CONTROL OF COMMUNICABLE DISEASES

Description

This chapter gives an overview of common and emerging communicable disease threats among displaced populations. General and disease-specific strategies for monitoring, preventing and controlling disease outbreaks are discussed.

Learning Objectives

- To discuss the principles of communicable disease control.
- To characterise the major disease threats in emergencies.
- To plan a communicable disease control program for emergency settings.
- To discuss simple but effective ways of preventing outbreaks of communicable diseases.
- To describe how to manage specific disease outbreaks in emergency settings.
- To review re-emerging and other diseases that may affect displaced populations.
- To discuss how to monitor and evaluate communicable disease control programs.

Key Competencies

- To understand the principles of communicable disease control.
- To recognise the major disease threats in emergencies.
- To define the objectives, strategies, and resources for setting up a disease control program.
- To identify ways of preventing or reducing outbreaks of communicable diseases in emergency settings.
- To initiate measures for managing specific disease outbreaks.
- To be aware of re-emerging and other diseases of public health importance.
- To define indicators for monitoring and evaluating communicable disease control programs.

TABLE OF CONTENTS

Principles of Communicable Disease Control 7-3
- Basic Principles 7-5

Major Disease Threats in Emergencies 7-7
- Acute Respiratory Infections 7-9
- Measles 7-10
- Malaria 7-10
- Meningococcal Meningitis 7-12
- Tuberculosis 7-13

Surveillance of Communicable Diseases 7-14
- Surveillance Forms 7-15
- Case Definitions 7-15
- Epidemic Thresholds 7-17

Planning and Setting Up Communicable Disease Control Programs 7-18
- Assessment 7-18
- Designing a Disease Control Program 7-19
- Setting Up a Disease Control Program 7-24

Preventing Outbreaks of Communicable Diseases 7-27

Managing Outbreaks of Major Communicable Diseases 7-29
- Responding to a Disease Outbreak 7-29
- Control of Specific Disease Outbreaks 7-31

Control of Other Communicable Diseases 7-38
- Hepatitis 7-38
- Typhoid Fever 7-40
- Parasitic Infections 7-41
- Re-Emerging Diseases 7-43

Monitoring and Evaluating Communicable Disease Control Programs 7-46

Appendix 7-48

References and Suggested Readings 7-50

Overview

Communicable diseases account for 51-95% of all reported deaths in refugee populations. Because there is a consistent pattern of communicable disease outbreaks in developing countries, health workers in emergency settings can predict and prepare for the following disease outbreaks:

- Communicable diseases that cause major outbreaks in the acute emergency phase as well as in non-emergency settings include: *acute respiratory infections* (ARI), *diarrhoeal diseases* (cholera, dysentery) and *vaccine-preventable diseases* (measles, malaria, and meningitis).
- *Re-emerging diseases* such as tuberculosis, sexually transmitted diseases, and HIV/AIDS are also commonly seen but, for various reasons, control measures are not usually attempted until the post-emergency phase.
- *Other infectious diseases* that cause outbreaks less frequently are yellow fever, relapsing fevers, and parasitic infections, such as worms, scabies, and lice.

Prevention and control of disease outbreaks in emergency settings requires a clear understanding of the characteristics of communicable diseases. This involves doing two things:

1. Assessing the potential incidence, prevalence, case-fatality, and mortality rates associated with frequently-occurring diseases.
2. Being aware of the biology of disease organisms and the risk factors for acquiring and transmitting them, and knowing when, where, and how to institute effective control measures.

When planning a disease control program for displaced people, consider the level of care and resources available to the host population. Because communicable disease outbreaks can affect both the refugees and host population, relief agencies should develop practical and effective disease control measures together with the local health authorities. These measures should be based on the national disease control policies.

PRINCIPLES OF COMMUNICABLE DISEASE CONTROL

A **communicable disease** may be defined as an illness that arises from transmission of an **infectious agent** or its toxic product from an infected person, animal, or reservoir to a **susceptible host**, either directly or indirectly through an intermediate plant or animal host, vector, or environment.

Note: *"Communicable" and "infectious" have the same meaning; both terms are used interchangeably throughout this chapter. However, it may be preferred to report an "outbreak" since it appears to cause less panic than "epidemic."*

The following table defines the terms that are related to the control of communicable diseases.

Table 7-1: Terms and Definitions

Attack Rate	The proportion of those exposed to an infectious agent who become clinically ill.
Carrier	A person that carries a specific infectious agent—and can transmit it to others—but has no clinical signs of infection.
Case	A person identified as having a specific health problem or disease of interest.
Case Definition	Standard criteria for deciding whether a person has a particular disease or health problem. Criteria can be clinical, laboratory, or epidemiological.
Case Fatality Rate (CFR)	The percentage of persons diagnosed with a specified disease who die as a result of that illness within a given period.

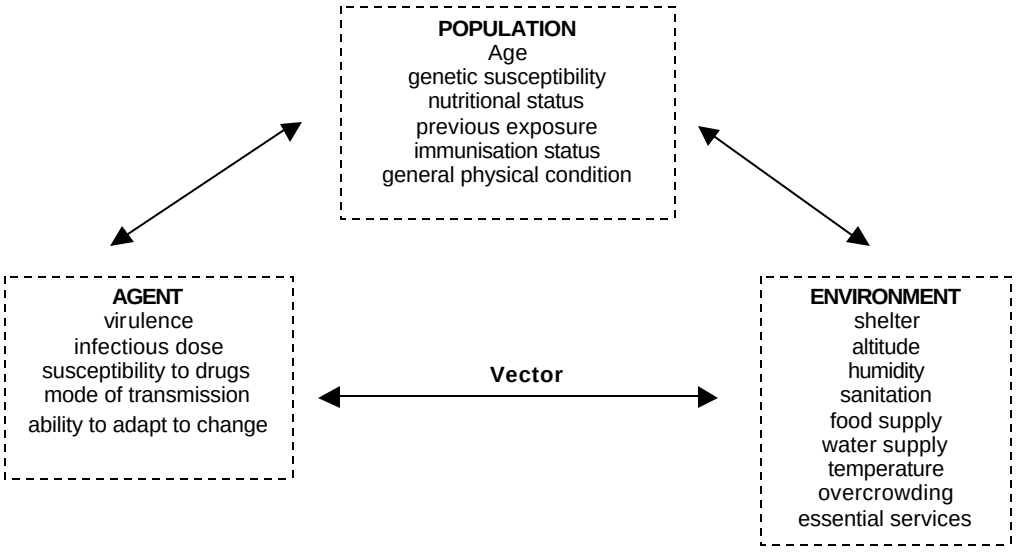
Chemoprophylaxis	The administration of drugs (usually antimicrobials) to prevent the development or progression of an infection to actual disease or to stop transmission and disease in others: • Mass chemoprophylaxis — administering drugs to the entire population • Selective chemoprophylaxis — administering drugs to the highest risk group
Clinical Illness	Signs and symptoms that give evidence of an infection.
Communicable Disease (Infectious Disease)	An illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector, or object in the environment.
Contact	A person or animal that has had an opportunity to acquire the infection following association with an infected person or animal or contaminated environment.
Drug Resistance	The ability of an infectious agent to survive despite the administration of an antimicrobial in a dose equal to or higher than the usual recommended dose.
Endemic	The continuous presence of a disease or infectious agent within a geographical area; the usual prevalence of a disease within such an area.
EPI	Expanded Program on Immunisation
Epidemic or Outbreak	The occurrence of cases of an illness with a frequency that is clearly in excess of what is expected in a given region, therefore, demanding emergency control measures.
Epidemic Threshold	The minimum number of cases indicating the beginning of an outbreak.
Epidemiology	The study of the distribution and determinants of disease in time, place, and person.
Exposure	Meeting with an infectious agent in a way that may cause disease.
Host	A person or other living animal that accommodates an infectious agent under normal conditions. The parasite may undergo various developmental stages in the host who may not have symptoms.
Incidence Rate	The number of new cases diagnosed or reported with a certain disease during a defined time period (usually 1 year) divided by the total population in which the cases occurred.
Incubation Period	The interval from the time of infection to the time clinical signs of illness appear.
Infectious Agent	Bacteria, viruses, fungi or parasites or their products that can cause disease.
Innoculum Size	The minimum dose of infectious agent or its products that can cause disease.
Isolation	Keeping infected persons or animals in separate places or under certain conditions for as long as they can transmit disease. This prevents or limits the direct or indirect transmission of the infectious agent to those who are susceptible to infection.
Morbidity	An incidence rate which includes all persons within a given population who become ill during a specific time period.
Mortality	The total number of deaths occurring in the total population during a certain period (usually 1 year) divided by the total number of people at risk.
Notifiable Disease	Disease for which regular, frequent, and timely information on individual cases is considered necessary for the prevention and control of the disease.
Prevalence Rate	The total number of persons having a certain disease or condition in a stated population at a particular time or period divided by the population at risk of the disease or condition at that time.
Primary or Index Case	A person who acquires a disease through exposure and brings it into a population.
Reservoir	Any person, animal, arthropod, plant soil, etc. in which the infectious agent normally lives and reproduces itself in such a manner that it can be transmitted to a susceptible host.
Secondary Case	A person infected by the primary case.

Surveillance	Systematic collection, collation, and analysis of data and dissemination of resulting information so that action can result.
Susceptible Host	Person or animal not possessing sufficient resistance against a particular infectious agent to prevent contracting infection or disease when exposed to it.
Transmission	Any mechanism by which an infectious agent is spread from a source or reservoir to a person: • Direct transmission — immediate transfer of infectious agents to a suitable portal of entry through which infection of a human or animal may take place (direct contact or projection) • Indirect transmission — transfer of infectious agents through intermediate means: e.g., vehicle-borne (contaminated materials), vector-borne (arthropods)
Universal Precautions	Simple, standard procedures to be used during the care of patients at all times to minimise the risk of transmission of blood-borne viruses, including HIV. They consist of handwashing, use of protective clothing such as gloves; safe handling of sharp instruments; safe disposal of medical waste include sharps; and decontamination of instruments and equipment.
Virulence	The ability of an infectious agent to invade and damage tissues of the host and/or cause death.

Basic Principles

A disease **epidemic** or **outbreak** is the occurrence of cases of a particular disease in excess of the expected, therefore, demanding that emergency control measures be implemented. It is incorrectly assumed that "epidemics and plagues are *inevitable* after every disaster." The threat of communicable disease outbreaks *is* greater after a disaster than in non-emergency situations, particularly when large populations have been displaced. However, an epidemic or outbreak will only occur if the equilibrium between the population's susceptibility (host or reservoir), the virulence of the infectious agent (bacteria, viruses, parasites, or fungi or their products) and the environment that promotes the exposure (refer to the Figure below) is upset.

Figure 7-1: Equilibrium Between the Population, Infectious Agent, and the Environment



Even though each emergency situation is unique, all emergencies are surrounded by the same factors, which can upset the balance between the **infectious agent**, the **host**, and the **environment**, as follows:

- **Agent:** Infectious disease agents are constantly searching for opportunities to multiply either in susceptible persons, vectors, animals, or in the environment. Because their genes can transform rapidly, they are able to spread to new locations, disappear, and then re-appear to infect more vulnerable populations. Some infectious agents cause higher rates of illness and death because they have become resistant to available treatment (e.g., *M. tuberculosis, P. falciparum*) or are more virulent, leading to major outbreaks (e.g. Shigella, Ebola).

  Note*: A disease outbreak will not occur if an infectious agent for a particular disease is not present in the environment and is not introduced after a disaster, even if environmental conditions are ideal for transmission.*[1]

- **Host:** Displaced persons may change the local environment or bring new or different strains of infectious agents. In addition, they may have low immunity to infections due to poor physical or nutritional status, underlying diseases, or poverty. Some individuals are more vulnerable to infectious diseases or the more severe form of the illness. For example, children less than 5 years of age (usually about 20% of the displaced population) are at greatest risk of morbidity and mortality from infectious diseases, particularly those who are malnourished.

- **Environment:** Opportunities for infection may increase due to overcrowding, unhygienic conditions, lack of safe drinking water, etc. In addition, essential services (public health or medical) may become disrupted or overwhelmed by the emergency situation.

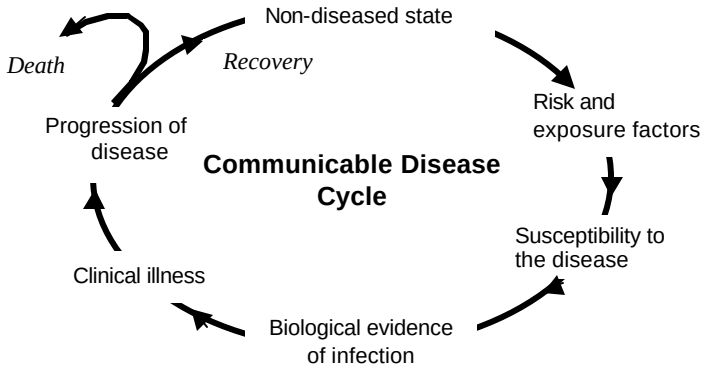
  Note: *Because communicable diseases respect no boundaries, outbreaks occurring within the displaced population may spread to the host population, and vice versa. The above risk factors may apply to either population.*

Whether communicable disease outbreaks occur will, therefore, depend on the type of infectious agents existing within the local environment and the refugee settlement, and the physical condition and health status of the displaced population.

Communicable Disease Cycle

It is important to understand the cycle of communicable diseases (see Figure below). This may help to identify the individuals that are likely to transmit the disease, as well as those at greatest risk of becoming ill or dying within the population.

Figure 7-2: The Communicable Disease Cycle



Communicable diseases do not always develop in the same way in susceptible hosts. Some diseases produce more non-clinical cases (e.g., polio, tuberculosis), while other diseases produce more clinical cases (e.g., measles). However, once exposed, even people *without* clinical or biological signs of infection are capable of spreading the disease to other susceptible hosts. Such people are known as **carriers**.

Control of Communicable Disease Outbreaks

To improve the health of displaced populations in developing countries, disease control programs need to focus on the communicable diseases that cause the highest rates of illness and death within a community. The following approach may be appropriate for disease control programs:

1. Preventing Communicable Disease Outbreaks

The goal of prevention is to preserve the health of displaced persons by predicting and — to the extent possible — lessening the impact of any possible outbreak of disease. Preventive measures focus on the initial stages of the communicable disease cycle, namely *risk and exposure factors* and *susceptibility to the disease*, as follows:

a. Prevent the development of infectious agents that can attack susceptible individuals —
Since this may be difficult, minimise the multiplication of infectious agent, e.g., by chlorinating water, disposing of human faeces properly, and draining wastewater.

b. Minimise opportunities for exposure to infections —
Interrupt disease transmission by treating or isolating infected persons and improving water sources and shelters.

c. Reduce susceptibility to infectious diseases —
Improve a population's immunity by promoting better nutrition, immunisation, and others means of self-protection.

2. Managing Communicable Disease Outbreaks

Managing communicable disease outbreaks focuses on controlling the more advanced stages of the communicable disease cycle, namely the *biological evidence of infection, clinical illness*, and *progression of disease* in infected persons. Possible outbreak control measures include the following:

a. *Primary Prevention* — preventing the development of biological and clinical signs of disease by immunising susceptible people, chlorinating water, practising good sanitation, etc.

b. *Secondary Prevention* — preventing mild illness from becoming more serious by diagnosing early and treating with antibiotics (where appropriate) and supportive care.

c. *Tertiary Prevention* — preventing or minimising disease complications by referring or treating individuals with cerebral malaria, tuberculosis, severe malnutrition, etc.

MAJOR DISEASE THREATS IN EMERGENCIES

Displaced populations may be at increased risk of illness and death from many types of communicable diseases—*diseases possible*. Depending on the local environment, some diseases are more likely to occur in an area than others—*diseases likely*.

