

2834 ✓

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR EUROPE



ORGANISATION MONDIALE DE LA SANTÉ
BUREAU RÉGIONAL DE L'EUROPE

WELTGESUNDHEITSORGANISATION
REGIONALBÜRO FÜR EUROPA

ВСЕМИРНАЯ ОРГАНИЗАЦИЯ ЗДРАВООХРАЩЕНИЯ
ЕВРОПЕЙСКОЕ РЕГИОНАЛЬНОЕ БЮРО



Disaster Planning - 1000

PREPAREDNESS IN FACING HEALTH PROBLEMS FROM
NATURAL DISASTER EMERGENCY SITUATIONS

Report on a WHO Workshop

Rabat
22-25 November 1981

ICP/ERO 001
0314D
ORIGINAL: FRENCH

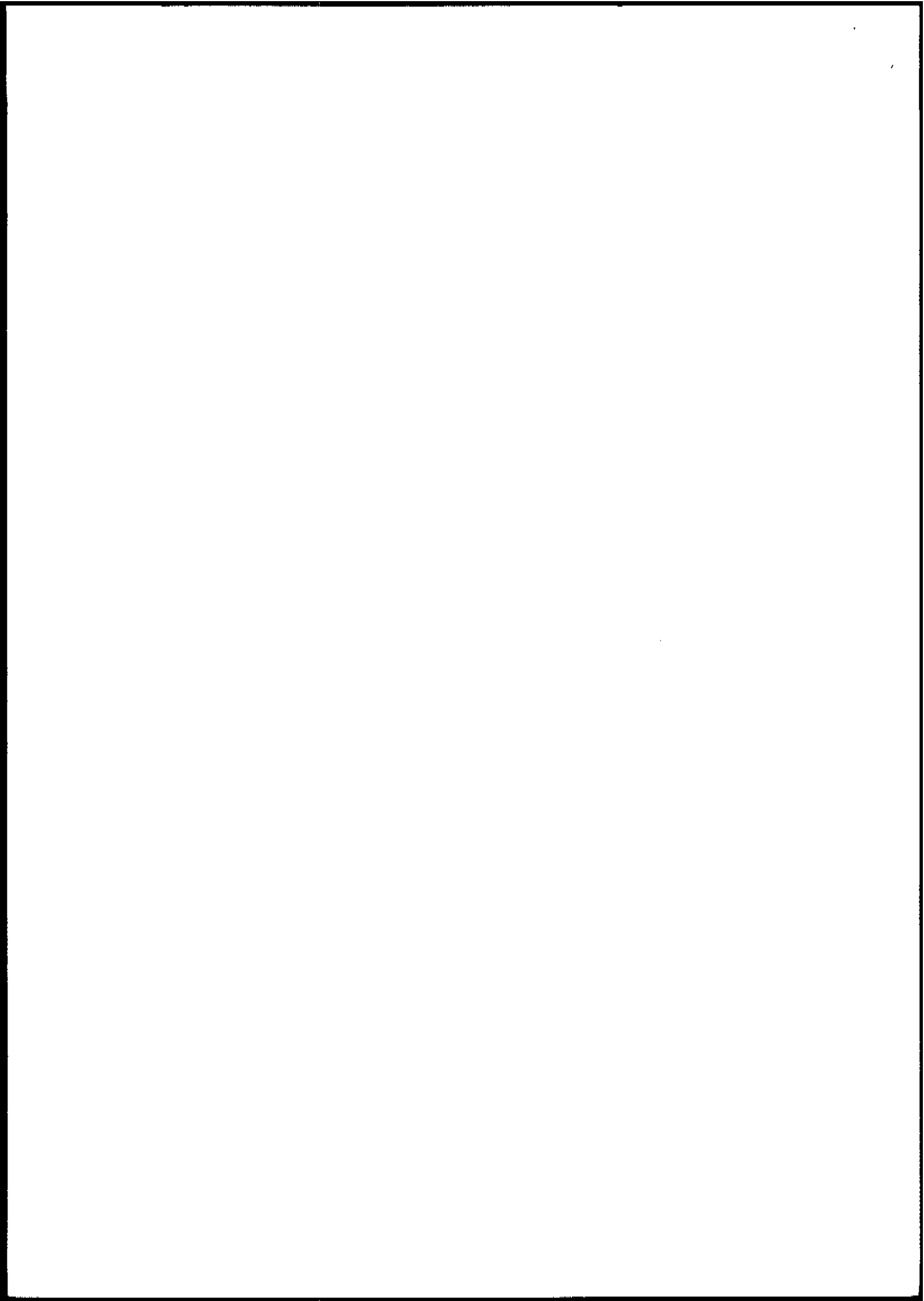
1982

Note

The issue of this document does not constitute formal publication. It should not be reviewed, abstracted or quoted without the agreement of the World Health Organization. Authors alone are responsible for views expressed in signed articles.

CONTENTS

	<u>Page</u>
1. Introduction	1
2. Scope and purpose	1
3. Method of work	5
4. Key requirements in relation to earthquakes	6
4.1 Legislation on disaster relief	6
4.2 Forward planning	6
4.3 Responsibilities of the health authorities	6
4.4 Mobilization of local resources	7
4.5 Hospital planning	8
4.6 Support areas	8
4.7 Inventory of resources	9
4.8 Advance information on potential needs and risks	9
4.9 Rapid assessment of needs and resources	9
4.10 Epidemiological surveillance	10
4.11 Veterinary surveillance	10
4.12 International aid	11
4.13 Volunteers	11
5. Conclusions and recommendations	12
Annex 1 Resolution WHA34.26 of the World Health Assembly (22 May 1981)	15
Annex 2 List of participants	16



1. Introduction

The Regional Office for Europe of the World Health Organization, in collaboration with the Government of Morocco and with financial support from the Commission of the European Communities, organized a Workshop for Preparedness in Facing Health Problems from Natural Disaster Emergency Situations, in Rabat from 22 to 25 November 1981. The meeting was convened in response to the continuing concern of governments of Mediterranean countries regarding the health consequences of natural disasters, especially earthquakes, and was in line with the approaches advocated by resolution WHA34.26 of the Thirty-fourth World Health Assembly on promotion of the prevention of adverse health effects of disasters and emergencies through preparedness (Annex 1) and WHO's efforts in this field.

