CHAPTER 3.
DISASTER PREPAREDNESS

The objective of disaster preparedness is to ensure that appropriate systems, procedures, and resources are in place to provide prompt, effective assistance to disaster victims, thus facilitating relief measures and rehabilitation of services.

Disaster preparedness is an ongoing, multisectoral activity. It forms an integral part of the national system responsible for developing plans and programs for disaster management (prevention, mitigation, preparedness, response, rehabilitation, or reconstruction). The system, known by a variety of names depending on the country, depends on the coordination of a variety of sectors to carry out the following tasks:

- Evaluate the risk of the country or particular region to disasters;
- Adopt standards and regulations;
- Organize communication, information, and warning systems;
- Ensure coordination and response mechanisms;
- Adopt measures to ensure that financial and other resources are available for increased readiness and can be mobilized in disaster situations;
- Develop public education programs;
- Coordinate information sessions with news media; and
- Organize disaster simulation exercises that test response mechanisms.

PREPAREDNESS IN THE HEALTH SECTOR

As outlined in Chapter 2, the health sector forms an essential part of the intersectoral (national, regional, or local) system for disaster preparedness and response. Its organization and response mechanisms need careful planning, and should take into account the vulnerability of the country or a specific region, health policies and legislation on disasters, and the administrative and technical organization of the health sector's institutions. This includes coordination of mechanisms, development of technical plans and programs, training and research, and logistical and financial support.

RISK ANALYSIS AND DEVELOPMENT OF REALISTIC SCENARIOS

The health sector must have a clear understanding of the risk of the country or a particular region to potential major hazards, whether the cause is natural (geologic

or hydrometeorological events), technological (chemical or radiological accidents), social (violence, war, or subversion), or biological (large epidemics). Hazard analysis is carried out by governmental and/or private institutions and requires knowledge in such areas as seismology, volcanology, meteorology, structural engineering, and epidemiology.

Vulnerability to disease outbreaks should be evaluated, and data obtained on housing, living conditions, overcrowding, basic sanitation, and antecedents or history of endemic or natural foci of disease.

The health sector is responsible for using the data provided by specialized institutions to determine the vulnerability of its essential facilities (hospitals, health centers, and administrative buildings), and lifelines that guarantee the operation of these institutions, such as water service, power, communications, and transportation, and its own response capabilities and mechanisms. When analyzing vulnerability, organizational as well as physical weaknesses should be assessed in order to develop realistic plans for health scenarios following disasters.

The first step in evaluating risk is to estimate the probability of hazards occurring. It is important, when possible, to obtain multi-hazard maps (usually available from the scientific community, industry, the press, political authorities, and other sources) or to create them. The second step is estimate the vulnerability for each region or area. These data will be collected from the national disaster management agency and other entities and in consultation with engineers, architects, planners, civil defense staff, and others.

Some countries are developing geographical information systems (GIS) that can be of great assistance in estimating levels of risk. They are generally located in institutions outside of the health sector, but their synthesis of information is useful for all sectors and activities of the country. They are commonly used for development and planning processes, which includes disaster mitigation.

HEALTH POLICY AND LEGISLATION ON DISASTERS

While health institutions can develop individual disaster preparedness plans, it is desirable for countries to have a clear policy on disaster prevention and management. Legislation should require health institutions to develop preparedness and response plans, to institutionalize the plans as part of their normal activities, to use simulations to test the plans, and to assign financial resources for their development and maintenance. Hospital disaster plans should be required for a hospital's accreditation.

PREPARATION OF DISASTER PLANS

The following guidelines should be kept in mind when preparing health sector disaster plans:

1. Identify probable health scenarios based on the hazard and vulnerability analysis, and use this knowledge as a basis for creating a disaster plan. Decisions have to be made as to the resources that should be mobilized in planning for the most probable scenario as opposed to the "worst case scenario" (which is unlikely to occur in a lifetime).

2. List all probable events and likely health needs created by different scenarios. To be effective, planning must be directed toward specific and realistic objectives, such as how to cope with unsolicited assistance or how best to use available resources.
3. Plan for the main features of administrative response, such as the location and general responsibilities of key officials. Do not complicate plans with detail. Allow for ad hoc and improvised responses to fill in gaps.
4. Subdivide plans into self-sufficient units. Adequate response to a disaster does not usually require specialized staff (e.g., hospital administrators) to be familiar with all aspects of the plan.
5. Disseminate the plan widely. People with roles to play in the disaster plan must be very familiar with it, which demands considerable training. Many good plans have failed during emergencies because of inadequate dissemination and practice.
6. Include exercises to test the plan periodically. Plans are not realistic if they are not tested. The absence of actual testing will largely negate even the best of abstract plans.
7. Include systems for early warning and information so that the public can adopt self-protection measures or reach temporary shelters if evacuation is necessary. Public information should come from authoritative and competent sources and have well defined formats so that messages are clear and precise. Warning systems for different types of disasters should be standardized at the national level and tested during simulations. The public must be aware of how warning systems work prior to the onset of an event.
8. Compile an information package with basic demographic information, including epidemiological data. The package should include topographical maps showing roads, bridges, and rail lines; the location and basic layout of health facilities; and other information that would assist in response. The package should be stored so that it can be rapidly retrieved in case of disaster. Where Geographic Information Systems (GIS) exist, they can be very useful; when they are maintained by other ministries or sectors, they can be shared.

COORDINATION MECHANISMS

If the health sector's disaster preparedness plan is to be successful, clear mechanisms for coordinating activities with other sectors and internationally must be in place.