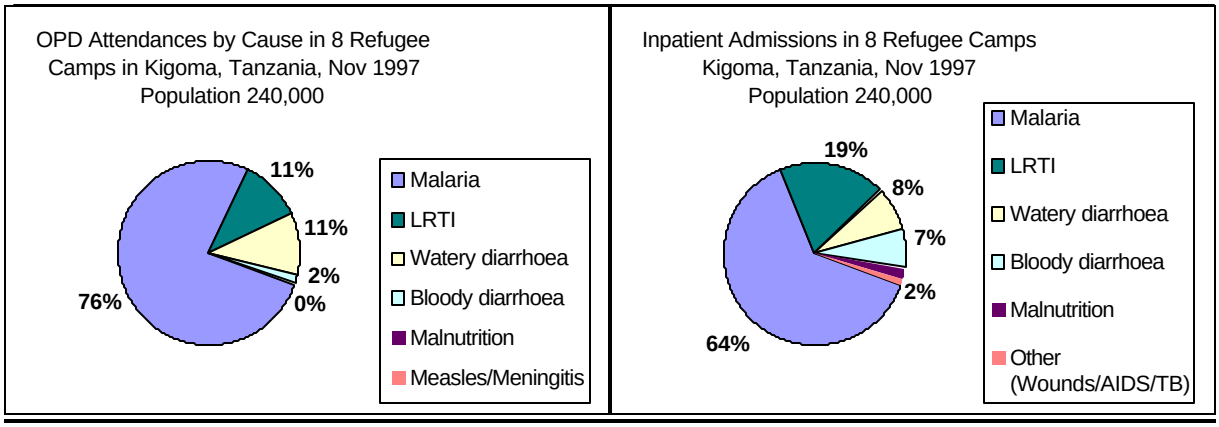
The following table defines the diseases that are possible and likely to occur in emergency situations. Among all possible and likely diseases, those that commonly occur among the host population have the potential to spread to the displaced population and cause major outbreaks (appearing in bold in the table). Diseases that appear in bold in the table will be the main focus for the remainder of this chapter.

Table 7-2: Overview of Possible and Likely Diseases During Emergency Situations

TRANSMISSION	DISEASES POSSIBLE	DISEASES LIKELY
AIR-BORNE	ARI Measles Meningitis Pertussis Tuberculosis	**ARI** **Measles** **Meningitis** Pertussis **Tuberculosis**
FAECAL OR FAECAL-ORAL	Amoebae Cholera Diarrhoea Dysentery Giardia Hepatitis Parasites: round/hook worm Typhoid	**Cholera** **Diarrhoea** **Dysentery** Parasites: round/hook worm
SEXUALLY TRANSMITTED INFECTIONS (STIs)	Syphilis Chancroid Gonorrhoea Chlamydia Trichomonas Others: HIV	Syphilis Chancroid **Gonorrhoea** Chlamydia Trichomonas Others: **HIV**
VECTOR BORNE	Malaria Relapsing fever Sleeping sickness Schistosomiasis Typhus Yellow fever Dengue Leptospirosis	**Malaria** Relapsing fever Typhus

Outbreaks of communicable diseases may occur among displaced populations at any time. However, the main causes of illness and death during the acute emergency phase are **acute respiratory infections (ARI)**, **measles**, **diarrhoeal diseases**, and **malaria** (in areas where it is endemic malaria), whereas tuberculosis, meningitis, and other diseases may become a bigger problem during the post-emergency phase (see exhibits below). In addition to these diseases, other communicable diseases, such as hepatitis, typhoid fever, and yellow fever may also cause outbreaks among displaced populations.

Figure 7-3: Morbidity reports from Kigoma Refugee Camps *Source: WHO/UNHCR*



Acute Respiratory Infections

Acute respiratory infections (ARI) are the leading causes of illness in developing countries, particularly among children less than five years. Many children have 4-6 episodes of ARI per year. Death may occur when children develop pneumonia, measles, or whooping cough. About four million children die every year from pneumonia, most of them less than 2 months of age.[2]

Although many disease pathogens can cause ARI, bacteria and viruses together account for 75% of all deaths from pneumonia. Specific disease pathogens for ARI include:

- **Bacteria** — *Streptococcus pneumoniae, Haemophilus influenza*
- **Viruses** — measles, respiratory syncitial virus (RSV), para-influenza, adenovirus, rhinovirus, which invade any part of the respiratory tract.[3] [4]

The following factors may increase the likelihood of transmission and poor outcome from ARIs:

- **Environment** — insufficient shelter, indoor air pollution (smoke from cooking fuel and cigarettes), overcrowding, and reduced access to health care.
- **Host** — age (less than 2 years and above 65 years), low birth weight, lack of breast-feeding, malnutrition, vitamin A deficiency, incomplete immunisation, and lack of maternal education.

Acute respiratory infections can affect one or more parts of the respiratory system as follows:

- **Upper respiratory tract** — nose, pharynx, epiglottis or middle ear
- **Lower respiratory tract** — larynx, trachea, bronchi, lungs

As a result, people with ARI may show a variety of clinical features, such as runny nose, sore throat, cough, difficult breathing, or ear problems. However, a few children with cough may develop acute lower respiratory infections, particularly pneumonia (an acute infection of the lungs). Severe pneumonia can lead to death either from lack of oxygen, or infection of the bloodstream (called sepsis or septicaemia). The following table summarises the classification of ARI based on the main symptoms.[5]

Table 7-3: Clinical Presentation of ARI

Main Symptoms	Classification of ARI
Cough or difficult breathing	• No pneumonia • Pneumonia • Severe pneumonia • Very severe disease (severe complications of measles, whooping cough, diphtheria)
Ear pain or discharge	• No ear infection • Mastoiditis • Acute ear infection • Chronic ear infection
Sore throat	• Streptococcal sore throat • Throat abscess

Source: WHO – IMCI

The remainder of this chapter will focus on ARI that cause high morbidity and death, namely those characterised by cough or difficult breathing.

Measles

Measles remains a major childhood killer, accounting for more deaths than any other vaccine-preventable disease. In 1995, measles caused an estimated 435,000 deaths or about 50% of childhood deaths world-wide, most of them in Africa.[6] Despite efforts of the global Expanded Program of Immunisation (EPI), measles is still endemic in many developing countries, especially where conflict prevents routine immunisation.[7]

Measles is an acute infection of the measles virus, *Morbillivirus* of the family *Paramyxoviridae*. The disease is spread through close respiratory contact with contagious air droplets. Infected persons can transmit the disease to susceptible hosts even before the appearance of the measles rash. Life-long immunity is acquired after measles infection. Normal case fatality rates for measles range between 3-5%. However, among displaced populations, the case fatality rate ranges between 10-30%, but can be as high as 50%.[8] [9]

Outbreaks of measles commonly occur in refugee settings, especially during the acute emergency phase. The following factors may promote the transmission and poor outcome from measles:

- **Environment***:* Overcrowding increases the risk of secondary infection, which increases the severity of disease in all age groups.[10] Health workers may fail to recognise measles cases and not give proper care to people with severe infection. [11] [12] General lack of awareness about measles within the community results in failure to seek appropriate health care for the sick and the spread of disease to others.
- **Host***:* All unvaccinated persons are at risk of developing measles, but the risk of death is highest among children between the age of 6 months and 5 years. Malnutrition, chronic vitamin A deficiency, and pre-existing diseases increase the risk of death from measles by decreasing the body's immunity.

Measles can affect many body systems and most deaths occur due to secondary infections of the respiratory system and/or gastrointestinal tract (GIT). This is summarised in the table below:

Table 7-4: Clinical Presentation of Measles

Clinical Measles	Complications of Measles
• Prodromal fever • Conjunctivitis • Cough • Koplik spots • Measles rash	• Respiratory — croup, bronchiolitis, pneumonia, **bacterial super-infections** • GIT — diarrhoea, **severe dehydration, malnutrition** • CNS — convulsions, **encephalitis** • Blood — anaemia • Skin — mouth ulcers • Eyes — infections, blindness (Vitamin A deficiency) • ENT — middle ear infections, deafness

Note: *Very sick children are more likely to develop and die from the viral complications and secondary bacterial infections that appear in bold letters in the above table. Severely malnourished children may have a milder rash but more severe disease.*

Malaria

In the last decade, the number of malaria cases has risen at an alarming rate, particularly in Africa. WHO estimates there are 300 million malaria cases annually, resulting in 1.1 million deaths, of which 86% occur in sub-Saharan Africa, about 71% of them among children less than 5 years of age. Between 1994 and 1996, outbreaks of malaria in 14 countries in sub-Saharan Africa caused an unexpectedly high number of deaths, many in areas previously free of the disease.[13]

Epidemics of malaria have been reported among displaced populations, with incidence rates ranging from 70 to 600 per 1000 population.[14] [15] [16] From late 1997 through 1999 malaria epidemics occurred across refugee camps and host towns in north-eastern Kenya, western Kenya, Somalia, DRC and southern Sudan. Death

rates were reported as high as 13 deaths per day per 10,000 people in NE Kenya amongst Somali refugee communities in early 1998 following El- Nino rains.[17]

Malaria is an illness that is caused by malaria blood parasites. There are four species of malaria parasites: *Plasmodium vivax*, *P. ovale*, and *P. malariae* or *P. falciparum*. In sub-Saharan Africa over 90% of infections are due to *P.falciparum*, whereas in emergencies in other parts of the world e.g., East Timor, there may be different infection levels for each species and a few cases may have mixed falciparum and vivax infections. Most deaths due to malaria are caused by *P. falciparum* (a small percentage of the total deaths from malaria are caused by *P. vivax*, predominantly amongst the very young and very old).

The malaria parasite is usually transmitted through the bite of an infected female anopheles mosquito, but transmission through blood transfusions may also occur. Factors favouring the spread of malaria in refugee settings include:

- **Agent**: Parasite breeding may increase due to changes in the environment, inadequate malaria control measures, or increasing resistance to anti-malarial drugs following wide-spread self-treatment.
- **Environment**: There may be increased opportunities for infection due to insufficient shelter, overcrowding, weather changes, or settlements being located too close to surface water sources. The risk of death is high where appropriate treatment for malaria is not available.
- **Host**: Displaced populations may be more susceptible to infections due to malnutrition or low immunity (if they migrated from non-endemic to highly endemic areas).

With the exception of severe malaria, which is caused by *P.falciparum*, it may be difficult to distinguish infections due to the four malaria species based on clinical symptoms alone. Not everyone infected with malaria parasites will develop clinical malaria, as this depends on the level of the host's pre-existing partial immunity. The following table summarises different clinical presentations of malaria:

Table 7-5: Various Clinical Presentations of Malaria

PRESENTATION	UNCOMPLICATED MALARIA	COMPLICATED MALARIA
Parasite species	*P. falciparum, P. malaria, P. ovale, P. vivax*	Only *P. falciparum*
At risk group	Very young and very old, people with concurrent health conditions. Displaced people of all ages and sexes with low or partial immunity if they move from a low to a high transmission area	Infants and young children, malnourished individuals, pregnant women, immuno-compromised adults. Displaced people of all ages and sexes with low or no partial immunity if they move from a low to high transmission area
Clinical Features	• Typical malaria: fever and shaking, chills, alternating with no symptoms. • Other symptoms: muscle/joint pains, nausea, vomiting, anaemia, enlarged spleen.	• Typical malaria may or may not be present. • Other symptoms:* confusion, drowsiness, extreme weakness, cerebral malaria, generalised convulsions, severe anaemia, metabolic acidosis with respiratory distress, jaundice, high fever, acute pulmonary oedema, ARDS, abnormal bleeding, algid malaria*, renal failure, haemaglobinuria, hyperparasitaemia.[18]

***** These manifestations can occur singly or, more commonly, in combination in the same patient

****** Circulatory collapse, shock, septicaemia

Many infected people do not show typical signs and symptoms of malaria, particularly those who are partially immune or have been taking anti-malarial drugs. Falciparum malaria can be fatal, even in cases without drug resistant malaria.

Note: *Other infections can cause clinical illness that appears to be malaria. However, in endemic areas where laboratory tests are not available, all patients with fevers should be suspected of having malaria.*

For more information about the *vector* that transmits the malaria parasite and control measures, please refer to the *Vector Control* chapter.

Meningococcal Meningitis

Outbreaks of meningococcal meningitis can occur in any part of the world. However, major outbreaks occur mainly within the semiarid areas of sub-Saharan Africa, often known as the "African meningitis belt," which extends from Ethiopia in the east to Senegal in the west. In these areas, sporadic infections occur in seasonal cycles, while large-scale outbreaks have been reported every 8–12 years during the past 50 years. Meningitis epidemics often reach their peak after 12 weeks and last about 6 months on average, with or without intervention.[19]

Due to climatic changes, increased mobility of populations, and adaptation of the bacteria species, shorter intervals have been observed between outbreaks since the 1980s. These outbreaks have also occurred beyond the meningitis belt. Attack rates of meningitis during major outbreaks in Africa range between 100-800 per 100,000 population. Several meningitis outbreaks have been reported among displaced populations in Malawi, Ethiopia, Burundi, and Zaire.[20] These outbreaks have not been confined to the displaced population, but have been widespread through the whole area.[21]

Meningitis is the most important bacterial infection of the central nervous system. Large outbreaks of meningitis are mainly caused by *Neisseria meningitidis*, better known as meningococci, types A, B, and C. 90% of outbreaks are caused by meningococci type A.

Note: *Meningitis due to other micro-organisms (viruses, fungi, TB, etc) does not cause epidemics.*

The disease is transmitted by direct contact with respiratory droplets from the nose and throat of infected people.[22] [23] While mainly a disease of very small children, meningitis also affects older children and young adults (up to 30 years), especially those living in crowded conditions.[24] The case fatality of meningitis depends on the time between the onset of the clinical disease and the start of proper medical care. Untreated meningitis has a case fatality rate of 50%, which can drop to 10% with treatment.[25]

The following risk factors may increase the transmission and risk of death from meningococcal meningitis:

- **Agent**: The meningococci may develop resistance to commonly used antibiotics.
- **Environment***:* Opportunities for infection are increased by overcrowding, the dry season, in endemic zones, insufficient hygiene, poor housing, limited access to health services, and delayed detection of outbreaks.
- **Host***:* The population may be more susceptible to infection due to pre-existing infection or malnutrition. Children less than one year are most susceptible to infections.

Meningococcal disease may either present as *meningococcal meningitis* (more common, especially in epidemics) or *meningococcal septicaemia* (not common in epidemics, but highly fatal). Both forms of the disease may be present in an individual at the same time. A classic case of meningococcal meningitis is easily diagnosed. The following table summarises the clinical presentation of meningococcal meningitis:

Table 7-6: Clinical Presentation of Meningococcal Meningitis

Typical Presentation	Atypical Presentation (Infants under 1 year)
Acute onset of intense headache, high fever, nausea, vomiting, stiff neck, photophobia, impaired consciousness, convulsions, coma.	Irritability, refusal to feed, vomiting, fits, lethargy, bulging fontanel. **Note***: Onset is not always rapid. A stiff neck may be absent.*

Note: *Meningococcal septicaemia is difficult to diagnose outside an epidemic since the stiff neck symptoms are usually absent and the rash or purpura may not be obvious.*

Tuberculosis

Tuberculosis (TB) is a major cause of chronic illness in many parts of the world, accounting for 25% of all avoidable deaths in developing countries. About one-third of the world's population is infected, and each year there are nine million new cases. 95% of TB cases reside in developing countries. Of these cases, 75% are within the economically productive age group.[26]

Over 85% of refugees originate from, and remain in, countries with a high prevalence of TB, for example:

- In 1989, 25% of all adult deaths in one refugee camp in Somalia were due to TB.
- In 1990, 38% and 50% of all adult deaths in two camps in Eastern Sudan were due to TB.[27]
- In Kenya, the incidence of new patients with infectious TB in refugee camps was 4 times the rate of the local population. This placed an extra burden on the Kenyan TB program.

