Medical centre in Tréguine camp (Chad)
Rosemarie North / International Federation of Red Cross and Red Crescent Societies
Emergency health services

Description

This chapter provides guidance on key principles of emergency health services during emergency relief operations. This chapter complements the previous on health systems and infrastructure.

Learning objectives

- To characterise the consequences of disasters on health services and the role of health services in disasters;
- To describe different strategies for setting up health services in emergency situations;
- To discuss the key steps for managing a mass casualty incident;
- To characterise the crucial role of community health workers and community health volunteers and traditional healers in emergencies;
- To design a health centre with a logical patient flow;
- To discuss the implementation of emergency health services in the acute emergency phase;
- To discuss the particular health issues of maternal and child health, trauma and surgical emergencies and acute exacerbation of chronic diseases in emergencies;
- To discuss the key issues in managing essential drug supplies and the importance of standard protocols; and
- To define indicators that may be used to monitor and evaluate health services in emergencies.

Key competencies

- To understand the consequences of disasters and the role of health services in disasters;
- To recognise the staffing required for managing large numbers of casualties;
- To design appropriate facility-based and community-based health services;
- To understand the importance of supporting community health services;
- To understand how to implement emergency health services in the acute phase;
- To recognise and address special health issues in emergencies;
- To design a drug supply system; and
- To organise an information system for monitoring and evaluating health services.

Introduction

In the wake of a disaster, the interaction between vulnerabilities and disaster hazards may result in significant injuries and the loss of human lives. Since a large number of casualties can easily overwhelm the existing but partly destroyed medical facilities, establishing an emergency health services is critical. The type of health services provided depends on whether the emergency situation is a natural disaster, a complex emergency or protracted refugee health; but it must guarantee basic physical and mental care as well as prevention. In all emergency situations, the prioritisation of health services must focus on meeting both the short-term and long-term needs of the victims.
This chapter’s audience is the local health relief worker, who might not have any formal medical training. This chapter will give guidance in providing emergency health care for different kinds of emergencies:

- Mass event with major long-term implications such as an earthquake or tsunami that results in major damage to the health system. In such a scenario, the local health system needs both immediate and long-term external assistance until the facilities can return to normalcy;
- Mass event of immediate but limited implications such as a train crash;
- Intermediate events such as displacement from flooding, lasting two to six weeks; and
- Mass displacement such as refugees fleeing from a neighboring country, or internally displaced persons as in Northern Uganda with potentially longer term needs in a select population.

Local organisations must foster a spirit of collaboration in the response to a disaster. The consequences from a lack of coordination among NGOs include the development of many parallel health systems. These duplicate services in one area while leaving others uncovered. It is the responsibility of the ministry of health and the lead health agency to coordinate all the activities of the involved agencies. It is also the responsibility of each agency involved in the emergency to recognise that the primary purpose of coordination is to achieve maximum impact with the given resources and to work with one another to reach this endpoint. A parallel health system, however, might need to be set up where local health facilities are not functioning nor have a limited capacity. In these situations, coordination of services is paramount.

The best way of setting up an emergency health programme is to strengthen the local system through local organisations. The emergency health programme must match the government’s health policies such as essential drugs, treatment protocols and referral systems. The priorities for health services in the emergency phase should focus on treating common health conditions such as trauma injuries, acute infections and acute exacerbation of chronic diseases. It should also involve all available health providers including community health workers. An ongoing health information system for monitoring the health status of the affected population can be integrated into the existing national health information system. In the post-emergency phase, health services can be expanded to include treatment of chronic diseases, comprehensive reproductive health and mental health care.

**Effects of disasters**

The effects of disasters on health depend on the disaster’s type and time of onset. Sudden onset disasters such as earthquakes pose greater threats to health than slow onset disasters. The actual and potential health problems resulting from the disaster are multifaceted and do not all occur at the same time. The resulting health problems might be related to food and nutrition, water and sanitation, mental health, climatic exposure and shelter, communicable diseases, health infrastructure and population displacement. The effects of disasters on health services will be discussed later. Other chapters in this book will discuss other health needs.

**Consequences of disasters on health services**

Disasters, whether natural or human-made, create particular problems for health services.

Damage to health infrastructure:

- Disasters can cause serious damage to health facilities, water supplies and sewage systems. The damage can severely limit health systems’ provision of medical care to the population in the time of the greatest immediate need. Structural damage to facilities poses a risk for both health care workers and patients;
The supply chain (medical equipment and pharmaceutical supplies) for the health facilities is often temporarily disrupted;

Limited road access makes it at least difficult for disaster victims to reach health care centres. Relief organisations might also have difficulties reaching vulnerable populations; and

Pre-hospital coordination and communication is crucial in emergency situations. Disrupted communication systems lead to a poor understanding of the various receiving facilities’, military resources’ and relief organisations’ actual capacity. Consequently, the already limited resources are not effectively utilised to meet the demands.

Increased demands for medical attention:

- Climatic exposure because of rain or cold weather puts a particular strain on the health system;
- Inadequacy of food and nutrition exposes the population to malnutrition, particularly in the vulnerable groups such as children and the elderly; and
- If there is a mass casualty incident, health systems can be quickly overwhelmed and left unable to cope with the excessive demands.

Population displacement:

- A mass exodus from the emergency site places additional stress and demands on the host country, its population, facilities and health services, particularly.
- Depending on the size of the population migration, the host facilities may not be able to cope with the new burden, and
- Mass migration can introduce new diseases into the host community.

Major outbreaks of communicable diseases:

- While natural disasters do not always lead to massive infectious disease outbreaks, they do increase the risk of disease transmission. The disruption of sanitation services and the failure to restore public health programmes combined with the population density and displacement, all culminate in an increased risk for disease outbreaks.
- The incidence of endemic vector-borne diseases may increase due to poor sanitation and the disruption of vector control activities.

The role of emergency health services in disasters

Disasters, depending on their type and magnitude, result in various levels of morbidity and mortality. Except earthquakes that produce special demands, the number of disaster victims requiring medical care is usually low. The demand for curative care is highest during the acute emergency stage, when the affected population is most vulnerable to the new environment and before basic public health measures such as water, sanitation and shelter have been implemented. Afterwards, the priority should shift to preventive measures that can improve the overall health of the displaced population dramatically.

Disasters call for a coordinated response between curative and preventive health services, including food supply, water and sanitation. To minimise mortality and morbidity, it is also necessary to organise the relief response according to three levels of preventive health measures:21

**Primary prevention** is the ultimate goal of preventive health care. It aims to prevent the transmission of disease to generally healthy populations by using the following actions:

- Promoting healthy practices;
- Implementing public health measures that reduce a population’s exposure to risk factors such as ensuring a safe drinking water supply to prevent diarrhoea, an adequate food supply to minimise malnutrition and distributing mosquito nets to prevent malaria; and
Conducting medical interventions such as chemo-prophylactics against malaria and measles immunisation.

**Secondary prevention** identifies and treats as early as possible diseased people to prevent the infection from progressing to a more serious complication or death. This is done using the following:

- Alleviating symptoms of diseases such as giving Oral Rehydration Solution early to a child with diarrhoea to prevent dehydration and possible death; and
- Curing patients with diseases through early detection and treatment of TB, dysentery, etc.

**Tertiary prevention** reduces permanent damage from disease such as a patient being offered rehabilitative services to lower the effects of paralysis due to polio or land mine injuries.

**The role of the military in disaster response**

The military are often one of the earliest first responders to a disaster. Its principle role is to assist in supporting the civilian authorities. The military’s hierarchical command structure allows it to respond to disasters in a rapid and coordinated manner. Military services generally have easy access to resources and are equipped to perform vital functions in disaster response such as resource distribution, security services, search and rescue, logistics assistance, transportation to otherwise unreachable communities and field hospital staffing and management.

Traditionally, most NGOs (local and international) do not involve the military because of the need for neutrality, impartiality and independence. While the nature of humanitarian response is becoming both more complex and insecure, the concerns about neutrality become more blurred. The overlap of humanitarian missions between the NGOs and the military is now more common. This issue, however, is beyond the scope of this chapter. If the political climate allows for collaboration, the host country’s ministry of health and the lead health agency should consider coordinating with the military in the response to a disaster as well as in the disaster preparedness plan.

**Disaster preparedness**

Disasters becoming more frequent since the turn of the 21st century, preparedness for disasters takes a more prominent role in the prevention of a disaster’s adverse outcomes. The health objectives of disaster preparedness are to: 1 2

- Prevent morbidity and mortality;
- Provide care for casualties;
- Manage adverse climatic and environmental conditions;
- Ensure restoration of normal health;
- Re-establish health services;
- Protect staff; and
- Protect public health and medical assets.

Disaster preparedness requires a comprehensive approach and must involve all sectors. The government, private and community organisation are all stakeholders in the preparedness process. According to Keim and Giannone, the preparedness process includes policy development, vulnerability assessments, disaster planning, training and education, monitoring and evaluation. 1
Policy development

National governments must designate a branch of the ministry or organisation with the responsibility to develop, organise and manage an emergency preparedness programme for the country. This group must work with central government, provincial and community organisations and NGOs whether local or international to develop a set of policies agreed upon by all. This process is vital for a well coordinated response and a sustainable policy. The policies’ endpoint must allow quick decision making, ensure the actions are legal and free from liability and ensure that appropriate pre-defined actions are taken during a state of emergency.

Vulnerability assessment

Potential hazards for the community are identified and prioritised in a vulnerability assessment. The community’s capacity can be determined by the availability of resources of the community and how the community is able utilise these resources. The community’s capacity is balanced against the degree of exposure to certain hazards that a community is susceptible to. This balance or its lack between capacity and susceptibility to hazards can determine a community’s vulnerability to disasters. Once the vulnerabilities are identified, the assessment must also recommend how to address each of the vulnerabilities.

Disaster planning

Planning is only one component of preparedness. A disaster’s outputs plan must provide:
- An understanding of organisational responsibilities in response and recovery;
- Stronger emergency management networks;
- Improve community awareness and participation;
- Effective response and recovery strategies; and
- A simple and flexible written plan.

Training and education

An important component of preparedness is to train and educate public health officials and community responders about the disaster plan. Training must provide the important skills and knowledge needed to show an effected community how it can participate in emergency management and also show it the appropriate and critical actions needed in an emergency.

Monitoring and evaluation

The objective in monitoring and evaluation is to measure how well the disaster preparedness programme has been developed and is being implemented. A systematic analysis must study the components of the preparedness programme and determine if it achieves its health objectives as discussed above.
Planning emergency health services

Assessment and priority setting

With limited resources, emergency health services planning must be based on the best available information. As will be discussed further in the epidemiology chapter of this book, needs assessment can gather information that is critical for prioritising health care needs.