Representatives of 11 Mediterranean countries (Albania, Algeria, France, Greece, Italy, Lebanon, Morocco, Portugal, Syria, Tunisia and Yugoslavia), other United Nations agencies (UNDRO, UNDP), the Commission of the European Communities and the League of Red Cross Societies took part in the meeting, with technical support provided by the Disaster Epidemiology Research Centre in Louvain (WHO collaborating centre), 7 temporary advisers and staff of WHO headquarters and the Regional Office. The group included specialists in health and other sectors working in national and international organizations, and having first-hand knowledge of earthquakes that have occurred in Mediterranean countries over the last 10 years (see Annex 2 for list of participants).

Dr Rahal Rahhali, Minister of Public Health of Morocco, welcomed the participants. He stressed the importance of earthquakes in countries of the Region, their very serious health consequences and the need for preparedness at both the local and the national levels.

Dr Leo A. Kaprio, WHO Regional Director for Europe, was represented by Dr C. Guttuso, and Dr H. Mahler, WHO Director-General, by Dr S.W.A. Gunn. Dr Guttuso thanked the Government of Morocco for its warm welcome, which was a mark of the interest it took in the urgent problems that were to be discussed. It was encouraging to observe how enthusiastically the Member States, like the international organizations, had taken up the invitation to attend the Workshop. That willingness could be attributed to the new awareness on all sides that the time had come to exchange experiences and draw lessons from the past in a domain that would be of crucial importance in the Mediterranean region, which over the years had been dramatically and repeatedly struck by natural disasters, especially earthquakes. The Member States and some international organizations were attempting to develop more effective mechanisms for responding immediately to requests for help.

Professor M.T. Alaoui was elected as Chairman, Professor L. Giannico as Vice Chairman and Professor M.F. Lechat as Rapporteur. Dr C. Guttuso acted as Secretary and Dr S.W.A. Gunn as representative of WHO.

2. Scope and purpose

Natural disasters have from time immemorial been an indissociable part of the human ecology. A disaster may be defined as an upheaval in the human ecology, with which the stricken community is unable to cope using its own resources.

A distinction must be made between natural disasters and those caused by man. Table 1 shows the broad categories of disasters.

Table 1. Natural disasters and disasters caused by man

<u>Natural disasters</u>	<u>Disasters caused by man</u>
Volcanic eruptions	Air disasters
Typhoons	Technological disasters
Tornadoes	Mining accidents
Hurricanes	Fires
Earthquakes	Collapse of dykes
Tidal waves (tsunami)	Large-scale poisonings
Avalanches	
Landslides	
Floods	
Droughts	

Such disasters pose a major public health problem for three reasons: they are an important cause of mortality and morbidity, i.e. they exact a heavy toll of victims through death, injury, disability and disease; they place a burden on medical resources, and generally necessitate large-scale health measures; they may sometimes destroy the health infrastructure or render it unusable, thereby cancelling out several years of efforts in the health field.

Large-scale disaster relief measures should be viewed in a much broader perspective than that of immediate or medium-term aid. They should form a continuum ranging from prevention before the disaster to alleviation of its impact and long-term rehabilitation. For instance, one of the most effective ways of reducing the number of people killed and injured by earthquakes is to alter certain building techniques.

Long-term rehabilitation in disaster areas frequently depends on the immediate relief measures taken. Some countries have learned to their cost that it is on the type of shelter provided in the first few hours or days following an earthquake that the future recovery of an area, rehousing of its population and the pattern of future settlement depend. Long-term rehabilitation must start immediately after the disaster.

For about 10 years now, different authorities responsible for disaster relief in one capacity or another have shown increasing concern to improve the effectiveness of their action. In particular, efforts have focused on the two areas of coordination and preparedness.

Coordination appears to be improving steadily in respect of administration as well as logistics.

Structures have been established through the United Nations (Office of the Disaster Relief Coordinator, in Geneva) and through nongovernmental relief agencies (International Council of Voluntary Agencies, also in Geneva) in order to centralize and disseminate information concerning requests for aid and its provision.

Earthquakes are of particular concern in the Mediterranean basin where, over the last 20 years, they have been the cause of tens of thousands being killed, even larger numbers being injured and hundreds of thousands being made homeless (Table 2). In view of the seismic potential of the area, it may be expected that other equally destructive earthquakes will occur again (Fig. 1).

We cannot at present predict in the long or medium term the exact time when an earthquake will take place, except with a considerable margin of uncertainty; however, using geophysical data it is possible to map the earthquake zones and to assign increasingly accurate coefficients of risk to different regions. Preparedness is therefore both feasible and necessary, and it is essential that the health authorities in the countries concerned, as well as the other authorities, should be fully aware of the position.

Although efforts have been made at the scientific level to determine the causes and nature of geophysical phenomena such as earthquakes and volcanic eruptions, far less attention has been paid from the sociological and medical standpoints to preparing countries to deal with the emergency situations that regularly arise.

Although in recent years tremendous progress has been made in international cooperation aimed at alleviating the damage caused by natural disasters, the advances have been due mainly to the widespread acceptance of humanitarian principles and the possibility of bringing relief to disaster areas by air and sea. Experience has, however, shown that in practice relief tends to reach the population several days or even weeks after the actual event. Consequently, in most emergencies, the immediate measures have been improvised and inadequate.

