feb%202007\).pdf](http://www.humanitarianinfo.org/iasc/content/documents/subsidi/tf_gender/IASC%20Gender%20Handbook%20(Feb%202007).pdf)

WHO/UNHCR Clinical management of rape survivors: Developing protocols for use with refugees and internally displaced persons 2004 - Revised edition

http://www.who.int/reproductive-health/publications/clinical_mngt_rapesurvivors/

HIV/AIDS

HIV/AIDS interventions in emergency settings: Interagency Standing Committee guidelines

www.who.int/3by5/publications/documents/iasc/en/

Leptospirosis

http://www.who.int/water_sanitation_health/diseases/leptospirosis/en/

Leishmaniasis

<http://www.who.int/leishmaniasis/en/>

Malaria

<http://www.who.int/malaria/epidemicsandemergencies.html>

Malnutrition

Guidelines for the inpatient treatment of severely malnourished children

http://www.who.int/nutrition/publications/guide_inpatient_text.pdf

Community-based management of severe malnutrition

http://www.who.int/nutrition/topics/comm_based_malnutrition/en/index.html

Management of the child with a serious infection or severe malnutrition: guidelines at first referral level in developing countries

http://www.who.int/child-adolescent-health/publications/referral_care/homepage.htm

Training Course on the Management of Severe Malnutrition

http://webitpreview.who.int/entity/nutrition/publications/en/manage_severe_malnutritiontraining_fly_eng.pdf

Guiding principles for feeding infants and young children during emergencies

http://www.who.int/nutrition/publications/guiding_principles_feedchildren_emergencies.pdf

Communicable diseases and severe food shortage situations

http://www.emro.who.int/sudan/media/pdf/CDs_severe%20food%20shortages_FINAL_25082005.pdf

Manual on the management of nutrition in major emergencies.

<http://whqlibdoc.who.int/publications/2000/9241545208.pdf>

Operational Guidance on Infant and Young Child Feeding in Emergencies

<http://www.enonline.net/ife/resources.aspx>

WHO Policy on optimal feeding of infants and young children in emergencies

<http://www.enonline.net/ife/view.aspx?resid=103>

Management of dead bodies

Management of dead bodies after disaster situations: a field manual for first responders

<http://www.paho.org/english/dd/ped/DeadBodiesFieldManual.pdf>

Management of dead bodies in disaster situations

<http://www.paho.org/english/DD/PED/DeadBodiesBook.pdf>

Measles

WHO/UNICEF Joint Statement on reducing measles mortality in emergencies

http://www.unicef.org/publications/index_19531.html

Medical waste in emergencies

http://www.who.int/water_sanitation_health/medicalwaste/emergmedwaste/en/

<http://www.healthcarewaste.org/en/documents.html?id=15&suiwant=16>

<http://www.healthcarewaste.org/en/documents.html?id=184&suiwant=8>

Mental health in emergencies

http://www.who.int/mental_health/resources/emergencies/en/index.html

IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings 2007

<http://www.humanitarianinfo.org/iasc/content/products/docs/Guidelines%20IASC%20Mental%20Health%20Psychosocial.pdf>

Meningitis

Control of epidemic meningococcal disease. WHO practical guidelines

http://www.who.int/csr/resources/publications/meningitis/WHO_EM_C_BAC_98_3_EN/en/

Laboratory specimen collection

http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_EDC_2000_4/en/

Pandemic influenza preparedness and mitigation in refugee and displaced populations

http://whqlibdoc.who.int/hq/2006/WHO_CDS_NTD_DCE_2006.2_eng.pdf

Polio

http://www.who.int/immunization_monitoring/diseases/poliomyelitis_surveillance/en/index.html

Travel advice

<http://www.who.int/ith/en/>

Tuberculosis

<http://www.moh.gov.np/programmes/Tb.asp>

Tuberculosis care and control in refugee and displaced populations. WHO 2007.

http://whqlibdoc.who.int/publications/2007/9789241595421_eng.pdf.

Vaccines and biologicals for emergencies

<http://www.who.int/vaccines/en/emergencies3.shtml>

Vector control

http://whqlibdoc.who.int/hq/2006/WHO_CDS_NTD_WHOPEP_GCDPP_2006.1_eng.pdf

Wounds and Injuries

Integrated Management for Emergency and Essential Surgical Care toolkit

<http://www.who.int/surgery/publications/imeesc/en/index.html>

<http://www.who.int/surgery/publications/BestPracticeGuidelinesonESCinDisasters.pdf>

Example of cluster of tetanus cases in Aceh, Indonesia, post Asian Tsunami disaster

Aceh epidemiology group. Outbreak of tetanus cases following the tsunami in Aceh province, Indonesia. *Global Public Health*. 2006

Zoonotic diseases

<http://www.who.int/zoonoses/resources/en/>

5. WHO-RECOMMENDED CASE DEFINITIONS

ACUTE DIARRHOEA

Acute diarrhoea (passage of 3 or more loose stools in the past 24 hours) with or without dehydration.

