

## Chapter 6

---

# Sudden-impact natural disasters

### Purpose of assessment

A rapid assessment should be initiated as soon as possible after a natural disaster to determine:

- the type of emergency, the affected areas and population, and the emergency's likely evolution;
- its impact on health;
- the immediate impact on health services; and
- the extent of damage to other sectors relevant to health operations.

### Background

In addition to killing and injuring people and causing extensive environmental, social, and economic damage, sudden-impact natural disasters often create an immediate obstacle to response by disrupting vital services (e.g. water, health, and security services) as well as key communication and transportation systems.

Sudden-impact natural disasters can be triggered by:

- cyclones, hurricanes, tornadoes;
- snowstorms;
- tsunamis (seismically induced waves);
- storm surges;
- flash floods;
- fires;
- earthquakes,
- landslides and avalanches; and
- volcanic eruptions

The impact of any one of these hazards upon a vulnerable population can cause a disaster. Nonetheless, natural hazards occur in well-defined patterns. Susceptible areas can be rather easily identified, and therefore emergency plans should be prepared that outline administrative and technical responsibilities and procedures for a health response to all likely natural disasters. These plans should be multisectoral and linked to any other existing emergency plans.

### Priorities

Disasters, emergencies, and the required response can be viewed in terms of stages, and the type of information collected must be appropriate for every stage of the emergency response.

### **Stage I (Day 1)**

The first response in sudden-impact disasters comes from the affected community, and local priorities are to simultaneously assess and respond rapidly to the crisis. This implies that medical measures are usually implemented without complete information. Local resources are spontaneously and, often, effectively reassigned and adjusted before the first results of a rapid assessment are available.

During this period, when additional resources have not yet arrived, the highest health priority is the emergency medical response.

The first injury estimates are needed within the 24 hours following impact to guide requests for assistance. However, in many sudden-impact disasters, it is difficult to project numbers of casualties during this period. An important task of preparedness is to review the experience gained in past disasters (e.g. earthquakes and floods) and prepare guidelines for estimating casualties (for instance, in the case of earthquakes, based on recorded magnitude, population density, and construction type).

### **Stage II (Day 2)**

By this time, most critical patients in accessible areas have already received initial medical attention and immediate life-saving measures become less important.

During this stage, a rapid assessment should determine:

- needs for emergency medical response in the less accessible areas;
- shortages in primary health care resources;
- secondary needs: health care, shelter, food and water for the population; and
- needs for additional national and international resources (to re-establish essential health services, and restock medical supplies and equipment).

### **Stage III (Days 3–5)**

At this point, restoring primary health care, lifeline systems, and adequate shelter become priorities.

Therefore, a rapid assessment should focus progressively on needs for:

- environmental health, food security and safety, and public health services;
- special protection and shelter for vulnerable groups; and
- re-establishing the primary health care system, and restoring health facilities.

### **Stage IV (after Day 5)**

After day 5, emergency plans should be fully implemented, and a response and recovery operation ideally in place, covering all sectors.

From this stage on, health assessment should:

- be based on an established surveillance system;
- incorporate information on both disease surveillance, and the health care system;
- focus on health trends as they relate to the response and recovery operation itself; and
- contribute to the most effective use of national and international resources.

## Conducting the assessment

The information collected must highlight the population and areas most severely affected, the damage to the health system, and the status of affected and unaffected health resources. Information previously obtained from other sources (such as government departments) should be included in the assessment. Rapid assessment activities should provide the basis for establishing ongoing surveillance.

Estimating the disaster's impact on a population requires basic demographic information (such as age and sex distribution of the population) and a good knowledge of the affected area (for example, the mapped location of health facilities, water sources, and high-risk communities). This information is often available from government departments, academic institutions or response and recovery organizations.

## Assessing the impact on health

### *Injuries*

*Primary injuries:* Injury patterns and their importance vary according to the type of disaster. For example, earthquakes are associated with a large number of traumatic injuries, while floods are often associated with many deaths, but relatively few injuries. A rapid assessment should:

- estimate the number of persons injured; and
- assess the severity of injuries (using a simple scale for ranking severity, such as “those requiring and not requiring hospitalization within 24 hours”).

Other useful information includes:

- types of injuries (such as laceration, fracture, and burns);
- injury sites (such as arm, back, leg, and head); and
- approximate age and sex distribution of affected persons.

*Secondary injuries:* Secondary injuries may occur in the post-impact phase of a disaster:

- from secondary effects of the disaster, such as fires and toxic releases; and
- in association with the clean-up and rescue operations, and as people return to their homes. Risk groups include residents, response and rescue workers, volunteers, and others in the affected area.

