3. SURVEILLANCE

This chapter outlines the key steps in setting up and running a surveillance system in an emergency.

3.1 Introduction and general principles

Surveillance is the ongoing systematic collection, analysis and interpretation of data in order to plan, implement and evaluate public health interventions.

A surveillance system should be simple, flexible, acceptable and situation-specific. It should be established at the beginning of public health activities set up in response to an emergency.

Public health surveillance classically comprises six core activities (detection, registration, confirmation, reporting, analysis and feedback) that are made possible through four support activities (communication, training, supervision and resource provision).

![Conceptual framework of public health surveillance and action](image)

If systematic surveillance activities have to be delayed owing to the magnitude of the emergency or a lack of human resources, an alternative means of
monitoring specific health-related trends is to sample the population through repeated health surveys, using design and questionnaires identical to those used for the initial rapid assessment (see Chapter 1).

3.2 Objectives

The objectives of a surveillance system in an emergency are to:

• identify public health priorities;
• monitor the severity of an emergency by collecting and analysing mortality and morbidity data;
• detect outbreaks and monitor response;
• monitor trends in incidence and case-fatality from major diseases;
• monitor the impact of specific health interventions (e.g. a reduction in malaria incidence rates after the implementation of vector control programmes);
• provide information to the Ministry of Health, agency headquarters and donors to assist in health programme planning, implementation and adaptation, and resource mobilization.

<table>
<thead>
<tr>
<th>DATA</th>
<th>INFORMATION</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of deaths</td>
<td>Crude mortality rate</td>
<td>Mortality reduction measures</td>
</tr>
</tbody>
</table>

Before starting to design a surveillance system, the following questions should be asked:

• What is the population under surveillance: displaced population, local population?
• What data should be collected and for what purpose?
• Who will provide the data?
• What is the period of time of the data collection?
• How will the data be transferred (data flow)?
• Who will analyse the data and how often?
• How will reports be disseminated and how often?

3.3 Setting surveillance priorities

It is not possible to monitor everything in an emergency. At field level, the health coordination team must identify a limited number of priority diseases that pose a threat to the health of the population. This selection process must be done at the beginning of health care activities in an emergency.
The choice of surveillance priorities should answer the following questions:

- Does the condition result in a high disease impact (morbidity, disability, mortality)?
- Does it have a significant epidemic potential (e.g. cholera, meningitis, measles)?
- Is it a specific target of a national, regional or international control programme?
- Will the information to be collected lead to significant and cost-effective public health action?

Experience from many emergency situations has shown that certain diseases/syndromes must always be considered as priorities and monitored systematically. In the acute phase of an emergency, the major diseases/syndromes that should be reported are:

- bloody diarrhoea,
- acute watery diarrhoea,
- suspected cholera,
- lower respiratory tract infection,
- measles,
- meningitis.

In certain geographical areas, other diseases that are endemic or that represent an epidemic threat, such as malaria or viral haemorrhagic fevers may have to be included.

In the post-emergency phase, additional diseases that should be reported include:

- tuberculosis,
- HIV/AIDS,
- neonatal tetanus,
- sexually transmitted infections.

See Annex 5 for case definitions for each disease/syndrome.

When setting up surveillance systems, it is important to be aware of health conditions that have local distribution and include these in the surveillance programme. In parts of West Africa, for example, Lassa fever should be included in the list of priority diseases for surveillance. In areas where typhus has caused problems in the past, routine surveillance should include reporting both of suspected/confirmed cases of the condition and of infestations with body lice, the vector of the disease.

In addition, other health events of importance, e.g. injuries, wound infections may need to be added to the list of surveillance priorities.
3.4 Data collection methods

There are three main methods for collecting data in emergency situations: routine reporting (including epidemic-prone diseases requiring immediate notification), surveys and outbreak investigations (see Table 3.1).