SUSPECTED CHOLERA

In an area where cholera is not known to be present: a person aged >5 years with severe dehydration or death from acute watery diarrhoea with or without vomiting.

In an area where there is a cholera outbreak: a person aged >5 years with acute watery diarrhoea with or without vomiting.

To confirm a case of cholera:

Isolation of *Vibrio cholera* O1 or O139 from a diarrhoeal stool sample.

BLOODY DIARRHOEA

Acute diarrhoea with visible blood in the stool.

To confirm a case of epidemic bacillary dysentery: take a stool specimen for culture and blood for serology; isolation of *Shigella dysenteriae* type 1.

ACUTE FLACCID PARALYSIS (SUSPECTED POLIOMYELITIS)

Acute flaccid paralysis in a child aged <15 years, including Guillain–Barré syndrome, or any acute paralytic illness in a person of any age in whom poliomyelitis is suspected.

ACUTE HAEMORRHAGIC FEVER SYNDROME

Acute onset of fever (duration of less than 3 weeks) and any of the following:

- haemorrhagic or purpuric rash
- vomiting with blood
- cough with blood
- blood in stools
- epistaxis
- other haemorrhagic symptoms.

ACUTE JAUNDICE SYNDROME

Illness with acute onset of jaundice **and** absence of any known precipitating factors **and/or** fever.

ACUTE LOWER RESPIRATORY TRACT INFECTIONS/ PNEUMONIA IN CHILDREN AGED <5 YEARS

Cough or difficulty breathing

and

Breathing 50 or more times per minute for infants aged 2 months to 1 year

Breathing 40 or more times per minute for children aged 1 to 5 years

and

No chest indrawing, no stridor, no general danger signs.

Note: Severe pneumonia = cough or difficulty breathing + **one or more of the following** (inability to drink or breast feed, severe vomiting, convulsions, lethargy or unconsciousness) or chest indrawing or stridor in a otherwise calm child

MALARIA

Person with onset of fever or history of fever within the past 48 hours (with or without other symptoms such as nausea, vomiting and diarrhoea, headache, back pain, chills, muscle pain) with positive laboratory test for malaria parasites (blood film (thick or thin smear) or rapid diagnostic test).

In children

Uncomplicated malaria

Fever **AND** no general danger signs such as lethargy or unconsciousness, convulsions, or inability to eat or drink. Where possible, confirm malaria with laboratory test in children aged >5 years.

Severe malaria

Fever **AND** general danger signs (lethargy or unconsciousness, convulsions, or inability to eat or drink).

MEASLES

Fever **and** maculopapular rash (i.e. non-vesicular) **and** cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red eyes).

or

Any person in whom a clinical health worker suspects measles infection.

To confirm a case of measles:

Presence of measles-specific IgM antibodies.

MENINGITIS

Suspected case

Sudden onset of fever (>38.5 °C) with stiff neck.

In patients aged ≤12 months, a suspected case of meningitis occurs when fever is accompanied by a bulging fontanelle.

Probable case of bacterial meningitis

Suspected case of acute meningitis, as defined above, with turbid cerebrospinal fluid.

Probable case of meningococcal meningitis

Suspected case of meningitis, as defined above **and** gram stain showing gram-negative diplococcus **or** ongoing epidemic **or** petechial or purpurial rash.

Confirmed case of meningococcal meningitis

Suspected or probable case, as defined above, with **either** positive-CSF antigen detection for *Neisseria meningitidis* **or** positive CSF culture or blood with identification of *N. meningitidis*.

TETANUS

Adult tetanus

Either of the following signs 3–21 days following an injury or wound:

- trismus of the facial muscles or risus sardonicus
- painful muscular contractions.

Neonatal tetanus

Any neonate with normal ability to suck and cry during the first 2 days of life who, between day 3 and day 28, cannot suck normally, or any neonate who becomes stiff or has spasms or both.

UNEXPLAINED FEVER

Fever (body temperature >38.5 °C) for >48 hours and without other known etiology.

UNEXPLAINED CLUSTER OF HEALTH EVENTS

An aggregation of cases with similar symptoms and signs of unknown cause that are closely grouped in time and/or place.