In small size local disasters that involve mass casualty incidents, a rapid assessment of the scene must be part of the initial steps for any mass casualty management. This will be discussed later in the chapter. The mass casualty incident may be the result of a bus accident or a small natural disaster. The rapid assessment covered in the epidemiology chapter will provide management with a broad picture of the emergency’s issues rather than just the health issues.

Emergency health care must focus on the most urgent health problems. These may vary depending on the nature and magnitude of the disaster on and whether there is a long-term population displacement. Any interventions recommended after the assessment must prevent excess mortality and morbidity as well as anticipate future health problems from the evolving emergency situation.

A simple technique shown in Figure 3-2 can rank problems and identify priority health interventions within the selected health services.

<table>
<thead>
<tr>
<th>Risk of excess mortality or morbidity</th>
<th>Frequency of disease diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
<td>Malaria</td>
</tr>
<tr>
<td></td>
<td>Diarrhoea</td>
</tr>
<tr>
<td></td>
<td>TB</td>
</tr>
<tr>
<td></td>
<td>Epilepsy</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Intestinal worms</td>
</tr>
<tr>
<td></td>
<td>URTI</td>
</tr>
<tr>
<td></td>
<td>Ringworm</td>
</tr>
<tr>
<td></td>
<td>Arthritis</td>
</tr>
</tbody>
</table>

It would be impossible and ineffective to address all issues all at the same time. Health interventions prioritisation is vital to the success of the disaster response campaign. Some diseases occur very frequently and are associated with a high risk of death such as malaria and diarrhoea in children under five years. These must be addressed before other diseases
that have as high a frequency but a lower risk of serious illness or death such as intestinal worms. Cases that are not emergent may be addressed after the life-threatening diseases have been put under control.

**Other health considerations**

After setting the priorities of an emergency health programme, consider the consequences of other health problems that were not addressed, for example:

- A higher number of tuberculosis (TB) cases among displaced populations might increase the risk of infection within the host countries’ populations;
- A large population of adolescents in a displaced population with a high prevalence of sexually transmitted diseases might increase the spread of HIV/AIDS;
- Neglecting the local population in disease control activities might render the control measures among the displaced population ineffective; and
- Ignoring harmful traditional practices might cause permanent injury to the victim.

**Setting goals and objectives**

The goals of establishing emergency health care for large displaced populations can be defined as:

- Reducing excess mortality and morbidity; and
- Targeting the health problems that are causing the excess mortality.

The goals for reducing excess mortality and morbidity can be reached by providing the appropriate medical care to those with:

- Acute injuries resulting from trauma or acute exacerbation of chronic medical diseases in a disaster’s aftermath; and
- Clinical illnesses from communicable diseases.

To target the health problems that cause excess mortality use the following preventive approaches:

- **Implementing preventive health measures** that combine primary, secondary and tertiary prevention. These are effective for reducing excess mortality;
- **Targeting vulnerable groups** for preventive health services such as children under five, pregnant women, the elderly and unaccompanied minors; and
- **Monitoring** population and health services data to detect emerging health problems.

For further details on preventive health measures, refer to the control of communicable diseases chapter.

Both immediate and long-term objectives can target groups with an increased risk of death and illness such as children under five, pregnant women, the elderly and unaccompanied minors. Targets for each objective can later be used to evaluate the programme in achieving stated objectives; for example:

- If 85% of the patients with TB completed treatment within the stated time period.
- If the death rate of children under five is declining or has returned to pre-disaster levels.

**Detailed planning**

A plan of action that defines how to reach programme goals and objectives must be developed. The following steps can be used to develop a plan:

- Identify the priority health services needed and when they should be established;
- Define the level of health care that will be provided;
- Define the strategy for providing health services; and
- Set standards for health services.
Identify the priority health services needed

The type of emergency health care established will depend on the emergency situation. Plan the programme in phases that are based on the priority health needs. For further details on prioritising health services, refer to the health systems and infrastructure chapter.

Define the level of health care that will be provided

As most developing countries have a health care system that is based on the primary health care (PHC) model, emergency health care should be implemented at the most appropriate level of the primary health care system available. The primary health care system should include the following levels of care:

- Home or family level;
- Community level, including Community Health Workers and other home visitors
- Peripheral health facilities (dispensary or health post);
- First level health facilities (health centre); and
- Referral hospital.

Note: not every emergency will require all levels of care.

With limited resources, only those levels that will effectively prevent excess illness and deaths should be introduced. The community and first level of health care, which are most cost-effective, should be introduced at the very beginning of the emergency. Additional levels of health care may later be introduced according to their potential for preventing excess illness and deaths. Refer to the health systems and infrastructure chapter for a detailed discussion on clinical services in the emergency and post-emergency phases.

Defining the strategy for establishing health services

There are two basic strategies for providing emergency health care to a large displaced population:

- Facility-based health care; and
- Community-based health care.

Each strategy is described below.

Facility-based health care

Facility-based health care can be established by augmenting the local health care system, setting up a separate health care system or setting up mobile or satellite clinics.

Augmenting the local health care system—the preferred approach

Avoid as much as possible building a ‘special emergency hospital’. Some local health systems will have the capacity to absorb the additional demand from displaced populations, especially in situations where:

- The total displaced population does not overwhelm the local services;
- There is little political tension between the local population and the newcomers;
- There is no excess demand for health services from disease outbreak or mass casualty incidents.

Even though the host country is primarily responsible for the care of displaced populations, relief agencies should try to strengthen the capacity of the local health care system. Existing health facilities should be assessed and repaired. Donated tents can be used to increase the size of the facility. The overall quality of local health services can be
improved through the regular supply of essential drugs and staff training. Augmenting local services has many advantages because:

- Resources are not wasted by duplicating existing services;
- Local health authorities are directly involved with the problems faced by the displaced population; and
- Both the host and displaced populations receive equal medical attention, thereby reducing resentment from the host population.

When augmenting local services, certain issues must be agreed upon:

- Compensate local services for extending health care to the displaced population such as paying the user fees for displaced people where cost-recovery programmes exist;
- During the Indian Ocean Tsunami, UNHCR coordinated with all the NGOs working in Indonesia to pay IDP workers a standard rate equal to that received by the locals. In Kenya, outpatient consultations for refugees were free, but UNHCR was charged double rates for inpatient care and diagnostic procedures;
- Provide means for communication and patient transfer between different levels of health care sites to improve their access and the access of referral services.
- Re-distribute health personnel so that the workload is evenly spread out. Additional staff, such as a surgeon or other health workers from less affected areas can be ‘seconded’ to the emergency health programme or various in-service training courses can be organised;
- Provide incentives for existing health workers handling an increased workload;
- Identify measures that can promote the return of health demands to normal or pre-disaster levels; and
- Agree on changes to national health policies such as TB treatment and measles vaccination programmes for large displaced populations. This might be different from those in place for host populations.

**Setting up a separate health care system**

Sometimes local services are inaccessible, overloaded or short-staffed. If setting up new facilities is the only option, seek approval from the national health authorities at the beginning. Where possible, policies of the host country health system should be adopted for the following:

- Clinical diagnosis and therapeutic protocols;
- Essential drugs and drug supply;
- Patient flow and referral system;
- Health information system;
- Training curriculum for health workers including health workers from the displaced population;
- Minimum staffing levels per facility including expatriates; and
- Coordinating health care and relations with the national health care system.

Good coordination with the national health authorities is critical because the introduction of a separate health care system can create problems for the host government:

- There might be marked differences between the levels of health services for displaced populations and locals. This is more likely to occur if the local health care is sub-standard;
- The host government must ensure that health services for the displaced population which are free and of better quality does not create competition between local and private health services which are based on cost-recovery;
- Most of the health workers should be recruited from the displaced population to overcome any cultural and language barriers. Their foreign medical documents, however, might not be recognised by the host government; and
Higher salaries from externally funded relief programmes can drain local staff from local facilities. Although relief agencies should focus their efforts on the health of the displaced population, in some cases it is as important to assist the local population. Since both the displaced and local populations are at risk during a disease outbreak, relief agencies should support local health authorities to implement effective disease control measures. Where local health facilities are lacking or cannot be strengthened, host populations must have access to health care services set up for displaced populations.

Field hospitals and clinics
The Pan American Health Organisation cites three basic criteria for setting up a field hospital:
- Be fully operational within twenty-four hours of the disaster;
- Be able to provide services that coincide with medical needs; and
- Allow for national health personnel to operate the technology contained within.17

More specifically, a field hospital should have the following features:
- A secure location;
- Easy access for the population to be served;
- Several access routes for transport of patients and supplies;
- Adequate water supply: 150-200 litres per patient per day including laundry;
- Access to local staff and translators;
- An organised supply chain;
- Sanitation system with latrines, drainage and waste disposal;
- Covered waiting areas for protection from the weather; and
- Several generators for a reliable electricity supply.

Example: ready-made systems and kits
Organisations like the International Federation of Red Cross and Red Crescent Societies have created preparedness and ‘press the button’ response systems with equipment ready for immediate use. Ready-made systems are quick, but they can only provide an operational platform that will have to have some adjustment once it is in the field.

Between disasters, the International Federation pays a lot of attention to training volunteers in the community to do preparatory work, looking after basic health needs and reporting on local conditions. During a disaster, the International Federation uses Regional Disaster Response Teams (RDRT) and Field Assessment and Coordination Teams (FACT) to assess the magnitude of needs, identify priorities and channel assistance to high priority areas in order to reach the neediest. Tented Emergency Response Units (ERU) are provided if needed at the secondary level to cover peripheral, clinical and community level needs.

At the same time, ERU hospitals are set up to cover needs at the tertiary level. To reach very remote areas, mobile systems are developed on a temporary basis. Essentially, the Interagency Emergency Health Kits (IEHK replacing the NEHK) are used as a medical supply base.
To support the emergency health system, other ERUs in water and sanitation, relief, logistics including medical logistics and IT are called upon. During the Tsunami operations, 17 ERUs, three FACTs and a large number of RDRT members were used. Since an ERU hospital is very complex, a ready made organisational chart and generic job descriptions help facilitate the start-up phase. All boxes are numbered in a specific way so that workers can easily identify all the items needed first. Colour coding further helps the supplies to reach the right division as soon as possible. This is illustrated below with the various tent colours.

Figure 3-3: Diagram of a ready-made system

Often, ready-made systems are not available. They have to be created one or parts of them on the ground. The initial step is to set up a health centre for 10,000 to 30,000 beneficiaries supported by a network of home visitors and a referral system to a tertiary care hospital. This enables active case finding and the integration of beneficiaries into the health system. Maintain a triage system throughout this process so that serious yet easily treatable diseases are immediately taken care of such as diarrhoea that might lead to severe dehydration. More complex problems are referred to specialised centres where chronic but non-life threatening problems are quickly treated such as small contusions or arthritis.