Tuberculosis is caused by *Mycobacterium tuberculosis*. Infected individuals release contagious droplets when they cough, talk, or sneeze. These droplets can be inhaled by susceptible adults and children. As long as viable tubercle bacilli are being discharged in the sputum, the disease is communicable. People with laryngeal TB are highly contagious. The most dangerous period for developing clinical disease is the first 6–12 months after exposure.[28]
The following factors increase the spread of disease or development of disease complications:

- **Agent***:* Transmission of tuberculosis depends on both the number and virulence of bacilli released. In addition, there is an increase in multi-drug resistant infections, mainly as a result of incorrect or incomplete treatment.[29]
- **Environment***:* Poor living conditions with overcrowding and inadequate ventilation can increase the spread of infectious agents from infected persons to susceptible hosts. Lack of access to clinical and diagnostic services results in delayed diagnosis and, therefore, treatment is delayed also.
- **Host**: The risk of infection is highest in children less than 3 years of age. It is lowest in late childhood and becomes high again among adolescents, young adults, and the very old. Young children may die from military TB or TB meningitis. The risk of death from TB is higher among people with HIV infection and other illnesses as well as among underweight and under-nourished people.[30]

  Note: *A large proportion of clinical disease among African adults arises from reactivation of latent infections.*

The following table summarises the clinical presentation of tuberculosis:

Table 7-7: Clinical Presentation of Tuberculosis

Pulmonary Tuberculosis	**Extra-Pulmonary Tuberculosis** (15-20% of cases)
May occur with or without cavities. If untreated, 50% of cases will die within 5 years, 25% will be self-cured, and 25% will remain ill with chronic infectious TB.	*Severe forms* — TB meningitis, miliary TB *Other forms* — pleural effusion, lymph nodes, pericarditis, bones and joints, peritoneum (ascites), gastrointestinal tract, kidney, skin, eyes
Signs and symptoms: Persistent cough for 4 weeks or more, loss of appetite and weight, fatigue, chills, chest pain, night sweats, blood in sputum	Signs and symptoms depend on the affected organ: Lymph nodes — pain and swelling Joints — pain and swelling Respiratory tract — pleural fluid CNS — meningitis, etc.

Note: *Children may produce no sputum and have non-specific symptoms.*

The following table summarises the epidemiology of major diseases in emergencies:

Table 7-8: A Summary of the Epidemiology of Communicable Diseases

DISEASE	AGENT	RESERVOIR	SPREAD	RISK FACTORS	INFECTIOUS PERIOD	NATURAL IMMUNITY
ARI	Bacteria, virus	Human	Airborne; Direct or indirect contact with nasal discharges	Crowding, malnutrition		Short term
Cholera	Vibrio cholerae 01 and 0136	Humans, partially salty water	Ingestion of contaminated food, water, raw or undercooked seafood	Low gastric acidity	As long as infectious agent is passed in stool, until a few days after recovery	Short term and not against other biotypes
Malaria	Plasmodium: vivax, malariae, falciparum, ovale	Humans	Mosquito bite, Blood transfusion	Lack of immunity* poor access to care, inadequate vector control	As long as patient harbours gametocyte form of parasite	Short term
Measles	Measles virus	Humans	Close respiratory contact and aerosol droplets	Crowding, Poverty	4 days before until 2 days after rash	Lifelong
Meningitis	Neisseria meningitidis Groups A, B, and C	Humans	Direct contact, respiratory droplets	Very young	Meningococci disappear from nasopharynx within 24 hours of using effective antibiotics	Group specific immunity of unknown duration
Shigellosis	Shigella dysenteriae type I	Humans	Faecal-oral	Very young/old, malnourished, having underlying disease (s)	During acute infection until 4 weeks after illness	Little or none
TB	Mycobacterium tuberculosis	Humans	Airborne droplets from sputum positive person	Malnutrition, poor access to care, low immunity	As long as sputum is positive and not on treatment	Not known, reactivation of old infection common

* Lack of immunity among people displaced from low to high transmission area is a risk factor for development of severe disease

SURVEILLANCE OF COMMUNICABLE DISEASES

> *Surveillance is the ongoing systematic collection, analysis, and interpretation of health data, which is essential to the planning, implementation, and evaluation of public health practice. It includes timely dissemination of data to those who need to know. The final link in the surveillance chain is the application of these data to disease prevention and control.*

Successful control of communicable diseases needs good surveillance. It is not enough to achieve a high coverage of measles immunisation, chlorination of water, and other disease control measures. Without collecting and analysing health data such as disease incidence, health workers would not be able to detect outbreaks and alert people early or identify groups at increased risk of death from communicable diseases. Good surveillance can increase understanding about the changing disease patterns as well as guide disease control measures.

During emergencies, a surveillance system should be set up as soon as possible. It should focus on diseases that cause the most problems, which can be controlled by local measures. Surveillance should be carried out within health facilities as well as in the community (through community health workers). Where possible, the emergency surveillance system should be linked with the host country's surveillance system.

Surveillance Forms

A central registration system for recording *all* deaths occurring at health facilities, and within and outside the settlement should be set up. When recording morbidity information, only *newly diagnosed cases* should be tallied under the specified disease condition. Patients returning to health facilities for the same health problem within a certain period (e.g., 7 days) should be recorded as "repeat cases." Depending on the reporting frequency (daily, weekly, or monthly), this information can be summarised on mortality and morbidity surveillance forms. See the Appendix for examples of surveillance forms.

Surveillance data may be collected from the following sources of information:

- Morbidity and mortality reports from health facilities and community health workers.
- Reported deaths from central death registers, health workers, community leaders, etc.
- Laboratory reports on isolation and identification of infectious agents.
- Reports on water supply, sanitation, vector control, food distribution, etc. from health-related services.
- Rumours or reports of disease outbreaks from community leaders, schoolteachers, field supervisors, etc.

Case Definitions

Case definitions are standard criteria that help health workers decide if a person has a particular disease or health problem. Standard case definitions for common health conditions are also needed for the following:

- **Registration of cases** — Standard case definitions are used to diagnose and record common health problems affecting the population. This helps to accurately monitor the disease trends and make better estimates of required resources, e.g., malaria, pneumonia. If standard case definitions are used at several locations or by different relief agencies, disease trends among different populations can be compared.
- **Notification** — Standard case definitions are used to alert national health authorities about outbreaks of *notifiable diseases* (diseases for which regular, frequent, and timely information on individual cases is considered necessary for the prevention and control of the disease). These include measles, cholera, shigellosis, meningitis, hepatitis, tuberculosis, yellow fever, and haemorrhagic fever.
- **Defining the appropriate treatment** — Patient treatment may be prescribed according to standard case definitions, e.g., ARI, TB.

Case definitions may be classified according to different criteria, including the following:

- *Site of clinical disease* – upper or lower respiratory infections
- *Severity of disease* – uncomplicated or complicated malaria
- *Laboratory results* – suspected or confirmed meningitis
- *History of treatment* – new, relapse, treatment failure or treatment after interruption case for tuberculosis

The following table gives examples of commonly used standard case definitions. Most cases in refugee settings are diagnosed according to clinical and epidemiological information. This is because laboratory confirmation and access to x-ray facilities may not be practical, particularly in the acute emergency phase.

Note: *Use of standard case definitions will depend on the training and skills of the health workers and availability of laboratory facilities.*

Table 7-9: Sample Case Definitions

Diagnosis	Key Signs and Symptoms
Measles	Any person with a generalised maculopapular rash AND history of fever of 38^{0} C (101^{0} F) or more AND *at least one of the following*: cough, runny nose or conjunctivitis (red eyes); *OR* Any person in whom a health professional suspects measles
Acute Respiratory Infections (ARI)	An acute infection of the ear, nose, throat, epiglottis, larynx, trachea, bronchi, bronchioles or lung
• Very severe disease	A child or infant who has any general danger sign*
• Severe pneumonia	Child aged 2 months– 5 years: Cough or difficult breathing with chest indrawing Infant aged less than 2 months: Severe chest indrawing or fastbreathing**
• Pneumonia	Child aged 2 months– 5 years: Cough or difficult breathing with fast breathing** (but no chest indrawing) Infant aged less than 2 months: Since pneumonia in this age group can progress very rapidly to death, all pneumonia is considered severe
• No pneumonia: cough or cold	Child aged 2 months – 5 years: No chest indrawing, and no fast breathing** Infant aged less than 2 months: No danger signs, no chest indrawing and no fast breathing**
• Mastoiditis	A child who has tender swelling behind the ear (in infants, the swelling is above the ear)
• Acute ear infection	A child who has pus draining from the ear for less than 2 weeks, ear pain or a red immobile ear drum
• Chronic ear infection	A child who has pus draining from the ear for 2 weeks or more
• Throat abscess	A child who is not able to drink at all
• Streptococcal sore throat	A child who has tender, enlarged lymph nodes in the front of the neck and a white exudate on the throat
Malaria	
• Simple	Fever (axillary temperature above 37.5oC) or history of fever in the last 3 days
• Complicated	Simple malaria with altered level of consciousness, coma, convulsion, severe haemolysis, severe anaemia, organ failure
• Lab-confirmed	Simple or complicated malaria confirmed by finding malaria parasites in blood
• Cerebral malaria	Unrousable coma not attributable to any other cause in a patient with falciparum malaria
Diarrhoeal Diseases	
• Watery diarrhoea	3 or more liquid stools per day
• Dysentery	Diarrhoea with visible blood in stools. In some situations, the presence of blood is verified by a health worker.
Meningitis	
• Suspected case	Any person under 1 year: Fever WITH a bulging fontanel Any person above 1 year: Sudden onset of fever WITH a stiff neck AND/OR pettechial or purpural rash
• Probable case	Suspected case WITH turbid CSF (with or without Gram stain) OR ongoing epidemic
• Confirmed case	Suspected or probable case AND a positive CSF (culture or antigen)
Tuberculosis	
• New case	A patient who has never had treatment for TB or who has taken anti-tuberculosis drugs for < 4 weeks
• Relapse case	A patient who had been declared cured of any form of TB in the past by a physician, after one full course of chemotherapy, and has become sputum smear-positive.
• Treatment failure	A patient who: • while on treatment, remained or became smear-positive 5 months or later after starting treatment. • was initially smear-negative before starting treatment and became smear-positive after the second month of treatment
• Treatment after interruption	A patient who interrupts treatment for two months or more and then returns to the health service with smear-positive sputum.

Source: WHO

* *Danger signs in infant aged less than 2 months* — stopped feeding well, convulsions, abnormally sleepy or difficult to wake, stridor when calm, wheezing, fever or low body temperature

Danger signs in child aged 2 months-5 years — not able to drink, convulsions, abnormally sleepy or difficult to wake, stridor when calm, or severe malnutrition

** *Fast breathing* — 40 breaths per minute or more if the child is aged 12 months up to 5 years; 50 breaths per minute or more if the child is aged 2 months up to 12 months; 60 breaths per minute or more if the child is aged less than 2 months

Epidemic Thresholds

Although many risk factors may indicate a possible disease outbreak, it is difficult to predict when or where the outbreak will actually begin. Keeping track of weekly incidence rates and comparing them to those of the previous month or season may improve prediction. A simpler way of determining whether reported cases are sporadic or suggest an epidemic is to compare the disease incidence rate or **attack rate** (the proportion of those exposed to an infectious agent who become clinically ill) to the **epidemic threshold** (the minimum number of cases indicating the beginning of an outbreak of a particular disease). Standard epidemic thresholds have been defined for some diseases, including the following:

- **Measles** — A *single* case of measles is enough to signal a possible outbreak of measles. Any reported case should be followed by an immediate investigation of the age and vaccination status of the suspected or confirmed case of measles.

- **Cholera**

  In a non-endemic area, an outbreak of cholera should be suspected if:[31]

  - a patient older than 5 years develops severe dehydration or dies from acute watery diarrhoea

  or

  - there is a sudden increase in the daily number of patients with acute watery diarrhoea, especially patients who pass the "rice water" stools typical of cholera.

  In areas that are endemic, a cholera outbreak should be suspected if there is a significant increase in incidence over and above what is normal for the season, particularly if it is multifocal and accompanied by deaths in children less than 10 years old.[32]

- **Shigella —** An outbreak should be suspected whenever there is an unusual increase in the weekly number of patients with bloody diarrhoea or deaths from bloody diarrhoea.[33]

- **Meningitis** — There is no universal epidemic threshold for defining an outbreak. The following table summarises useful indicators of emerging epidemics for different settings:

Table 7-13: Threshold for Predicting Meningitis Epidemics in Different Settings

Setting	Threshold
Area endemic for meningitis (with populations of 30,000-100,000)	**15 cases per 100,000 persons per week in a given area,** averaged over two consecutive weeks **an increasing proportion of patients five years or older,** primarily among school children and young adults
Area where meningitis epidemics are unusual, outside the meningitis belt. (Also where population data is not known, refugee or closed communities.)	**a three-to four-fold increase in cases** compared with a similar time period in previous years **doubling of meningitis cases from one week to the next for a period of three weeks**
A settlement next to an area where an epidemic has been declared.	**5 cases per 100,000 persons per week**

Source: WHO

The surveillance team should be aware of the epidemic thresholds for all diseases that can cause outbreaks in the disaster location. Otherwise, an outbreak may become large scale simply because the team failed to recognise and respond to it on time. Once an outbreak of a notifiable disease is detected, it must be reported immediately to all concerned. All suspected cases should be confirmed (by laboratory, where possible) and given appropriate treatment and follow up.

(See the section on Managing Outbreaks of Communicable Diseases for details on Outbreak Investigation.)

Assessment

Planning of disease control programs should begin with an assessment, which gathers essential background information, as summarised in the following table:

Table 7-14: Summary of Background Information for Communicable Disease Control Programs

- the demographic composition of the displaced population
- the annual disease incidence rates of common diseases in the place of origin
- the annual disease incidence rates of common diseases in the host country
- the disease control policies in the place of origin
- the disease control policies in the host country
- the performance of disease control programs in the place of origin
- the performance of disease control program in the host country
- the displaced population's knowledge, cultural beliefs, and treatment of communicable diseases
- the knowledge and experience of health workers in the control of communicable diseases
- the resources available for implementing a communicable disease control program
- the capacity of local institutions and NGOs to implement a disease control program

After the assessment, the factors that promote the spread or influence the outcome of common diseases should be summarised in order to determine the appropriate control measures.

The following table gives examples of identified risk factors and recommended actions for communicable disease control after a rapid assessment:

Table 7-15: Risk Factors and Recommended Actions for Control of Priority Diseases

PRIORITY DISEASES	IDENTIFIED RISK FACTORS	RECOMMENDED ACTIONS
Diarrhoeal Diseases	Not enough latrines Poor quality water sources Contamination of stored water Poor food preparation practices	Build and keep latrines clean Chlorinate water and supply water vessels Provide soap Promote food hygiene Health education on diarrhoeal disease control
Measles	Overcrowding Low immunisation coverage Poor nutrition	Minimum living space standards (if possible) Mass immunisation campaign with vitamin A distribution to all children under 5 Carry out a nutritional survey
Acute Respiratory Illness (ARIs)	Poor shelter Lack of blankets and clothing	Provide shelter materials Provide sufficient blankets
Malaria	Non-immune refugees in malaria-endemic area Many breeding sites Interruption of vector control program Lack of or inappropriate treatment	Improve access to effective treatment Residual spraying of shelters and provide insecticide treated nets (ITNs) Give anti-malarial prophylaxis & intermittent treatment to pregnant women Manage/destroy potential vector breeding sites
Meningococcal Meningitis	Overcrowding in endemic areas	Improve ventilation Consult experts about mass immunisation
Tuberculosis	Inadequate health care Overcrowding High prevalence of HIV	Train health workers on proper diagnosis, treatment, and follow-up of cases Decrease crowding Health education on HIV/AIDS prevention

*For populations with a low level acquired immunity give prophylaxis treatment for pregnant women using either chloroquine (if not resistant) or mefloquine during 2nd and 3rd trimesters. For populations with a high level of acquired immunity, pregnant women should receive intermittent therapy. Treatment with sulfadoxine-pyrimethamine is recommended (where effective) – single doses given during the second and the third trimesters

Designing a Disease Control Program

After the assessment, representatives from the relief agency, the host authorities, and the affected community should sit together to plan the communicable disease control program. This can be carried out through the following steps:

1. Select Priorities

Since it is not possible to carry out all the actions recommended by the assessment team, planners need to determine which are the priority interventions. Specific criteria can be used to rank different public health measures and determine the top priorities for a relief operation, as shown in the following table.

