

# PUBLIC HEALTH ACTION IN EMERGENCIES CAUSED BY EPIDEMICS

Prepared by P. Brès



World Health Organization, Geneva



# **Public Health Action in Emergencies Caused by Epidemics**

## **A practical guide**

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*Control of communicable diseases in man*, edited by A. S. Benenson and published by the American Public Health Association, has proved to be a most reliable source of information on many diseases and particularly on diagnosis, epidemiological features, and control measures.

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# 1. Introduction

The number of outbreaks of communicable disease has been increasing in recent years. There may be several reasons for this: the increased rapidity of national and international travel and the greater distances travelled; extensive deforestation and irrigation works; neglect of insect and rodent vector control programmes; explosive urbanization and overcrowding associated with poor sanitary conditions; more frequent opportunities for collective gatherings resulting, for example, from improvements in public transport; frequent movements of populations and refugees; social or recreational events; tourism; and large-scale industrial food processing. Some of the increase, however, may be apparent rather than real, since better medical and epidemiological coverage in developing countries has improved the surveillance of these diseases, and outbreaks are now reported that would formerly have gone unnoticed. These reasons may also explain why a disease formerly considered as only occurring sporadically is now endemic or epidemic, although the possibility of changes in pathogenicity or virulence must not be overlooked.

At its foundation in 1948, the World Health Organization was given a mandate by its Member States to help countries facing outbreaks of communicable diseases when they cause problems too great to be dealt with by national resources alone or represent a risk to international health. WHO staff have intervened in epidemics on many occasions and have thereby acquired a great deal of experience based on field operations. An informal consultation on strategies for the control of emergencies caused by epidemics of communicable diseases was convened in Geneva in November 1981. Public health experts from a number of countries exchanged experiences and made recommendations for future WHO activities in this field. They also suggested that WHO should prepare a technical guide to serve as a quick reference on practical measures for public health officers facing an outbreak of a communicable disease, for use primarily under field conditions, in developing countries.

A number of difficulties were encountered in attempting to prepare such a guide, the first being that of defining when an epidemic disease could be considered as constituting an emergency for the public health service, i.e., an "epidemic emergency situation". A definition has been worked out that takes the epidemiological context into account and covers cases when the incubation period of the disease is too long for it to cause panic among the population.

The selection of diseases that can cause epidemics also gave rise to difficulty. Some diseases, such as influenza, are well known to cause epidemics in all countries. Other diseases are usually sporadic or endemic but may be able to cause an epidemic in unusual situations, say, in a refugee camp or among a group of tourists, e.g., schistosomiasis or Legionnaires' disease. The increasing frequency of travel and population movements has meant that certain tropical diseases have occurred in temperate regions as imported cases of "exotic" diseases. It is also obvious that an epidemic disease highly prevalent in one part of the world may be rare or absent elsewhere. A decision—perhaps a somewhat arbitrary one—was therefore taken to try and make the coverage as complete as was reasonably possible in order to facilitate differential diagnosis under unusual circumstances, so that certain diseases have been included although they are unlikely to cause emergencies. In contrast, although they may cause epidemics, sexually transmitted diseases have not been included as they do not give rise to emergencies as defined in this guide.

A competent epidemiologist should have an adequate knowledge of other relevant specialities: pathology, microbiology, entomology, veterinary health, and sanitary engineering. It was therefore thought necessary to include some of this diverse background information, but it has been kept within reasonable bounds and limited to what is needed by a reader who is not necessarily a specialist in these disciplines.

References to the many valuable specialized books that might be consulted have been limited, since a sudden outbreak of a communicable disease is not likely to leave much time free for visiting libraries. Where it was felt that further reading could be recommended, preference (purely arbitrary) has been given to widely available WHO documents.

As this guide is intended for practical use, an attempt has been made to arrange the text in the order of the steps that should be taken in an emergency: organizing the emergency health service, following proven procedures for field investigations, analysing methodically the results of investigations, implementing the appropriate control measures and evaluating them. For the reader's convenience in an emergency situation, additional practical information is given in the annexes. Reference should also be made to DUNSMORE, D. J., *Safety measures for use in outbreaks of communicable disease*, published by the World Health Organization.

Many diseases are known under several different names. The guide follows the *International nomenclature of diseases*, published jointly by the Council for International Organizations of Medical Science (CIOMS) and the World Health Organization, for those diseases covered so far, namely diseases of the lower respiratory tract, mycoses, bacterial diseases, and viral diseases. Other common synonyms have been included as appropriate.