The Health Disaster Coordinator is in charge of preparedness activities and coordinating plans with government agencies, including civil protection, armed forces, and foreign relations divisions; United Nations and other international agencies; Red Cross and other NGOs; and entities responsible for housing, communication, power, and water services. It is particularly important for the Health Disaster Coordinator to maintain ongoing communication and coordination with civil protection agencies and the PAHO/WHO Emergency Preparedness Program in each country.[1]

[1] For more information visit the PAHO Web site (http://www.paho.org/english/ped).

RELATIONS WITH THE MEDIA

The media play an important role in providing critical information to the affected population and the national and international audience in the event of a disaster. It is essential that authorities and media practitioners share an understanding of the objectives of information dissemination, as well as their respective roles in the disaster. Ongoing meetings or seminars between members of the media and disaster managers to clarify these roles and responsibilities are strongly recommended as part of disaster planning.

The media also play an essential role in educating the community about simple but critical measures that can be adopted to lessen the effects of disaster. The health sector should use the media to convey such messages on disaster preparedness and mitigation.

TECHNICAL HEALTH PROGRAMS

In the event of disaster, the health sector is responsible for treatment of casualties, epidemiologic surveillance and disease control, basic sanitation and sanitary engineering, oversight of health care in camps or temporary settlements for displaced persons and refugees, training, and logistic resources and support.

The responsibilities of the health sector in the aftermath of a disaster cover practically every aspect of normal pre-disaster operations. No technical department or support service can remain uninvolved or immobilized in case of a major disaster. Preparedness should address all health activities and disciplines and cannot be limited to the most visible aspects of mass casualty management and emergency medical care. To reinforce these responsibilities, a standing advisory committee (see Chapter 2) comprising specialists from health disciplines should meet on a regular basis to review preparedness activities and disaster plans in their respective areas of operation.

Treatment of Casualties

Prehospital and hospital plans for treating casualties are essential in organizing health services for disaster situations. The prehospital disaster plan focuses on search and rescue of victims requiring either specialized medical personnel or equipment, as in the case of persons trapped in buildings collapsed by earthquakes. Reliance on external assistance for search and rescue (SAR) activities should be minimized; instead, the health sector should promote the development of a national search and rescue capacity familiar with modern techniques and equipment.

Other prehospital activities include: first aid administered at the disaster site and, depending on the severity of injury, providing immediate treatment. The injured are identified or tagged at the disaster site, and classified according to priority for treatment and/or transfer to hospital. This process, known as triage, uses an internationally accepted color coding system (see Chapter 6). Because many health workers are unfamiliar with mass casualty management, it should be included in the medical and paramedical curricula in health schools.

The hospital disaster plan refers to the organization within a hospital, and focuses on: development of emergency plans, training, information, safety of patients and hospital personnel, evacuation, and availability of medicines and medical supplies for emergency treatment. The plan also addresses backup systems for communication, power, water supply, and transportation. It should form part of the hospital disaster response network, with clear procedures for patient referral and transport.

Identification of Bodies

Identification of bodies requires careful coordination with forensic medicine departments. The health sector should develop protocols for the identification and conservation of cadavers, death certification, and local and international transport, as necessary. Not all countries will find it practical to maintain expertise in this field, but health authorities should be familiar with the approach and establish contacts with potential sources of technical cooperation.

Epidemiological Surveillance and Disease Control

As discussed in Chapter 7, the type of disaster determines the levels of morbidity and mortality in a population. However, as part of the epidemiological surveillance system, it is advisable to institute warning mechanisms with a list of potential illnesses related to the type of disaster, establish a simple data collection system, and set up special programs such as those for vector control or control of diarrheal diseases or nutritional problems. This is not to be improvised. It is the responsibility of the epidemiology department to prepare itself and the health services to face this challenge at the time of crisis.

Technological accidents require a specialized surveillance system. Disaster planning should include prior designation of information centers and treatment for chemical poisoning and for exposure to ionizing radiation. Although not addressed in this publication, health workers must acquire special skills to respond to technological accidents.

Many different resources are available to support this training.[2] In addition to printed and audiovisual materials, an increasing body of work is available for consultation via the Internet.

Basic Sanitation and Sanitary Engineering

Basic sanitation and sanitary engineering include water supply and wastewater disposal, solid waste disposal, food handling, vector control, and home sanitation (see Chapter 8). The environmental health department and the water authorities should collaborate in developing contingency plans to ensure that these vital services are uninterrupted regardless of the magnitude of the disaster.

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[2] Among other documentation centers, the Regional Disaster Information Center (CRID), a multi-agency center based in San José, Costa Rica, collects and distributes documentation relating to various aspects of disasters and disaster management. The CRID database is accessible through the Internet (http://www.disaster.info.desastres/net/CRID).

Health Management in Shelters or Temporary Settlements

The health sector is responsible for establishing basic health programs for temporary shelters, including a surveillance and control system for infectious diseases and nutritional surveillance. Children should receive appropriate vaccinations, and opportunities should be taken to provide basic health education to residents of temporary settlements.

Training Health Personnel and the Public

Health ministries in countries vulnerable to disasters should institute comprehensive in-service training programs. Specific training in first aid, search and rescue (SAR) techniques, and public hygiene for the population at risk should be given, and health officials should receive ongoing instruction in disaster management issues in their respective areas of responsibility. Health institutions should recruit professional staff with qualifications in disaster management to be in charge of disaster programs.

It is even more important, perhaps, for professional training institutions (universities, schools, etc.) to include disaster preparedness and response in their regular curricula or as part of continuing education programs.[3] The health sector should also encourage the development of research protocols to be applied during the disaster phase to identify factors that would contribute to improving disaster management, or to characterize the effects of a disaster on the health of the population.

Logistical Resources and Support

The health sector must have a budget for preparedness as well as disaster response activities. Mechanisms should be in place to allow for the quick mobilization of resources after a disaster, rather than using normal administrative procedures that are generally bureaucratic and time-consuming.