Table 3.1 Data collection methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Indication</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine reporting: endemic</td>
<td>Routine surveillance</td>
<td>Weekly (emergency phase), then monthly</td>
</tr>
<tr>
<td>Alert system: epidemic (early</td>
<td>Epidemic-prone diseases</td>
<td>Immediate notification</td>
</tr>
<tr>
<td>warning)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outbreak investigations</td>
<td>Declared outbreaks</td>
<td>Ad hoc</td>
</tr>
<tr>
<td>Surveys</td>
<td>Delays in setting up routine surveillance,</td>
<td>Depends on specific needs or questions addressed</td>
</tr>
<tr>
<td></td>
<td>or Household-based data (e.g. nutrition,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>basic needs, vaccination)</td>
<td></td>
</tr>
</tbody>
</table>

In routine reporting, clinical workers collect data on the number of cases and deaths from priority diseases. Data are reported as part of the day-to-day work of the hospital, health clinic or outreach post. Routine data are usually recorded in an inpatient or outpatient register, and are then transferred to summary tally sheets at the end of each week. At the end of the reporting period, the information is sent to the health coordinator for compilation and analysis. Case definitions for epidemic-prone diseases listed in the surveillance system should include specific indications on when immediate notification is mandatory: either as soon as a single case is suspected (e.g. haemorrhagic fevers, measles, yellow fever) or after an indicated alert threshold is reached (e.g. epidemic meningitis).

Surveys aim at collecting data on a representative sample of the emergency-affected population (or of a defined subgroup). When the organization of a sustainable surveillance system has to be delayed, iterative surveys can provide the information needed for emergency decisions. Survey principles and methods are described in Chapter 1.

Outbreaks entail active case-finding and in-depth investigation, whereby attempts are made to identify the cause of an unusual number of cases of death or disease and to implement control measures. These investigations are dealt with in Chapter 4.
3.5 Case definitions

Case definitions must be developed for each health event/disease/syndrome. Standard WHO case definitions are given in Annex 5, but these may have to be adapted according to the local situation. If possible, the case definitions of the host country’s Ministry of Health should be used if they are available. What is important is that all of those reporting to the surveillance system, regardless of affiliation, use the same case definitions so that there is consistency in reporting.

Case definitions considered here are designed for surveillance purposes only. A surveillance case definition is not to be used for the management of patients and is not an indication of intention to treat.

In many emergency situations, where there is no timely laboratory access for confirmation of certain diseases (e.g. cholera), public health action can be based on a presumptive diagnosis. Surveillance case definitions should indicate, if appropriate, when a case is suspect, probable or confirmed.

### Table 3.2 Case classification

<table>
<thead>
<tr>
<th>Type of case</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| Suspected case | Clinical signs and symptoms compatible with the disease in question but no laboratory evidence of infection (negative, pending or not possible)  
Example for meningococcal meningitis: suspected case = meets clinical case definition |
| Probable case | Compatible clinical signs and symptoms, and additional epidemiological (e.g. contact with a confirmed case) or laboratory (e.g. screening test) evidence for the disease in question  
For meningococcal meningitis: probable case = suspected case + turbid CSF or ongoing epidemic or epidemiological link to confirmed case |
| Confirmed case | Definite laboratory evidence of current or recent infection, whether or not clinical signs or symptoms are or have been present  
For meningococcal meningitis: confirmed case = suspected or probable case + laboratory confirmation  
Note that in outbreaks of certain diseases, clinical symptoms are not present in a proportion of people, however they are counted as confirmed cases with laboratory evidence since subclinical infection is a major source of transmission |

Some infectious diseases, such as neonatal tetanus, normally do not require laboratory confirmation and can be reported on the basis of pure clinical criteria. Others, such as pulmonary tuberculosis, need to be confirmed by laboratory tests before official reporting of a case. In other instances, disease presentation can correspond to various or multiple causative organisms (e.g. sexually-transmitted infections) and the demonstration of the etiologic agent(s) is irrelevant for adequate case management or public health action. In such
cases, a “syndromic” case definition is adequate. Presumptive (suspect or probable) or syndromic case definitions may assist the Outbreak Control Team in establishing the likely occurrence of an outbreak and in taking appropriate control measures, before laboratory results become available.

Case definitions may have to be adapted to the circumstances, as illustrated by the following two classic examples.

✔ The case definition recommended by WHO for suspected cholera varies, depending on cases being seen during a confirmed outbreak or not (see Annex 5).

✔ For malaria, a clinical case definition may need to suffice during the acute phase of an emergency since microscopy confirmation of all suspected cases may be difficult, particularly in high-transmission areas where the case-load is large*. In unstable endemic areas, even the best clinical algorithms may wrongly classify a disease episode as being malaria and may also fail to identify many true cases of malaria; diagnosis by microscopy or RDTs should be provided as soon as possible to improve case management and surveillance. In stable high-transmission areas, where a high proportion of the population can have parasitaemia without symptoms, microscopy may not be so useful for the definition of cases; anaemia in children and pregnant women, low birth weight and high rates of splenomegaly (although not very specific) may serve as supporting indicators.