Example: setting up a health centre in Pakistan

When setting up a health centre, be sensitive to gender in the local context. After the Pakistan earthquake on October 2005, several rural health centres which are equivalent to the secondary level of care in normal circumstances were totally destroyed. Relief workers, therefore, had to set up tents as temporary facilities until the centres could be rebuilt. Since the tents were located near the original health centres, all the local people knew where to go for health services. The large tent had barriers that could be erected for privacy between rooms as well as an entrance at both ends. A separate tent and latrine were set up at a distance from the main tent to give women some privacy. The benefit from using tents is that the facility is modular and can be adapted to changing needs such as separation of services by gender.
One suggested layout for an independent health centre with a lab and basic maternity care is given below in Figure 3-4. Although most cases will be diagnosed clinically, there might be a need for laboratory services in certain situations such as countries where drug resistant malaria is a major problem. Until the rehabilitation phase is initiated however, laboratory services should be kept to a minimum. Laboratory services that are implemented should be agreed upon and established with the host country government.

**Figure 3-4: Suggested layout of a clinic**

<table>
<thead>
<tr>
<th>Lab</th>
<th>Treatment room</th>
<th>Office</th>
<th>Duty utility</th>
<th>WC/bath</th>
<th>Maternity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacy/store</td>
<td>Multi-purpose room</td>
<td>Adult OPD</td>
<td>Inpatient ward</td>
<td>Inpatient ward</td>
<td></td>
</tr>
<tr>
<td>Dispensary</td>
<td>Registration</td>
<td>Mother and child clinic</td>
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</tr>
</tbody>
</table>

**Setting up mobile or satellite clinics**

Outreach services are appropriate for delivering preventive care such as immunisations or antenatal care. Outreach clinic supervisors should be encouraged to visit health workers based in the community such as Community Health Workers, Traditional Birth Attendants (TBAs) and auxiliaries to assess and build the capacity of the community-based health workers. Mere contact with medical care at regular intervals, however, does not ensure that the community does have access to health care. Access implies a continuous relationship between those who need services and the health care provider. Outreach clinics are not the appropriate facility for treating serious medical conditions that require a more frequent follow-up.

**Facility-based health care—key points**

The aim of establishing an emergency health system should be to strengthen the local health system. Whichever strategy is adopted, all services should function effectively and be well coordinated to achieve the following:

- Comprehensive care—looking for other conditions that a patient may not report such as depression with persistent headaches or abdominal pain (somatisation);
- Continuity of care—following up referrals, defaulters of TB treatment or immunisation; and
- Integrated care—linking curative with preventive care at every opportunity such as combining child immunisation with antenatal clinic days.

Refer to the health systems and infrastructure chapter for further details.
Community-based health care

Strengthening local health facilities does not guarantee that everyone will use them. Many patients, some seriously ill, might still not pursue medical treatment, even if the facilities provided are nearby or free. Possible barriers to seeking health care include the lack of:

- Awareness of available services;
- Access due to various problems such as being too far, inconvenient hours of operation, health workers’ poor attitudes, no money for drugs, ethnic-based or politically-based discrimination and inadequate security; and
- Health care resources such as drugs, materials, staff and services.

If such barriers to facility-based health care exist, community-based health care is very important.

Setting up a community health worker programme

There are two ways of establishing community-based health care:

- Setting up a community health worker programmes; and
- Integrating alternate health providers.

Community health workers who have received training as emergency first responders are a great resource in the acute phase of the disaster response. Local health workers are usually the first to respond to any local disaster before any external help even arrives. Their knowledge of the local geography, people and health system is invaluable.

In a disaster’s recovery and post-emergency phases, Community Health Workers (CHWs) are community members who are trained to act as direct intermediaries between the beneficiary population and the health care system. The reasons for setting up a network of CHWs are to extend emergency health care coverage through mobilising the community for public health initiatives and through preventive health activities such as disease control and surveillance. CHWs reduce health facilities’ patient burden by increasing the population’s awareness of how to improve their own health and take preventive health measures such as proper water and sanitation practices. This allows staff at health facilities to concentrate on more severe conditions.

The appropriate level of training for Community Health Workers (CHW) depends on both the available resources including CHW trainers and supervisors and the CHWs’ expected role in providing Primary Health Care (PHC). During the acute emergency phase, initial training should focus on simple priority tasks that address immediate health needs such as:

- Identifying cases of disease as early as possible;
- Referring the seriously ill as early as possible;
- Identifying vulnerable groups;
- Information, Education and Communication about disease prevention and control such as water and sanitation, re-hydration, good nutrition, immunisation, safe motherhood care, condom distribution and protection from sexual violence; and
- Data collection on all the above activities.

The following points should be considered when setting up a CHW programme:

- Ensure that CHWs are selected from all ethnic groups and that at least half are female.
- Realise that some CHWs may be illiterate. Training and updating the CHWs on current health protocols must be delivered at their level of comprehension, that is demonstrations through enactment or pictures, verbal communication etc. CHWs will need support in keeping records of their activities; and
- Define CHW roles clearly. PHC programmes will, therefore, work better especially when CHWs receive visible support from both the community and the entire health care team.
Integrating alternate health providers

Some displaced population members might prefer to use the services of alternate health providers. Health workers in the facilities must try to understand the population’s reasons for seeking alternate health care and integrate these alternate health providers into the emergency health system.

‘Modern’ health practitioners:

Within the displaced population, there may be doctors and nurses who have been formally trained in their country of origin but lack certification to work in the local health sector. It might not, therefore, be possible to incorporate them directly into the emergency health programme. The emergency health system, therefore, should encourage these people’s involvement to streamline patient management practices especially drug treatments and improve the reporting of communicable diseases. They should be encouraged to use the referral system (at both upper and lower levels).

Non-government organisation (NGO) hospitals:

These hospitals might have been set up by religious institutions long before the emergency. They often provide quality health care for a small fee. The critical role these hospitals play at the onset of a disaster might be overlooked after the emergency health system is set up. Close links must be maintained for mutual support within the health care system.

Other service providers:

The community’s overall health needs can be better represented within the emergency health system by integrating into the system community
- Elders,
- Religious leaders,
- Teachers, and
- Social service organisations.

These community members should have access to basic medical training such as first aid. Integrating modern and traditional medicine increases the effectiveness of emergency health services. Training workshops, regular meetings and supervision visits should be established for the alternate health providers if possible. This will improve patient care and referral. It will also discourage harmful practices. Traditional healers can also participate in preventive health measures such as immunisations and HIV/AIDS prevention.

Setting standards for emergency health care

Because emergency health programmes involve health workers and organisations with different training backgrounds, delivery of services must be standardised. Relief agencies must make it known from the beginning the standards or protocols must be followed (ministry of health, WHO, etc.). These standards can be used later to evaluate the programme. Advantages from standardising emergency health care include:
- Easier integration of new staff members;
- Regulating patient referrals to higher levels of care;
- Improving management of drugs and equipment; and
- Preventing competition between facilities that provide the same care.

Standardising the care-giving process

Care-giving procedures may vary for health providers at various levels of care. Highly-trained health workers in hospitals can apply a wide range of diagnostic and care-giving procedures, but Community Health Workers being based in the community should only use those procedures which reflect their level of training and competence.
Health care providers should be trained to approach each patient’s health problem in a systematic way. After receiving a patient, a clinical history should be taken, a physical assessment done and an interim diagnosis made. A decision can, therefore, be made of whether to treat the patient with medical drugs or procedures, give advice on home care, make a referral or give a follow-up. If after deciding to do nothing, the health care provider must explain to the patient why this decision has been made otherwise patients might lose confidence in the health system and become less keen to follow advice about preventive measures.

For effective health care, patients should accept the decision of the health care providers and follow their instructions such as taking medications strictly as advised. Whether or not a patient is willing to ‘follow doctor’s orders’ can be influenced by the following:

- Cultural beliefs about the cause and outcome of the illness;
- How much advice a patient receives about the illness and the treatment needed;
- Use of standard health cards such as patient medical records which document the patients’ clinical history, diagnosis, decisions and future appointments;
- The type of treatment prescribed such as drugs and injections; and
- Possible follow-up visit from a community health worker.

**Using standard health cards**

Health workers must document each patient’s diagnosis and specific treatment using the standard method. Health cards or exercise books for each patient can be introduced and kept either at the registration office or by each family. These will help in the follow-up of patients as well as in monitoring the quality of health care.

**Standard case management**

To prevent unnecessary treatment, investigations and the wastage of limited resources, drugs and staff, standard case management procedures must be established. These include standard:

- Diagnostic protocols and case definitions;
- Procedures for diagnostic common illnesses. Many of them represent simple flow charts using standard case definitions to identify key signs from the patient’s history and physical assessment and, where necessary, laboratory investigations;
- Investigation procedure. A laboratory might be set up before or during the post-emergency phase at the health centre. Standard laboratory procedures such as specimen collection, storage and analysis should be used to confirm a diagnosis and define the drug sensitivity patterns of disease pathogens during major outbreaks of malaria or cholera;
- Treatment protocols. Most countries have established national treatment protocols for common ailments based on the essential drugs supply. Note that for some diseases such as TB, the treatment of displaced people might have to be different from that of the host population;
- Admission criteria. Standardising admission procedures prevents the admission of non-serious cases that could overload inpatient facilities. Standard clinical procedures and guidelines for managing serious health problems ensure that critically ill patients are promptly admitted and given the appropriate care including close monitoring; and
- Referral criteria. Standardising the criteria for patient referral helps define the limits of each level of care and the health conditions that require higher level of attention and skills. This prevents emergency cases from being delayed at lower levels of the health system and non-emergency cases from being forwarded to higher levels. Standard procedures should be in place for referring inpatients to health care units after treatment of an emergency condition such as severely malnourished patient who are referred to therapeutic feeding centres after treatment for pneumonia.
Mass casualty management

A Mass Casualty Incident (MCI) is any event where the needs of a large number of victims disrupt the normal capabilities of the local health service. MCIs range from a few patients injured in a bus accident that might overwhelm the capacity of one local hospital, to a natural disaster or conflict where hundreds or thousands of victims incapacitate the entire health system of the affected area.

Resources, transportation, access and physical environments are often disrupted during a disaster. These austere conditions place huge constraints on the very emergency medical care that should be given immediately to the affected population. An MCI’s efficient management requires the pre-establishment of basic guidelines and principles of an Incident Command System (ICS), triage and patient flows according to the hospital’s plan.