It is usually uneconomical for individual health facilities, particularly hospitals, to stockpile disaster relief supplies. Medicines with expiration dates, for example, should not be kept in large quantities. As part of preparedness planning, hospitals should join a network of national or regional institutions that maintain stocks that can be quickly distributed. These might include stocks in government or military warehouses. Chapter 12 outlines factors to consider in managing the receipt, inventory, and distribution of humanitarian supplies.

Simulation Exercises

Simulations should take place with the participation of health authorities and operative personnel. They are the only way to keep plans up to date, especially during prolonged periods when emergencies do not occur. There are a variety of techniques for conducting simulation exercises:

[3] This is taking place in several Central American training institutions, where the modular approach has been quite successful. These training activities have received the technical support from the WHO/PAHO Collaborating Center at the Universidad de Antioquia in Medellín, Colombia, which has strengthened links worldwide.

- Desktop simulation exercises (sometimes called "war games" in military jargon) use paper or computer-based scenarios to improve coordination and information sharing and test the decision-making process.
- Field exercises are more costly, but are highly visible and are popular because they actually test the activation of a disaster plan in simulated field conditions. While these exercises cannot realistically reproduce the dynamic and chaos of real life disasters, they are very useful when intended to detect the inevitable errors, lack of coordination, or deficiencies of the simulated response. A critical evaluation is the essential conclusion of these exercises. A perfect field exercise is one that exposes many shortcomings in the disaster plan.
- Drills are designed to impart specific skills to technical personnel (e.g., search and rescue, ambulance, firefighting personnel). A perfect drill is one that leads to a flawless repetition of the intended task under any circumstance.

CHAPTER 4.
DISASTER MITIGATION IN THE HEALTH SECTOR

It is virtually impossible to prevent the occurrence of most natural hazards, but it *is* possible to minimize or mitigate their damaging effects. In most cases, mitigation measures aim to reduce the vulnerability of the system (for example, by improving and enforcing building codes). In some cases, however, mitigation measures attempt to reduce the magnitude of the hazard (e.g., by diverting the flow of a river). Disaster prevention implies that it is possible to completely eliminate the damage from a hazard, but that is still not realistic for most hazards. An example would be that of relocating a population from a floodplain to an area where flooding has not occurred or is unlikely to occur. In such a case, the vulnerability will be brought to zero, since from a public health or social point of view there is no vulnerability where there is no population.

Medical casualties could be drastically reduced by improving the structural quality of houses, schools, and other public or private buildings. Although mitigation in these sectors has clear health implications, the direct responsibility of the health sector is limited to ensuring the safety of health facilities and public health services, including water supply and sewerage systems.

In the last two decades in Latin America and the Caribbean, nearly 100 hospitals and more than 500 health centers have suffered damage as a result of hazards. In the worst cases, hospitals collapsed, killing patients and medical staff. More commonly, services to the community were interrupted, jeopardizing the health of the population. In many instances, even years after an event, repairs have not been completed. When water supplies are interrupted or contaminated, public health consequences can be severe. In addition to the social costs of such damage, the costs of rehabilitation and reconstruction severely strain economies.

HEALTH SECTOR DISASTER MITIGATION PROGRAMS

Because of the variety and cost of mitigation activities, priorities for implementing these measures must be established. In the health sector, this is the function of the national health disaster management program, working with experts in such areas as health and public policy, public health, hospital administration, water systems, engineering, architecture, planning, education, etc. A specialized unit within the national health disaster management program should coordinate the work of these professionals. Mitigation complements the disaster preparedness and disaster response activities of the program.

The mitigation program will direct the following activities:

1. Identify areas exposed to natural hazards with the support of specialized institutions (meteorology, seismology, etc.) and determine the vulnerability of key health facilities and water systems.
2. Coordinate the work of multidisciplinary teams in developing design and building codes that will protect the health infrastructure and water distribution from damage in the event of disaster. Hospital design and building standards are more stringent than those for other buildings, since hospitals not only protect the well-being of their occupants, but must remain operational to attend to disaster victims.
3. Include disaster mitigation measures in health sector policy and in the planning and development of new facilities. Disaster reduction measures should be included when choosing the site, construction materials, equipment, and type of administration and maintenance at the facility.
4. Identify the priority hospitals and critical health facilities that will undergo progressive surveys and retrofitting to bring them into compliance with current building standards and codes. The function of a facility is an important factor in establishing its priority. For example, in earthquake zones, a hospital with emergency medical capacity will have higher priority in the post-disaster phase than a facility that treats outpatients or those who could be quickly evacuated. Create mitigation committees at the local level to identify key facilities and ensure that mitigation measures are implemented in all projects.
5. Ensure that disaster mitigation measures are taken into account in a facility's maintenance plans, structural modifications, and functional aspects. In some cases, the facility may be well designed but successive adaptations and lack of maintenance increase its vulnerability.
6. Inform, sensitize, and train those personnel who are involved in planning, administration, operation, maintenance, and use of facilities about disaster mitigation, so that these practices can be integrated into their activities.
7. Promote the inclusion of disaster mitigation in the curricula of professional training institutions related to the construction, maintenance, administration, financing, and planning of health facilities and water distribution systems.

Annex I describes the steps involved in establishing a national disaster mitigation plan for hospitals in an earthquake-prone region.

VULNERABILITY ANALYSIS IN HEALTH FACILITIES

The first phase of the disaster mitigation program is to conduct a vulnerability analysis, i.e , to identify weaknesses in the system that may be exposed to hazards. Since the objective of this analysis is to establish priorities for either retrofitting or repair, there is no reason to perform the study if there is no intention of implementing the recommended mitigation measures.