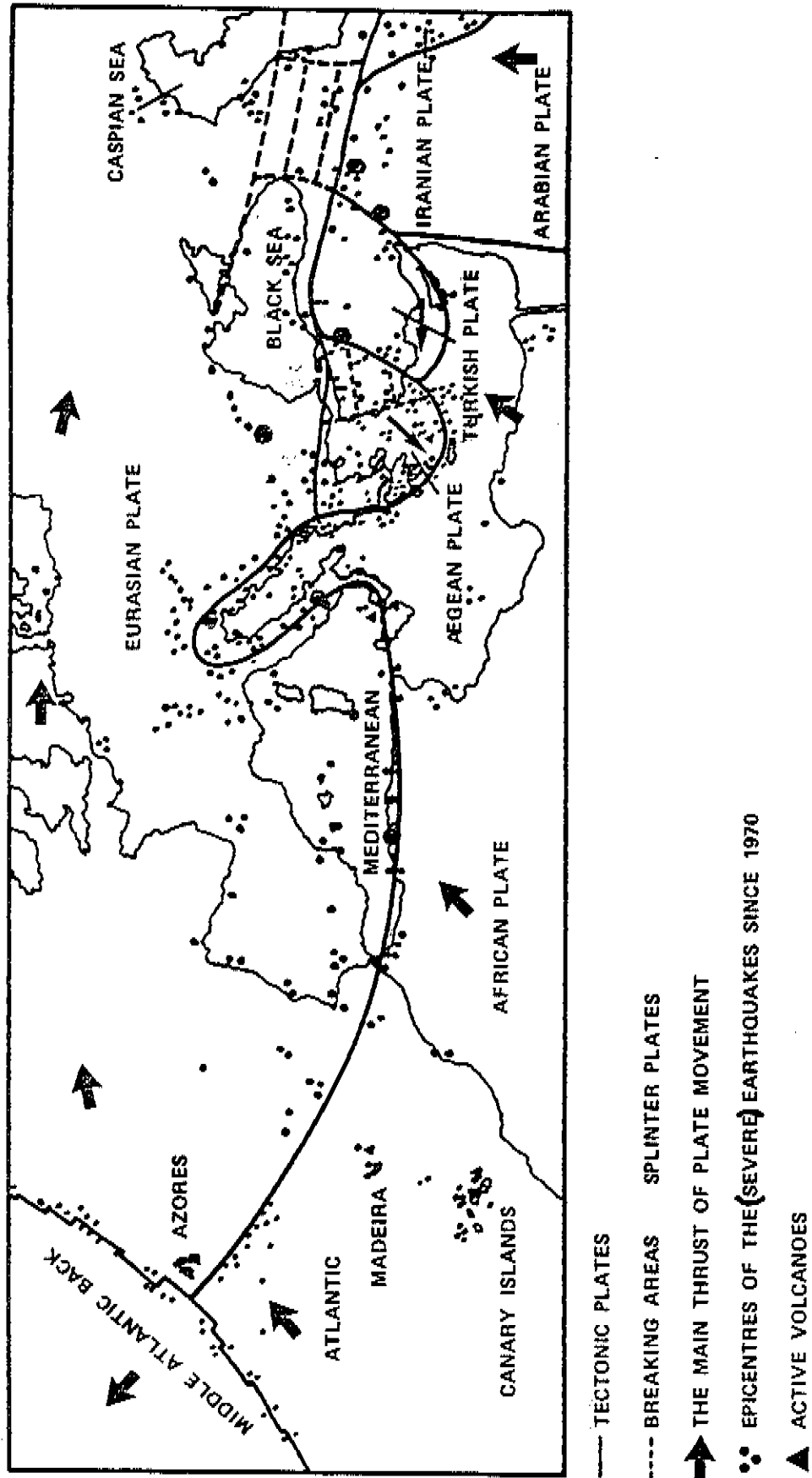
Recent disasters in some Mediterranean countries have shown that during the first few hours, only the national relief operations proved effective. This implies that countries at risk must not only map their seismic areas, but also draw up plans enabling them to cope with natural disasters on their own. This applies as much to the health as to the other sectors.

Preparedness has been recognized as a key factor in dealing with natural disasters. Since the effectiveness of relief depends on the availability of the necessary resources as well as information to take appropriate action, it is important to build up stocks in strategic locations and to prepare lists of staff who can be mobilized without delay. Suitable transportation must be available immediately. Information must also be obtained in advance concerning the equipment and supplies that can be called upon, the probable needs, the existing facilities in the area, and the logistic conditions for dispatch and deployment of the relief.

Table 2. Natural disasters occurring in Europe and elsewhere
in the world during the twentieth century

Year	Disaster	Place	Deaths	Year	Disaster	Place	Deaths
1903	Earthquake	Messina	>100 000	1906	Earthquake	San Francisco	600
1912	Earthquake	Turkey	3 000	1907	Earthquake	Kingston (Jamaica)	1 400
1915	Earthquake	Arezzano (Italy)	30 000	1908	Flood	Yangtze-Kiang (China)	100 000
1930	Earthquake	Naples (Italy)	2 000	1920	Earthquake	Mansu (China)	100 000
1939	Earthquake	Turkey	33 000	1923	Earthquake	Tokyo (Japan)	>20 000
1959	Earthquake	Algeria	1 500		and fire		41 000
1960	Earthquake	Agadir (Morocco)	12 000	1927	Earthquake	Narka (China)	200 000
1963	Earthquake	Skopje (Yugoslavia)	>1 000		and fire		
1966	Earthquake	Turkey	2 500	1931	Flood	Hoangho (China)	1 000 000
1970	Earthquake	Gediz (Turkey)	1 000	1932	Earthquake	Canton (China)	70 000
1971	Earthquake	Turkey	1 000	1935	Cyclone	India and Pakistan	60 000
1975	Earthquake	Lice (Turkey)	3-5 000	1939	Earthquake	Chile	40 000
1976	Earthquake	Friuli (Italy)	1 000	1939	Earthquake	Erxigan (Iran)	23 000
1976	Earthquake	Turkey	3 790	1939	Typhoon	Trentin (China)	200 000
1977	Earthquake	Bucarest (Romania)	1 570	1949	Earthquake	San Juan (Argentina)	10 000
1979	Earthquake	Montenegro (Yugoslavia)	91	1949	Earthquake	Equador	6 000
1980	Earthquake	El Asnam (Algeria)	10 000	1949	Flood	Guatemala	40 000
1980	Earthquake	Irpinia (Italy)	>3 000	1950	Earthquake	Assam (India)	26 000
				1951	Earthquake	El Salvador	6 000
				1953	Earthquake	Philippines	423
				1956	Earthquake	Afghanistan	2 000
				1957	Earthquake	Iran	25 000
				1959	Flood	China	2 000 000
				1960	Earthquake	Arequipa (Peru)	142
				1962	Earthquake	Iran	12 400
				1963	Earthquake	Libya	3 000
				1964	Earthquake	Indonesia (Harka)	131
				1964	Earthquake	Taiwan	100
				1968	Earthquake	Iran	11 588
				1970	Earthquake	Yungay-Chimbote (Peru)	70 000
				1970	Cyclone	East Pakistan	206 000
				1971	Earthquake	Los Angeles	?
				1972	Earthquake	Managua (Nicaragua)	6 000
				1974	Earthquake	Pakistan	5 300
				1975	Earthquake	China	655 000
				1976	Earthquake	Guatemala	22 778
				1978	Earthquake	Tabas (Iran)	15-20 000
				1978	Earthquake	Kerman (Iran)	25 000
				1981	Earthquake	Kerman area	1 000
				1981	Earthquake	Kerman	4-8 000
				1981	Earthquake	Golbaft (Iran)	2 000

Fig. 1. Movement of tectonic plates in the Mediterranean basin



The public health authorities should liaise both with other sectors and with members of the affected communities in order to analyse the problems that arise as well as any errors in the health measures taken after earthquakes. On this basis recommendations could then be made on how countries could deal on their own with health problems associated with natural disasters as well as recommendations for appropriate international cooperation in such situations.