### 3.6 Minimum data elements

Through appropriate data collection methods (see Section 3.4), the surveillance system must capture at least the following categories of health-related parameters:

- mortality,
- morbidity,
- population figures and trends (demographic data),
- nutrition,
- basic needs,
- programme activities (including vaccination).

For each category, key indicators must be calculated to allow analysis of trends and comparison of the data. Ideally, mortality and morbidity data should be reported as the incidence for a given size of population, so demographic data are needed to calculate them (e.g. incidence of malaria per 1000 population per month).

If the population denominators are not taken into account, or demographic changes are not monitored, simple changes in numbers of cases of a disease/

* However, increasing availability of rapid diagnostic tests (RDTs) for falciparum malaria may allow confirmation of malaria cases.
syndrome can be highly misleading in terms of assessment of potential epidemics, since they may represent changes in the numbers of the targeted population rather than changes in incidence. Nevertheless, case numbers should be collected and reported (with suitable disclaimers as to accuracy) even in the absence of demographic data. Even if the increased numbers of cases of a disease are not indicative of an outbreak, they nevertheless present medical staff and logistic services with an increased demand that must be quantified and met.

Malnutrition and compromised access to basic needs are frequently seen in emergencies and have a major impact on disease susceptibility. Available data (preferably from household surveys) on malnutrition, basic household needs and vaccination coverage should be collected as well, and included in the periodical analysis of surveillance data, together with communicable diseases. Sample household survey forms are included in Annex 2.

### 3.6.1 Mortality

The crude mortality rate (CMR) is the most important indicator in an emergency, as it indicates the severity and allows monitoring of the evolution of an emergency. In most developing countries, the average crude mortality rate is about 18 deaths per 1000 population per year, i.e. 0.5 per 10 000 per day. Early in an emergency, mortality is expressed in deaths per 10 000 people per day. The acute phase of an emergency is defined as when the CMR goes above 1 per 10 000 per day in a displaced population (see Table 3.10).

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**Crude mortality rate** is the total number of deaths in the population (over 1 week or 1 month), divided by the average population at risk during that time (week/month), multiplied by 1000 (this gives number of deaths per 1000 per time frame chosen). This can then be converted to deaths per 10 000 per day.

* On causes of death:
  - **Proportionate mortality**: Proportionate mortality describes the proportion of deaths in a specified population over a period of time attributable to different causes. Each cause is expressed as a percentage of all deaths, and the sum of the causes must add to 100%. These proportions are not mortality rates, since the denominator is all deaths, not just the population in which the deaths occurred. For a specified population over a specified period: Proportionate mortality = \[ \text{deaths due to a particular cause} / \text{deaths from all causes} \] \times 100

  - **Cause-specific mortality rate**: The cause-specific mortality rate is the mortality rate from a specified cause for a population. The numerator is the number of deaths attributed to a specific cause. The denominator is the at-risk population size at the midpoint of the time period.
3.6.2 Morbidity

Priority diseases/syndromes will have been selected by the health coordination team depending on the main disease threats in the emergency area. For maximum efficiency, it is important to limit the number of diseases reported and the data collected for each case. Health facilities are generally the main source of morbidity data in an emergency. Where access to or use of health facilities is limited, such data might not be representative of the condition of the overall population. For certain epidemic-prone diseases, however, it is essential that all cases are detected in the community and reported. Social mobilization by community workers may be useful in the acute phase of an emergency to ensure that those among the emergency-affected population that are ill access to health care services.

The **incidence** is the number of new cases of a specified disease reported over a given period. The number of new cases reported should be counted (over 1 week/month), divided by the average population at risk during that time (mid-week/month), and multiplied by 1000 (or any other global number to allow easy interpretation). The incidence is then specified as number of new cases per 1000 people (or the number that you have multiplied by).

**Case-fatality ratio (CFR):** the percentage of persons diagnosed as having a specified disease who die as a result of that disease within a given period, usually expressed as a percentage (cases per 100).

**Attack rate (outbreaks):** The cumulative incidence of cases (persons meeting case definition since onset of outbreak) in a group observed over a period during an outbreak.