The incident command system

Incident command system is a hierarchical structure that commands, controls and coordinates an effective emergency response among all the agencies and organisations in a disaster. It is designed to organise people and resources and to allocate necessary services to the population in need. Incident command system was developed in the United States in 1970 after previous problems with MCI responses. Previous problems included inadequate planning, poor communications, lack of an on-the-scene needs assessment and inappropriate triage of patients.

Incident command system is composed of five major components:

- Incident command;
- Operations;
- Planning;
- Logistics; and
- Finance

Incident command system is flexible in scaling-up or scaling-down the level of response to meet needs that arise in different circumstances without any loss of compatibility with the other entities involved. In a small incident, the incident commander can manage with the above five components. In large scale incidents, a chief for each sector will be necessary to report to the incident commander.

Figure 3-5. Incident command system organisational structure

![Diagram of incident command system organisational structure]
Hospitals can adapt a similar structure to incident command system such as the Hospital Emergency Incident Command System (HEICS). These structures are set within a hospital system. Such an incident command system within the hospital can provide management a scope of supervision for all in-hospital personnel within one hospital as well as other hospitals responding to the incident.5

The Incident Command System (ICS) and HEICS disaster management tools are not currently used worldwide and even less so in developing countries. The incident command system concept is being introduced in this chapter as a reference management tool in disaster response. When developing a disaster preparedness plan, the incident command system concept should be incorporated into the plan. This concept is active on the management tool scene. It requires a great deal of preparation, planning, practice and capacity building from the government. The incident command system structure cannot be used as a tool to manage a disaster from a distance, however. Major losses of lives and unnecessary illnesses have resulted from its being used from a distance. Familiarisation and adaptation of the command structure to a disaster situation by the ministry of health and the lead health agency can help organisations involved in the response to understand their roles within the command system in the overall response.

Preparing to manage a Mass Casualty Incident (MCI)1

Management of an MCI begins with preparing the mobilisation of resources and following the standard procedures in the field and at the hospital. Hospitals with a limited number of emergency workers may find it difficult to hold regular training sessions on MCI management. Countries with limited resources should focus on the following preparations for managing an MCI:

* Improving routine emergency services for sudden-impact, small-scale incidents such as car accidents or accidents in the home). To avoid confusion, the same procedures that are necessary to save lives during an MCI should be performed during routine emergency services;
* Coordinating activities that involve more than one emergency medical unit such as police, fire fighters, ambulances and hospitals, etc;
* Ensuring a quick transition from routine emergency services to mass casualty management; and
* Establishing standard procedures for managing incidents of all scales such as search and rescue, first aid, triage, transfer to hospitals and hospital care.

MCI procedures should be adapted to the local situation in terms of staff skills, transport, communication, supplies and equipment. Standardisation of routine emergency activities will make the teams more efficient and will improve the overall survival of MCI victims. Each emergency unit (police, fire, health) should be prepared to respond to an MCI. Standard kits for field triage should be maintained and drills should be conducted regularly to develop well coordinated teams of trained personnel.
Ethical issues can make the implementation of triage challenging particularly for health workers. All teams need training in MCI management community ethics. This will help them save the greatest number of lives possible by focusing the limited resources on those who can be saved rather than the most gravely injured.

**Basic Mass Casualty Incident (MCI) management**

Basic MCI management is a series of steps that together meet the immediate health needs of disaster victims. It begins with a search and rescue at the disaster site and ends with either a referral to a health facility or release for home care. Figure below illustrates the general organisation of an MCI management field.

**Figure 3-6: General organisation of a Mass Casualty Management field**

In a mass casualty management field, each team operates in a specific area to remove all victims from the disaster site and transport the critical cases to health facilities. The team’s responsibilities are given by the Rapid Assessment Team, led by the Incident...
Commander, who establishes the following information:

- The time and extent of the damage;
- The potential continuing danger from the disaster;
- The estimated number of casualties and exposed victims; and
- The resources needed for response.

A single map is created indicating the main topographical features, the victims, potential risk areas, access roads, etc.

The incident commander based at the command post has overall authority coordinating the multi-sector operation. The Command Post Team’s responsibility is to set up the field posts and assess and report continuously on the general situation. The Command Post’s location should be strategically placed close to the disaster centre but far enough from the centre so that risk of continuing danger is minimised such as down wind of a forest fire or chemical spill or high ground in a flood.

A security team protects restricted areas limiting any further danger from the disaster and to provide crowd control in order to ensure the safety of responders and victims.

The search and rescue team’s priority is to locate and evacuate victims from the impact zone and transfer them to the medical post after assessing their status. The search and rescue team may provide to victims in the impact zone essential first aid measures such as control bleeding, maintaining clear airways, but this is not the time for cardiopulmonary resuscitation.

A medical post should be established as close as possible to the impact zone while again maintaining a safe distance. The medical post should be located in a building or shelter as soon as possible.

The triage team, under the leadership of the Triage Officer, tags, treats and releases patients from the medical post according to their health conditions. Each stage must be completed before the next step can be taken. The type of care given is limited to first aid and emergency medical care. Under limited resource conditions, such as staff shortages, the small emergency health team might be required to rotate within the medical post in order to attend all patients.

The evacuation team is responsible for the safe transfer of stabilised victims to a health care facility using the most appropriate transport and escorts available. Victims with minor injuries may be transferred by non-medical transport after all acute victims have been evacuated. Upon arrival at the hospital, every injured person must be re-triaged, reassessed, stabilised and given definitive care.

Many factors can affect the quality of triage such as the patient’s condition, access to health facilities and the availability of resources as in information, hospitals, personnel and supplies. The monitoring of patients in the triage area might be prolonged if the stabilisation area is overloaded, if resources for evacuation are inadequate or the receiving facility requests a delay. If there is only one health care facility within a disaster region and the victims are stabilised in the field, transport can be staggered. This strategy helps prevent the health facility from becoming overwhelmed.

**Triage**

In a disaster medical response, triage sorts and prioritises victims for medical attention according to the degree of injury or illness and expectations for survival. Triage reduces the burden on health facilities. In an emergency, there are shortages of personnel, supplies and transportation vehicles. Triage should be carried out at various levels. By providing care to victims with minor or localised injuries, health facilities are freed to attend to more critical tasks. When health facilities cannot meet the needs of all victims immediately, it is appropriate to give the limited resources to those most likely to survive.
The goal of managing a mass casualty incident is to minimise the loss of life or disability among disaster victims by first meeting the needs of those most likely to benefit from services. The goal of triage is to identify critical injuries requiring life-saving intervention in the shortest possible time. Patients are categorised to determine their priority of treatment and transportation. Basic triage is done against ‘absolute’ rather than ‘relative’ considerations. Each patient’s need for medical care is judged as being urgent or not urgent, based on the patient’s condition rather than relative to other patients. Triage categorisation of patients is based on the following criteria:

- The nature and life-threatening urgency of the patients’ present condition rather than the order in which they arrived, as is normal in emergency care facilities; and
- The potential for survival or the prognosis identifying those patients with the most urgent need for care which is counter-balanced by the availability of health care resources. This concept is critical and can greatly influence the overall survival rate of disaster victims.

Note: The factors that aggravate the imbalance between medical needs and the required resources to meet those needs include:

- Lack of appropriate numbers and types of medical, nursing or emergency personnel;
- Poor access by rescuers and emergency personnel to the disaster site and to the disaster victims;
- Shortage of medical equipment and supplies;
- Limited availability of evacuation transport vehicles; and
- Inadequate availability of functional medical facilities with intact integrity.

The commonly used triage system is the classification of the patient’s medical condition into four levels:

- Immediate medical care;
- Delayed care;
- Non-urgent or minor; and
- Dead or ‘near dead.’

Please refer to reference for the Simple Triage and Rapid Treatment (START) colour coding system and the Secondary Assessment of Victim Endpoint (SAVE) secondary triage for more in-depth discussion of triaging systems.

There is a natural tendency to over-triage disaster casualties. Over-triaging of non-critical casualties or the expectant dead comes at the cost of time and attention or the ‘immediate care’ that should be given to the truly critical patients. Resuscitation of the hopeless casualties following Mass Casualty Incidents (MCI) often yields dismal outcomes and such heroic measures should be discouraged.
Table 3-2: Triage classification system.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immediate care</strong></td>
<td>Severely injured patients with a high probability of survival need procedures to prevent death. Examples include airway obstruction, inaccessible vascular wound with limb ischemia, incomplete amputation, unstable chest and abdominal wounds, pneumothorax, sucking chest wounds, deteriorating Central Nervous System (CNS) injuries, 2\textsuperscript{nd}/3\textsuperscript{rd} degree burns of 15% to 40%, severe medical problems such as DKA and cardiac emergencies.</td>
</tr>
<tr>
<td><strong>Delayed care</strong></td>
<td>Casualties do not require immediate life-saving intervention so treatment can be delayed. Examples include large bone fractures without circulatory compromise, uncomplicated major burns, head or spinal injuries, intra-abdominal and/or thoracic injuries (no bleeding), vascular injuries with controlled bleeding, most eye and Central Nervous System (CNS) injuries, and time-consuming surgeries.</td>
</tr>
<tr>
<td><strong>Minor</strong></td>
<td>Individuals who require minimal or no medical care are the walking wounded. Examples include superficial wounds, burns &lt;15%, upper extremity fractures, sprains, abrasions and blast injuries without obvious problems.</td>
</tr>
<tr>
<td><strong>Deceased/expectant</strong></td>
<td>Pre-defined criteria should be agreed upon among all agencies involved in providing medical care and triage.</td>
</tr>
</tbody>
</table>

Triage is an ongoing process. It begins either in the field or when patients arrive at the medical post. It continues as patients’ conditions evolve until they are evacuated to the hospital. Triage during overwhelming Mass Casualty (MCI) Incident differs from smaller mass casualty settings because the number of victims is vastly increased and medical treatment resources can become extremely limited or non-existent. Patients can remain on the field for prolonged periods of time. Triage does not have to be confined to one area. Simultaneous triage of many victims at one time and in different locations can take place. Multiple and continued evaluations must be done as patients’ conditions can change at any time. As mass casualty management is a dynamic process, physicians and pre-hospital personnel must have an effective disaster plan that involves knowing how to work in an environment where the standard of care may change.

The following are some general rules for triage:
- In borderline cases, select the more urgent category;
- When children are involved, give them priority over adults in the same triage class;
- Give a higher priority than the medical condition warrants to victims with hysteria or hysterical relatives. They can be given priority for transfer to a health facility because it is important to control of and maintain calmness at the scene;
- Stabilise all patients before giving further care to any individual; and
- Definitive care such as cleaning and stitching wounds, antibiotic treatments, applying plaster for fractures etc. can be started once no more casualties arrive and all the injured are in a stable condition.