A multidisciplinary team (composed of health administrators and specialists in natural hazard assessment, environmental health, engineering, architecture, planning, etc.) conducts the vulnerability analysis. The team will identify potential haz-

ards, classify the location of the system (soil quality, access routes, etc.), determine the expected performance of the system, and analyze maintenance operations. The team will then be in a position to present the results of this initial, low-cost study to the "owner" or "client" and propose mitigation measures, taking into account political willingness and financial constraints. Based on the decision taken, a quantitative vulnerability analysis study is then performed.

Professionals with expertise in natural hazard evaluation, methods of risk analysis, and conducting retrofitting projects generally are hired from outside of the hospital or water system being targeted. Training should take place during the analysis, so that institutions gain the basic capacity to lessen their vulnerability.

Vulnerability analysis must take place regularly, as both hazards and vulnerability change over time.

DISASTER MITIGATION IN HEALTH FACILITIES

Building standards for health facilities are different than those for most buildings, particularly those health facilities that will be under increased pressure to attend to medical emergencies in a disaster's aftermath. Mitigation measures in hospitals have to be oriented, first, to avoiding loss of life of patients and staff, and second, to ensuring that the hospital will function properly after the hazard's impact. Each component of the hospital must undergo vulnerability analysis.

The following factors are considered when conducting vulnerability analysis and preparing mitigation plans for medical facilities:

1. Structural elements, which include a building's load-bearing components, such as beams, supporting columns, and walls;
2. Nonstructural elements, including architectural elements (exterior non–load-bearing walls, in-fill walls, partition systems, windows, lighting fixtures, and ceilings); lifeline systems (water, power, and communication systems); and the building's contents (medicines, supplies, equipment, and furnishings). Nonstructural damage can be severe, even if the building structure remains intact;
3. Functional elements, which include the physical design (site, external and internal distribution of space, access routes), maintenance, and administration. The administrative and operational aspects of the facility (including disaster plans and performance of simulation exercises) are addressed as part of preparedness activities.

The analysis of structural components should be carried out first, since these results are used to determine the vulnerability of nonstructural and functional elements.

Once a facility's weaknesses are identified, a mitigation plan can be developed. Considering the costs and technical complexity of different measures, it is quite legitimate to begin with the least expensive measures. If resources permit, the structural components, which generally are the most complex and require substantial investment, will be retrofitted. The cost of applying seismic-resistant measures to existing structures ranges between an estimated 4% to 8% of the total cost of the

hospital. In the case of mitigation measures for structures exposed to hurricanes, the percentage is even less.

Functional elements, while requiring only modest capital investment, may be surprisingly complex and time consuming. In situations where there are severe political or financial obstacles to undertaking mitigation projects, the application of simple, low-cost measures, such as those applied to nonstructural elements, will reduce the probability of failure of systems in the event of small-scale hazards, which occur most often. The role of maintenance engineers is important in such cases.

All parties concerned (the clients or owner of the institution, financial officers, and technical personnel) should discuss the decision to undertake a mitigation program at the national or local level. Where there are limited economic and technical resources, the mitigation plan should be programmed for completion over a period of several years.

DISASTER MITIGATION IN DRINKING WATER SUPPLY AND SEWERAGE SYSTEMS

Drinking water supply and sewerage systems in urban and rural areas are particularly vulnerable to natural hazards. The systems are extensive and often in disrepair. When water supply is contaminated as a result of disasters, the population is at increased risk of contracting disease, and sanitation quickly deteriorates. Indirect health consequences are often difficult to evaluate and the costs to repair the system are generally very high. For example, as a result of the Mexico City earthquake in 1985, an estimated 37% of the city's population did not have access to water in the weeks following the disaster. As a result of the effects of the El Niño phenomenon in 1997–1998, the population of Manta, Ecuador, went without water for three months. Costs to repair the damaged infrastructure in this case exceeded US$ 600,000; losses to the water authority due to uncollected receipts exceeded

TABLE 4.1. Hospitals and health centers damaged or destroyed, by selected natural disasters, Latin America and the Caribbean.

Disaster	Hospitals and health centers damaged	Beds out of service
Earthquake, Chile, March 1985	79	3,271
Earthquake, Mexico, September 1985	13	4,387
Earthquake, El Salvador, October 1986	7	1,860
Hurricane Gilbert, Jamaica, September 1988	24	5,085
Hurricane Joan, Costa Rica and Nicaragua, October 1988	4	...
Hurricane Georges, Saint Kitts, September 1998[a]	1	170
Hurricane Georges, Dominican Republic, September 1998	87	...
El Niño, Peru, 1997–1998	437	...
Hurricane Mitch, Honduras, November 1998	78	...
Hurricane Mitch, Nicaragua, November 1998	108	...

[a] In the 35 years that the Joseph N. France Hospital in Saint Kitts has operated, it has been seriously damaged by hurricanes on 10 occasions.

— Not available.

US$ 700,000. Costs to repair damage to the aqueduct system resulting from the Limón, Costa Rica, earthquake in 1992 exceeded US$ 9,000,000.[1]

Authorities that operate and maintain water systems should have strategies directed at reducing these systems' vulnerability to natural hazards and procedures to quickly and effectively restore services in the event of a disaster. As with health facilities, vulnerability analysis is the first step in identifying and quantifying the effect of potential hazards on the performance and components of the system. This process is complicated by the fact that drinking water and sewerage systems are spread over large areas, composed of a variety of materials, and exposed to different types of hazards, including landslides, flooding, strong winds, volcanic eruptions, or earthquakes.