3.6.3 Population figures and trends

Demographic data deal with the size and composition of the population affected by an emergency. They are needed to calculate:

- the size of the population targeted for humanitarian assistance,
- the size of high-risk groups (e.g. under-fives),
- the denominators for mortality, morbidity and other rates,
- the resource needs for health interventions.

In most emergencies, demographic data can be obtained from public institutions or United Nations agencies. It is important that all agencies working in an emergency agree on and use the same population figures. In certain emergency situations involving displaced persons, the local population in the affected area should also be included in the total population. The demographic data that need to be collected are given in Table 3.3.
Table 3.3  **Demographic data to be collected**

- Total population size
- Population under 5 years of age
- Numbers of arrivals and departures per week
- Predicted number of future arrivals (if available)
- Place of origin
- Number of people in vulnerable groups, such as unaccompanied children, single women, pregnant women, woman-headed households, destitute elderly people and people with disabilities

Table 3.4  **Standard age distribution in developing countries**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Proportion of total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4 years</td>
<td>17%</td>
</tr>
<tr>
<td>5–14 years</td>
<td>28%</td>
</tr>
<tr>
<td>15+ years</td>
<td>55%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>Women 15–44 years</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 3.4 gives the standard age distribution in developing countries. However, the age structure of displaced populations is often heavily distorted, with excess numbers of children, women and the elderly. Young males of military age are often under-represented.

### 3.6.4  Basic needs

Basic needs in emergencies are listed in Annex 1 (see also nutritional requirements in Section 2.5.1).

While questionnaires can be easily administered on convenience samples of the population visiting health facilities, results of such surveys are biased and do not represent the basic needs of the whole population. Basic needs are better addressed through household-based surveys, using the same techniques as those used for the initial rapid survey.

### 3.6.5  Nutrition

Data from paediatric centres or malnutrition clinics are important in monitoring the performance of health-centre-based programmes, but they do not represent the nutritional status of the whole population affected by the emergency. As with basic needs, malnutrition should be assessed at household level if relevant community-based actions have to be planned.
3.6.6 Programme activities, including routine vaccination

Monitoring activities at all levels of the health system set up in emergencies is an integral part of surveillance. Typical activities to be registered include: number of vaccinations, number of consultations, number of admissions, and number of children in supplementary or therapeutic feeding programmes.

3.6.7 Post-emergency phase

As the emergency evolves from the acute to a more chronic phase, the minimal surveillance system initially put in place has to expand. Useful adaptations can include:

- more detailed data: indices by sex, high risk groups,
- better quality of data,
- updating denominators,
- capturing more events (e.g. reproductive health, child health, HIV; tuberculosis, sexually transmitted infections).

3.7 Data sources for routine surveillance

The six categories of data are collected from the sources given in Table 3.5.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>Health facilities, home visitors, grave-watchers, numbers of shrouds issued, community leaders</td>
</tr>
<tr>
<td>Morbidity</td>
<td>Health facilities, home visitors</td>
</tr>
<tr>
<td>Demography</td>
<td>Local health and administrative services, other agencies</td>
</tr>
<tr>
<td>Basic needs</td>
<td>Agencies involved in water/sanitation, food distribution</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Nutritional surveys, food distribution agencies</td>
</tr>
<tr>
<td>Programme activities, including vaccination</td>
<td>Health facilities, EPI programme</td>
</tr>
</tbody>
</table>

The main sources of data for routine surveillance are clinic registers used for day-to-day activity in health facilities. Recording the number and causes of death in an emergency can be difficult, as many deaths may take place outside the health facility. Home visitors can play an important role in collecting information on numbers and causes of deaths, using a “verbal autopsy” method with the family of the deceased person.
Data on demography and basic needs will usually be available from specialized agencies, such as UNHCR and nongovernmental organizations providing rehabilitation of water and sanitation facilities.

A standard form should be developed for clinical workers to compile the data at the end of each week (sample weekly morbidity and mortality forms are provided in Annex 4). These forms should be simple, and clear, have enough space to write information clearly and ask only for information that will be used. The minimum data needed for each health event/disease under routine surveillance include:

• case-based data for reporting and investigation: name, date of birth (or age, approximate if necessary if date of birth is not known), camp district/area, date of onset, treatment given (Yes/No) and outcome; this is not necessary for all events and often a tally may suffice as, in a major emergency, health personnel will not have the time to record case-based information;

• aggregated data for reporting: number of cases (less than 5 years old, 5 years old and over) and number of deaths.