The terms of reference for the Workshop were clear: it was to discuss the preparedness of countries to deal with health problems arising from emergency situations. In other words its purpose was to formulate a programme of preventive measures and decide what action should be taken immediately before and after a disaster in order to:

- (1) reduce the number of people killed or injured at the time, or who die as a result of their injuries;
- (2) make services for helping survivors more effective;
- (3) safeguard existing health facilities or enable them to be restored as soon as possible.

3. Method of work

In preparation for the Workshop, countries were requested to develop case studies on recent earthquakes, and examine a number of problems in the light of the following three hypotheses:

- greater participation by health professionals in planning emergency measures, with a view to ensuring coordination of the different measures, should significantly reduce the number of people injured or killed at the time or who die as a result of their injuries;
- by making better use of local resources, it should be possible to give immediate emergency aid while awaiting external relief;
- better information should improve the effectiveness of external relief.

The purpose of the case studies was to test the validity of the above hypotheses in the light of the experience of specialists who had personally assisted in dealing with health problems arising from recent earthquakes.

Case studies were presented from six Mediterranean countries (Albania, Algeria, Greece, Italy, Portugal, Yugoslavia) that have recently experienced earthquakes or are in earthquake zones.

Five working groups were set up to study the problems of disaster relief, taking into account the results of the case studies, as well as the experience of different people, namely:

- (a) people who were on the spot during an earthquake and were able to observe the reactions of the population during and after the event;
- (b) people who were not on the spot but who were responsible for emergency measures, e.g. provincial administrators serving the disaster area, who received the first requests for assistance or those in adjacent areas either not, or only slightly affected by the earthquake;
- (c) officials at the central level who were responsible for overall coordination of relief in the country and submission of requests for international aid, e.g. in ministries of health or offices of the Red Cross or Red Crescent;
- (d) people who came to the area immediately after the disaster with the relief teams, e.g. volunteers;
- (e) people responsible for international aid.

The groups endeavoured to draw up practical recommendations for:

- (a) improving the chances of survival of the population, i.e. reducing the number of people killed or seriously injured in natural disasters, including earthquakes;
- (b) making services for helping survivors more effective;
- (c) making preparations for health rehabilitation of the population.

4. Key requirements in relation to earthquakes

The group discussions showed considerable agreement concerning the key requirements for relief measures following earthquakes.

4.1 Legislation on disaster relief

It is the responsibility of the countries themselves to take appropriate action to alleviate the impact of natural disasters, especially the health consequences for the population. Such measures are not the responsibility of a particular ministry, but of the government as a whole.

Each country should have specific legislation on protection of the population in the event of a disaster and on emergency relief for the victims. It should stipulate the measures to be taken, the authorities responsible for them and the resources of all kinds to be made available to the authorities. It should provide for the designation of an authority that will assume overall responsibility for protection and emergency relief, and for the establishment of a national coordinating body to represent the different authorities that will carry out specific measures, including the health authorities. This structure should exist at each level of administration in the country.

4.2 Forward planning

Each responsible authority must plan appropriate measures to deal with disasters occurring in its area, within the overall framework of action laid down by the national coordinating body.

A national plan should be developed by combining the different sectoral plans, and it should specify the measures to be taken by the individual authorities, at each level.

The plan should state what measures are to be carried out at the different phases of disasters, namely preventive and preparatory measures prior to the event, emergency relief at the time and immediately afterwards, short- and medium-term measures, and long-term rehabilitation.

Sectoral plans must therefore be drawn up at national level concerning the action to be taken in areas at high risk of earthquakes; they should include provisions for twinning of facilities in adjacent areas, so those that are not seriously affected can serve as support zones for the provision of first aid.

Financial arrangements should be carefully worked out and clearly stipulated.

4.3 Responsibilities of the health authorities

At the national level, the health authorities have sole responsibility for immediate emergency relief. They should take all major decisions on health matters within the general framework of action laid down by the national coordinating body. Hence it is essential that they be closely involved in the formulation of emergency plans.

The health authorities have the initial responsibility for health care of the victims as soon as they can be reached. This responsibility encompasses first aid, evacuation of patients, hospitalization, rehabilitation of the disabled and long-term care. They are also responsible for preventive measures including environmental monitoring, epidemiological surveillance, communicable disease control, supervision of food and water supplies, and burial of the dead. Close coordination must also be established with the veterinary services.

For the exercise of these responsibilities the preventive and curative services require logistic support, and this should be planned in advance, in order to channel all the available resources, whether governmental or private, to meet the needs. Particular attention should be paid to staff training, the maintenance of an up-to-date inventory of resources, the establishment of emergency stocks that are rationally distributed and can be mobilized immediately, and the standardization of supplies and equipment.

If necessary the health authorities should make an assessment of the needs, risks and resources so as to be able to alert the responsible services at all levels and to request international aid, where applicable.

The health authorities should also be in a position to issue recommendations to nongovernmental bodies.

4.4 Mobilization of local resources

In the case of earthquakes, the only means of reducing the numbers of victims and the severity of injuries is to take immediate action in providing shelter, freeing people trapped by debris and giving first aid. External relief usually reaches the area too late to be effective, as has been demonstrated recently in a number of cases throughout the world.

On the fifth day following the earthquake in Guatemala in February 1976, outpatient attendances in dispensaries were back to normal, i.e. they were at the same level as they had been previously, suggesting that the emergency phase was over in less than a week.