To avoid overwhelming health facilities, the most experienced clinician should be facilitating patient flow by managing triage. There should be at least one medical doctor on staff at the facility. Having female health workers is necessary to ensure access to care for female patients, especially in communities which are sensitive to communication between genders.

**Emergency medical care**

This section addresses some important components of emergency medical care, such as special health issues in emergencies, managing essential drug supplies, training and supervision of emergency health workers, monitoring and evaluation.
Mass event with long-term major implications

Clinical concerns and medical response

Emergency health care responses to disasters due to natural or human-made causes can be divided into the acute response phase and the external response phase. This section focuses on expected injuries and on the anticipated medical response needs in the acute phase before the arrival of external resources in a mass disaster event with long term implications.

The acute response phase is generally very short, ranging from twenty-four to seventy-two hours or until external assistance from governmental, non-governmental or international aid agencies can be organised and dispatched to the disaster site. In the acute phase, local health facilities are likely to be overwhelmed. It has been reported that up to 85 to 90% of earthquake survivors were rescued by the local population in the first seventy-two hours after an acute onset disaster. In the 1992 Turkey earthquake, first aid training of uninjured lay survivors was significantly associated with a higher likelihood of saving entrapped victims. It is, therefore, important for local facilities and health providers and even laypersons located in vulnerable areas to be prepared to provide initial assistance in a disaster. This training should ideally be provided during the preparation and mitigation phases of disaster preparedness.

Clinical concerns

In a mass disaster event that overwhelms the disaster response capability of a large region, there are a number of clinical concerns that should be anticipated. Knowledge of the risks, vulnerabilities, type of likely disasters that may occur and the expected injury patterns will assist local responders in mounting a more effective response in the immediate aftermath of a disaster.

Certain disasters have a higher risk of causing injuries than others. Table 3.3 shows the expected injury patterns based on the type of disaster. The most common causes of surgical emergencies and the highest causes of mortality in a disaster situation are earthquakes and wars.

<table>
<thead>
<tr>
<th>Type of disaster</th>
<th>Expected injury pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought</td>
<td>Heat exhaustion, stroke, dehydration, renal failure, malnutrition and starvation</td>
</tr>
<tr>
<td>Earthquake</td>
<td>Fractures, blunt trauma, wounds, crush syndrome</td>
</tr>
<tr>
<td>Epidemic</td>
<td>Specific to type of infectious disease</td>
</tr>
<tr>
<td>Temperature</td>
<td>Hypothermia, hyperthermia, frostbite, heat stroke</td>
</tr>
<tr>
<td>extremes</td>
<td></td>
</tr>
<tr>
<td>Slide</td>
<td>Blunt and penetrating trauma, crush syndrome, fractures, wounds</td>
</tr>
<tr>
<td>Volcano</td>
<td>Severe burns, crush injuries, respiratory infections/complications</td>
</tr>
<tr>
<td>Wave/surge/flood</td>
<td>Drowning, hypothermia, waterborne communicable diseases</td>
</tr>
<tr>
<td>Wildfire</td>
<td>Severe burns, respiratory complications</td>
</tr>
<tr>
<td>Windstorm</td>
<td>Blunt/penetrating trauma to head/chest (caused by flying debris), crush syndrome, fractures</td>
</tr>
</tbody>
</table>
Medical response

A concerted effort to reinforce a hospital’s existing surgical services should be performed before setting up of a new field hospital. Military medical planners can be helpful resources for establishing a field hospital or surgical ward. Security of the humanitarian assistance workers must also be kept as a high priority.

Only agencies that are equipped with the expertise required to implement surgical services, including bringing in adequate quantities of water, maintaining strict levels of hygiene, providing adequate anaesthesia and post-surgical care should attempt to do so. It is recommended that planners review the types of injuries that might be present based on the disaster so that they can plan the surgical remedies needed. In an earthquake, there might be more bony fractures that require surgical intervention whereas in armed conflict there might be more penetrating injuries or powerful weapons with blast effect resulting in delayed internal injuries.

A specialised referral hospital which can perform surgeries and manage obstetric emergencies should be identified and made available to the affected population. Arranging transport to hospitals from the health centre should be made. It is also important to set up a referral system with strict guidelines to prevent inappropriate self-referrals to the most specialised care. A continual information feedback system to the general practitioners at the more basic facilities is a key component of setting up a referral system.

An important aspect of managing traumatic injuries in the field is to ensure that health providers are well versed in first aid and triage to ensure the greatest numbers of patients are efficiently treated. These simple skills can significantly improve survival rates. Triage skills have already been discussed. Once patients have been appropriately triaged, they can be individually treated. Simple first aid measures that can be implemented in the field include:

- Removal of airway obstructions;
- Assisting with breathing, artificial respiration;
- Compression to control bleeding (circulation);
- Immobilising broken bones;
- Pain control;
- Cleaning wounds, bandages; and
- Tetanus prophylaxis.
All victims of disaster should be examined first for the status of the airway, the presence and quality of breathing and the presence and quality of circulation such as pulses as highlighted above.

WHO has on its website a list of essential medicines and a description of the New Emergency Health Kit that consists of a basic and supplemental kit with enough medicines, disposables and equipment to care for 10,000 people for three months.36

Some skills that should be taught to local workers are beyond the scope of this text. In earthquake prone areas, training for structural collapse, search and rescue techniques is useful. Local providers and laymen if possible should undergo Basic Life Support training as outlined by the American Heart Association as well as learning basic first aid techniques.43

**Injuries and treatment**

The audience is a local health worker who might not have received formal medical training. Some of the more common types of acute injuries listed in Table 11.5 are briefly discussed in this section. After stabilisation, most of the severe illnesses and complications will require transport to a referral hospital equipped with surgical and intensive care unit capabilities.

**Trauma**

Trauma victims face high morbidity and mortality risks. Advanced Trauma Life Support guidelines were developed for early recognition and management in order to reduce these risks. Immediate attention should be given to the Airway, Breathing and Circulation, the ABC of trauma assessment and treatment when evaluating trauma victims.

Immobilisation of the cervical neck spine is critical in care of any trauma victim. The endpoint of protecting the neck vertebrae is to prevent paralysis and disability. The initial control of the cervical spine is to instruct an assistant to hold the head. Then a stiff cervical collar or towels on each side of the head with tape across the forehead can be used to limit head and neck movement.

Inspect ‘A’, the airway, of the ABCs of trauma assessment. Ensure the airway is patent. Ask the patient, ‘How are you?’ A clear response with quiet respiration indicates no airway obstruction. Hoarseness or pain with speaking indicates laryngeal injury, which can lead to obstruction. Look for foreign body or loose teeth in the mouth. If there is any decrease in mental status, one should check the gag reflex by probing the posterior pharynx with a tongue depressor. Absence of a gag reflex indicates a high risk for aspiration. Patients with severe facial injuries are at risk of bleeding or compression of the airway. Endotracheal intubation to protect the airway is indicated for patients with aspiration risk or severe facial injuries.

Inspect ‘B’ for breathing. Check the chest and neck for respiration motion, trachea deviation, open chest wounds and breath sounds. Agitation or obtundation indicates hypoxia and carbon dioxide retention. Decreased breath sound on one side of the lung accompanied by tracheal deviation and low blood pressure might mean a collapsed lung under tension (tension pneumothorax). Immediate decompression of the pneumothorax with a large bore needle to the second intercostal of the chest is necessary, followed by chest tube insertion.

Inspect ‘C’ for circulation. Check for signs and symptoms of poor circulatory perfusion: severe bleeding and low blood pressure leading to shock; confusion due to inadequate brain perfusion, poor radial or femoral pulse. If there is no pulse, start cardiopulmonary resuscitation while looking for reversible causes. If there is a weak pulse, place two large bore IV catheters (14 or 16 gauge) in the peripheral veins and give intravenous fluids of 10-20 mL/kg bolus. If there is no improvement of blood pressure and pulse, give blood.
Inspect ‘D’ for disability. One should assess the level of consciousness, pupil size and reactivity, verbal response and motor function. This is the Glasgow Coma Scale. This information is very helpful to determine the neurological function of the patient.

The ‘ABCD’ of the initial exam should only take one to two minutes to perform. One can then proceed to a more thorough head to toe secondary exam. When examining the back, the patient’s neck needs to be immobilised and moved in unison with the rest of the body or ‘log-rolling’.

The devastating outcomes of blunt trauma to the head or the body may not be obvious on initial evaluation. What can appear as bad looking bruises peripherally can result in concussions or bleeding in the brain, internal organ rupture or bleeding and fractures, compartment syndrome of an extremity and loss of extremity arterial perfusion. Penetrating trauma is the result of some penetrating injury anywhere on the body. Do not remove debris where bleeding might be controlled because this could result in uncontrolled bleeding. All trauma victims suffering from severe injuries should be transported to a hospital with surgical capabilities.

**Head injuries**

The primary cause of death in trauma is head injury, accounting for 50 to 55% of mortality. The concerns of head injuries are typically skull fracture, bleeding inside the brain (either subdural or epidural haematoma), brain swelling (cerebral contusion), diffuse axonal injury and concussion. Maintain the head and neck in line with the spine because the neck and spine may also be injured. Head injuries can develop suddenly or over a period of time following trauma. Serious signs include disorientation, slurred speech, unequal pupils or blurred vision, vomiting, worsening headache, numbness or weakness in any extremity or drowsiness. If there is a sign of penetration into the skull, do not remove the debris. Cover with a clean or sterile if possible cloth. Transport to the nearest hospital for further medical support and treatment. A CT scan of the head must be done to detect any serious intracranial injuries.

**Abdominal injury**

Any penetrating abdominal injuries require hospital evaluation for the potential of intra-abdominal hollow or solid organ injury. The size to the external wound often grossly underestimates the degree of internal damage. Stab wounds to the lower chest may also carry the risk of intra-abdominal injury.

Blunt abdominal trauma injury pattern is often diffuse. All parts of the abdomen are at risk following a compression or crushing trauma. The sheering and stretching forces transferred to the hollow intestine can cause bowel rupture and bleeding. Solid organs are susceptible to laceration or fracture, particularly the liver and spleen.

In the presence of extra-abdominal traumatic injuries, assess for intra-abdominal injury, even when the patient does not complain of any abdominal pain. This is particularly true in patients who have confusion or low blood pressure. Signs that herald intra-abdominal injuries are abdominal wall bruising, distension and decreased bowel sounds. Up to 30% of the patients with bruising over the abdominal wall, also known as the ‘seat belt sign,’ have intra-abdominal injuries.

All patients with suspected abdominal injury require further hospital diagnostic evaluation, such as CT scan or ultrasound or diagnostic peritoneal lavage.