Outbreak alert forms should also be available for clinical workers for immediate reporting of a disease of epidemic potential (Annex 6).

It is important in filling out the forms that clinical workers:

• record the exit diagnosis (based on agreed case definitions);

• avoid double counting – if a patient comes to the health centre for a follow-up visit for the same condition, he/she should be counted only once;

• only count those cases diagnosed by a professional health worker, unless well motivated community workers trained in specific programme areas can be identified as reliable sources of information (e.g. for the poliomyelitis eradication programme).

The system should include **zero reporting.** Each site should report for each reporting period, even if it means reporting zero cases. This avoids the confusion of equating “no report” with “no cases.”

Sources of mortality, morbidity and demographic data are given in Tables 3.6–3.8.
### Table 3.6 Sources of mortality data

<table>
<thead>
<tr>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health facilities</strong></td>
</tr>
<tr>
<td>Hospital/health facility death records - inpatient registers/outpatient registers</td>
</tr>
<tr>
<td><strong>Home visitors/community workers</strong></td>
</tr>
<tr>
<td>Grave-watchers trained to provide 24-hour coverage on a designated single burial site and report on the daily number of burials</td>
</tr>
<tr>
<td>Home visitors trained to use the verbal autopsy method for expected causes of death with standard forms</td>
</tr>
<tr>
<td>Religious/community leaders</td>
</tr>
<tr>
<td>Community workers trained to report deaths for a defined section of the population, e.g. 50 families</td>
</tr>
<tr>
<td><strong>Other agencies</strong></td>
</tr>
<tr>
<td>Records of organizations responsible for burial</td>
</tr>
<tr>
<td>Agencies distributing shrouds free of charge to families of the deceased to encourage reporting of deaths</td>
</tr>
</tbody>
</table>

### Table 3.7 Sources of morbidity data

<table>
<thead>
<tr>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health care facility records</strong></td>
</tr>
<tr>
<td>Health care facility records: outpatient department (OPD) and inpatient department (IPD) registers and records in camp clinics, hospitals, feeding centres and local communities</td>
</tr>
<tr>
<td>Health workers and midwives within the displaced population</td>
</tr>
</tbody>
</table>

### Table 3.8 Sources of demographic data

<table>
<thead>
<tr>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Registration records maintained by camp administrators, local government officials, United Nations agencies, religious leaders, etc.</strong></td>
</tr>
<tr>
<td><strong>Mapping</strong></td>
</tr>
<tr>
<td>Aerial photographs or global positioning systems</td>
</tr>
<tr>
<td><strong>Census data</strong></td>
</tr>
<tr>
<td>Interviews with community leaders among the displaced population</td>
</tr>
<tr>
<td><strong>Cross-sectional surveys</strong></td>
</tr>
</tbody>
</table>

### 3.8 Identifying tasks and responsible persons

The surveillance team must include a health coordinator, clinical workers, community workers, a water and sanitation specialist and representatives of local authorities. The health coordinator is usually the team leader. The team should meet at least daily in the acute phase of the emergency and weekly or monthly when the situation stabilizes.

One of the most important requirements for a good surveillance system is a network of motivated clinical workers trained in case detection and reporting.
These clinical workers will have many other duties, primarily the clinical care of patients. It is essential from the beginning that these workers appreciate the importance of surveillance in the control of communicable diseases. The data collected must be simple and relevant. Constant feedback is necessary to maintain motivation.

One clinical worker in each health facility should be assigned the task of data collection and reporting, and if necessary be given on-site training. One person, normally assigned by the Ministry of Health, should be responsible for: (a) liaison with United Nations agencies and nongovernmental organizations, to collect data and report to the Ministry of Health, (b) analysing data from health facilities and (c) providing feedback. Each member of the surveillance team must have specified tasks to be completed within a defined time period.

**Figure 3.2  Information flow for communicable disease surveillance in emergencies**

### 3.8.1 Health workers

This is the first contact that a sick person has with the health services. Reporting of data is only one of many tasks for the clinical worker at this level. Data must be simple and the number of items should be limited. Standard case definitions should be distributed and used for the diseases or syndromes under surveillance. Recording should be in line with clinical record-keeping practices. Tally sheets are very useful for this purpose. Suspected cases rather than confirmed cases should be reported. Zero reporting (when there are no cases) is also essential. Immediate reporting of an epidemic disease should be followed by an immediate response according to preset standard procedures.
In many emergency situations, there are **community workers** available for active case-finding, who can provide home treatment for mild cases and refer moderate or severe cases in a designated geographical area. These people, if trained, can increase the quality and completeness of the surveillance system. **Community key informants** may be used to collect birth, death and migration information.