Table 7-16: Ranking Public Health Measures

Public Health Measure	Seriousness of Problem 1 = minor 3 = major	Ease of Implementing 1 = difficult 3 = easy	Availability of Staff 1 = few 3 = many	Cost of Implementing 1 = high 3 = low	Agency Capacity 1 = low 3 = high	Overall Score
ORT for dehydration	3	3	3	3	3	**15**
Sanitation — build latrines	3	2	3	2	2	**12**
Drill boreholes	3	1	1	2	1	**8**
Supply/treat mosquito nets	3	1	2	3	2	**11**
Measles immunisation	3	3	2	3	3	**14**
Control TB via DOTS	2	1	1	2	2	**8**

The above exercise ranks oral rehydration therapy (ORT), measles immunisation, and building of latrines as the priority measures for the relief operation.

2. Define the Goals, Objectives, and Strategies of a Disease Control Program

The ultimate goal of communicable disease control programs is to *prevent excess mortality* among the displaced population by preventing and managing outbreaks of communicable diseases. Even though preventive measures may prevent most of these deaths by reducing the incidence of disease outbreaks, they may not successfully prevent *all* outbreaks. It is important to be prepared to manage the outbreaks that do occur.

Goals

- To prevent excess morbidity and mortality due to communicable diseases.
- To reduce the morbidity, mortality, and transmission of communicable diseases.

Objectives

The overall objective of an emergency response should be to achieve a crude mortality rate of <1/10,000/day and an under-five mortality rate of < 2/10,000/day as soon as possible. More specific objectives may be set for different disease control programs, for example:

- To immunise more than 90% of all children in the target group for measles.
- To reduce the incidence of acute respiratory infections to pre-disaster levels in 3 months.
- To keep the case-fatality rate of cholera at less than 1%.
- To cure at least 85% of identified cases of TB and to detect at least 70% of existing cases.
- To ensure the concerned population has access to knowledge and the means to protect itself from HIV transmission.

Strategy

Because of limited resources, communicable disease control programs should focus mainly on diseases that cause the highest morbidity and mortality. During the acute emergency phase, the priorities of the disease control program may be limited to providing basic needs, surveillance of the top three or five diseases, and treatment of acute illnesses. Once the emergency phase is over (death rates fall below 1 per 10,000 population per day), another assessment should be carried out. If basic services are adequate for controlling common diseases but there is evidence of increasing problems due to other diseases, additional control measures may be considered. However, carrying out additional control measures should depend on the availability of resources and the future plans for the displaced population.

The following table summarises examples of disease control strategies for the acute and post-emergency phase.

Table 7-17: Examples of Disease Control Strategies for Emergencies

COMMUNICABLE DISEASE CONTROL STRATEGIES		
	Acute Emergency Phase	**Post-Emergency Phase**
Surveillance	Monitor illness and death due to • Most common diseases: ARI, diarrhoea measles, malaria • Early detection of cholera, meningitis	Monitor illness and death due to: • Most common diseases • Skin and eye infections • Urinary tract infections and STDs • Parasitic infections • TB, HIV • Malnutrition and micronutrient deficiencies
Prevention	• Sanitation • Safe and sufficient water supply • Provision of soap • Adequate food and nutrition • Shelter • Basic health care and referral of emergencies • Immunisation for measles	• EPI program (measles, diphtheria, polio, whooping cough, TB) • Vector control • Prevention and care of STDs, HIV/AIDS • TB treatment under special conditions • Meningitis immunisation under certain conditions
Case Management	• Clinical diagnosis • Use referral laboratory * • New Emergency Health Kit	• Diagnostic and treatment algorithms, e.g., IMCI** • On-site laboratory for malaria smear, stool ova/cyst, haemoglobin, gram stain, sputum smear, blood sugar, HIV test. (Blood typing and transfusions also possible) • Essential drugs and supplies (stratified for different levels)

** An on-site laboratory may be set up in the acute phase if there is a major disease outbreak or high drug-resistance (malaria, dysentery)*

*** Integrated Management of Childhood Illnesses*

3. Develop a Plan of Action

A plan of action should be drawn for controlling all the diseases that are likely to cause high morbidity and mortality. An example of a plan of action is shown below:

Table 7-18: Example of a Plan of Action for Control of Common Diseases

DISEASE	TARGET GROUP	CONFIRMATION	PREPAREDNESS	OUTBREAK CONTROL	TREATMENT	COMMON ERRORS
Diarrhoea	Young children	History/ physical assessment	Obtain ORS	Improve sanitation	Rehydration	Emphasis on IV fluids
Measles	Young children	Diagnosis by experienced health worker	Vaccination	Mass immunisation campaign*	Treat cases, supplementary feeding	Waiting for outbreak to occur
Malaria (falciparum, vivax)	Young children, pregnant women & all non-immunes	Blood smear, Rapid diagnostic tests ("dip sticks")	Surveillance, understand disease pattern	Mosquito control	Effective anti-malarial drugs	No surveillance, failure to confirm illness
Cholera	All	Stool culture	Surveillance	Improve sanitation, w ater supply, hygiene	ORS, antibiotics	Reliance on vaccination as a control measure

* May be carried out too late

Because communicable diseases do not discriminate between the displaced and host populations, national health authorities must be involved in planning the communicable disease control program. The following areas should be agreed upon:

- linking the disease control program for displaced people with the national program
- treatment protocols to be used
- coverage of the local population in the communicable disease control program
- referral of seriously-ill displaced people to local hospitals
- use of host country referral laboratories
- supply of essential drugs and laboratory re-agents for health facilities of the displaced as well as the local population
- follow-up on displaced persons with chronic diseases after repatriation
- disease surveillance and program evaluation

4. Define Key Indicators for Monitoring Activities

Examples of key indicators for monitoring disease control activities are shown in the following table:

Table 7-19: Key Indicators for Monitoring Activities

DEFINING KEY PROCESS INDICATORS				
Goal	**Objective**	**Input Indicator**	**Output Indicator**	**Outcome Indicator**
Prevent excess mortality & morbidity from communicable diseases	**Immunise more than 90% of all children in target group for measles**	% CHWs trained to promote immunisations, Frequency of vaccine shortage	No. of mothers counselled on immunisation, No. of children immunised	% Children fully immunised
	Reduce deaths from diarrhoea to pre-disaster levels in 3 months	% CHWs trained in control of diarrhoea, Frequency of ORS stockouts	No. of mothers counselled on ORT, No. of mothers given ORT	% Diarrhoea cases given ORT
	Reduce prevalence of the 3 most common diseases to host country levels in 6 months	% Health workers trained in disease control, Frequency of shortage of essential drugs	No. of mothers counselled, No. of children given prescribed drugs	% Mothers comply with standard treatment

5. Estimate Resource Needs

A communicable disease control program requires many resources, including special treatment centres, drugs and medical supplies, staff (for surveillance, health care, and disease control), laboratory equipment and supplies, diagnostic and treatment guidelines, stationery, and transport.

Emergency Treatment Centres

Special treatment centres, e.g., ORS units, cholera centres, TB manyattas (huts), and shigella centres may be needed to improve treatment and limit the spread of diseases by infected persons. If the capacity of existing facilities is small, temporary facilities can be established in huts, school buildings, or tents and equipped with adequate staff and supplies. They should have facilities for hand-washing for health workers and caregivers, and also for disposing of excreta or other human waste. See the chapter on *Diarrhoeal Disease Control* for details on setting up an ORS unit.

Drugs and Medical Supplies

The amount of drugs and medical supplies needed may be estimated as follows:

1. Select the treatment regimens to be adopted (from the host or home country or the World Health Organisation), and define the specific drugs, patient categories, and dosages for the priority diseases.
2. Calculate the drug requirement per patient for each disease.
3. Estimate the number of expected cases, based on the assessment data.
4. Estimate the number of expected patients in each category.
5. Calculate the total drug requirements.
6. Add 10% for children (for tablets that can be broken) and for possible waste.
7. Add 50% for reserve stock.

Pre-packaged drug kits have been developed that may be used during the initial phase. If patients see that the drugs are effective, other patients may be encouraged to get treatment. WHO's **New Emergency Health Kit** (1998) is designed for treating 10,000 persons with common illnesses during the first 3 months of an emergency situation. It consists of 10 *basic units* and a *supplementary unit*. (See the *Incident Management System* chapter for more details on the New Emergency Health Kit.)

The following table lists the anti-infective drugs contained in these kits:

Table 7-20: New Emergency Health Kit — Anti-Infective Drugs

ANTI-INFECTIVE DRUGS	QUANTITY	MAIN INDICATION
Ampicillin or Amoxycillin	2,000 tabs (250 mg), 200 vials (500 mg/vial)	Antibacterial (only neonates & pregnant women)
Benzathine benzylpenicillin	50 vials (2.4 MIU/vial)	Antibacterial
Chloramphenicol	2,000 caps (250 mg), 500 vials (1 g/vial)	Antibacterial
Chloroquine *	10 x 2,000 (150 mg)	Antimalarial
Cotrimoxazole*	10 x 2,000 tabs (400 + 80 mg)	Antibacterial***
Mebendazole*	10 x 500 tabs (100 mg)	Intestinal antihelminthic
Metronidazole	2,000 tabs (250 mg)	Antiamoebic, antigiardiasis
Nystatin	2,000 tabs (100,000 IU)	Antifungal (oral thrush)
Phenoxymethylpenicillin	4,000 tabs (250 mg)	Antibacterial
Procaine benzylpenicillin**	1,000 vials (3-4 MU/vial)	Antibacterial
Quinine sulfate,	3,000 tabs (300 mg), 100 amps (300 mg/ml)	Antimalarial (cerebral or resistant malaria)
Sulphadoxine + pyrimethamine	300 tabs (500 + 25 mg)	Antimalarial
Tetracycline (or Doxycycline)	2,000 caps or tabs (250 mg)	Antibacterial, antimalarial (cholera and chlamydia)

Source: WHO, 1998

** Most drugs listed above are in the supplementary unit except these drugs, which are from the basic units.*
*** Procaine penicillin fortified (PPF) can be used as an alternative to this drug in many countries.*
**** Wide-spread drug resistance by shigella*

Reviewing the amount of drugs used from the New Emergency Health Kit during the first three months helps in estimating the essential drugs required for the post-emergency phase. However, these kits do not normally provide an adequate supply of effective antimalarial drugs for use in emergencies. A supplementary order of an effective antimalarial drug will be needed to ensure an adequate treatment response.[1] Other kits have been designed for managing specific disease outbreaks e.g., the **Cholera Kit** and **Shigella Kit**. For details about these kits, please refer to the *Diarrhoeal Disease Control* chapter.

Setting Up a Disease Control Program

Control of communicable diseases should be implemented within the Primary Health Care (PHC) framework. In this framework, health care is provided at various levels, including:

- *The family* is responsible for carrying out preventive health measures (e.g., getting immunised, personal hygiene, etc.) and for ensuring sick family members take their medication and oral rehydration therapy.

[1] This order will vary with location e.g. in most sub-Saharan Africa, sulphadoxine-pyrimethamine (SP) alone may still be effective and can be given in one dose. Chloroquine is not recommended for use in the acute emergency phase as the regimen is too long to ensure good compliance, health workers may only see patients once, and resistance occurs too commonly to take chances in vulnerable populations with no monitoring. In multi-drug resistant areas in SE Asia agencies will need to use combination therapy of an artemisinin derivative with a second drug such as mefloquine or SP.

- *The community level* – Most disease control activities should be carried out at this level. Community health workers can conduct home-visits to identify and report cases, refer those in serious condition, and ensure compliance to treatment. In addition, they can provide health education and promote preventive health measures, e.g., breastfeeding, hand-washing, etc.
- *The health post or dispensary* can be equipped to treat uncomplicated illness and underlying diseases, give vaccinations, and supervise community health workers.
- *Health centres* may be equipped to treat patients with minor complications of communicable diseases.
- *Referral hospitals* are necessary for treating the few people who develop major complications as well as providing referral laboratory services.
- *Special treatment centres* may be set up at the health centre or referral hospital to limit the spread of highly communicable diseases, e.g., cholera, tuberculosis.

See the *Primary Health Care (PHC)* chapter for more details on the Primary Health Care framework.

Promoting Community Participation

Success in disease control depends on the participation of the population at risk. Some preventive and control measures may require long-term change in behaviour. This can only be achieved through the co-operation of the displaced population. The following sequence might be used to set up a community-based disease control program:

1. Identify and prioritise the common health problems with the community.
2. Study a community's behaviour and customs that relate to the identified disease problem (risk/ protective factors).
3. Define the aims for the control of communicable disease program, e.g., hand washing, environmental hygiene, bucket chlorination, outreach program, etc.
4. Determine the most appropriate ways of promoting community-based measures that are acceptable to the community, e.g., by using community health workers and religious leaders.
5. Carry out the community-based disease control measure.
6. Evaluate the impact of a community-based disease control measure.

Training Staff

Training is critical for effective control of communicable diseases. It should be organised locally, using existing materials that are adapted to the local setting. All concerned staff should have a basic knowledge in the following:

- Methods of transmission of common diseases
- Prevention and control of communicable diseases, including community education
- Clinical signs and symptoms of common diseases in children and adults
- Diagnosis of communicable diseases, including the role of the laboratory
- Supportive and specific treatment, including dosages and adverse effects of drugs
- Patient education and follow-up
- Record keeping and medical supplies management
- Indicators for monitoring and evaluating disease control activities

Record Keeping and Reporting

Health workers must be trained to keep accurate records and to report the information as required. Good record keeping is essential for following up patients and monitoring their care. The following records should be kept:

- Individual patient records – books or health cards
- Health facility registers for all consultations, admissions, discharges, and death
- Central register for specific diseases – e.g., TB, cholera
- Laboratory register
- Pharmacy register

Note: *Data in the above records should be regularly analysed and the findings shared with all concerned persons.*

Supervising Staff

Successful disease control requires good supervision of health workers in the following areas:

- All health workers should follow **universal precautions** in order to prevent and limit the spread of infections.
- Records should be reviewed regularly to ensure that patients needing hospitalisation are referred in a timely manner.
- Appropriate treatment should be prescribed for all patients diagnosed with common diseases in order to ensure a successful outcome (cure).

The following table identifies common problems of poor treatment outcome and possible solutions.

Table 7-21: Common Problems of Poor Treatment Outcome and Possible Solutions

IDENTIFIED PROBLEMS	POSSIBLE SOLUTIONS
Patients delay seeking treatment at health facilities.	Identify and address any barriers to seeking or receiving treatment at health facilities.
Delays in making the correct diagnosis.	Train and supervise health workers in following standard diagnostic algorithms. Address identified problems.
Inappropriate prescriptions.	Establish and enforce standard treatment protocols. Monitor patient treatment registers. Promote health worker self-assessment.
Health workers not following up defaulters.	Increase health worker understanding of importance of tracing defaulters and address any other problem.
Patients do not understand their health problem and do not value the prescribed treatment.	Health workers should educate patients on the nature of their disease and value of treatment.
Patients not completing the full treatment.	Follow-up all patients taking medication until they complete the prescribed treatment. Improve health worker communication practices.
Patients trading their drugs and materials.	Investigate thoroughly and improve patient education.
Disease agents showing resistance to drugs.	Carry out appropriate laboratory tests and revise treatment protocols according to the local situation.
Poor quality medications are being used.	Review the drug procurement procedures.
Slow dispensing of medications at health units.	Enhance training and staff morale. Improve patient flow.

PREVENTING OUTBREAKS OF COMMUNICABLE DISEASES

During emergencies, the priority should be to prevent rather than manage outbreaks of communicable disease. More deaths can be averted through preventive measures, such as:

1. **Hygienic Disposal of Human Faeces**
   Hygienic disposal of human faeces is probably the most important preventive measure during the initial stage of emergencies. This requires setting up sanitary systems that are adapted to the local situation and culture. Defecation fields or latrines should be located at a safe distance from the shelters, but not too far from the population. *Everyone* should be encouraged to use the latrines, and prompt disposal of children's faeces should be emphasised. (See the *Environmental Health* chapter for more details.)