The analysis of the water and sewerage system is conducted by a team of professionals with expertise in natural hazard assessment, environmental health, and civil engineering, along with water service company personnel who are familiar with service operation and maintenance. Their focus is on operation and maintenance, administration, and potential impacts on service, as outlined below:

- **Operation and Maintenance.** The team analyzes how the overall system performs. Important factors for drinking water are the capacity of the system, the amount supplied, continuity of service, and quality of water. For the sewerage system, coverage, drainage capacity, and quality of effluents are evaluated. Information on the vulnerability of specific components (intakes, pipelines, treatment plants, storage tanks, drainage systems, etc.) indicates how the failure of one component will affect overall performance.
- **Administration.** The team ascertains the ability of the water service company to provide effective response by reviewing its disaster preparedness, response, and mitigation program. This includes mechanisms to disperse funds in emergency situations and necessary logistical support (personnel, transportation, and equipment) to restore water service. The analysis reveals whether disaster mitigation measures are included in routine maintenance, if necessary equipment and replacement parts are available for emergency repairs, and staff are trained in disaster response.
- **Impact on Service.** The team analyzes the potential impact of different hazards on specific components. Special attention is given to the location of a component and risks in the area, its condition (for instance, corrosion in pipes), and how critical it is to overall performance of the system. The team also estimates the time required to make repairs, the potential number of broken connections, and decreases in water quality or quantity that would result in rationing.

This information is used in the disaster preparedness plan to indicate the need to provide alternative water sources, the amount of time required to restore water service, and connections and installations that have priority for special monitoring, repair, or replacement.

[1] Pan American Health Organization. Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente (Publicación N°. 96 23). Estudio de caso: terremoto del 22 de abril de 1991, Limón, Costa Rica. Lima: OPS/CEPIS; 1996.

Mitigation measures for water systems include retrofitting, replacement, repair, placement of back-up equipment, and improved access. The mitigation plan may recommend such measures as relocation of components (as in pipelines or structures located in unstable terrain or close to waterways), construction of retaining walls around installations, replacement of rigid joints, and use of flexible piping.

Applying mitigation measures to existing systems is complex and costly. Water authorities, administrators, and operators must take responsibility for ensuring that disaster mitigation measures form part of the design and routine operation of these systems, and are included in the master plan and execution of any expansion to the system.

CHAPTER 5.
COORDINATION OF DISASTER RESPONSE ACTIVITIES AND ASSESSMENT OF HEALTH NEEDS

The response to disasters, both by nations affected and from the international community, has gradually improved in Latin America and the Caribbean in the last 30 years. With the evolution of national disaster management agencies, disaster response by governmental and nongovernmental institutions is better coordinated and based on pretested advance plans.

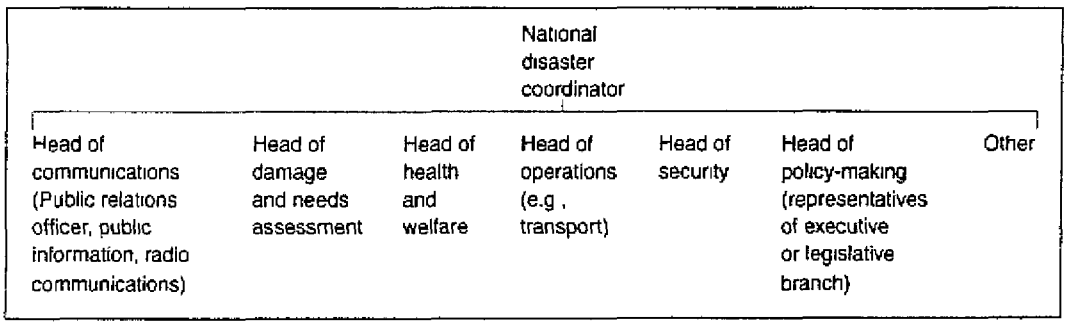
NATIONAL EMERGENCY COMMITTEE

After a disaster, all resources of the affected country are mobilized. Ideally, they are placed under the direction of a single national authority in the National Emergency Committee, in accordance with emergency legislation adopted beforehand. This Committee should be attached to the national disaster management agency and assumes overall disaster response coordination from a designated Emergency Operations Center. The National Emergency Committee is chaired by the President of the country or by his/her representative. Where there is an impact on the health situation of the population, the Health Disaster Coordinator will provide the link between the overall national disaster management authority and the health sector. The Minister of Health or his/her representative is the official health representative on the National Emergency Committee.

Membership of the National Emergency Committee will vary depending on the nature of the disaster. For example, its composition during a complex emergency would differ from that during a cholera epidemic. Figure 5.1 illustrates a proposed organization for the Committee. The organization will reflect each country's specific administrative, social, and political structure. Final responsibility for equipment such as heavy vehicles and telecommunications, the authority to request or accept external assistance, and clearance to issue news releases on health matters will probably lie outside the health sector.

In support of this national structure, the United Nations system in each country has established a Disaster Management Team. That team is chaired by the U.N. Resident Representative and is composed of the heads of U.N. agencies present in the country and in some cases of major bilateral agencies and NGOs. Chapter 13 discusses the role of international agencies in humanitarian assistance.

FIGURE 5.1. Members of the National Emergency Committee.



Note: These members are usually permanently stationed in the Emergency Operations Center during the disaster response phase. Membership is according to the hazard. Other officials should be invited for special briefing sessions.

HEALTH EMERGENCY COMMITTEE

In case of disaster, the major function of the Health Disaster Coordinator is to advise, or execute on behalf of the health sector authority (e.g., Minister of Health) operational coordination and to mobilize all possible health resources to save lives and limit material losses to the health sector.

In support of these activities, a Health Emergency Committee is convened. This Committee will include senior representatives of the health ministry, sanitation and water services, major accredited voluntary agencies, and other ministries involved in health relief programs. In contrast to the standing advisory committee for disaster preparedness mentioned, which has a large membership, the size of the Health Emergency Committee should be limited. Meetings that include too many staff members have impeded quick and efficient decision-making in several disaster situations.