In some recent earthquakes, emergency field hospitals have recorded occupancy rates of less than 10% after a few days of operation.

After the earthquake in Agadir (Morocco) in 1960, certain injuries such as fracture associated with crushing were much less common than might be expected, suggesting that the victims of multiple injuries died before they could be treated.

After the earthquake in Tangshan (China) in 1976, it was found that 99% of victims freed during the first half-hour survived, while the proportion fell to 81% after 24 hours, 37% after 48 hours and 7% after 4 days.

Studies by sociologists attest to the important role that can be played by the community itself in immediate emergency relief. In the half-hour following one earthquake in Japan, it was observed that 75% of survivors were already engaged in useful rescue work.

Recent experience of earthquakes in the Mediterranean basin has confirmed that it is only by using local resources that effective action can be taken during the first few hours.

The participants gave examples of problems that must be tackled immediately after the disaster or within the next few hours and days if the community is to survive:

- hospitalization of the injured immediately and of the seriously ill subsequently - which may be impeded by incapacitation of the local health facilities, the difficulty of establishing communication with hospitals in adjacent, unaffected areas, the destruction of roads and bridges, traffic congestion, and reduced availability of helicopters;
- collection and recording of data on the injured, the missing, the sick and persons refusing to be hospitalized;
- supply of drinking-water in a situation where containers are lacking; and supervision of natural water sources downstream from the population centres;
- burial of victims and identification of the dead, in a situation of lack of staff, reduced capacity of cemeteries, absence of burial rites and the psychological effect of this on the people;
- removal of stray dogs.

Broadly speaking, apart from medical treatment, the main problems faced during the first 24 hours are: housing and protection from the cold (blankets); supply of food and water; provision of health services to the population in makeshift facilities; veterinary health.

People living in areas at risk must therefore be clearly informed about what they should do to find shelter in the case of an earthquake, and the health staff at all levels must know what has to be done and be informed about their precise responsibilities beforehand.

At present there are certain shortcomings in this respect, and it would therefore be useful to prepare a guide clearly setting out the immediate action to be taken by the primary health services at the site of an earthquake. In countries at risk, training of all health staff should include instruction on first aid. Public education should be undertaken in conjunction with the health authorities.

It must, however, be admitted that we still know very little about what exactly occurs following a disaster such as an earthquake. What injuries prove fatal during the first few minutes or first few hours? What are the chances of victims' survival in relation to the time they are trapped by debris? How much time do the rescuers have to free victims? What can be done to

alleviate the impact of the disaster? What are the chances of survival and physical or functional rehabilitation depending upon the type of injury? What population groups are at special risk?

The local health staff cannot be given precise instructions unless the allocation of responsibilities has been decided in advance, i.e. what can or should be done by the community and what functions can be entrusted to external aid. To work out the allocation of responsibilities, a detailed epidemiological study must be made of the usual effects of an earthquake on the population. Information must be systematically collected, through retrospective studies of recent situations and, where possible, through longitudinal field studies prepared in advance and conducted at the time of the disaster. Simple and reliable epidemiological indicators must be developed in respect of deaths, injuries, morbidity and the use of health services, from the time of the disaster up to the first few days following the arrival of external relief. It is difficult to collect information in conditions of confusion and chaos, and people may not be ready to supply it. Hence it is important to confine the exercise to an analysis of key indicators on which to take practical decisions.

4.5 Hospital planning

Health facilities, hospitals where they exist, and dispensaries, all serve as focal points for first aid.

They also serve as rallying points for the community - both the victims, if they are mobile, and their families or onlookers. The injured will be directed to hospitals and the relief teams will set out from them. Being places for assembly of casualties and contact for survivors, hospitals will also constitute a high-risk environment should they collapse during the first or subsequent tremors.

Arrangements should therefore be made to build earthquake-proof hospitals in areas at risk. They should preferably be low, one-storey structures with a strong metal frame. The grounds should be sufficiently large for helicopters to land and particular attention must be paid to the construction and equipment of the technical facilities (operating, radiology, intensive care, laboratory units, etc.). The access roads should be designed for heavy traffic.

The hospital should serve as a "survival, information and coordination centre" for management of the relief operations, referral of the injured and coordination of the health care (including evacuation of the less seriously injured and possibly transfer of some casualties to other facilities). Each hospital should have a specific emergency plan for dealing with a massive influx of victims, and their medical, paramedical and administrative staff should be specially trained. They should have a secretariat, vehicles, an independent power generator, and a reliable telecommunication system. The staff should be on call at immediate notice. The necessary equipment and supplies for relief should be available and accessible. Emergency stocks should be set up in conformity with the WHO recommendations on first-line drugs and equipment.

Thus, for areas at risk of earthquakes, hospital plans must be drawn up that meet the criteria laid down by the national health authorities.

In these areas, each hospital should be twinned with one or more support hospitals located in a nearby area that is either at no or only slight risk. Each support hospital should have a survival, information and coordination centre with the same facilities as the twinned hospital. The centre should be linked by radiotelephone with the hospital in the earthquake zone and have full information on the area it serves, so as to be in a position to organize relief.

Operational coordination could also be ensured by establishing radiotelephone links between several hospitals in the vicinity that would provide services in the disaster area if necessary.

4.6 Support areas

During the first few hours following an earthquake, the community will have to count on its own resources. Once the alarm has been given, emergency relief measures can be organized, initially in the adjacent areas that are not, or are only slightly affected and then in more distant areas. Such actions will be spontaneous in the first instance, but they must be coordinated both regionally and nationally at the earliest possible stage to avoid the launching of large numbers of improvised and sometimes unsuitable relief activities.

Because of the emergency nature of relief work, the designated support areas must be in constant readiness and it should be possible to mobilize staff and equipment without delay.

For concerted action of this kind, it is essential to have an adequate system of communication allowing the national authorities to be rapidly informed about the needs, requests for aid and the provision of relief.

Special attention must be paid to maintaining or rebuilding all access roads to the disaster area, so that aid can be provided from adjacent areas without delay. Localized damage, e.g. collapse of bridges, may cause congestion and delay evacuation of the injured. In all known earthquake zones, consideration should therefore be given to building secondary tracks alongside the regular roads; they would be longer, but would be more likely to remain intact after the earthquake.