**Extremity fractures**

A broken bone is also known as a fracture. Differentiate a closed fracture, which might occur where the overlying skin is intact, from an open fracture where the overlying skin over the fracture is cut. Open fractures face higher risks of wound and joint infections and need immediate medical attention. Check the affected extremity for adequate pulse
perfusion. Fractures with dislocations must be reduced as soon as possible so that there is no compromise in arterial perfusion to the affected area distal to the dislocation.

The extremity that is affected should be immobilised or splinted to prevent injury to the surrounding blood vessels or nerves. Splints can be made of professional plaster or simple materials such as sticks and sheets wrapped around the extremity to keep it immobilised. Any open wounds should be covered with a clean cloth. Tetanus prophylaxis should be given. Patients with open wounds will need antibiotics and surgical treatment.

**Crush syndrome**

This syndrome, also known as traumatic rhabdomyolysis, is due to muscle breakdown with release of intracellular contents following a traumatic injury and prolonged pressure on an extremity. The prolonged crush injury to the extremity leads to a decreased blood flow and ischemia of the skeletal muscle. This in turn results in the breakdown of muscle tissue and release of free myoglobin, iron, potassium and phosphorus into the circulation system, which can damage the kidney. The classic symptoms include muscle pain, swelling, weakness and dark urine. Patients require large volumes of intravenous fluid hydration. Treatment is most effective if it is started early even while the patient is still under rubble and being rescued. Haemodialysis might be necessary if there is progression to renal failure.

**Respiratory complications**

In an explosion or volcanic eruption where there might be a sudden burst of pollutants and lung irritants into the air, many victims will develop inhalation injury and other respiratory problems. After the September 11 terrorist attack on the World Trade Centre, there was released into the air a large amount of dust and debris to which victims were exposed. The New York City Department of Health and Mental Hygiene have developed a registry for the long-term follow-up of persons who were affected by the World Trade Centre towers collapse. Since the incident, out of 71,437 enrollees in the registry, 56.6% have reported new or worsening respiratory symptoms such as shortness of breath and coughing. Protect victims from further exposure to the irritant if possible. Wearing masks and the dampening of ash with water after an eruption can help reduce exposure. Evacuation might be necessary and some victims might require very specialised breathing support in an intensive care unit.

**Heat exhaustion/heat stroke**

Heat exhaustion occurs when the body cannot regulate its own temperature, resulting in a high body temperature of up to 104°F/40°C. This is often due to salt depletion and dehydration after strenuous exertion in high temperatures. The very young and elderly are most susceptible. Symptoms of exhaustion include weakness, nausea and vomiting, headache, dizziness, muscle cramps and pain. Heat stroke is extreme hyperthermia (above 40°C) and can result in organ failure and neurological complications. Symptoms of heat stroke include all the symptoms of exhaustion plus an elevated body temperature, confusion or disorientation, seizures, coma, hallucinations, blood in urine, and the patient may not be sweating. Treatment includes:

- Removing any excess clothing;
- Placing the patient in a cool or shaded environment;
- Covering the patient with a wet sheet or the patient can be sprayed with room temperature water and cooled with fans to maximise heat loss;
- Oral salt solution if the patient can drink or intravenous fluids if the patient cannot drink; and
- Ice packs to the underarms, groin area, and neck.

Do not use alcohol sponge baths. Avoid giving aspirin or acetaminophen to patients with high temperature due to heat stroke. Patients who develop seizures may require
benzodiazepines. Comatose patients may require intubation and ventilation that will require a higher level of care as well as a possible transfer to an intensive care unit for heat stroke patients. If no urine is produced and there are signs of renal failure, the patient will need haemodialysis, and possibly need to be transferred to an intensive care unit.

**Hypothermia**

In cold climates, victims of a mass disaster might be displaced from their homes and exposed to the elements. Hypothermia is defined as a core body temperature below 95°F/35°C. Patients should be kept horizontal and warm compresses applied to the trunk of the body, to the groin, underarms and neck. Extremities should not be warmed first because this can lead to cold peripheral blood with further cooling of the body core. Inhaled humidified and warmed air is effective in the field for hypothermic patients. Warmed intravenous fluids should be initiated in the axillaries and groin, or by placing a bottle against a caregiver’s skin to warm the fluid if no other means are available. Patients should not receive alcoholic drinks. Patients should be handled very gently, not jostled nor manipulated because the heart in this condition has an increased risk of fatal dysrhythmias. Patients should not exert themselves if conscious and hypothermic which can lead to a core temperature drop or further cooling. Patients might need aggressive core re-warming techniques in a hospital.

**Burns**

First degree burns involve the most superficial layer of the skin or epidermis, are usually minor and can be caused by excessive sun exposure. The skin may be red and painful. Blistering does not occur. Cool fluid or cool compresses but not ice can be applied to the area. Pain relievers such as paracetamol (acetaminophen) or ibuprofen can be used.

Second degree burns are deeper burns. There may be pain, redness and blisters on the burned area. Assess the mouth for any signs of smoke or soot, which can indicate that the airway might be affected. The patient will require intubation for airway protection because inhalation injury to the airway might progress to airway oedema and respiratory compromise. Remove any jewellery around the burned area particular rings on fingers in case there is any swelling later. Remove clothing carefully because skin might be attached to burnt clothing. If this is the case do not remove any clothing. Cool water can be applied to the area and pain relief given. Intravenous lines might need to be started for fluid in case the burn is larger than 10% of the body surface area. Burnt areas should be covered loosely with clean sheets. Tetanus prophylaxis should be given. Do not put butter or oil on burns because this increases the chances of infection.

Third degree burns are deep full thickness burns involving the superficial and deep skin (epidermis and dermis). The skin is often pale, waxy, leathery appearing and painless. Scarring will occur. Again tetanus prophylaxis should be given. Intravenous fluids should be started and the burn covered with a cool clean sheet. Avoid cloth with fibres that may stick to the burn such as cotton wool. Patients with extensive deep second or third degree burns may require skin grafts. Patients should be transported to a hospital as soon as possible.

Fourth degree burns extend from the superficial to the subcutaneous fat, muscle and possibly bone. This life-threatening type of burn will require amputation and extensive reconstructive surgery.

**Drowning**

In case of flooding or wave surges such as tsunamis, drowning may occur. Once removed from the water, place the person on the back with the head and neck stabilised in the event of a possible neck injury. If the person does not respond and is not breathing, cardiopulmonary resuscitation should be initiated.
In near drowning or submersion injury, a fluid aspiration of 1 to 3 mL/kg can result in impaired oxygenation due to alveolar-capillary unit collapse (atelectasis) and pulmonary oedema. Pneumonia is a rare complication of submersion from aspiration of either stagnant or fresh water. Near drowning victims are critically ill and will need transport to a specialised facility with intensive care capabilities.

**Skin infections**

Wounds received during the disaster might become infected. Signs of infection include redness, swelling, pus drainage and pain. Infected wounds should be cleaned, dressed with clean gauze and antibiotic ointment and the patient treated with antibiotics and tetanus prophylaxis. Diabetics with infected wounds should be aggressively treated and educated on wound hygiene. Diabetics may require intravenous antibiotics and possibly hospitalisation and surgery if the wound infection progresses.

Another common skin infection that should be addressed is scabies. Scabies is a highly contagious skin disease caused by a mite. It is easily transmitted among close contacts. Signs include itching which is worse at night, small linear marks in the web spaces of the fingers, torso, genitals and breast areas. All the symptoms are in close contact with each other. Anti-scabies treatment with permethrin cream must include all persons living in the one household along with cleaning sheets and clothing. Clothes and sheets may also be placed in the sun away from people for two days as an alternative to laundring.

**Disease outbreak**

In any disaster where there is mass displacement and crowding of people in close quarters without shelter or access to clean water and proper sanitation, there is the risk of a communicable disease outbreak. There is more information about disease outbreaks in chapters 6 and 7. Common epidemics to be expected in emergency conditions are measles, diarrhoea, and acute respiratory infections. Compare the number of new cases in a current disaster situation with the baseline of previous years to ensure that number of cases can be classed as an epidemic. Endemic illnesses such as malaria might reach epidemic proportions during a disaster situation. Training should be made available to local health workers through the ministry of health or through long standing health institutions in the area.

Understand and apply the case definitions and standard treatment protocols for the potential diseases in the area. Many standard definitions and treatment protocols exist already such as those published by WHO or Médecins Sans Frontières. The aspects regarding epidemics to be covered are:

- Specimen collecting for specific diseases to be sent to a designated referral laboratory;
- Performing rapid assessments and surveillance methods;
- Means for treating an infectious outbreak should be in place;
- Vaccines should be identified;
- Stocks of oral rehydration solution should be reserved;
- Intravenous fluids should be reserved;
- Items needed to set up clinics or augment clinic space should be reserved; and
- Mass immunisation campaigns should be carried out.

**Acute exacerbations of chronic medical problems**

In any disaster, patients already suffering from chronic diseases such as diabetes, renal failure, emphysema or asthma might have severe exacerbations due to the inability to access medications or facilities. After Hurricane Katrina, which made landfall on the U.S. Gulf Coast on August 29 2005, the most common morbidity reported in evacuation centres in the four most affected states was chronic illness, comprising 33% of the 14,531 visits during the first three weeks after the disaster. In the same period, the most
commonly reported morbidity among the 9,772 visits to health care facilities was injury (58%). According to the Sphere Project, treatment for chronic conditions that were ongoing prior to the disaster should be continued in the emergency phase, particularly if ‘cessation of therapy was likely to result in death’ such as for diabetes and hypertension. Although patients requiring haemodialysis would likely die with cessation of the dialysis, it is extremely difficult to maintain a clean and appropriate water supply for these patients in an acute disaster. Priority should remain on curative care for life threatening illness in the emergency phase including treating the complications of chronic disease such as infected wounds in diabetics.

Special clinical topics within health services

In organising the health system, the several areas that merit specific attention are:

- Malnutrition and Starvation. Any acute disaster, whether major with long-term impact or temporary, may highlight or worsen a pre-existing malnutrition problem. Multiple studies have shown a significant association between malnutrition and mortality rates in displaced populations and refugee camps. Nutrient deficiencies can leave a population susceptible to disease such as measles. Service implementation methodology to counter malnutrition and starvation is detailed in Chapter 9; and

- Reproductive Health, which includes sexually transmitted diseases, sexual and gender based violence, safe motherhood and family planning. These must be addressed as soon as possible in the emergency phase. Chapter 4 has more information on reproductive health.