*Methods for collecting information:* Potential sources of information include any place where the injured may have gone to seek care. The number of seriously injured is more important than the number of ambulatory patients. Therefore, information should be collected from second- and third-level health facilities, where most of the seriously injured seek help (see Table 4).

Information may be obtained by site visits or contacting the officers responsible. As soon as possible, a surveillance system should be established to monitor changing health conditions.

### ***Missing persons***

Other critical information for determining the severity of a sudden-impact natural disaster is the number of persons who are missing or unaccounted for. Information on their possible location and expected health condition may be needed to plan the medical aspects of search and rescue operations.

An accurate tally of missing persons and the number of dead bodies recovered will be essential, at least at a late stage of the operations (see Deaths, p. 47).

Information sources include the following.

- Preliminary indications will come from interviews with the families of the missing persons and the community at large (e.g. through a survey).
- The most important sources for this information are those entities which are responsible for search and rescue: i.e. the police, army and fire brigade.
- In some cases, schools and hotels, for example, will have registers of pupils or guests that can help in this task.

### ***Survivors in need***

Most, if not all, the survivors in the affected area, even if not physically injured, may have been left homeless and deprived of all lifeline systems and services (see Assessing the impact on health-related sectors, p. 49, and Chapter 7).

**Table 4. Gathering information to assess the health impact of a natural disaster**

<i>When</i>	<i>Where: information sources</i>
During immediate post-impact stages	<ul style="list-style-type: none"> <li>• Hospitals (those with usable emergency room and inpatient records, including mobile hospitals, are the best sources)</li> </ul>
During later stages	<ul style="list-style-type: none"> <li>• Pharmacies</li> <li>• Community health centres</li> <li>• Evacuation centres</li> <li>• Local officials and leaders</li> <li>• Nongovernmental organizations</li> <li>• Community organizations</li> </ul>

Many among them may also need psychological support to overcome the stress of the disaster or the loss of relatives or friends.

Obtaining figures or estimates on their number is essential to plan immediate and medium-term response and activities.

Data can be collected from:

- local officials and leaders;
- evacuation centres;
- NGOs; and
- community organizations.

### ***Other illness***

Communicable disease outbreaks are quite rare in the days immediately following a sudden natural disaster. However, with continued lack of utilities (such as water supplies and sewage treatment), disrupted health services, and poor environmental conditions, there is an increased risk of communicable disease outbreaks.

Careful consideration should be given to identifying those communicable diseases of increased risk in the disaster-affected area because only those pathogens present in the affected area are likely to cause outbreaks.

The rapid assessment should:

- identify pathogens already present, or likely to be introduced from outside the affected area (e.g. by external health workers or displaced persons or migrants from other locations); and
- identify the best measures for disease control.

Following a disaster, mass immunization campaigns are frequently unnecessary and counterproductive because they divert resources from more essential services. However, attention should be paid to the immunization status of children against measles, pertussis, diphtheria, and polio in densely populated areas.

### ***Deaths***

Mortality information is the first to be reported by the communities affected, but there are important considerations in using it.

- For immediate decision-making purposes following a sudden-impact disaster, mortality data are not as useful as information on injury patterns.
- However, for setting future priorities in emergency preparedness and response, it is useful to determine the leading causes of mortality and associated risk factors in specific types of disasters.

Key considerations in assessing information on deaths include the following.

- In a rapid-impact disaster, it may be particularly difficult to estimate the number of unrecovered bodies. reported mortality is limited to the number of bodies recovered, thus underestimating true mortality.

- It is important to differentiate between mortality estimates based on body counts, and those which include the number of people missing.
- Sources of mortality information that may be useful in a slow-onset disaster may not be useful after a rapid-impact disaster (i.e. registration of dead persons may lag in the latter case).

In addition to crude mortality information, other data can be collected after the emergency period that may be helpful in setting future preparedness priorities. They include:

- age-specific and sex-specific death rates;
- causes of death; and
- risk factors for death.

Depending on the setting and culture of the population(s) affected, the range of potential sources for mortality data includes:

- hospitals;
- cemeteries and burial grounds;
- health centres or posts;
- religious leaders;
- offices that register deaths;
- donor organizations;
- local officials and leaders; and
- NGOs.

## **Assessing the impact on health services**

### ***Medical services***

A rapid assessment must provide essential information for determining the extent of damage, and the location of undamaged and functioning services in relation to health needs.

Immediately following the disaster or when facing time constraints, the information below should be gathered.