A press or communications officer should be attached to the Health Emergency Committee to disseminate information and decisions (see Chapter 3).

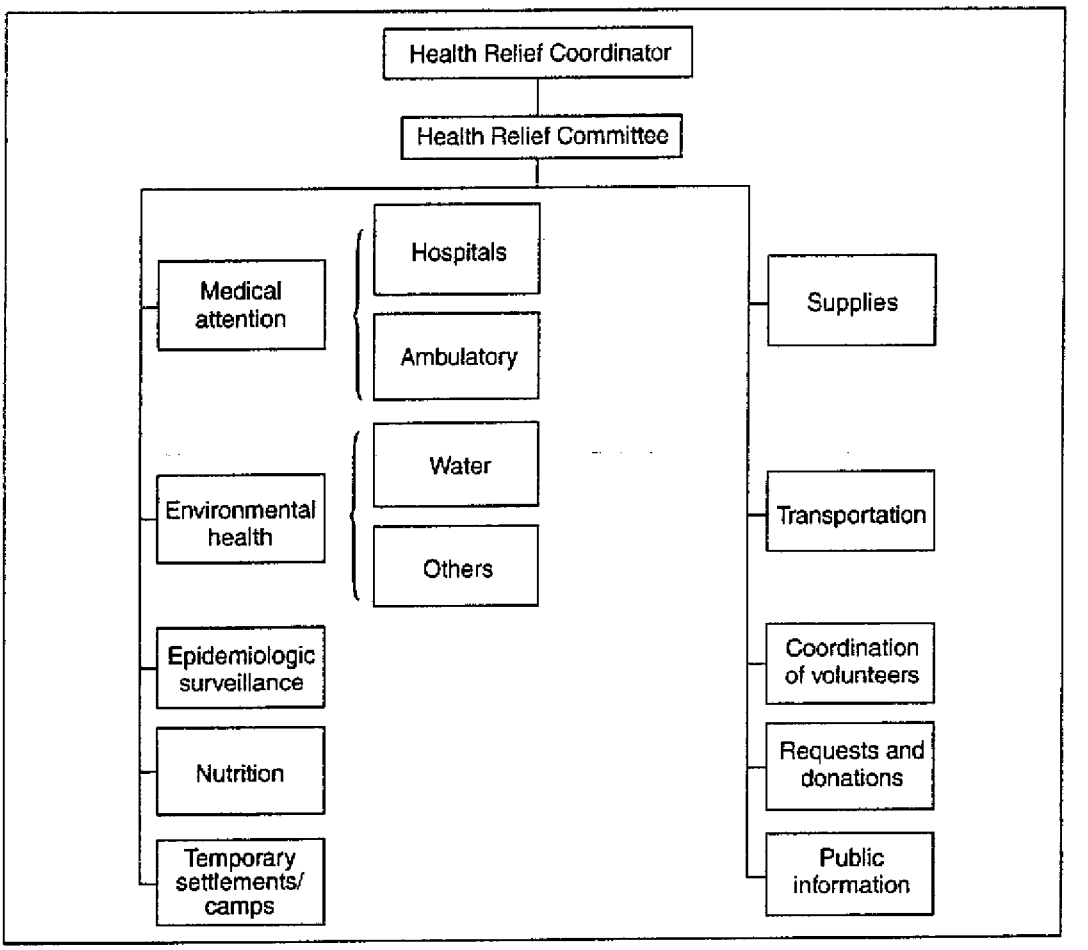
Figure 5.2 illustrates the functional areas that the Health Disaster Coordinator and Health Emergency Committee should consider in organizing humanitarian operations. Several activities, such as transportation, supply management, and volunteer coordination, must be integrated with the corresponding areas of the National Emergency Committee (Figure 5.1). The health transportation unit, for example, will work closely with and under the direction of the National Emergency Committee's transport section.

Should the creation of the National Health Disaster Management Program have been overlooked, a senior health official must be appointed in the immediate post-disaster phase to represent the health sector on the National Emergency Committee. His or her tasks, with the support of the Health Emergency Committee, will be to direct the sector's relief activities and set its priorities, clear news releases, approve requests for external cooperation, and accept or reject offers of assistance on behalf of the Minister of Health.

ASSESSMENT OF NEEDS

The major administrative problem in many relief operations is the mass of conflicting and often exaggerated reports about the extent and effects of the disaster.

FIGURE 5.2. Coordination of Health Emergency Activities.



Factual information is necessary to meet three main objectives: to define the affected population; identify and anticipate its unmet needs by assessing the extent of damage and existing local human and material resources; and identify potential secondary risks to health. The Health Disaster Coordinator will also require information in order to keep the international assistance community abreast of the changing situation so that it can respond appropriately; provide verified facts to the national and international media in order to avoid unsubstantiated reports, such as of disease outbreaks, that may provoke inappropriate responses; and keep the local population accurately informed about available services and prevent or counteract rumors.

Timing of the information is usually more important that its completeness and accuracy, as decisions need to be made as soon as possible in the emergency phase, with the data that are available. Within the first few hours of the hazard impact, authorities must have an idea of the overall extent of the disaster, allowing them to take the first decisions for the general population affected. Subsequently, data will be progressively adapted to a smaller scale, culminating, if possible, in the satisfaction of individual needs.

Information Requirements

Figures 5.3 and 5.4 show probable changes in needs and relief priorities at different periods after earthquakes and floods, respectively. The major information requirements for emergency relief after different types of disaster are: (1) the geographic area affected, an estimate of the population size, and its location in the affected area; (2) the status of transport (rail, road, air) and communication systems; (3) the availability of potable water, food stocks, sanitary facilities, and shelter; (4) the number of casualties; (5) damage sustained by hospitals and other health facilities in the affected area, their capacity to provide services, and their specific drug, equipment, and personnel needs; (6) the location and numbers of people who have moved away from their homes (for example, into urban areas, roadsides, or high ground); and (7) estimates of the numbers of dead and missing. The last has low priority when the major concern is to provide essential services to survivors.