## 2. Explanation of terms and general lines of action

### 2.1 Explanation of the terms “epidemic” and “emergency”<sup>1</sup>

An *epidemic* of an infectious or parasitic disease is the occurrence of a number of cases of a disease, known or suspected to be of infectious or parasitic origin, that is unusually large or unexpected for the given place and time. An epidemic often evolves rapidly, so that a quick response is required.

A *threatened (or potential) epidemic* is said to exist when the circumstances are such that the epidemic occurrence of a specific disease may reasonably be anticipated; this requires (a) a susceptible human population; (b) the presence or impending introduction of a disease agent; and (c) the presence of a mechanism such that large-scale transmission is possible (e.g., a contaminated water supply, or a vector population).

An *emergency* can be defined only within the context of the social, political and epidemiological circumstances in which it occurs, since such circumstances significantly affect the urgency of the problem, the action that has to be taken and the need for external cooperation.

The characteristic features of an emergency caused by an epidemic or threatened epidemic therefore include the following, although not all need be present and judgement must be exercised in assessing their importance:

- (a) there is a risk of introduction and spread of the disease in the population;
- (b) a “large” number of cases may reasonably be expected to occur;
- (c) the disease involved is of such severity as to lead to serious disability or death;
- (d) there is a risk of social and/or economic disruption resulting from the presence of the disease;
- (e) the national authorities are unable to cope adequately with the situation because of a lack or insufficiency of:
  - technical or professional personnel;
  - organizational experience;

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<sup>1</sup> For explanation of other terms used in this guide, see Annex 1.

- necessary supplies or equipment (drugs, vaccines, laboratory diagnostic materials, vector control materials, etc.);  
 (f) there is a danger of international transmission.

The types of situation that may come within the category of "emergencies" will differ from country to country, depending on two local factors: (a) the pre-existing state of endemicity; and (b) the presence or absence of a means of transmitting the agent. The examples given in Table 1, for non-endemic and endemic areas, serve to illustrate what may be described as epidemic emergencies for the particular diseases listed.

Epidemic emergencies usually result in human and economic losses, and political difficulties. It is the responsibility of the health services to control or preferably to prevent such situations by the organization of an emergency health service. The general lines of action aimed at achieving this objective are described below and are further discussed in subsequent chapters of the guide.

Table 1. Examples of emergencies related to epidemics or potential epidemics

Disease	In non-endemic areas	In endemic areas
Cholera	One confirmed indigenous case	"Significant" increase in incidence over and above what is normal for the season, particularly if multifocal and accompanied by deaths in children less than 10 years old
Giardiasis	A cluster of cases in a group of tourists returning from an endemic area	A discrete increase in incidence linked to a specific place
Malaria	A cluster of cases, with an increase in incidence in a "defined geographical area"	Rarely an emergency; increased incidence requires programme strengthening
Meningococcal meningitis	An incidence rate of 1 per 1000 in one week in a "defined geographical area" is ominous; the same rate for two consecutive weeks is an emergency	
Plague	One confirmed case	(a) A cluster of cases apparently linked by domestic rodent or respiratory transmission; or (b) a rodent epizootic
Rabies	One confirmed case of animal rabies in a previously rabies-free country	"Significant" increase in animal and human cases
Salmonellosis	A large cluster of cases in a limited area, with a single or pre-dominant serotype, or a "significant" number of cases occurring in multiple foci apparently related by a common source (not forgetting that several countries may be involved)	

Table 1 (continued)

Disease	In non-endemic areas	In endemic areas
Smallpox*	Any strongly suspected case	Not applicable
Typhus fever due to <i>Rickettsia prowazekii</i>	One confirmed case in a louse-infested, non-immune population	"Significant" increase in the number of cases in a "limited" period of time
Viral encephalitis, mosquito-borne	Cluster of time- and space-related cases in a non-immune population (a single case should be regarded as a warning)	"Significant" increase in the number of cases with a single identified etiological agent, in a "limited" period of time
Viral haemorrhagic fever	One confirmed indigenous or imported case with an etiological agent with which person-to-person transmission may occur	"Significant" increase in the number of cases with a single identified etiological agent, in a "limited" period of time
Yellow fever	One confirmed case in a community with a non-immune human population and an "adequate" vector population	"Significant" increase in the number of cases in a "limited" period of time

\* The WHO smallpox eradication campaign succeeded in eliminating the disease in 1980; vigilant surveillance of pox-like diseases (e.g., varicella, monkeypox) is maintained during the post-eradication era.