It may also be necessary to cordon off the disaster area, giving first priority to maintenance of health communications, and strictly regulating the entry of health workers (whether or not volunteers) from outside the area. Unplanned relief measures should not be permitted. An influx of hundreds of doctors and other health workers may in fact be more of a hindrance than a help, since they must not only be fed, but also housed, and that poses considerable difficulty in a disaster area.

4.7 Inventory of resources

The needs of an area struck by a major disaster will, by definition, be beyond the relief capacity of the affected and adjacent communities. When there are large numbers of casualties and homeless (possibly running to tens of thousands), national or even international aid must be sought as soon as possible.

Thus it is essential that the health authorities maintain an accurate, updated inventory of the available resources throughout the country, so as to be able to mobilize the necessary staff, transportation, equipment and supplies as effectively as possible.

4.8 Advance information on potential needs and risks

The task of organizing relief will be greatly facilitated if the central and regional authorities have advance information on the potential needs, specific health problems and special risks of earthquake zones.

The inventory should show the density and distribution of the population, the location of public buildings (hospitals, schools, etc.), industrial installations posing special risks (dams, chemical plants, gas pipes, power plants), storage depots for poisons, the water and electricity supply systems, the sewerage network, the lines of communication and access, engineering structures (bridges, etc.). In other words, it is essential to prepare a "risk map".

The epidemiological problems of the area, with regard to both human and veterinary health, should be studied in advance and reference data should be assembled to allow proper surveillance of communicable diseases in both humans and animals. If there are any special services in the area (such as maternity, dialysis or intensive care units), they should be listed in the inventory of facilities that could be damaged.

4.9 Rapid assessment of needs and resources

External relief, even when it is official, is generally characterized by an overriding concern to act fast and a lack of any specific target for the action. These two features complement each other since, if time is to be gained, this will necessarily be at the expense of information. As a result, decisions are often taken without due thought, with adverse consequences such as the dispatch of physicians without a clearly defined role, the provision of unnecessary drugs and inappropriate supplies, the setting-up of field hospitals that may be unsuited to the local requirements. For instance, in the case of a recent earthquake, it would have been more useful to send teams of epidemiologists and sanitarians, rather than adding to the numbers of local physicians and surgeons. Moreover, as the infrastructure is generally destroyed, specialists would not have access to the necessary technical facilities. It has also been found that the most suitable types of staff to deal with health problems associated with disasters are in many cases those at the intermediate level, e.g. technicians and nurses; with the necessary guidance from public health officers, they are well able to provide very effective care and to adapt to a wide range of difficult conditions.

However rapidly it is provided, external relief is generally too late to be of significant value in alleviating the immediate impact of an earthquake. It is therefore essential that it be organized as effectively as possible in the medium and long term. Hence it is important to assess the needs and resources in the disaster area as quickly as possible.

Assessment teams, possibly operating under the auspices of international bodies, should be on immediate call to undertake such surveys. However, this will involve the prior development of procedures and techniques for rapid collection of essential data in the difficult conditions associated with disasters. Further studies should be made to develop indicators of sufficient predictive value to assess the health consequences of disasters. For this purpose it would be useful to make retrospective studies of the earthquakes that have occurred in the Mediterranean region in recent years.

4.10 Epidemiological surveillance

Infectious diseases are always a serious concern when disasters occur. Theoretical approaches to the problem differ, and a variety of practical measures have been advocated.

It is of crucial importance to establish an epidemiological monitoring system covering the entire disaster area, especially if it is extensive and many people are involved.

There is an urgent need to develop sound longitudinal epidemiological surveillance as a framework for identifying problems in good time, conducting rapid surveys in suspected foci of transmission, taking preventive action and assessing its effectiveness.

An adequate epidemiological surveillance system should also facilitate accurate assessment of the extent of transmission of diseases, with a view to either limiting the coverage of preventive measures, such as immunization campaigns, or dispensing with them altogether.

Epidemiological surveillance of this type would have to be developed in collaboration with the central health authorities, who would ensure integration of the activities of all the local health institutions.

The strategy adopted to deal with a recent earthquake in the Mediterranean region was based on the following principles:

- (a) evaluation of the risk of infection, taking into account the characteristics of the area and the epidemiological patterns;
- (b) preparation of an inventory of the technical facilities, including microbiology laboratories;
- (c) designation of hospitals that could receive infectious cases should an epidemic occur.

The proposed measures included protection of particularly vulnerable people, support of emergency services in diagnosis and care, hospitalization where necessary, treatment of carriers and contacts for certain infections, technical guidance on preventive measures, provision of sanitary facilities for temporary housing, and education of the public on the risks of infection. It was felt that responsibility for health care of the population should be assigned to teams including both public health officers and clinical epidemiologists with a knowledge of infectious diseases.

The present division between specialists in infectious diseases working at hospitals and other health facilities and physicians responsible for detecting and treating these diseases at the local level is very regrettable. If epidemiologists were part of a permanent system for surveillance and control of the diseases, considerable progress could be made in promoting a control strategy and developing suitable approaches for different types of intervention. The teaming of public health officers and infectious diseases specialists should form the basis of the surveillance system.

Thus, rather than embarking on an unplanned vaccination programme, efforts should be made to strengthen epidemiological surveillance. Advantage could also be taken of the situation provoked by the disaster to continue and strengthen routine vaccination programmes started earlier.

An epidemiological surveillance system of this kind cannot function without adequate arrangements for data collection, and these cannot be improvised. A local health information system operated in collaboration with the basic health workers must be developed in advance. The data that are collected could then be compared with statistics compiled before the disaster for guidance of the epidemiological surveillance at the regional and national levels.

4.11 Veterinary surveillance

Natural disasters such as earthquakes often have serious consequences for domestic animals. In turn, the veterinary problems obviously have indirect consequences for human health, in terms

both of the danger of transmission of zoonoses to man and of long-term economic processes such as food supply.

Veterinary health measures should therefore be conducted in conjunction with other preventive and relief activities. A central coordinating body should be established at government level with responsibility for integrating the veterinary and other measures. It could enlist the services of the local teams for control of stray dogs, reopening of abattoirs, stabling of animals without shelter and surveillance of zoonoses.

Such considerations are often overlooked, but are nevertheless very important both for immediate emergency measures and for long-term rehabilitation of rural populations.