In the first few days, the provision of immediate humanitarian assistance and the collection of information will be conducted simultaneously. As urgent relief needs are met, information can be collected on specific topics to define further priorities.

Background Information

Collecting and interpreting information will be simplified if background information is maintained in a summarized and easily accessible form (displayed, when possible, on maps) as part of a pre-disaster plan. It should show the size and distribution of the population in the area; major communication lines and topography; distribution and services provided by health facilities, with notations of those that might be particularly vulnerable to natural disasters as determined by prior vulnerability analysis; location of large quantities of food, medicine, and health supplies in government stores, commercial warehouses, and those of major voluntary

FIGURE 5.3. Changing needs and priorities following earthquakes.

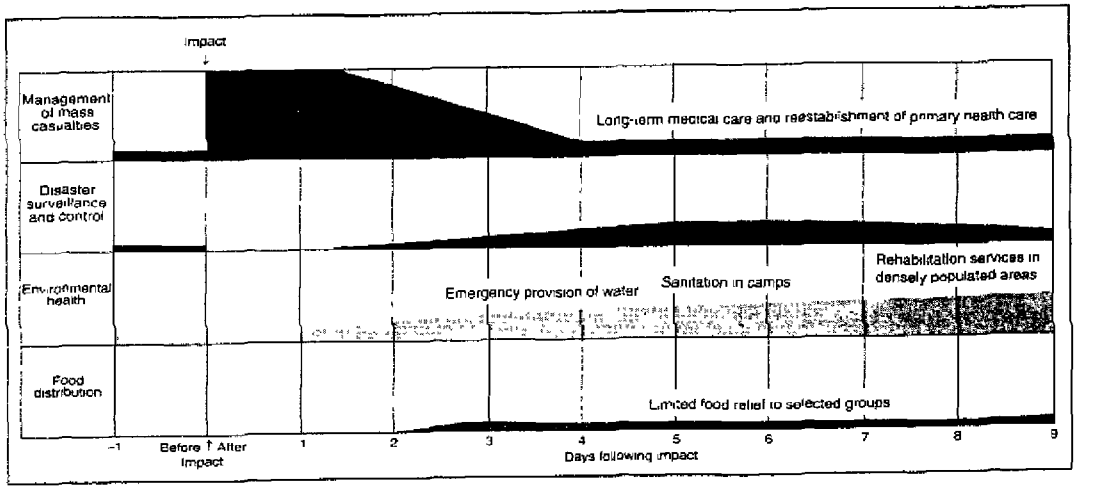
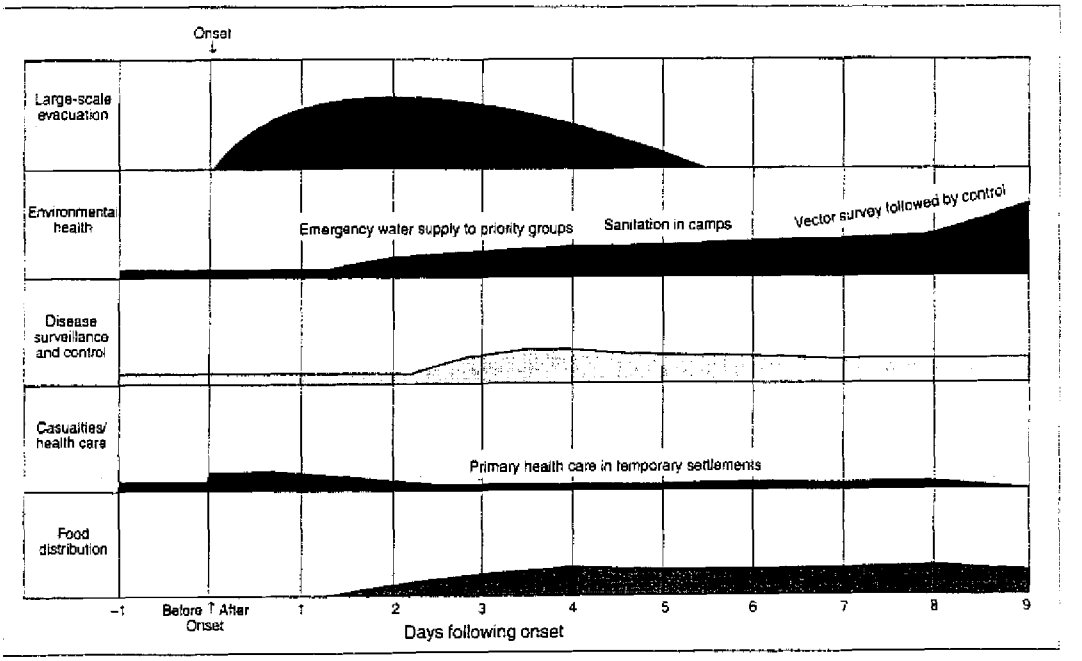


FIGURE 5.4. Changing needs and priorities following floods/sea surges.



and international agencies; key people and organizations active in relief; and the location of potential evacuation areas.

Computerized geographical information systems offer a very promising tool for storing and displaying these data. They require a significant and sustained commitment of human resources to maintain, however, and it is difficult to justify their use exclusively for disaster response. As mentioned earlier, they are most commonly used for a country's development and planning processes. Where GIS exist, they should include the essential information to help authorities make decisions in a post-disaster situation.

METHODS OF GATHERING INFORMATION AFTER HAZARD IMPACT

Information can be obtained in five main ways: from aerial observation (light aircraft, helicopters, satellites); reports directly from the community and relief workers; reports from the media; regular reporting systems; and surveys.