In the immediate situation, minimum requirements can be delivered through the Minimum Initial Service Package (MISP). In addition to kits and supplies, MISP is a ‘set of activities that must be implemented in a coordinated manner by appropriately trained staff’. To assist with its implementation, the United Nations Population Fund (UNFPA) has designed a reproductive health kit consisting of three blocks of twelve sub-kits to use at the three different levels of health facilities. MISP objectives are to:

- Designate a person to implement the services;
- Prevent and manage sexual violence and its consequences. Providing emergency contraception, treatment of sexually transmitted infections and mental health support are key components;
- Reduce HIV transmission and practice universal precautions in health facilities such as gloves and eye protection for health workers;
- Guarantee the availability of free condoms;
- Provide clean delivery kits for home deliveries and health facility deliveries as well as implement a referral link for obstetric complications; and
- Plan for the integration and provision of comprehensive reproductive health services into the primary health system of the country as soon as possible.

In addition, there must be female staff present to provide care and education to women. This will encourage women to access the clinics. Care must be provided in a culturally sensitive manner to encourage unmarried women, widows and men to access services. Please refer to the reproductive health chapter for further information.

Maternal and child health care services

Children under five have been shown to have the highest rates of morbidity and mortality in an emergency. For this reason, it is imperative that children under five receive curative services that are geared to lowering excess mortality, such as measles immunisation and Vitamin A dosing, improvement of sanitation, oral rehydration therapy, and malaria treatment as per country protocols. It is not always appropriate or possible to initiate an Expanded Programme of Immunisation in the emergency phase, but this programme should be reinstated during the integration of primary health care once resources are adequate. Preventive public health messages should also be disseminated
amongst the pregnant women and mothers in the population through home visits about breast feeding and the early treatment for symptoms of potentially dangerous diseases such as diarrhoea and fever as well as antenatal care referral for pregnant women.

**Mental health services**

Many patients seen in the emergency will likely have witnessed traumatising events during the emergency or disaster. Programmes for the proper rehabilitation of patients suffering from mental health disorders should be initiated as early as possible, but might not be implemented until the post-emergency phase. Be aware that mental health problems might also be present in resettlement situations especially after temporary displacement due to the stress of rebuilding and resettling in an area that is known to be disaster or war prone. Please refer to the mental health chapter for further information.

**TB control**

A well run TB programme might not be possible during the emergency phase further contributing to multi-drug resistant bacilli and infectivity. For this reason, TB control programmes are not commonly implemented until after the emergency phase in collaboration with the host country guidelines.

**Exit strategy**

All activities performed should be in coordination with the local government health system and local personnel. The ministry of health should be involved from the beginning of programme development. After a disaster with long-term major implications, health care needs may not return to pre-disaster levels for many years particularly if health infrastructure has been severely damaged. Ideally, a government health centre or established local institution should be identified to take over health care response for the long-term during the initial stages of the emergency. Careful documentation of a strategic plan and targeted activities that follow a logical framework; clear training manuals and job descriptions; monitoring and evaluation of inputs, outputs, outcomes and eventual impacts; the development and continual improvement of health information systems; all these will make the transition to local personnel less prone to error or miscommunication. A sufficient number of local workers should be trained to take over the roles and responsibilities prior to the exit of the international NGO.

**Mass event of immediate, limited implications**

A mass casualty incident might occur for any number of reasons including a bus, train or plane crash, biological warfare, fire or explosive incident or a localised natural disaster. While most of these scenarios will result from a known incident, a localised communicable disease outbreak might be present insidiously with health providers noting an increase in the numbers of a particular disease. In this case, they must maintain surveillance records of the rise in cases and contact a public health organisation to help initiate an investigation into the causative agent.

In a mass casualty incident, usually the local health infrastructure will be intact. As a result, a reasonable medical response can be easily mounted within the existing system. Where a mass casualty incident occurs, it is imperative to have an integrated approach with rescue and pre-hospital care teams and the medical response teams in hospitals nearby. Disaster drills on absorbing a surge in the number of patients either through actual simulation or table top disaster simulations should take place to ensure all involved groups are aware of their roles and responsibilities. The medical response will depend largely on the type and size of disaster that has occurred. In a transportation accident such
as a plane, train, or bus, there will be prolonged extrication times for the victims who might have multiple fractures and burns with possible crush syndrome.

**Exit strategy**

A mass casualty event with limited implication will usually not require a complicated exit strategy due to the time frame. External assistance from the government or international organisations is often not needed. Victims may require assistance with rehabilitation and health care follow-up for surgeries which should be managed by the local health care infrastructure. Patients might need to be referred to specialised health care centres if resources are limited in the local context.

**Intermediate events causing temporary displacement**

Intermediate events causing temporary displacement include flooding and hurricanes and even armed conflict. In these events, people expect to return to their homes and lives within several weeks to several months. The condition of their homes and health infrastructure, however, might not be acceptable for utilisation on return.

**Medical and clinical concerns**

Many medical and clinical concerns are similar to those of mass events. Mass migration when combined with the interruption of public health infrastructure might give rise to potential infectious disease outbreaks as discussed above. A special medical concern that should be highlighted here is mental health. Often repatriation or return to the home area is viewed positively by international agencies, host countries and countries of origin. The victims of temporary displacement, however, might have witnessed traumatic events such as the killing of their entire family or the destruction of their livelihood such as stores, livestock or land.

There might also be the threat of further violence or another natural disaster in the area. Local mental health services, therefore, must be strengthened and reinforced even when victims are able to return to their homes after an intermediate event. It is a necessary component of health services in any of the types of disasters discussed in this chapter.

**Exit strategy**

In events of intermediate scale with temporary displacement, many victims will have fled to surrounding geographic areas. As victims return to their homes, there will be a need for reinforcing the infrastructure of the community health services based on assessments done in the region. More than likely in such an event, local and national staff should be available for staffing health services and responding to the disaster without a significant need for expatriate staff. Staffing and planning must be done in concert with the host government and ministry of health.

**Mass event long-term displacement**

When large numbers of victims are displaced because of a complex humanitarian emergency or large scale natural disaster, the victims might be displaced within their own country to become Internally Displaced People. The victims might find refuge in neighbouring countries or be relocated to countries far from their homes. When the victims are internally displaced because of political conflict and warfare as in Iraq, they are often the most difficult for international agencies to reach and assist due to security issues and the deliberate blocking of aid to victims by hostile parties. Victims escaping to neighbouring or far away countries might find themselves vulnerable to the new
environment. Refugee camp conditions are variable and might be overcrowded, have insufficient material for shelter and living space, inadequate quantity and quality of water and sanitation facilities, inadequate food and access to health care. These factors when coupled with mental stress from recent catastrophic events, result in refugees being vulnerable to disease outbreaks and susceptible to prolonged health problems which contribute to the excess mortalities seen in refugee camps. UNHCR leads the international coordination response for refugee protection.

**Medical and clinical concerns**

Complex humanitarian emergencies and natural disasters resulting in large numbers of displaced victims often result in increased morbidity and mortality due to close sheltering in refugee settlements. Between 50 and 95% of deaths in these situations are due to one of four causes: measles, diarrhoea, acute respiratory infection or malaria. Mortality is further exacerbated by malnutrition and poor access to a safe and sufficient quantity of water particularly among children. It is imperative that mass immunisation campaigns against measles that has a high potential for outbreaks continue or are bolstered during this phase of the disaster particularly among displaced populations.

Community outreach programmes can be involved in vital preventive interventions of disease surveillance and education of refugee beneficiaries. Selected members from within the refugee camp can be involved in community outreach programmes with home visits. These members usually can be trained in case definitions and simple symptom recognition to assist with compliance to immunisation campaigns and early disease detection. Home visitors are important to set up and spread awareness of other specialised health services. These specialised clinical health services will be required in the long-term in the context of a mass event that results in long-term displacement. These were discussed previously in the section ‘Mass Event with Long Term Major Implications’.

In addition to communicable diseases, diseases that are specific to the geographic region or population during normal times should be expected such as malaria due to Plasmodium falciparum that requires different treatment in specific regions. Refugees might also be susceptible to certain types of trauma if there is warfare in the region. Trauma was discussed above.

**Exit strategy**

When delivering emergency health services in a complex humanitarian emergency, it is imperative to think of the exit strategy from the beginning of service initiation. Remember that there are many refugee camps that started out as temporary settlements, but have become semi-permanent lasting for years because of ongoing conflict or instability in refugees’ countries of origin such as Sudan. Essential drug lists, diagnostic and treatment protocols must be in accordance with the host country. The host country’s ministry of health must be involved in the development of the health services. Refugees must also be involved from the beginning in planning health services and be trained to take over long-term positions as appropriate in running various health service centres’ operations such as managing essential drug supplies. Other necessary activities for human resource development were discussed under the ‘Exit strategy’ section of ‘Mass event with long-term implications’.

**Managing essential drug supplies**

A standardised and effective drug supply is essential in any emergency health services delivery and response efforts. As well as allowing providers to treat their patients effectively, an operative drug supply helps patients gain confidence in the emergency health services and continue treatment as necessary. Health care providers must have access to standardised treatment protocols to ensure consistency of treatment among the affected population. Often the Ministry of Health protocols are not immediately available.
Providers, therefore, might have to start with the generic WHO standard protocols or Médecins Sans Frontières guidelines that are available on-line in several languages at http://www.msf.org/source/refbooks/msf_docs/en/msfmenu_en.pdf.

Guidelines are also included in the Interagency Emergency Health Kit (IEHK 2006, replacing the NEHK), which is a well known type of emergency health kit designed for use at peripheral and central health facility levels.24

IEHK has made considerable modifications to the kit, including significant changes in twenty-five items. Most importantly, the antibiotic spectrum and malaria treatment have been updated and malaria rapid test sticks are now included. It is available through WHO and other organisations. IEHK consists of a basic unit of ten boxes and a supplementary unit of fourteen boxes. The entire kit is sufficient to care for 10,000 people over a three-month period (based on four new cases per person per year). It includes medications, medical disposables, instruments and sterilising equipment. The basic unit is a stand-alone kit and is suitable for non-health professionals at peripheral clinics. The supplementary unit is only suitable for trained health professionals and is, therefore, useful for health centres and hospitals. The supplementary unit must be used together with the basic unit. There are various modules of medications that can be added or subtracted as appropriate in the context of the disaster such as anti-malarials, narcotics, psychotropic drugs and tramadol in the event that a license for narcotic drugs cannot be obtained.

Early in an emergency, the demand for prescriptions is high and certain drugs will be particularly in high demand depending on disease patterns and prescription habits. Drug consumption patterns and close monitoring of stocks is required to capture depletion as early as possible. It is essential that providers are trained about treatment protocols and appropriate use of drugs in this setting.

**Logistics cycle**

Medical supply management is a full time job in any development programme and particularly so in the emergency response phase of a disaster. The logistics cycle of drug management includes the selection, procurement, distribution and use of drugs:

* Drug selection entails choosing the type and quantity of drugs to be made available to the population;
* Procurement comprises all the decisions involved in buying a particular product including quality assurance, supply source and terms of payment;
* Distribution includes inventory control, storage, waste management and transportation; and
* Use of drugs comprises prescribing practices, the training of personnel and the education of consumers about appropriate drug use and dosage.