### 3.8.2 Health coordinator

At this level, data are collected from the health facilities (according to pre-arranged timing), usually under the responsibility of the health coordinator of the district or agency. Distribution of forms and guidelines must be ensured by the health coordinator. The function of this level is the ongoing analysis of data in order to recognize outbreaks or changes in disease trends. Simple procedures should lead to an appropriate response such as investigation of suspected outbreaks. Organization for shipment and laboratory confirmation of samples from selected cases should be conducted at this level. Feedback of data to clinical workers is essential. Data should be reported to the Ministry of Health.

### 3.8.3 Ministry of health/agency coordinators

Data at this level should feed into the national surveillance system of the host country. The data can also be used for advocacy, fundraising, donor reports, programme reviews and overall evaluation of the effectiveness of health care interventions.

The tasks of the various health workers at key steps in surveillance are summarized in Table 3.9.

<table>
<thead>
<tr>
<th>Health worker</th>
<th>Detection</th>
<th>Reporting</th>
<th>Investigation</th>
<th>Analysis</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Laboratory</td>
<td>Epidemiology</td>
<td>Control</td>
</tr>
<tr>
<td>Clinical worker</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Health coordinator</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Ministry of Health/agency coordinators</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
3.9 Analysis and interpretation of surveillance data

Data analysis must be done at the field level by the health coordinator. In the initial stages of an emergency, the most important data elements to be analysed are the number of deaths and the number of victims of an emergency. Using these data, the crude mortality rate should be monitored daily during the acute phase. As those under 5 years of age are at higher risk of death in an emergency situation, mortality rate in this age group should also be calculated. If population data for the under-five age group are not available, an estimate of 17% of the total population may be used. For the under-fives, the cut-off value is more than 2/10 000 per day. The cut-off values for mortality in an emergency situation are shown in Table 3.10.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Crude mortality rate (deaths/10 000 population per day)</th>
<th>Under-five crude mortality rate (deaths/10 000 under-fives per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0.3–1.0</td>
<td>0.6–2.0</td>
</tr>
<tr>
<td>Alert</td>
<td>&gt; 1.0</td>
<td>&gt; 2.0</td>
</tr>
<tr>
<td>Severe</td>
<td>&gt; 2.0</td>
<td>&gt; 4.0</td>
</tr>
</tbody>
</table>

For endemic diseases, morbidity trends over time are analysed by calculating incidence rates per 1000 population. For epidemic-prone diseases, particularly those for which one confirmed case constitutes an outbreak (e.g. cholera), absolute numbers of cases and attack rates must be analysed by place and person, i.e. location within the area and under 5, 5 and over, age groups. This information should be presented in a weekly report by the health coordinator in the emergency phase and then in a monthly report once the situation stabilizes. Simple summary tables, graphs and maps should be used as much as possible so that the information is readily understandable.
3.10 Feedback

3.10.1 Why feedback data?

Feedback is needed to:

• motivate clinical workers and give them an incentive to report data;
• inform health centre/clinical workers about the main health problems locally and at other health centres;
• provide examples of control measures: yellow fever vaccination, clean water, isolation, distribution of oral rehydration salts, new defecation field;
• feed forward to effect policy change.

One way to provide feedback of surveillance data is in a monthly epidemiological review (during an emergency, a weekly review is often required), which is a one-page summary of the major disease problems over the past month.

3.10.2 Performance indicators for the evaluation of a surveillance system

Reporting

Indicators of reporting are:

• zero reporting (see Section 3.6);
• timeliness:
  – percentage of weekly reports received within 48 hours of end of reporting period,
  – percentage of cases of epidemic prone diseases reported within 48 hours of onset of illness,
  – percentage of cases investigated within 48 hours of reporting of alert;
• completeness.

Laboratory efficiency

Indicators of laboratory efficiency may include, for example:

• the number of cholera cases for which samples were confirmed by the laboratory;
• the number of malaria cases confirmed by blood smear.

Investigation efficiency

Indicators of efficiency are periods/delays between:

• date of onset of the first case;
• date of reporting using outbreak alert form;
• date of investigation;
• date of response.
3.10.3 Further reading