Aerial Observation

Low-altitude overflights may yield rapid information on the geographic extent of damage and major damage to bridges, roads, and other specific lines of communication. This information is of limited use in determining the operational capacity of facilities and damage to underground installations, however. Helicopters have great flexibility and health workers should try to use them early on in needs assessment.

Satellite imagery is rapidly replacing aerial observation. Although satellite images are extremely valuable in determining the extent of physical damage,

they are, at present, of little use in identifying the needs for urgent medical care.

Reports from the Community and Humanitarian Workers

Reports are received from community leaders, administrators, and local authorities, but they often have serious information gaps, since they lack information about isolated, severely affected communities. The respondent may have little accurate information to report, and may exaggerate the importance or urgency of some needs. Where reasonable doubt exists, the health assessment committee should not accept requests for large-scale relief at face value, but should try to discover why a particular need is said to exist. Humanitarian teams sent to affected communities should also be instructed to provide basic information on health needs and the community's ability to cope with them.

Reports from the Media

The international and national media provide rapid reports on damage and health needs. Their technical relevance, accuracy, and completeness usually do not match their speed and coverage. An increasing number of decisions are based on those reports, however, as they are a valuable source of information for health authorities when planning and orienting their professional assessment of the situation.

Regular Reporting from Existing Facilities

Where communications can be reestablished rapidly, information must be sought directly from administrative centers, public and private hospitals, and other technical agencies about immediate medical care, water, food, and sanitation needs. As noted in Chapter 7 on disease surveillance, epidemiological techniques are particularly useful in gathering and evaluating this information.

If large numbers of casualties are expected, for instance, daily reports should begin to be gathered from major health facilities as soon as possible after the impact to determine their ability to cope with the increased load and their need for support. A standard reporting format should be used by all components of each agency (health ministry, social security agency, armed forces, NGOs, and the private sector). The information collected should include the number of casualties appearing for treatment each day, other patients, admissions, vacant beds, and deaths. If possible, attendance and admissions should be reported by broad age and diagnostic categories.

Essential material in short supply such as casting plaster or x-ray film and specific food, water, and power problems also should be reported.

Surveys

Objective and quantified information on certain health needs can be obtained only through systematic surveying. If existing information sources are inadequate or inaccurate, suitable surveys should be conducted as soon as possible. After a major disaster, surveys may be organized in the following three stages:

Stage 1

Within the first 24 to 48 hours, an initial rapid assessment of damage—called "quick and dirty"—generally conducted by helicopter and sometimes based on satellite imagery, delineates the affected area by examining all potentially affected areas. The physical condition of health, transport, and communications facilities, as well as the status of relief activities should be quickly assessed by gathering information provided by one or several of the above mentioned methods. This will be sufficient to establish the types of problems that have arisen, to serve as a basis for mobilizing specific relief, and to design more formal surveys. The initial survey is generally carried out with the assistance of the armed forces and the participation of international experts (e.g., PAHO/WHO and U.N. Disaster Assessment and Coordination Teams).

Familiarity with the area to be surveyed is most important. Participation by health professionals in the survey will be an asset, but is not essential, as the data are not highly technical and can be gathered by others.

There is generally a conflict between the need for assessing the overall problem and the urge to provide immediate humanitarian assistance. To resolve this, surveillance personnel should refrain whenever possible from giving medical care, and backup medical assistance must be provided.

Stage 2

During the second phase of assessment, which may vary from a few hours up to several days after the impact, a detailed multidisciplinary health survey must attempt to include all affected areas.

During the first days, a survey in outlying areas should include an assessment of the numbers of casualties and dead. A survey of health needs must be a part of emergency care so that the survey team can call in immediate medical backup. Information should be collected on: (1) the total number of casualties; (2) number requiring evacuation and their major diagnostic categories; (3) number requiring local treatment; (4) availability of essential health supplies and personnel; (5) continued aftercare likely to be needed for those receiving emergency treatment; and (6) need to supply or make temporary repairs to local medical facilities.

The detailed survey will also try to assess the immediate impact of the disaster on water quality and availability. The aim is to estimate the extent to which damage to water supply systems and other sanitation services immediately increases health hazards (e.g., transmission of diseases) when compared to pre-disaster conditions, not to assess their absolute quality.

The need for food, shelter, and protective clothing must also be assessed.

In contrast to the initial rapid survey, it is essential to have the most qualified available health professionals take part in this survey, since major humanitarian operations will be based on the findings. At least one survey team member should be chosen for his or her familiarity with local conditions. Since technical competence and prior experience in disaster assessment are major assets, regional or international personnel may have to be called on to provide expertise unavailable locally. Neighboring countries should consider pooling such resources before disasters occur, based on principles of technical cooperation among developing countries.

Transporting survey teams must be given highest priority, since other relief activities will be competing for available transportation. Specifically, survey team space should be sought on all relief transport if the teams do not have their own transportation. Helicopters are the most flexible and useful transport for such surveys.

Stage 3

In the third assessment stage, surveys of specific problems must be made. Damage to health facilities and related utilities should be surveyed throughout the affected area by competent technicians and engineers. These surveys will provide a basis for estimating reconstruction costs. If such cost estimates are not quickly available, scarce international relief funds cannot be suitably channeled to priority areas in the health sector. Finally, these surveys will start the continuing surveillance needed to direct health sector assistance activities rationally.

Too often, disaster managers have confused the assessment of emergency humanitarian needs with the evaluation of rehabilitation and reconstruction requirements. Humanitarian agencies and donors expect immediate data on the emergency needs and not on estimates of the long-term economic impact of damages and the cost of subsequent redevelopment. These data should be collected, but at a later stage.