- number, location, and type of facilities (preferably mapped before the disaster), and previous level of functioning;
- structural integrity of health care facilities after the event;
- current capacity of health facilities,
- disrupted communications and supply lines,
- injuries and deaths of staff;
- functioning electricity and water supplies (yes or no);
- gaps in coverage by key personnel; and
- acute gaps in key supplies and medicines.

If time permits, or at a later stage, the following information may be collected:

- number and types of injuries or illnesses reported at facilities;
- needs for evacuation of injured or ill persons to other types of facilities; needs for specialized care (e.g. burn treatment);

- number and functions of medical operations (e.g. types of injuries treated and resources needed),
- number and types of medicines available, vaccines, blood, laboratory supplies, and key emergency supplies most urgently needed.

Information needed can be collected by visiting the facilities in the stricken area, or communicating by radio or telephone with outlying areas.

### ***Environmental health***

Assess the status of health-related services, such as water supply, sanitation, vector control, shelter, and transport.

Also look at secondary hazards, such as fires, chemical releases, collapse of infrastructure, such as dams, roads, and bridges that may occur after extensive structural damage in the affected area.

The priority is to assess the quantity and quality of untreated water supplies. For example, in earthquakes, ensuring an adequate quantity of water is a major problem if supply lines are cut.

Particular attention should be paid to:

- structural or functional damage to water supplies,
- size and location of populations with an adequate water supply to identify groups at increased risk of communicable disease; and
- actual or potentially contaminated water sources, and populations exposed to such sources.

In determining the state of sanitation the following should be examined:

- structural integrity of sewage treatment systems;
- signs of functional damage (such as overflowing of septic pits); and
- presence of vectors.

Floods are often associated with vector-related problems. This is due to several factors, including the emergence of new breeding sites, overcrowding in shelters and camps, and the disruption of vector control activities. Later assessment should identify the types of vectors present in the affected area, as well as the populations at increased risk of related illness.

### **Assessing the impact on health-related sectors**

Health status and, consequently, emergency health response depend heavily on other key services. Key sectors that affect health include.

- food;
- shelter and housing, and
- transport and communication

After a sudden-impact disaster, assessing the nutritional status is not a priority, though it is important to consider that the disaster may have affected food stocks and pipelines, and shortages may occur

Rapid nutritional assessment will be necessary, however, if the affected population had inadequate or marginal food security before the event.

For discussion of the last two points, see Chapters 7 and 8.

### ***Sources of error***

Morbidity estimates from health care providers may not be accurate or representative.

Injuries may be under-reported owing to poor record-keeping, or because health facilities may be inaccessible for many of the injured. On the other hand, they may be over-reported because they are registered or counted several times (e.g. at the Red Cross Station, the health centre, and the hospital).

In the later stages of a sudden-impact natural disaster, other factors emerge that may reduce the usefulness of morbidity and injury data collected from health providers.

For example, the availability of health care may actually improve because of the disaster response, leading to increased medical care for both disaster-related and other injuries.

Furthermore, better diagnostic equipment in more sophisticated facilities may allow more specific or accurate diagnoses in some locations than in others. This may limit the comparability of data gathered from different sites.

A rapid assessment that concentrates on health services in the worst stricken but easily accessible areas may exaggerate the acuteness of need for the entire population affected. On the other hand, the needs of isolated areas with disrupted road, air, and telecommunications may be underestimated and easily forgotten.

## **Presenting results**

In presenting the results of your assessment, indicate the following information.

- Describe briefly the event: site, causes and general effects, date and time of event.
- Give an estimate of the area and of the number of people affected.
- Give information on:
  - number of deaths;
  - number and pattern of injuries;
  - number of missing persons, and
  - number of people displaced or in need of being evacuated.
- Describe the extent of the damage and the current state of:
  - health facilities and services;
  - lifeline systems (water, energy, communications);
  - houses; and
  - other vital infrastructures (road, bridges, sanitation systems, etc.).

- Describe the response operations, under way or planned:
  - by the community;
  - by the local authorities;
  - by the central government,
  - by NGOs;
  - by international partners;
  - distribution of tasks and coordination mechanisms;
  - main constraints to the operations; and
  - identify other hazards that may compound the emergency.
- Give recommendations on:
  - geographical areas or population groups of priority concern;
  - activities that need to be undertaken immediately or in the short term;
  - activities that may be needed at medium term; and
  - immediate needs for external assistance such as drugs, other medical supplies, equipment, personnel, expert assistance, logistics and communications, and funding.