## 2.2 General lines of action

When an epidemic occurs, the resulting panic among the population and pressures of various kinds leave no time for reflecting on the soundness of the actions necessary to control the situation. Success in dealing with an epidemic therefore depends largely on the state of preparedness achieved in advance of any action. The basic initial step is to institutionalize an emergency health service headed by a coordinator responsible for preparing contingency plans in which all available and necessary resources in different situations are identified. Such plans should be approved by the other public services. Another important step is the establishment of an early warning system to detect any unusual incidence of a communicable disease that could cause an emergency situation. These initial tasks and actions are indicated in Table 2.

An analytical procedure should be followed in investigating epidemics, just as in diagnosing a disease (see also Annex 2). Various sources of information may originate the initial alert, apart from the early warning system, but are not always reliable. The first step is therefore to confirm that an epidemic, or the threat of an epidemic, as defined above, does actually exist. It would be an error to consider as

Table 2. General lines of action

Stage	Action to be taken
Preparedness	<ol style="list-style-type: none"> <li>1. Constitution of an emergency health service</li> <li>2. Elaboration of contingency planning</li> <li>3. Establishment of an early warning system</li> </ol>
Intervention	<ol style="list-style-type: none"> <li>1. Rapid assessment of reality of epidemic</li> <li>2. Formulation of provisional hypotheses as to its origin</li> <li>3. Organization of field investigations</li> <li>4. Analysis of data and determination of causes</li> <li>5. Implementation of control measures</li> <li>6. Final evaluation</li> </ol>

an epidemic a hitherto unrecognized endemic situation or a mere seasonal increase in the incidence of a disease. It would also be an error to neglect the significance of a single case of a "new" disease in a country, which might well be the prelude to a further dramatic spread. The first data confirming the reality of the epidemic will lead to provisional hypotheses as to the nature of the disease<sup>1</sup> and its epidemiological pattern, which in turn will help to guide thorough field investigations. The objectives are defined, and the most appropriate technique is selected to find cases corresponding to the disease definition (or "case definition") that has been drawn up, at least provisionally to begin with. Observed cases are then located and listed as suspect, presumptive or confirmed, depending on the results of rapid laboratory tests. The analysis of the data collected by the field investigation teams makes it possible to determine the extent of the outbreak in time and place. The incidence of cases in different groups of the population is expressed in terms of the rates defined in Annex 1. The geographical spread of the disease is mapped out. Information on contacts enables the transmission characteristics to be determined and high risk groups identified; they should be placed under close surveillance and protected from the disease.

Although the approach to the understanding of an outbreak should be a systematic one and general advice is given later in this guide, experience shows that each epidemic is different from all the others; this is what, at the same time, causes it to spread among the population and makes it both difficult and interesting for the epidemiologist. This is where the "epidemiological sixth sense", which can be acquired only by personal experience, is so valuable. Above all, an open mind free from any preconceived ideas and a refusal to jump to hasty conclusions are the best safeguards in reaching the correct conclusion.

<sup>1</sup> Brief descriptions of diseases that can cause epidemics are given in Annex 3.



### **3. Organization of an emergency health service**

Adequate structures must be established in advance so that a quick response can be made to an epidemic or the threat of an epidemic. The organization of an emergency health service (EHS) should therefore be considered by the health authorities as an integral part of communicable disease prevention and control. Two key steps to be taken to ensure that the EHS will be able to cope rapidly with an outbreak are contingency planning for interventions and the setting up of an early warning system for the detection of epidemics or threatened epidemics. Training and periodic refresher courses are also an integral part in ensuring the necessary preparedness of responsible personnel.

#### **3.1 Structure of an emergency health service**

The ultimate responsibility for planning and coordinating emergency operations must rest with a single individual in the health service, identified by title, e.g., the emergency health service coordinator. The EHS coordinator should have the support of an EHS advisory committee, which is indispensable as a permanent source of expertise and a channel for action.

##### ***3.1.1 Role of the emergency health service coordinator***

The coordinator appointed should be a person of recognized competence and his authority and responsibilities should be clearly defined. He should be either a senior medical officer responsible for the epidemiology service in the ministry of health, or an epidemiologist trained in the newly emerging speciality of disaster preparedness, and should delegate responsibility to appropriate subordinates within the national administrative structure. His field of competence should cover as much as possible of the following:

- (a) epidemiology, including statistical methods;
- (b) community medicine;
- (c) tropical pathology and epidemiology;
- (d) relevant aspects of microbiology and clinical laboratory diagnosis;
- (e) the entomology and mammalogy of current reservoirs and vectors;