2. **Sufficient and Safe Water Supply**
   If one has to choose between water quantity and water quality, it is more important to provide a sufficient quantity of water. For diarrhoeal control, provide at least 15 litres of safe water per person per day as soon as possible. If drinking water is obtained from surface water, these sources should be protected from faecal contamination. If all local water sources are suspected of being heavily contaminated, potable water may be trucked in as a short-term measure until the local water supply is made safe.

   A safe water supply does not guarantee that the water will be safe when it is consumed. Bucket chlorination may be carried out if the risk of water being contaminated after collection is high. It may also be necessary to distribute water containers if most households do not have enough. The incidence of diarrhoeal diseases has been found to be lower among households storing water in narrow-mouthed vessels. These vessels prevent hands from coming in contact with the water. If possible, water for washing should be stored separately from drinking water. (See the chapter on *Environmental Health* for more details.)

3. **Hand-Washing With Soap**
   Displaced people will wash their hands more frequently if they have sufficient water within easy reach. In addition, the spread of diarrhoea and parasitic infections can be reduced more effectively if people wash their hands with soap before preparing meals, before eating, after defecating, and after disposing of children's faecal material. Studies of Mozambican refugees in Malawi have found that households with soap were at lower risk of contracting cholera than those without. Therefore, soap must be part of the general ration to all households, particularly during epidemics.
   Note*: If soap is temporarily not available, ash or earth can be used (as an emergency measure) to scrub the hands.*

4. **Health Promotion**
   Promoting good health is the key to increasing a community's awareness and co-operation in disease prevention. The affected community should be aware about how common diseases spread, the early signs of possible infection, and the danger signs for seeking immediate medical attention (particularly in children). Stressing the importance of taking the full course of treatment, e.g., ORS, antibiotics, etc. will assure full recovery and reduce drug-resistance, particularly for dysentery, malaria, and tuberculosis.

   Educational messages should be linked with preventive measures that are being implemented, e.g., latrine construction, chlorination of water, soap distribution, immunisation campaigns, etc. In addition, these messages should be adapted to the local situation and the cultural beliefs and practices of the target population. Any practices that increase the spread of disease or interfere with the care of infected individuals should be addressed with caution.

5. **Food Safety**
   Health education campaigns should encourage people to only eat raw foods that are safe, to protect their food from contamination, to cook it thoroughly, and eat it while it is hot.

6. **Adequate Living Space**
Where possible, the minimum standards for living space (at least 3 m^2 per person) must be met to reduce exposure to ARIs, measles, tuberculosis, parasitic infections, and diarrhoeal diseases. Where over-crowding is unavoidable, it is important to have adequate ventilation to reduce the risk of developing respiratory diseases due to indoor pollution (smoke from cooking fuel and tobacco).

7. **Adequate Shelter**
Appropriate shelter material, including blankets, suitable clothing, and mosquito nets must be provided when needed.

8. **Nutrition**
Because communicable diseases worsen the nutritional status of infected persons, and malnourished individuals are more susceptible to infections, adequate nutrition is essential for improving the immunity of displaced people against infections. Good nutrition is particularly important for recovery from measles and tuberculosis. Prevention through nutrition includes:

- *Adequate intake of micronutrients* through a varied diet, fortified foods, or micronutrient supplements (e.g., vitamin A, iron, folate) can prevent complications of measles (blindness), malaria (anaemia), and other acute infections, particularly among children and pregnant women.
- *Promotion of breast-feeding* helps to reduce the incidence of communicable diseases, particularly diarrhoea, among children less than 2 years. All healthy mothers should be encouraged to exclusively breast-feed their babies during the first 6 months of life, and continue breast-feeding until the child is 2 years of age. Donation of milk products should be restricted, and baby bottles should never be distributed in the camp. (See the *Food and Nutrition* chapter for more details on nutrition and infant feeding in emergencies.)

9. **Medical Interventions**
Outbreaks of communicable diseases may occur where health services have been disrupted. The following medical measures may prevent these outbreaks:

- *Immunisation* is the most cost-effective way of preventing outbreaks of vaccine-preventable diseases, such as measles or meningitis. Mass immunisation against measles combined with vitamin A distribution should target all children between the ages of 6 months and 15 years. Experts may be consulted about the value of carrying out mass immunisation during meningitis outbreaks, since it takes one week for the vaccine to confer adequate protection. For more information on vaccines, and the immunisation response to measles and meningitis, see the chapter on *Vaccinations*.
- *Drug prophylaxis* is giving drugs (usually antimicrobials) in order to prevent the development or progression of clinical illness in infected persons and to stop the disease from being transmitted to others. Drugs may be given to the entire population (*mass chemoprophylaxis*) or only to those who are at increased risk of developing the disease or death (*selective chemoprophylaxis*). However, a drug prophylaxis program requires the following:
  - reasonably stable population
  - adequate medical support structure
  - capacity to carry out health education
  - proper administration and use of the right drug

  Because distributing drugs is resource-intensive and not all people will take the drugs as required, the decision to carry out mass or selective drug prophylaxis will depend on the local setting, the identified risk factors, and the availability of resources. In malaria control, mass treatment or prophylaxis should always be combined with vector control measures to reduce the spread of any drug resistant parasites.

- *Early diagnosis and treatment of sporadic infections* is only possible where a population has access to health care with a functioning referral system. Health workers should be trained to manage patients with common diseases such as ARIs, measles, and malaria. CHWs should be trained to follow-up patients on long-term treatment, e.g., tuberculosis cases, in order to ensure compliance and to control the spread of disease.

10. **Handling Dead Bodies**
    Displaced persons who die from cholera or shigella should be buried quickly and close to the place of death. Ritual washing of the dead should be discouraged during outbreaks as well as funeral feasts and gatherings, unless all contaminated clothing and the environment is disinfected first.

11. **Vector Control**
    Vector control measures are necessary in order to reduce the transmission of vector-borne diseases such as malaria. For an overview of specific vector control measures, see the *Vector Control* chapter.

Because most preventive measures reduce the incidence of more than one disease, they should be carried out as early as possible, whether or not there is a threat of a disease outbreak. Priority should be given to community-based measures, since they are usually more effective than health facility-based measures. However, getting the affected community to participate in disease prevention is not simple because the benefits of disease prevention are not always obvious.

MANAGING OUTBREAKS OF MAJOR COMMUNICABLE DISEASES

Many factors can cause failure in disease prevention and lead to disease outbreaks, including:

- lack of political commitment and funding
- poor surveillance systems
- poor organisation of services
- unskilled health workers
- inadequate or incomplete treatment of cases
- over-reliance on preventive measures, e.g., chlorination of water, immunisations, etc.

Responding to a Disease Outbreak

Once the surveillance team suspects a possible disease outbreak, an investigation and basic control measures should be carried out. An outbreak response committee should be formed to co-ordinate all activities. This committee may include representatives from the affected community, health facilities, disease surveillance and control units, reference laboratory, and sometimes the livestock and veterinary sectors.

Outbreak Investigation

Objectives should be set for investigating a possible outbreak, for example:

- To confirm and establish the extent of the disease outbreak.
- To identify the cause(s) and ways of preventing further transmission of the disease.
- To define the best means of dealing with the outbreak.
- To determine ways of preventing future outbreaks.

The investigation should be approached in a systematic way, as follows:[34]

1. **Confirm the Epidemic** — The first report of a communicable disease outbreak should be detailed. This may help determine whether or not the epidemic really exists. "False epidemics" may be the result of changes in data collection and reporting, new treatments being introduced, improved access to health facilities, etc. The existing surveillance system may be revised, if necessary, to detect all new cases. Compare the incidence of the disease with that of previous seasons to check if the number of cases exceeds the expected level.

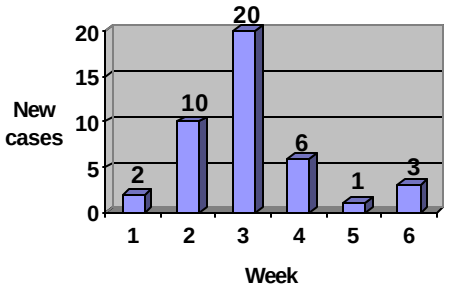
2. **Verify the Diagnosis** — Standard clinical or laboratory methods should be used to diagnose the cause of outbreak. An interim diagnosis, e.g., "cholera or food poisoning," may initially be used to identify the type of resources needed for the investigation.

3. **Identify the Affected Persons and Their Characteristics** — Establish a standard case definition for identifying all possible cases. Collect and record the clinical history of the index case(s) and describe the outbreak in terms of *time*, *place*, and *person*.

   Reviewing the age and gender distribution, immunisation status, and other characteristics will help identify those at greatest risk. Mapping the location of each case will help identify clusters of patients and a common source of infection. These maps should be used to plan and co-ordinate control measures.

4. **Define and Investigate the Population at Risk** — Using the information that has been collected, calculate the attack rate and graph the number of reported new cases per day or week. An "epidemic curve" can bring to light the onset and magnitude of the epidemic, the incubation period, and how the disease spreads (single source, multiple sources, etc.).

   Figure 7-4: Example of Epidemic Curve



5. **Formulate a Hypothesis About the Source and Spread of the Epidemic** — In order to explain why, when, and how the epidemic occurred, the situation or conditions before the outbreak should be understood. Understanding the epidemiology of communicable diseases may help to identify the cause of the outbreak (refer back to Table 7-8).

6. **Verify the Causative Disease Agent and the Mode of Spread** — The probable cause of the outbreak needs to be identified in order to select more effective control measures. A case-control or other type of study may be carried out to test theories about the disease agent and mode of spread. In addition, laboratory investigations may be conducted for affected cases and contacts, where possible. Environmental sampling with laboratory analysis may be done to confirm a suspected source of infection.

7. **Control the Epidemic** — Throughout the investigation, efforts should focus on limiting further spread of the disease. If resources are limited, then an epidemiological approach can be used to identify appropriate control measures and target them to the groups at highest risk. (See the next section below for further details on the Control of Specific Disease Outbreaks.)

8. **Writing a Report** — Regularly document and report the progress of the outbreak investigation and response to all concerned. The affected community needs to be aware of the nature of the outbreak and how they can protect themselves or assist affected people. Local health authorities need the information to

plan appropriate control measures and ensure they are better prepared for future outbreaks. Reports in the media and medical journals may increase external support and improve responses to future outbreaks.

(See the *Disaster Epidemiology* chapter for more details about "Investigating an Outbreak.")

Control of Specific Disease Outbreaks

Once the investigation team confirms an epidemic, the most effective ways of reducing the spread and case fatality of the disease outbreak should be started, using available resources. All suspected cases should be managed in a standard manner. This will minimise the spread and severity of disease. In addition, disease specific control measures should be started that target those who are at highest risk of dying from the disease, e.g., children less than five years.

Case management does not have to be limited to hospitals, but may be carried out at two levels:

1. *Community-based care* — Community Health Workers (CHWs) can be trained to identify cases and provide simple treatment, e.g., ORT. They can refer serious cases to the health facilities.
2. *Facility-based care* — Health facilities are necessary to provide the following:
   - Basic health care that is easily accessible for prompt treatment of underlying diseases.
   - Special health facilities for managing cases with highly communicable diseases.
   - Laboratory services may be set up during the post-emergency phase and used for diagnosing and following-up severe cases, identifying the causative disease agent and vector species and assessing drug sensitivity.

Acute Respiratory Infections

Most episodes of ARI in children are self-limiting and not serious. However, some children can develop pneumonia, which may become severe and cause death. This is common where caregivers (usually mothers) and primary health care workers fail to recognise the danger signs of pneumonia (which include the inability to drink or breastfeed, convulsions and lethargy, or loss of consciousness). Thus, correctly identifying and treating the few sick children who have pneumonia among many others with milder respiratory infections can greatly reduce deaths in children.

Case Management — Because most refugee settings lack X-rays, laboratories, or doctors, simple clinical criteria are needed to assess the child, classify the illness, and determine appropriate treatment (which includes referral to hospital, antibiotic treatment, and care at home). The following table summarises the management of ARI based on IMCI classification of ARI.[35]

Table 7-22: Treatment of Cough or Difficult Breathing

DISEASE	CARE OF CHILDREN AGED 2 MONTHS TO 5 YEARS
Severe pneumonia or very severe disease	• Give first dose of antibiotic • Refer *urgently* to hospital
Pneumonia	• Give an appropriate antibiotic for 5 days • Soothe the throat and relieve the cough with a safe remedy • Advise mother when to return immediately • Follow-up in 2 days
No pneumonia: cough or cold	• If coughing more than 30 days, refer for assessment • Soothe the throat and relieve the cough with a safe remedy • Advise mother when to return immediately • Follow-up in 5 days if not improving

Source: WHO – IMCI

Note: *Health workers need to assess, classify, and treat young infants (aged less than two months) differently from older children. This is because young infants may have different ARI symptoms and they can die very quickly. All young infants with pneumonia must be referred immediately to a hospital.*

Control of ARI is based on standard case management. This requires staff training, adequate drug supplies and ARI management charts for PHC workers (e.g. IMCI). Access to health care (first-level health facilities and first referral hospitals) should also be assured. In addition to case management, ARI control also involves health education and promotion. This will ensure that caregivers give appropriate home care, recognise danger signs, and know when to seek help. Promoting breast-feeding, immunisation (for measles, whooping cough, and diphtheria), vitamin A supplementation and reducing domestic pollution will lead to fewer episodes of ARI in children.

Measles

Case Management — If possible all children with measles should receive a dose of vitamin A to prevent blindness. Because children with measles do not eat well, ensure that affected children receive supplementary food and fluids. Only very sick children need hospitalisation. The following table summarises the case management for measles:

Table 7-23: Summary of Measles Case Management

Treatment	Indication
Vitamin A • Standard dose (100,000 IU if < 12 months; 200,000 IU if > 12 months) • 2nd dose on day 2 • 3rd dose in 1-4 weeks	• all children with measles to prevent xerophthalmia (unless previously treated) • children with complicated measles • children with eye complications
Care for Complications • ORT and re-feeding • Antibiotics • Topical antibiotics • Genetian violet • Promote breast-feeding • Ensure adequate food and fluids. (supervise feeding if necessary) • Hospital admission	• diarrhoea • bacterial super-infections • eye infections • mouth ulcers/oral thrush • malnutrition • for the very ill

Control of Measles — Since measles is highly contagious, most susceptible persons may already be exposed to the infection by the time a measles outbreak is confirmed. Resources should not be wasted where the disease has already spread. It is more important to vaccinate susceptible individuals (all children age 6 months to 12 years if resources are adequate) in *neighbouring* settlements where measles has not been detected. If the measles vaccine is not available before the outbreak, an emergency stock should still be procured. Thereafter, decisions of whether or not to vaccinate can be made based on the estimated susceptible population. (See the *Immunisation in Emergencies* chapter for more details on measles vaccination.)

Malaria

Case Management — Early diagnosis and treatment of clinical malaria should be the main strategy for malaria control, as prevention of malaria is difficult in many refugee settings. Relief agencies should aim at establishing basic diagnosis of all suspected malaria cases as early into the emergency as possible. This can be achieved immediately with the use of rapid diagnostic dipsticks (RDTs) for malaria. "RDTs are simple to perform and interpret. They do not require electricity or training in microscopy. Peripheral health workers (and other health providers and community volunteers) can be taught the procedure in a matter of hours."[36]

Microscopy should be re-established as soon as practical and possible (with good monitoring to ensure accuracy of blood film-making and reading). Where these equipments are lacking, diagnosis of malaria in an endemic area must be based on clinical symptoms, preferably using the IMCI protocol to ensure effective treatment of all cases. Since malaria does not always present in a typical way, all patients with fever, or a history of fever within the last 3 days, in a highly malaria endemic area should be diagnosed as having malaria until proven differently.