While there are common pitfalls in each part of the logistics cycle, many of them can be avoided.12

**Selection**

Selection pitfalls involve excessive, expensive or inappropriate drug purchasing. By using standard emergency health kits such as IEHK and by paying attention to national essential drug lists, this pitfall can be avoided. Providers must also understand that drug selection is usually a dynamic process that depends on:

* Changing demands in the current emergency (e.g. needing more analgesics in a post-earthquake zone for contusions);
* Geographic location (e.g. a malaria endemic region); and
* Population demographics and local culture (e.g. pain medicine substitutions because of the inability to obtain narcotic drug licenses).
Generic drugs are often preferable and cheaper. If a certain preparation has not been introduced before in the host country however, customs might refuse importation. In one case, a country refused to import metronidazole as a generic drug, but was happy to accept Flagyl which is approximately the same thing—the active component is metronidazole. It is worthwhile to ask the ministry of health which drugs have been accepted for import in the past.

**Procurement**

Some of the many procurement pitfalls include using unreliable suppliers, not maintaining firm contract terms that hold suppliers accountable for delivered drugs and not following up on drug quality. For local procurement, it is absolutely vital to
- Deal with a certified supplier;
- Follow WHO regulations for Good Manufacturing Practice and Good Distribution Practice;
- Use official inspections and independent quality control laboratories; and
- Make sure that certificates such as country of origin are all in place.

Many countries have a flourishing counterfeit drug production, so it is easy to make wrong decisions.

Contracts with suppliers must be specific in order to hold suppliers accountable for delivered drugs. A drug stored at an inappropriate temperature either too hot or too cold while it is being transported by the supplier to the purchasing facility might result in drug spoilage. There must be a contract term in place to handle such a situation.

When importing drugs, the WHO/Interagency guidelines on drug donation must be used. Donated drugs that are inappropriate or expired might take up limited storage space and consume the time and energy of the staff who must sort through them.8

**Example: donations for Armenia**

5,000 tons of drugs and medical supplies were sent to Armenia after the 1988 earthquake. However, only 30% of the drugs were immediately usable, and 20% ultimately had to be destroyed. Sorting through the drug donation inventory required 50 people for six months.16

For medical supply specifications, WHO regulations and descriptions see International Federation Emergency Relief Items Catalogue 2004.

**Drug distribution**

Drug distribution is a complex process with a potential for problems caused by miscommunication, misinformation and stock mismanagement. Some common problems that arise during drug distribution include:
- Delays at port and customs clearance;
- Theft because of inadequate security;
- Pest control issues;
- Inadequate temperature storage as a result of poor maintenance of distribution facilities; and
- Inaccurate information about quantities of supplies because of stock mismanagement.

The transport of particular materials might also be strictly regulated by organizations, such as the International Air Transport Association (IATA) regulations that limit the transport of certain corrosive materials and oxygen cylinders.
To prevent drug waste and ensure timely ordering of needed supplies, follow the FEFO rule in medical supply management: First Expiry, First Out. Proper and secure storage conditions with adequate temperature controls (refrigeration if necessary) and ventilation are important for maintaining drug quality. Drugs should also be well organised by their type such as by route of administration: internal, external, injectable and alphabetised so that they can be easily found. Within each administration route category, liquid and solid drugs should be separated. Liquid medications should be kept below tablet or dry medications to prevent possible spoilage of dry medications by leakage.

**Use of drugs**

The use of drugs involves educating both the health care providers and the patients. Ensure that the labels are in a language that can be read and understood by the providers and patients for proper prescription and dosage. As standardised treatment protocols are often not easy to access or find in the host country, generic WHO standard treatment protocols or Médecins Sans Frontières guidelines can be used at first. Note that the treatment protocols of various infectious and communicable diseases can vary greatly by region such as malaria.

While collaboration between local and expatriate staff is generally not a problem in emergency settings, disagreements and cooperation problems might arise about the use of drugs. Local doctors, for example, often ignore the ministry of health’s standard treatment protocols and prefer to use the latest and often most expensive drugs. Prescription habits in many developing countries also include a multi-pharmaceutical approach. Inexperienced doctors might prescribe several antibiotics at the same time to the same patient with the hope that at least one will work.

Dosage should be clearly labelled for the patients. Instructions about drug use should maximise compliance and minimise drug selling and drug sharing among families.

**Training and supervision**

Hiring staff and planning them for any emergency are major undertakings that require more information than the scope of this chapter permits. Serious considerations include determining the availability and skills of local staff. Take into account a payment scale that is in accordance and relative to the local economy. This scale should not cause local staff to favour one organisation over another because of higher pay thereby disrupting the local economy.

Planners might encounter many challenges during the hiring process. Graduation and specialisation certificates are not always accurate. Planners can use testing to verify qualifications, but this method might significantly reduce the pool of candidates. Staffing shortages are further exacerbated by most staff not been keen about working far from urban centres. Hiring local staff can also be very complicated while labour laws and regulations can be quite strict. Using hiring agents or other mechanisms can be very helpful.

During emergencies, locally available health professionals might be victims themselves or be busy caring for their own families. Often, they are willing to work only part-time or for short periods, which is an administrative nightmare. This might result in a high turnover and repeated training. Nurses’ training, responsibilities and skill sets also vary by country. Giving anaesthetic to patients, a normal responsibility for European and American nurses, is an unfamiliar task for nurses in many developing countries.

Training is important for maintaining team morale, which can suffer if staff members are not well prepared for the tasks they are asked to perform. There is generally not enough time to do significant training in the emergency phase of a disaster; therefore, the health staff already working should already have basic training. Work in an emergency situation might be quite different from normal duties and such specialised training is not always
provided. If there is a new skill being asked of the staff, or if it is observed that personnel are not performing tasks properly, training might be in order.

Training in the emergency phase has to be short and concise—and frequently repeated. Training should remain focused on specific topics that will be of use to the beneficiaries. The role of the various health workers must also be well defined and in accordance with national policy. Would community health workers be expected just to recognise illnesses and refer, or to recognise and treat some common illnesses? Clear role expectations will facilitate the integration of emergency health workers into the primary health care system in the post-emergency phase.

Médecins Sans Frontières (MSF) lays out specific recommendations about the training of emergency health staff. Each trainer should have no more than ten trainees. MSF also recommends the following common training topics:

- Conducting mass measles immunisation;
- Data collection;
- Essential drugs and standard treatments;
- Conducting surveys;
- Environmental health measures;
- Specific measures to take during epidemics;
- Oral rehydration;
- Active screening for those who are sick; and
- Safe deliveries.

Training can be conducted in various ways such as ‘on the job’ or in small groups with lesson plans and demonstrations. Conduct the training efficiently during the emergency and keep it appropriate for the audience. Work with the national health authority also to determine whether there will be formal recognition of the training, which will help the participants further their careers. If there is not going to be any formal recognition of the training, this should be made clear to the participants.

**Example: training in Pakistan**

During the emergency response to the Pakistan earthquake, WHO officials conducted a half-day measles immunisation refresher course for a group of vaccinators working with International Federation including community health workers, pharmacists, doctors and nurses. In addition to familiarising everyone with the goals of the WHO measles campaign, this course ensured that the vaccinators possessed the skills to maintain the drug supply cold chain and give vaccinations to both infants and older children.

During the training session, break down tasks clearly, using the job description as a guide. This will also help with the evaluation. For example, if community health workers are to diagnose and treat diarrhoea, they must know how to ask the parent about the child’s medical history, recognise the signs of diarrhoea during a physical exam and show the parent how to make an oral rehydration solution and administer it to the child. After training, community health workers can be individually evaluated based on their ability of asking about medical history, conducting a physical exam, making oral rehydration solutions and teaching others to do it.

Active supervision must be ongoing throughout the emergency phase. Supervisors must provide feedback so that staff can improve their performance and ensure quality and professional care. WHO states, the ‘purpose of supervision is to guide, support and assist staff to perform well in carrying out their assigned tasks.’ Staff members with superior skills should be promoted to supervisory roles. Training local staff on the job to be
supervisors will support the sustainability of the programme as it is integrated into the primary health system.

**Health Information Systems (HIS): monitoring and evaluation**

In the emergency phase, assessments should be done quickly and efficiently to guide initial decision making. A rapid assessment template must be adapted for use in a disaster situation as discussed earlier in this chapter. This worksheet was used by International Federation in Aceh after the Pacific Ocean tsunami in 2004 and in Pakistan after the 2005 earthquake.

The details of developing an emergency and post-emergency phase health monitoring system are discussed in another chapter, but it is important to highlight a few points here. In the emergency phase, any health information system must be easy to establish, use and manage. In the first week(s), health information systems should monitor the five-to-seven most common diseases and the ones that need early attention such as measles. This information should be available by gender and age especially for children under five. It can be built up later into a more comprehensive system with data on birth and death rates in the affected target community, morbidity in the community and health facilities, medical activities such as consultations and walk-outs. If no particular template is available, the Sphere Humanitarian Charter and Minimum Standards in Disaster Response handbook (Sphere) basic format can be used. Excel spreadsheets are also helpful. Avoid sophisticated systems that are too time-consuming to manage. It is essential that the facts and figures can be transmitted over the Internet or even by SMS on mobile telephones. Data on clinic visits should be classified by age group, gender and illness as soon as possible in order to follow the proportion of clinic visits over time by vulnerable populations, particularly women and children under five.

Include members of the affected community in the data collection during the initial assessments; participatory health surveillance will promote sustainability of the health surveillance infrastructure. Home visitors and Community Health Workers should be trained in data collection, and a health provider at each level of the health system should be responsible for data collection.

**Post-emergency phase**

The post-emergency phase usually starts when excess mortality is controlled and basic needs are met. It is usually defined as the period when the crude mortality rate drops below 1 death per 10,000 population per day or back to approximately baseline pre-disaster levels. Maximum integration into the pre-disaster primary health care system is critical. In some post-disaster situations, that is after earthquakes, floods or hurricanes however, parts of the health care system might have been wiped out. Interim solutions such as prefabricated clinics and hospitals have to be introduced. Another dilemma is that some pre-disaster health care systems are so weak that integration might be very difficult.

During the post-emergency phase:

- Introduce psychosocial services;
- Reintroduce programmes such as the Expanded Programme on Immunization (EPI); and
- Reinstate the care and treatment of chronic illnesses and infectious diseases such as TB and HIV/AIDS.

This transition must be coordinated with the ministry of health and other organisations involved in the continued health care support.