4.12 International aid

The national health authorities are responsible for assessing the health needs following a disaster and for deciding whether or not to accept offers of international aid. Requests should be clearly worded so as not to give rise to repeated correspondence and to avoid errors and misunderstandings. International aid should be properly organized and carefully tailored to the requests submitted by governments. Better advance knowledge of the potential needs and existing resources would facilitate the adoption of bilateral or multilateral agreements.

The emergency plans of national health authorities should provide for the coordination of international aid, both governmental and private, and for the dispatch and reception of staff and equipment (police and customs clearance, approval of foreign qualifications).

The international organizations should prepare lists of staff and equipment available at immediate notice. Guides should be issued or updated to give each country at risk the essential information it requires for mobilizing appropriate and effective assistance.

Collection of information in advance does not, however, allow one to dispense with making an assessment of the specific needs faced after the disaster, in conjunction with the national authorities. An international assessment team of specialists, operating under the auspices of the relevant international bodies and in collaboration with the government, could play an important role in guidance of the short-, and medium-term measures and long-term rehabilitation.

The terms used in issuing information on disasters should be standardized, to avoid misunderstandings. Efforts should also be continued to promote standard labelling of materials (equipment, drugs, foodstuffs, etc.).

Mention has already been made of the need to prevent the sudden influx of supplies and equipment that are either useless or inappropriate. The national health authorities should set up an emergency committee to decline or redirect offers of assistance that are inappropriate to the needs.

At the international level, aid to countries would of course be provided more rapidly, since the organizations have a more effective system of coordination.

The main coordinating centre for emergency relief should preferably have its own data bank containing details not only of the local conditions in the countries at risk, but also the locations of international stocks and of possible sources of certain types of aid, as well as other relevant information. The Office of the United Nations Disaster Relief Coordinator (UNDRO) should be able to perform this function, while WHO should play the same role with regard to health.

Information on conditions in countries following a disaster, as disseminated by the press and other media to the public and the international community, is an important element in an emergency operation.

National authorities and international agencies must supply correct information to avoid the spread of false rumours and unsubstantiated reports. It is essential that the international agencies receive information from a single official source.

4.13 Volunteers

Particular attention should be paid to the involvement of national and international volunteers in relief and other activities. The arrival of large numbers of volunteers of differing skills and qualifications has been noted in recent earthquakes. This assistance has posed certain problems at times, including:

- (a) the difficulty of housing and feeding the volunteers;
- (b) their lack of technical expertise necessary for relief work;
- (c) the difficulty of safeguarding the welfare of individuals;
- (d) psychological problems of assimilation.

It is therefore essential that the services of volunteers be properly coordinated if optimum use is to be made of them. The unplanned arrival of individual volunteers, whether foreign or national, should be discouraged, as it hinders the normal performance of relief work.

It is essential that volunteers have suitable training. The nature of their qualifications should be clearly stated and the content of their training be decided at the international level, under the supervision of the relevant bodies. They should also be members of recognized organizations.

Some countries have issued regulations requiring volunteers to:

- (a) attend courses in first aid;
- (b) be available at all times;
- (c) carefully maintain the equipment issued to them;
- (d) undergo vaccination against tetanus with boosters every five years.

Their names are then entered in an official list and they are given identity cards.

Relief teams sent from abroad should, in addition to having the necessary training, be given precise information on the nature of the work and especially on the local living conditions. Aid by private and voluntary bodies should be coordinated with the work of the national relief agencies and its purpose be clearly specified.

5. Conclusions and recommendations

On the basis of the discussions of the five working groups, the following conclusions and recommendations were formulated.

1. Studies have shown that if first aid is to be effective it must be provided within hours of a disaster; it should therefore be an integral part of primary health care. Consequently, health staff at all levels who work in areas at risk should have the necessary training to enable them to work in emergencies. The content of the training should be determined on the basis of actual experience in recent situations. The training should not be confined to health matters, but cover all aspects of rescue and survival of the population. It would also be useful to give appropriate instruction to other members of the community who might be required to offer their services, so that a full range of human resources can be mobilized immediately at the site of the disaster.
2. Local health facilities (hospitals, health centres, dispensaries) should be designed to serve as rallying points and as "survival, information and coordination centres" for emergency care and coordination of health services. During the first few hours they should also serve as focal points for collection and transmission of data on the severity and extent of the material damage and on the number of victims.
3. To allow for cases where the local health facilities are destroyed or put out of service, arrangements must be made for the twinning or preferably networking of establishments in areas that may or may not be adjacent, depending on the means of access and communication, so that services can be rapidly provided by substitute facilities.
4. If external aid is to be effective, it must be given in response to specific requests and meet precise needs. Although, in the first few hours following a disaster, aid can be given to meet what are presumed to be the essential needs (rescue work, first aid, food, shelter), any untimely and disorganized relief work carried out subsequently will only add to the confusion and cause chaos. It is therefore essential to channel external aid on the basis of information that is as accurate as possible. In many cases it would certainly have been preferable to delay some outside interventions and thereby make them more effective, rather than acting in haste. Thus, it would undoubtedly be worthwhile to conduct studies in the countries at risk in order to decide which measures must be taken without delay, even on the basis of unreliable information, and those for which it would definitely be preferable to obtain additional information, even if this caused some delay.
5. Areas especially prone to earthquakes should be surveyed in advance with reference to: density of population, geographic situation, microzones, housing, vulnerable structures (public

buildings) and the hazards for the environment of industrial structures, power plants, dams, pipe networks, etc., and the risks for particular population groups. The resulting "risk maps" should facilitate the planning of preventive measures (reinforcement or reconstruction), as well as evacuation or rescue work. Particular attention should be paid to hospitals.

6. In the same way an inventory of the health resources (infrastructure, equipment, personnel) should be prepared and kept up to date, to allow immediate mobilization of the available facilities. A list should also be made of suitable helicopter landing sites, as well as a standardized inventory of survival supplies, equipment, tools and materials necessary for the rescue of victims and effective health care. In cases where these items are unavailable, depots should be built at suitable locations throughout the country.

7. Emergency health care should be planned not only at the national or provincial level, but also at the local and decentralized level, to ensure that the measures decided upon are carried out as rapidly as possible. This "micro-planning" requires prior education of the public and this, in the short term, will encourage local communities to assume responsibility for emergencies and, in the long term, help to prevent the development of attitudes whereby the victims regard themselves purely as recipients of aid.