It is not possible to standardise malaria treatment protocols for displaced populations. The appropriate treatment policy should be based on up to date information on drug resistance patterns in the area. This is particularly important for displaced populations who are especially vulnerable due to low immunity (from malnutrition or lack of previous exposure to malaria), or lack access to re-treatment if treatment fails. Local health authorities and relief agencies should collaborate on obtaining or sharing the information. As drug resistance develops rapidly it is also important to evaluate second line or future treatments proactively. Drug efficacy monitoring should follow standard procedures as developed by WHO.[37] Other causes of treatment failure, such as non-compliance, vomiting and poor quality drugs should also be monitored.

Note: *If an emergency situation limits access to patients, then agencies should prioritise a single dose treatment protocol and observe all patients for one hour after taking the drugs to make sure they do not vomit (and retreat anyone who vomits in less than 1 hour).*

The following table summarises the basic approach to malaria case management. Other measures may be required for patients with complicated malaria.

Table 7-24: Malaria Case Management

Treatment	Indications
Specific	
• Chloroquine	Still the first line treatment for malaria in many African countries
• Fansidar (Sulfadoxine-pyrimethamine)	• Second line treatment for malaria. • May be considered first line for areas with chloroquine resistant malaria is widespread
• Mefloquine • Artemisin*	Second line treatment for chloroquine resistant malaria
• Quinine	For treatment of complicated malaria
Supportive	
• Antipyretics (paracetamol) • IV glucose plus glucose infusion • Haematinics, blood transfusion** • Fluid/electrolyte replacement (ORS, IVF) • Broad spectrum antibiotics	• fever • hypoglycaemia • anaemia • dehydration • bacterial infections

* Reserve for multi-drug resistant malaria. Given alone or combined with other anti-malarial drugs.

** Blood transfusion is necessary for anaemic patients with high parasitemia. Due to high risk of HIV transmission, transfusions should only be done to save life. See the *Reproductive Health Care in Emergencies* chapter for details on safe blood transfusion

Note: Treatment of Plasmodium falciparum gametocytes with primaquine is not recommended, as evidence of its effectiveness is inadequate, and it can be dangerous in glucose 6 phosphate dehydrogenase (G6PD) deficient individuals

Note: *WHO maintains a database of national treatment protocols of emergency affected countries where these protocols exist. It may recommend that protocols be adapted if necessary in the event of a complex emergency. The database will eventually also include information on drug sensitivity, simple protocols for sensitivity testing and mapping of malaria and malaria risk (epidemiological, climatic, land use, etc) in complex emergency countries.*[38]

Control of Malaria — In refugee settings, various strategies may be used to control outbreaks of malaria, depending on the available resources and the local health priorities. For example:

- If the outbreak is severe, mass anti-malarial treatment of all patients with fever is justified (if possible with a single dose). Laboratory confirmation may be necessary where drug resistance is a problem or the antimalarial is expensive.
- Where mortality is high or referral systems are not available, CHWs should be trained to actively identify malaria cases.
- Passive case finding for malaria is acceptable in chronic refugee settings when mortality is under control.[39]

Other measures for minimising exposure to malaria vectors/parasites may be carried out at different levels of the refugee settlement. Indoor spraying of residual insecticide ("house spraying") has been the method of control most often used in chronic refugee situations. Residual spraying is fast and effective, but expensive. With safe insecticides it is very appropriate during the first 2-3 months, combined with introduction of insecticide treated materials as soon as possible (ITNs are also expensive initially but cost effective if used over time). The following table summarises commonly used malaria control measures:

Table 7-25: Malaria Control Measures at Various Levels, by Expected Effect

Expected Effect	For Individual & Family Protection	For Community Protection
Reduction of human/ mosquito contact,	ITMs*, repellents, mosquito coils, protective clothing, screening of houses	Site selection
Destruction of adult mosquitoes	Use of domestic space spraying (aerosols)	Residual indoor insecticides, space spraying, ultra-low-volume sprays
Destruction of mosquito larvae	Peridomestic sanitation, intermittent drying of water containers	Larviciding of water surfaces, intermittent irrigation, biological control
Source reduction	Improve sanitation, wastewater drainage	Environmental sanitation, provision of piped water, water management
Social participation	Motivation for personal and family protection	Health education, community participation

* Insecticide treated materials – includes mosquito nets, bedding, curtains, clothes
(Source: Malaria control among refugees and displaced populations, WHO 1996)

For more information about source reduction, protection of susceptible groups, and interruption of transmission, read the *Vector Control* chapter.

Meningococcal Meningitis

Case Management — Because meningococcal meningitis can be treated effectively, efforts should be focused on ensuring drugs and trained staff are available. This will help save lives and reduce disability and deaths during outbreaks. Patients with meningococcal meningitis should be managed according to the following principles:[40]

1. Meningococcal meningitis is potentially fatal and each case should be seen as a *medical emergency*.
2. *Admission to a hospital* or a health centre is necessary for diagnosis and treatment of cases.
3. *Antimicrobial therapy* is essential and should be combined with supportive treatment.
4. As contagiousness of patients is moderate and disappears quickly following antimicrobial treatment, *special facilities for isolation of the patient are not necessary*.

Community health workers training is needed to ensure early detection and prompt treatment of cases. Anyone suspected of having meningitis should be referred to a health facility or hospital. Simple techniques for diagnosing meningitis should be used where specialised techniques are not available (such as, lumbar punctures and culture of fluids). For example, if several suspected cases of meningitis present with a rash, assume that they have meningococcal meningitis and take the following steps:

1. If lumbar punctures can be done, obtain fluid and send it to a laboratory to confirm the diagnosis and to determine the type of meningitis.
2. Care for each case in a separate area until 24 hours of treatment has been given.
3. Even if laboratory facilities are available, treatment should be started before results are known.[41]
4. Keep accurate records of the number of cases and their ages.

The following table summarises the management of meningitis in epidemic situations:

Table 7-26: Meningitis Case Management

INDICATIONS	CARE
Meningococcal meningitis	First choice: Penicillin G Alternative: • Ampicillin or amoxycillin, • Chloramphenicol, • Ceftriaxone, • Cotrimoxazole
Complications	Supportive Treatment: • Ampicillin, • Rehydration • Anticonvulsants • Intensive care for severe disease

Control of Meningitis — The simplest way of controlling the spread of meningitis during an outbreak is to prevent overcrowding. Other control measures include:

1. *Early Treatment:* Actively finding cases and promptly treating them with a single injection of long-acting oily chloramphenicol (tifomycin), long-acting penicillin or ceftriaxone.[42] [43] [44] The dose of antibiotic can be repeated after 24-48 hours for patients who do not improve immediately.
2. *Mass Immunisation:* An effective meningitis vaccine is available, which can control meningitis outbreaks due to serotypes A and C. A mass immunisation campaign should only be carried out at the onset of an outbreak. It is not useful if the epidemic is on the decline. Routine immunisation of young children against meningitis is not recommended within the EPI program for the following reasons:
   - the currently available vaccines (against meningococcal types A, C, Y, W) do not provide enough protection to children less than 18-24 months of age; or may have to be administered in several doses. (It protects vaccinated people aged more than 2 years for 1-3 years.)
   - the possibility of carrying out such vaccination is questionable since the vaccines have limited effectiveness in young children.[45]
   - the limited availability and relatively high cost of the meningitis vaccine.

   (See the Immunisation in Emergencies section for more details on immunisation for meningitis.)
3. *Mass Chemoprophylaxis:* WHO no longer recommends mass chemoprophylaxis during meningitis outbreaks. Carrying out selective chemoprophylaxis with rifampicin for household contacts may be effective, but expensive. Because mass or selective chemoprophylaxis demand extensive resources, it is recommended that meningitis control be limited to active case-finding and early treatment.[46] [47] [48]

Tuberculosis

Case Management — Although TB may be a major problem among displaced persons, it does not demand immediate attention during the acute phase of the emergency. However, once diseases such as measles and diarrhoea have been controlled, tuberculosis treatment programs should be started in order to cure infected persons and prevent the disease from spreading.

Managing TB cases begins by confirming the diagnosis. An experienced laboratory technician can do this by examining the sputum under a microscope. However, it is more difficult to diagnose TB in children as their sputum is rarely positive. Since children represent about 10% of all TB cases, other techniques for diagnosing TB in children are needed. The table below shows a score chart for diagnosing childhood TB.

Table 7-27: Score Chart for Diagnosis of Tuberculosis in Children

	Score if the Feature is Present					
FEATURE	0	1	2	3	4	**SCORE**
GENERAL						
Duration of illness (weeks)	< 2	2 – 4		> 4		
Nutrition (% WFA)	> 80	60 – 80		< 60		
Family history of TB	None	Reported by family		Proved sputum positive		
Tuberculin Test				Positive		
Malnutrition				Not improving after 4 weeks		
Unexplained fever & night sweats			No response to malaria treatment			
LOCAL						
				Lymph nodes		
				Joint or bone swelling		
				Abdominal mass or ascites		
				CNS signs and abnormal CSF findings		
					Angle deformity of spine	
					TOTAL SCORE	

Source: WHO[49]

Newly-diagnosed patients with pulmonary TB or severe extra-pulmonary TB and children with a score greater than 7 are given high priority in treatment. The short course or direct observed therapy (DOTS) by the World Health Organisation's TB control strategy is effective for limiting the spread of TB in crowded refugee settlements. In DOTS, all patients with confirmed TB take anti-TB drugs for six to eight months under the direct observation of health workers or community leaders.

There are various short course treatment regimens for TB. Each is delivered in two phases, as follows:

- *Initial Phase* — During this phase, the tubercle bacilli are rapidly killed to prevent further spread of the disease
- *Continuation Phase* — During this phase, the sterilising effect of the drugs eliminates any remaining bacilli and prevents subsequent relapse.

The following table summarises the treatment regimens for different TB categories.

Table 7-28: Recommended Treatment Regimen for Different Categories of TB

Category	Diagnosis of Patient	Treatment Priority	Initial Phase	Continuation Phase
I	• New smear-positive pulmonary TB • New smear-negative pulmonary TB • New cases of severe forms of extra-pulmonary TB • Children with score of 7 or more	High priority because they pose a high public health risk	$2\ E_3\ H_3\ R_3\ Z_3$ $(2\ S_3\ H_3\ R_3\ Z_3)$	$4\ H_3\ R_3$ (6 HE)
II	Treated but sputum smear-positive: • Relapse after treatment • Treatment failure • Treatment after interruption	Medium priority	2 SHRZE / 1 HRZE	$5\ H_3\ R_3\ E_3$
III	• New smear negative pulmonary TB (not in category I) • New cases of less severe forms of extra-pulmonary TB	Low priority and should not get treatment at initiation of TB program or if resources are scarce	$2\ H_3\ R_3\ Z_3$	$4\ H_3\ R_3$ (6 HE)

Source: WHO[50]

E = Ethambutol; H = Isoniazid; R = Rifampicin; Z = Pyrazinamide; S = Streptomycin
The number before the drug abbreviations is the duration of that phase in months.
The subscript after a drug abbreviation (e.g. $_3$) is the number of doses of that drug per week.

Note: *Some authorities recommend a 7-month continuation phase with daily isoniazid and rifampicin (7HR) for Category I patients with serious forms of disease, e.g. TB meningitis, miliary TB, spinal TB with neurological signs.*

Control of Tuberculosis — Short-course anti-tuberculosis treatment with multiple drugs may limit the spread of TB in a crowded refugee settlement. However, in some situations, establishing a TB control program may cause more harm than good for the following reasons:

1. TB requires prolonged treatment, which may not be completed by migrating populations.
2. Treatment failure may lead to the development of multi-drug resistant bacilli.[51]

TB control programs may be appropriate under certain conditions, as shown in the table below.

Table 7-29: Implementation of a TB Control Program

TB PROGRAM NOT RECOMMENDED	TB PROGRAM RECOMMENDED
During the emergency phase following the population displacement.	Emergency phase is over (death rates <1 per 10,000 population per day.
During warfare of significant insecurity.	Security in the camp envisaged for at least 6 months.
Very unstable population (e.g. nomadic or population moving up and down a border.	Stability of the camp for at least 6 months.
Major health problems not fully addressed.	Basic needs of water, adequate food, shelter and sanitation are available. Laboratory services for sputum smear microscopy will be available. Essential clinical services and basic drugs are available. Data indicate that TB is an important health problem.
Limited financial resources.	Sufficient funding and drug supplies available for at least 12 months.

In addition to funding, the following should be assured when setting up a TB control program:

- one person in charge of managing the TB program
- commitment to TB control by authorities at different levels
- passive case-finding and diagnosis by sputum microscopy
- a regular drug supply system
- health workers trained in the management and control of TB[52]
- monitoring TB patients by the national TB recording and reporting system[53]

Other control measures for TB include:

- BCG vaccination of new-borns should be included in the EPI program.
- Reducing overcrowding and ensuring good ventilation in health facilities.
- Separating patients with TB from others for the first two weeks of treatment
- Separating infectious TB patients from HIV positive individuals

  Note: *Isoniazid prophylaxis is not recommended for infants except for those being breast-fed by smear positive mothers. If the infant is well, isoniazid should be given for the first 6 months before the BCG vaccine is administered. If the refugee settlement is suddenly closed, Isoniazid may be stopped and the child vaccinated before departure with BCG (preferably one week later).*

CONTROL OF OTHER COMMUNICABLE DISEASES

Hepatitis

Hepatitis outbreaks have occurred among various displaced populations. Different viruses may cause these outbreaks, e.g., hepatitis A, B, D, and E viruses are common in the tropics whereas the geographic distribution of hepatitis C virus is unknown. The most common route for spreading hepatitis infection is faecal-oral (particularly for hepatitis A), although transmission through food and other routes also occurs. Water has been the main route of transmission during major outbreaks. Hepatitis B, C and D virusesare transmitted sexually as well as through blood or its products. Infection with these viruses may persistent for a long time, with some people becoming **carriers** (they transmit the virus without developing the disease). Even though hepatitis E virus is fairly uncommon, it strikes refugee populations more frequently than populations in normal settings and causes a high death rate among pregnant women. Most individuals who recover from hepatitis infections develop life-long immunity.

The following table summarises the epidemiology of different hepatitis infections.

Table 7-30: Epidemiology of Different Viral Hepatitis Infections

	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis D	Hepatitis E
Incidence	Childhood	Young adult	Young adult	Young adult	Young adult
Incubation Period	2 – 6 weeks	4 – 30 weeks	2 – 25 weeks	Co-infection B-D: consequence of hepatitis B Super-infection of carrier chronic B: about 5 weeks	2 – 8 weeks
Infectious Period	Begins before signs appear. Brief: <10 days after onset of jaundice. Maximal at the end of the incubation period	Begins before signs appear, Lasts the whole active period, Can persist in chronic carriers	Begins before signs appear, Duration poorly understood, may resemble HBV infection or persist for longer periods	Begins before signs appear Duration poorly understood. May resemble HBV infection.	Begins before signs appear, Duration poorly understood (10-15 days after onset of jaundice)
Transmission	Faeco-oral, Contaminated water and food, Rarely transfusion	Blood and its derivatives, Sexual, Contaminated blood products, Vertical (mother to neonates)	Blood and its derivatives, Sexual: weak, Contaminated blood products: weak, Probably vertical	Blood and its derivatives, Sexual (especially homosexual), Contaminated blood products, Vertical possible	Faeco-oral, Contaminated water and food
Long-term Prognosis	No chronic forms	0.2–10% become chronic, of which 5 – 15% develop cirrhosis Hepatoma possible	Up to 50% become chronic of which 10–25% develop cirrhosis Hepatoma possible	2-5% of B-D co-infections and >90% super-infections in HBV carriers become chronic (rapidly develop cirrhosis)	No chronic forms
Personal Prevention	Non-specific immunoglobulin injections	Specific immunoglobulins anti HBS Safe sex (condoms)	Anti HBS immunoglobulins can be effective	Same as for HBV (HDV infection can only develop with HBV)	Specific imunoglobulins for pregnant women
Vaccination	Anti-hepatitis A	Anti-hepatitis B	Non existent	Anti-hepatitis B	Non-existent

Source: MSF – Clinical Guidelines

Clinical Features and Management of Hepatitis

All hepatitis viruses can cause acute hepatitis, as summarised in the following table:

Table 7-31: Clinical Symptoms of Hepatitis

Diagnosis	Clinical Signs and Symptoms
Acute Hepatitis	Nausea, fever, fatigue, abdominal discomfort, followed by jaundice, dark urine and stools, more or less pale
Sub-clinical Infection	Mild or anicteric (non-jaundice) infection
Fulminant Hepatitis	Severe acute infection that leads to necrosis and liver failure. Associated with high mortality.
Chronic Active Hepatitis	May lead to cirrhosis and eventually primary liver cell cancer.

Case Management — There is no specific treatment for viral hepatitis and some individuals recover naturally. The following measures may relieve symptoms of hepatitis:

- Symptomatic: rest, diet, rehydration, tranquillisers, caution in use of analgesics (e.g., acetyl salicyclic acid, paracetamol), etc.
- Avoid corticosteroid therapy and other medications that are metabolised by the liver.

Control of Hepatitis — The following measures may be used to control outbreaks of hepatitis:

- Chlorinating water for the entire population.
- Promoting personal and food hygiene (particularly among pregnant women to protect them against Hepatitis E infections).
- Proper screening of blood prior to transfusion, which should be restricted to life-threatening emergencies. Transfusion materials should be disposed of properly.

Typhoid Fever

Typhoid fever is a disease caused by the bacteria *Salmonella typhi.* Most large outbreaks are waterborne, while smaller outbreaks are foodborne. The disease primarily affects the lymph nodes of the small intestine. Common symptoms of typhoid include fever, headache, abdominal cramping and constipation. Not everyone with typhoid will develop diarrhoea. Intestinal perforation is a much feared complication of typhoid. While most infected people stop passing the bacteria in their stool shortly after regaining their health, about 10% of them will continue shedding for three months after the onset of symptoms. Infected food handlers present the primary hazard in the spread of disease.

Case Management – patients with acute typhoid illness should be carefully observed in a hospital to detect possible abdominal complications such as bleeding or perforation. They often require two weeks of antimicrobial treatment and supportive care, as summarized in the table below:

Table 7-32: Typhoid Fever Case Management

Typhoid Fever Case Management	
Specific Treatment	*First choice*: Chloramphenicol *Second choice*: • Ampicillin or Amoxycillin • Sulphamethoxazole/Trimethoprim
Supportive Treatment	• Rehydration • Treat fever • Corticosteroids for critically ill patients

Control of Typhoid — the following measures may control outbreaks of typhoid:

- Chlorinating the water supply is the best assurance against a massive typhoid outbreak.
- Promoting food hygiene should focus on handwashing among food handlers and checking that anyone who has ever been sick does not prepare food for others. However, identifying food vendors with typhoid fever and restricting them from work until they are not contagious may be impossible in emergency situations.

Note*: WHO does not recommend vaccination as it offers only low, short- term individual protection and little or no protection against the spread of the disease.*[54]

Parasitic Infections

Parasites are organisms that grow, feed, and are sheltered on or in a different organism while contributing nothing to the survival of its host. This chapter focuses on parasites that live within the body of the host. For details about parasites that live outside the body, such as lice, fleas, scabies, etc., please refer to the *Vector Control in Emergencies* chapter.

In addition to the malaria parasite, other parasites that live within organisms and cause significant clinical illness may be classified as follows:

- **Intestinal Protozoa**: *Entamoeba histolytica, giardia lamblia*
- **Worms** (helminths): roundworm, hookworm, strongyloides, trichuris trichura, pinworm, tapeworms, blood flukes (schistosoma)

Depending on their geographical and socio-economic background, many displaced populations harbour parasites within their bodies for many years. However, since most infections cause less serious problems than infections of measles, diarrhoeal diseases, malaria, etc., aggressive measures to treat all cases with parasites in the emergency phase are a lower priority, when resources are limited.

Risk factors for the spread of parasitic infections in emergencies include the following:
- Poor personal hygiene
- Contamination of the environment by human faeces
- Overcrowding
- Disruption of public health measures

Control of Parasitic Infections — Control of parasite infections among displaced populations should be approached as follows:

1. *Individual approach* — Control the rate of the disease progression in infected individuals by:
   - Treating serious forms of intestinal parasitic infection, such as giardiasis, amoebiasis, or infections by hymenolepsis nana, where they are present.
   - Treating complications due to heavy parasitic infections, e.g., anaemia (hookworm), intestinal obstruction (ascariasis), rectal prolapse (strongyloides).
2. *Community approach* — Reduce the risk of exposure and susceptibility to parasitic infection and diseases through the following measures:
   - Environmental sanitation
   - Adequate and safe water supply
   - Promotion of personal hygiene
   - Health education

The following table summarises the transmission, clinical features, prevention, and treatment of parasites that commonly affect displaced populations in Africa.

Table 7-33: Overview of Common Parasitic Infections

Parasite	Transmission	Clinical Features	Prevention	Treatment
Amoebiasis • ***Entamoeba hystolitica***	Direct: person to person contact (dirty hands) Indirect: contaminated water or food	Amoebic dysentery Amoebic liver abscess (fever, large tender liver)*	Personal: hand washing, cut fingernails, boil water Community: hygiene, sanitation, safe water supply, h/ education	Metronidazole + rehydration
Giardia lamblia	Direct: person to person contact (dirty hands) Indirect: contaminated water or food	Diarrhoea, cramps malabsorption Motile forms seen in stools	Personal: hand washing, cut fingernails, boil water Community: hygiene, sanitation, clean water supply, h/ education	Metronidazole
Trichomonas vaginalis	Sexual	Vaginitis Males: usually no symptoms, or urethritis	Treat all sexual contacts (even if asymptomatic)	Metronidazole
Roundworms *(Ascaris lumbricoides*)	Faeco-oral: eggs (dirty hands)	Few, if any, GIT symptoms, eggs in stool	Personal: hand washing, cut fingernails Community: health education, hygiene, sanitation, enough clean water	Albendazole, Mebendazole, (or Piperazine, Pyrantel palmoate)
Hookworm • ***N. americanus*** • ***A. duodenale***	Transcutaneous: bare feet in contact with moist soil contaminated with larva	Epigastric pain, anaemia, eggs in stool	Personal: wear shoes Community: sanitation, hygiene, safe water supply, h/ education, mass chemotherapy	Albendazole, Mebendazole (or Pyrantel Palmoate, Levamisole)
Schistosomiasis • ***S. hematobium*** Tropical/N Africa	Transcutaneous during contact with water contaminated with Bulinus cercariae	Dysuria, haematuria, Late: hydronephrosis Eggs in urine	Avoid swimming, vector control, h/ education, mass chemotherapy	Praziquatel (or Metrifonate)
• ***S. mansomi*** - Tropical Africa • ***S. intercalatum*** Central & W Africa	Transcutaneous contact with water contaminated with cercariae Bilomphalaria SPP	Diarrhoea, cramps Late: portal hypertension Eggs in stools	As above	Praziquantel (or Oxamniquine)
Adult tapeworm • ***T. saginata*** • ***T. solium***	Undercooked beef Undercooked pork (eggs)	Non-specific GIT symptoms, irritability. Segments may be passed with stools. Eggs in stools	Personal: cook meat adequately Community: veterinary inspection of abattoirs	Mebendazole, Niclosamide, (or Praziquantel)
Cysticercosis **Larva of *T. Solium***	Food contaminated by eggs of T. Solium Autoreinfestation	Nodules in muscle, subcutaneous tissue, headache, fits, coma Eosinophilia	Personal: treat infected persons, hygiene, cook meat well, h/ education	Difficult Praziquantal, Albendazole, Thiabendazole
Hymenolepsis nana	Direct (dirty hands) Feco-oral Autoreinfestation (eggs)	Often asymptomatic Non-specific GIT symptoms Eggs in stools	Personal: hand washing, cut fingernails Community: hygiene, sanitation, safe water supply, h/ education	Niclosamide (or Praziquantel)
Hydatid cyst *Echinococcus granulosus* North Africa	Direct: contact with dog (faeces) Indirect: via food contaminated by dog	Hydatid cyst of liver and lung	Personal: avoid contact with dogs Community: control dogs, do not feed offal to dogs, inspect abattoirs	Surgery

Source: MSF – *Clinical Guidelines*

* *Motile forms* (not cysts) must be present in fresh stools to diagnose amoebic dysentery.

Re-Emerging Diseases

The control of communicable diseases over the last decade has met with many successes. For example, smallpox eradication and the control of polio and neonatal tetanus have been achieved mainly through high vaccination coverage. Successful control of dracunculiasis, onchocerciasis, and Chagas disease has been the result of effective vector control, improved case management, mass treatment, and health education on preventing infection.

However, serious setbacks have also arisen in communicable disease control programs. The eradication of smallpox led to the belief that infectious diseases were no longer a threat. This belief and other factors have led to the emergence of several diseases, for example:

- Successes in global polio eradication programs led to several cases with human monkey-pox (a variant of small pox) among susceptible populations in the Democratic Republic of Congo.[55]
- Lack of needles and syringes and failed barrier nursing caused small outbreaks to turn into major epidemics, such as Ebola in the Democratic Republic of Congo.
- Global warming led to the spread of vector-borne diseases, such as malaria and dengue.
- Deforestation led to ecological changes that increased contact between man and animals. Micro-organisms spread from animals to humans, e.g., Lassa fever in West Africa.

Specific Re-Emerging Diseases

Diseases that have re-emerged and become a major threat because of failure in disease control programs include the following:

- **Viral diseases** — dengue and dengue haemorrhagic fever, yellow fever, HIV/AIDS
- **Bacterial diseases** — cholera, dysentery, meningitis, diphtheria, plague, tuberculosis
- **Parasitic diseases** — malaria, African trypanosomiasis (sleeping sickness)

Although cholera, dysentery, malaria, meningitis, and tuberculosis are likely to cause outbreaks during emergency situations, other diseases that may spread among displaced populations include:

1. **African Trypanosomiasis**, also known as sleeping sickness, remains a persistent problem in East, Central, and West Africa where the tsetse fly is distributed. Refugee populations have been significantly affected. Humans are the main reservoirs for *gambiense* sleeping sickness. Large populations of domestic and wild animal reservoirs make the control of *rhodesiense,* sleeping sickness in humans difficult. (See the *Vector Control* chapter for more information about the vector of sleeping sickness.)

2. **Dengue** is among the most rapidly increasing arbovirus infections around the world. Outbreaks have been reported in Africa, Southeast Asia, and Latin America. The virus is transmitted by *Aedes aegypti* mosquito, which multiplied and spread as mosquito eradication campaigns of the 1970s and 1980s deteriorated. As a result, countries in Latin America that had not reported dengue for several decades are now reporting a high transmission of the disease. More alarmingly than the spread of dengue has been an increase in reported cases with the severe form of the disease, dengue haemorrhagic fever/dengue shock syndrome.

3. **Yellow fever** exists in two forms: the *sylvatic yellow fever* and *urban yellow fever*. Sylvatic yellow fever is restricted to tropical regions of Africa and Latin America where 1000-1500 cases occur annually, with reported case fatality rates of 25-34%. Risk factors for yellow fever outbreaks include neglect of yellow fever vaccination, overpopulation, rural to urban migration and poor water supply or sewage disposal. Young adult males who work in forested or transitional areas are most affected.

   No cases of urban yellow fever have been reported in the Americas since 1942, except for a few cases in Trinidad in 1954. The threat of outbreaks of urban yellow fever has increased in Africa, as the *Aedes aegypti* re-infests the cities. Outbreaks have been reported in Nigeria, Kenya, Cameroon, Gabon, and Ghana. In 1995, an outbreak in Liberia spread to Sierra Leone.

4. **Diphtheria** was a leading cause of childhood deaths until vaccination was introduced in the 1950s. Thereafter, it became extremely rare in industrialised countries after mass immunisations. However, the incidence of diphtheria began to rise in the early 1980s because of disruption of routine immunisation programs. Since the early 1990s epidemics have occurred in the Russian Federation, with more than 39,000 cases and 1,100 deaths in 1994.

5. **Plague** continues to pose a public health threat globally. *Primary pneumonic plague* (urban plague) may occur where domestic rodent populations are not controlled. *Human plague* is endemic in Asia but it is increasingly being reported in Africa. It is more difficult to control because of persisting wild rodents or fleas.

6. **HIV** (**Human Immunodeficiency Virus**) infection is cutting the life expectancy of many African countries. By the end of 1999, there were an estimated 32.4 million adults and 1.2 million children infected with HIV, with about 70% of all HIV-infected persons living in Africa. As the virus spreads, it is changing the demographic profile of Africa, and the future of millions of people within the next 10-15 years. Since the beginning of the epidemic, the cumulative total for **AIDS orphans** (defined as those who have lost their mother before reaching the age of 15) has risen to 11.2 million.[56]

   Two types of retrovirus have been identified as causative agents: type 1 (HIV-1) and type 2 (HIV-2).[57] Acquired Immune Deficiency Syndrome (AIDS) is a fatal clinical condition that develops in the late clinical stage of the HIV infection. HIV may be transmitted as follows:

   - It is directly linked to unsafe sexual practices.
   - Between 5-10% of HIV transmission occurs through blood transfusion and contaminated surgical instruments, syringes, and needles.
   - Mother-to-child transmission is the most common mode of HIV transmission in children. More than 90% of children with mothers who are HIV positive become infected during pregnancy, delivery, or breastfeeding.

     ** Even though HIV transmission through breastfeeding is possible, WHO continues to recommend this form of feeding for developing countries where the benefits of breastfeeding outweigh the risk of HIV transmission.*

   Although the prevalence among many displaced populations is not known, HIV/AIDS has become a serious problem in emergencies. The risk of transmission among displaced populations is greater for various reasons, including increased sexual violence, poverty, social disruption, unsafe blood transfusions, and widespread lack of information on HIV/AIDS.

Diagnosing HIV/AIDS

HIV infection may be diagnosed clinically according to the following case definition:

- *Adults* — by the presence of at least 2 major signs and at least one minor sign, or by the presence of a generalised Kaposi sarcoma, or by the presence of cryptococcal meningitis
- *Children* — by the presence of at least 2 major signs associated with at least 2 minor signs

It is not possible to confirm HIV infection without an antibody test. However, voluntary HIV testing and counselling has been a low priority in refugee settings, except where strict confidentiality can be maintained and the needs of HIV/AIDS patients can be met. Large-scale testing for HIV among refugees requires extreme caution. In some cultures, revealing one's HIV-positive status can lead to outright rejection and even physical harm to infected individuals from all levels: the partner, family, and community. In addition, if testing shows high HIV rates in a refugee population, the entire population may be stigmatised in the eyes of the host population. In addition, resettlement may be more complex as countries do not wish to absorb the burden of caring for refugees who are HIV positive or have AIDS. For a summary of the UNAIDS/WHO position on mandatory HIV testing in refugee situations, please see the Appendix at the end of this chapter.

Prevention and Care of HIV/AIDS

HIV prevention should begin from the acute emergency phase to limit the risk of infection. The nature of the disaster and the HIV problem among the affected population will dictate what HIV/AIDS interventions are appropriate. Basic measures should include health education, access to condoms, and safe blood transfusions. The **universal precautions against HIV/AIDS** should be enforced in order to minimise the transmission of HIV and other blood-borne diseases through health facilities.[58] (See the Appendix for a description of these precautions). Concerned staff should be trained and equipped to care for patients with HIV/AIDS-related illness (such as tuberculosis) and support AIDS orphans.

Note: *An essential minimum package for HIV prevention has been designed to address the above priorities for a population of 10,000 persons per month. For more details about MISP and HIV/AIDS, refer to the* Reproductive Health in Emergencies *chapter. For more details about caring for AIDS orphans, refer to the* Needs of Children and Adolescents *chapter.*

The following table summarises the transmission, clinical features, prevention and treatment of the re-emerging diseases discussed above:

Table 7-34: Summary of Re-Emerging Diseases

Infectious Agent	Transmission	Clinical Features	Prevention	Treatment
African trypanosomiasis **West Africa** **Southeast Africa**	• Tsetse fly vector • Man, domestic and wild animal reservoir	• Primary stage: chancre • Blood stage: fever, adenopathy, hepato-splenomegaly, facial edema • Cerebral stage: disturbed sleeping pattern, sleeping sickness	• Active case finding and treatment • Vector control • Surveillance	• Suramin • Pentamidine • Melarsoprol • Ornidyl
Dengue, Yellow fever ***Arboviruses***	• Mosquito vectors	• Flu-like viral illness, • Encephalitis, • Hepatorenal syndrome, • Hemorrhagic fever	• Immunisation, Personal protection, • Vector control, Epidemic management	• Treatment is supportive. No causal therapy.
Diphtheria ***Corynebacterium diphteriae***	• Human to human contact	• Fever, • False membrane in throat, • Infection/inflammation of pharynx and tonsils	• Treat contacts systematically with penicillin or erythromycin	• Diphtheria anti-toxin • Penicillin G or PPF IM
Plague ***Yersinia pestis***	• Direct bite of infected rodent, • Vectorborne (flea) from rodent host, • Airborne (pneumonic plague)	• Bubonic form: High fever, painful buboes • Septicemic form: fatal complications from bubonic form • Pneumonic form: severe pneumonia with hemoptysis	• Isolate cases, • Disinfect bedding & clothes, • Drug prophylaxis for contacts & health personnel, • Flea & rat control, • Sanitation & hygiene	• Sulphonamide • Streptomycin • Tetracycline • Chloramphenicol
HIV/AIDS	• Sexual • Blood transfusion, contaminated sharps • Mother-to-child (pregnancy, delivery, breastfeeding)	Major signs: • Loss of weight >= 10% • Chronic diarrhoea • Persistent fever >= 1 month Minor signs include: • Chronic cough • Generalised dermatitis • Oropharyngeal candidiasis • General lymphadenopathy	• Ensure safe blood transfusion • Access to condoms • Promote universal precautions • Health education on prevention	Supportive since no effective treatment: • Treat HIV-related illnesses, e.g. TB • Educate family and community on care of PWA* (safe sex, hygiene, nutrition,)

**People with AIDS*

MONITORING AND EVALUATING COMMUNICABLE DISEASE CONTROL PROGRAMS

Emergencies are unstable and dynamic situations. Simply carrying out disease control measures after an initial assessment does not mean that communicable diseases will not cause problems among a displaced population. Disease surveillance is useful for monitoring the incidence of communicable diseases as well as the effectiveness of disease control measures. This will determine whether selected control measures are appropriate and resources are adequate for preventing disease and preserving the health of the affected population.

Evaluation of the disease control program is vital because it measures effectiveness, identifies lessons for future programs, and promotes accountability. Communicable disease control programs can be evaluated in two ways:

a) **Internal Program Evaluation** — This is normally carried out by program staff who regularly analyse and review monitoring information. They must also evaluate the effectiveness of all control measures or compare these measures across different situations.

b) **External Program Evaluation** — This may be part of a wider evaluation exercise by agencies and donors. It may be planned, for example, after the acute phase of the emergency.

The following minimum standards and key indicators of the Sphere Project may be used to evaluate a communicable diseases control program in emergencies:[59]

1. Measles Control

The following indicators are used to evaluate if a systematic response is mounted for each outbreak of measles within the disaster-affected population and the host population, and whether all children who contract measles receive adequate care:

- A single case (suspected or confirmed) warrants immediate on-site investigation which includes looking at the age and vaccination status of the suspected or confirmed case.
- Control measures include the vaccination of all children 6 months to 12 years of age (or higher if older ages are affected) and the provision of an appropriate dose of vitamin A.
- A community-wide system for active case detection using the standard case definition and referral of suspected or confirmed measles case is operational.
- Each measles case receives vitamin A and appropriate treatment for complications such as pneumonia, diarrhoea, and severe malnutrition, which cause the most mortality.
- The nutritional status of children with measles is monitored, and if necessary, children are enrolled in a *supplementary feeding program*.

For details about specific indicators for measles vaccination, see the *Vaccination in Emergencies* chapter.

2. Monitoring Communicable Diseases

The following indicators are used to evaluate the monitoring of communicable diseases:

- The responsible surveillance and disease control unit or agency is clearly identified and all participants in the emergency know where to send reports of suspected or confirmed communicable diseases.
- Staff experienced in epidemiology and disease control are part of the surveillance and disease control unit or agency.
- Surveillance is maintained at all times to rapidly detect communicable diseases and to trigger outbreak response.

3. Investigation and Control of Communicable Diseases

The following indicators are used to evaluate whether diseases of epidemic potential are investigated and controlled according to internationally accepted norms and standards:

- Diseases of epidemic potential are identified by the initial assessment; standard protocols for prevention, diagnosis, and treatment are in place and appropriately shared with health facilities and community health workers/home visitors.
- Case reports and rumours of disease occurrence are investigated by qualified staff.
- There is confirmation of the diagnosis.
- Outbreak control measures are instituted, which include attacking the source, protecting susceptible groups, and interrupting transmission of the disease.
- Qualified outreach personnel participate in the control measures at the community level by providing both prevention messages and proper case management according to agreed guidelines.
- Public information and health promotion messages on disease prevention are part of control activities.
- Community leaders and outreach personnel facilitate access to population groups and disseminate key prevention messages.
- Only drugs from WHO's Essential Drugs List (1998) are used.

4. Human Resource Capacity and Training

The following indicators can help evaluate whether the staff are suitably experienced and trained and that they are adequately managed and supported by their agency:

- Staff and volunteers involved in surveillance (as part of assessment, monitoring, or review process) are thoroughly briefed and regularly supervised.
- Staff responsible for communicable disease control have previous experience or training and are regularly supervised in the use of recommended treatment protocols, guidelines, and procedures.
- Carers are informed about priority prevention activities such as the need for vaccination, use of soap, bednets, latrines and good health seeking behaviours.

The techniques and resources used for monitoring or evaluating must be consistent with the scale and nature of the disease control program. At the end of the evaluation, a report must be written which describes the methodology used and how conclusions were reached. This report should be shared with all concerned, e.g., the affected population, host authorities, donors, and other humanitarian agencies.

APPENDIX

The following table summarises the UNAIDS/WHO position on mandatory HIV testing in refugee situations:

UNAIDS/WHO Position on Mandatory HIV Testing in Refugee Situations
Mandatory testing, except in testing blood for transfusion, is not justified and should not be pursued as a matter of policy for the following reasons: 1. Identifying people with HIV/AIDS does not stop the spread of the virus. 2. It is a violation of human rights, leaving those identified as HIV-positive open to discrimination and persecution. 3. A negative HIV test does not exclude the possibility of HIV infection. 4. A negative test offers no assurance that the person tested will not be exposed or become infected soon thereafter. 5. A negative test is no reason to relax the practice of universal precautions in health settings. 6. Mandatory HIV screening for resettlement purposes is forbidden. 7. Resettlement conditions for refugees living with HIV are difficult and need special attention to prevent discrimination, refoulement and institutionalisation.

The following table describes the universal precaution against HIV/AIDS:

Universal Precautions Against HIV/AIDS
1. Frequent hand-washing with soap and water, especially after contact with body fluids or wounds. 2. Availability of gloves for all procedures involving contact with blood or other body fluids. 3. Protective clothing (masks, eye shields, aprons or gowns) when there is exposure to large amounts of blood. 4. Safe handling of sharp objects (used needles) in puncture-proof containers. 5. Disposal of medical waste materials by burning or burial in a deep pit, at least 10 meters from a water source. 6. Cleaning, disinfecting, and sterilising medical instruments between use on different patients. 7. Proper handling of corpses by using gloves, cover wounds, and later wash thoroughly with soap and water. 8. Treating accidental needle-stick or other injuries by washing thoroughly with soap and water, with or without prophylactic treatment with anti-viral drugs (depending on local policy).

Examples of mortality and morbidity surveillance forms are shown below:

Example of a Mortality Surveillance Form for the Acute and Post-Emergency Phase

ID No.	Date of Death	Age	Sex	Possible Underlying Cause	Place of Death	Remarks

(Source: Spiegel and Sheik, publication pending)

Example of a Morbidity Surveillance Form for the Acute Emergency Phase

DIAGNOSIS	Less than 5 years		More than 5 years		TOTAL
	Males	Females	Males	Females	
Suspected malaria					
URTI					
LRTI					
Watery diarrhoea					
Bloody diarrhoea					
Suspected cholera					
Acute malnutrition					
Suspected measles					
Suspected meningitis*					
Trauma/injuries					
Others					
TOTAL					

Example of a Morbidity Surveillance Form for the Post-Emergency Phase

DIAGNOSIS	DISPLACED POPULATION				HOST POPULATION			
	Less than 5 years		More than 5 years		Less than 5 years		More than 5 years	
	M	F	M	F	M	F	M	F
Suspected malaria								
Lab-confirmed malaria								
Anaemia								
URTI								
LRTI								
Watery diarrhoea								
Bloody diarrhoea								
Suspected cholera								
Worms								
Skin diseases								
Eye infections								
Suspected measles								
UTIs								
STDs								
Tuberculosis								
Acute malnutrition								
Suspected meningitis*								
Schistosomiasis*								
Injuries/trauma								
Others								
Repeat cases (return within 7 days)								
TOTAL CONSULTATIONS								

(Source: Spiegel and Sheik, publication pending)

*In areas where this disease is endemic

REFERENCES AND SUGGESTED READINGS

1. Anne Golaz (CDC: National Immunization Program). Immunisation Programs in Complex Emergencies. Lecture notes for International Diploma in Humanitarian Assistance Course, Geneva, Feb 1999.
2. Joint WHO/UNAIDS: AIDS Epidemic Update, December 1999.
3. The International Bank for Reconstruction and Development. Disease Control Priorities in Developing Countries. Edited by Dean T Jamison et al, Oxford 1993.
4. IFRC African Red Cross and Red Crescent Societies' Health Initiative 2000-2010 (ACHI 2010) Fact sheet: Measles in Africa.
5. MSF, Refugee Health, An approach to emergency situations, Macmillan Education Ltd., London, 1997.
6. Noji, E.K., The Public Health Consequences of Disasters, Oxford University Press, New York, 1997.
7. Pierre Perrin, *War and Public Health, Handbook on War and Public Health*, ICRC, Geneva, 1996.
8. Sandler, R.H., Jones, T.C., *Medical Care of Refugees*, Oxford University Press, New York, 1987.
9. The Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Response. Oxfam Publishing Oxford, 2000.
10. WHO. Control of Epidemic Meningococcal Disease: WHO Practical Guidelines.
11. WHO. Emerging and Re-emerging Communicable Diseases. Lecture notes for the International Diploma in Humanitarian Assistance, February 1999, Geneva. Department of Surveillance and Response, Communicable Diseases Cluster.
12. WHO. Rapid Health Assessment Protocols for Emergencies, Geneva 1999.
13. WHO. *Guidelines for Cholera Control.*
14. WHO. *Guidelines for the control of epidemics due to Shigella dysenteriae type 1.*
15. WHO. Malaria Control among refugees and displaced populations, Geneva, 1996.
16. WHO. The Management of Acute Respiratory Infections in Children: Practical guidelines for out-patient care.
17. WHO. *Outline Strategy for Malaria Control in Emergencies*. WHO Roll Back Malaria: Emergency and Humanitarian Action, Geneva 1999.
18. WHO. *Treatment of Tuberculosis, Guidelines for National Programmes*, Geneva, 1997.
19. WHO. *Tuberculosis Control in Refugee Situations, an Inter-Agency Field Manual*, Geneva, 1997.
20. UNHCR. Handbook for Emergencies, Geneva 2000.

[1] Noji, E.K., The Public Health Consequences of Disasters, Oxford University Press, New York, 1997.
[2] The International Bank for Reconstruction and Development. Disease Control Priorities in Developing Countries. Edited by Dean T Jamison et al, Oxford 1993.
[3] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[4] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[5] WHO/UNICEF. Integrated Management of Childhood Illness.
[6] IFRC African Red Cross and Red Crescent Societies' Health Initiative 2000-2010 (ACHI 2010) Fact sheet: Measles in Africa
[7] Ibid.
[8] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[9] Sandler, R.H., Jones, T.C., *Medical Care of Refugees*, Oxford University Press, New York, 1987.
[10] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[11] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[12] The Sphere Project, Humanitarian Charter and *Minimum Standards in Disaster Response. Oxfam Publishing, Oxford*, 2000.

[13] IFRC, ARCHI 2010 Fact Sheet: Malaria in Africa
[14] WHO, Malaria Control among refugees and displaced populations, Geneva, 1996
[15] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[16] Pierre Perrin, *War and Public Health, Handbook on War and Public Health*, ICRC, Geneva, 1996.
[17] Allan et all, Merlin and malaria epidemic in north-east Kenya (1998) Lancet, Vol. 351
[18] "Management of Severe Malaria" a practical handbook – second edition WHO Geneva 2000
[19] Anne Golaz (CDC: National Immunization Program). Immunisation Programs in Complex Emergencies. Lecture notes for International Diploma in Humanitarian Assistance Course, Geneva, Feb 1999.
[20] Noji EK. The Public Health Consequences of Disasters. New York, 1997.
[21] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[22] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[23] Pierre Perrin, *War and Public Health, Handbook on War and Public Health*, ICRC, Geneva, 1996.
[24] Pierre Perrin, *War and Public Health, Handbook on War and Public Health*, ICRC, Geneva, 1996.
[25] Ibid.
[26] WHO, *Treatment of Tuberculosis, Guidelines for National Programmes*, Geneva, 1997.
[27] WHO, *Tuberculosis Control in Refugee Situations, an Inter-Agency Field Manual*, Geneva, 1997.
[28] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[29] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[30] Ibid.
[31] WHO. *Guidelines for Cholera Control*
[32] WHO. Rapid Health Assessment Protocols for Emergencies, Geneva 1999.
[33] WHO, *Guidelines for the control of epidemics due to Shigella dysenteriae type 1*
[34] who-outbreak
[35] WHO. The Management of Acute Respiratory Infections in Children: Practical guidelines for outpatient care.
[36] Malaria Diagnostics – New Perspectives WHO/CDS/RBM/2000.14. WHO/MAL/2000.1091
[37] WHO/MAL/96.1077
[38] The WHO/HINAP project will hold malaria data on complex emergency countries on its website.
[39] WHO. *Outline Strategy for Malaria Control in Emergencies*. WHO Roll Back Malaria: Emergency and Humanitarian Action, Geneva 1999.
[40] WHO. Control of Epidemic Meningococcal Disease: WHO Practical Guidelines.
[41] Ibid.
[42] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[43] Robinson, D., *Epidemiology and the community control of disease in warm climate countries*, Churchill Livingstone, Edinburgh, 1985.
[44] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[45] WHO. Control of Epidemic Meningococcal Disease: WHO Practical Guidelines
[46] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[47] Pierre Perrin, *War and Public Health, Handbook on War and Public Health*, ICRC, Geneva, 1996.
[48] MSF, Refugee Health, An approach to emergency situations, Macmillan Education ltd., London, 1997.
[49] WHO. TB/HIV, A clinical manual, 1996.
[50] Adapted from Treatment of Tuberculosis Guidelines for National Programs: Second edition 1997.
[51] Ibid.
[52] Ibid.
[53] WHO, *Tuberculosis Control in Refugee Situations, an Inter-Agency Field Manual*, Geneva, 1997.
[54] UNHCR. Handbook for Emergencies, second edition, Geneva.
[55] World Health Organisation. Emerging and Re-emerging Communicable Diseases. Lecture notes for the International Diploma in Humanitarian Assistance, February 1999, Geneva. Department of Surveillance and Response, Communicable Diseases Cluster.
[56] Joint WHO/UNAIDS: AIDS Epidemic Update, December 1999
[57] Benenson, A.S. ed., *Control of Communicable Diseases Manual*, American Public Health Organization, Washington DC, 1995.
[58] Ibid., pp. 34-35.
[59] The Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Response. Oxfam Publishing Oxford, 2000.