8. A system for rapid assessment of losses and damage is essential to channel the first aid and external relief. Information mechanisms of this sort, which cannot be improvised, should be incorporated in the information system of the basic health services. Also, because of the multiple nature of the problems associated with disasters, the degree of uncertainty, and the need for rapid action, the nature of the information should be specified, and it should be collected and analysed by specially qualified people. Assessment of losses and damage is often beyond the capacity of the local community and hence specialized staff or techniques (epidemiological evaluation by sampling, aerial reconnaissance) must be used. In such cases arrangements must be made for calling on services at a higher, provincial or national, level for the assessment of damage by a suitable method. The capacity for rapid assessment of damage must be augmented at the national level by establishing specialized epidemiological teams and developing adequate techniques. International support that could be mobilized immediately, be constantly on call and be available to all countries at risk, might be particularly valuable for this purpose, even more than for actual emergency care.

9. Forecasting indexes and indicators for epidemiological evaluation (mortality, morbidity) in emergency situations should be simple and reliable and enable immediate decisions to be taken.

10. Information collected at the local level must be communicated to the higher level from a single source responsible for this function. This helps the national authorities both to administer and to channel external aid so as to meet the real needs. Machinery should be established at the national level for declining or reorienting unsuitable offers of aid. Prior collection and centralization of demographic and medical/nutritional information on areas at risk of natural disasters, and its dissemination internationally through the appropriate channels, would be helpful in enabling foreign institutions to provide the most suitable forms of aid.

11. External aid should be appropriate to the needs of the population and not duplicate the local human and material resources. It is particularly important to ensure strict control of the entry of volunteers whose services have not been requested.

12. Epidemiological surveillance (in the broad sense, as applied to all aspects of health) is an essential emergency response measure. It will not be effective, however, unless data are available on the situation before the emergency. It should form part of the local health information system, which should preferably have been established before the disaster.

13. To improve coordination between human and veterinary epidemiological surveillance, it is recommended that more research be undertaken in this field, especially with reference to long-term consequences. Health authorities should pay particular attention to the veterinary aspects of natural disasters.

14. The epidemiological surveillance must not be confined to the emergency phase, but continue through the intermediate phase of restoration of normal conditions and subsequent rehabilitation. A system for evaluating the effectiveness of relief work is an important requirement, in the medium and long term. It is recommended that detailed epidemiological studies be conducted, in conjunction with WHO and specialists, on recent earthquakes in the Mediterranean basin. It would be very useful to establish a standing interdisciplinary consultative group, which could collaborate in such studies with the authorities of the countries concerned.

15. The measures for protection of the population in each country should be the subject of specific legislation, setting out the functions to be performed, the authorities responsible and the resources to be made available to them.
16. A system of international support that could be mobilized immediately, be constantly on call, and be available to all the countries at risk, on request, might be more valuable than emergency services as such.
17. The effectiveness of international aid naturally depends to a large extent on the procedures established beforehand to ensure coordination between the activities of the different international or governmental bodies involved and rapid communication with the country.
18. WHO should prepare a guide for countries at risk, setting out the duties to be performed by the primary health services, the precautions to be taken by communities and the instructions to be followed by health staff at all levels. The guide should be based on retrospective analyses and prospective studies to be conducted in countries at the time of disasters. A protocol should be drawn up for issue to countries interested in participating in the prospective studies.
19. WHO-sponsored courses should be organized to train teachers who could give instruction on health problems associated with natural catastrophes. Training standards should be established.
20. Where considered desirable, it would be useful to make a survey of the present capacity of countries to deal with health problems associated with disasters and to assess the changes made following the Workshop. The findings of this survey and the implementation of the present recommendations should be reviewed by a future workshop.
21. The work of international health agencies should be coordinated and their responsibilities clarified, so as to simplify the work of governments. WHO would be asked to make available to countries so requesting the services of a technical group that would evaluate international aid and determine its suitability.
22. As proposed by the Italian participants, it would be desirable to convene a further WHO-sponsored workshop in Italy in 1982, with the specific objective of evaluating the results of the survey of the capacity of countries to deal with health problems associated with earthquakes, and to assess the implementation of the present recommendations.

Annex 1

RESOLUTION WHA34.26 OF THE WORLD HEALTH ASSEMBLY (22 MAY 1981)

Promotion of the prevention of adverse health effects of
disasters and emergencies through preparedness

The Thirty-fourth World Health Assembly,

Recalling resolutions EB51.R43, EB55.R62 and WHA28.48 on the role of the World Health Organization in emergencies and disasters;

Noting that a great number of Member States, in particular developing countries in view of their socioeconomic situation, are vulnerable to the effects of disasters;

Recognizing that sudden calamities and disasters adversely affect a country's health services and impede its development;

Stressing that, despite the undoubted importance of relief in emergencies, preventive measures and preparedness are of fundamental importance;

Reaffirming that the Organization should assume a leadership role in the health aspects of disaster preparedness;

1. COMMENDS the Director-General for his valuable efforts in providing and coordinating emergency relief for disaster-stricken countries;
2. URGES Member States to strengthen the Organization's role in all health aspects of disasters and to increase their direct cooperation with countries at risk;
3. REQUESTS the Director-General, while continuing the Organization's useful emergency action, to strengthen its capacity and increase its resources, whether from budgetary or extrabudgetary sources, with a view to promoting the development of approaches to the prevention of adverse health effects of disasters, when possible, and the preparedness of Member States to deal with disasters, to participate in the coordination of aid, and to report on the matter to future Health Assemblies.

Annex 2

LIST OF PARTICIPANTS

ALBANIA

- Dr M. Boci
Director, Department of Hygiene and Epidemiology, Ministry of Public Health, Tirana
- Dr F. Toska
Head, Environmental Affairs, Ministry of Public Health, Tirana

ALGERIA

- Mr B. Bentaleb
Director-General, Attafes Hospital, Ech-Chlef Willaya
- Dr D. Naceur
Lecturer in Social Medicine, National Institute of Public Health, Algiers

FRANCE

- Mr R. Coirier
Supervisor, Office of Emergency Relief, Ministry of Health, Paris
- Dr M. Gillet
Lecturer on Disaster Problems, University of Bordeaux II

GREECE

- Dr Aspasia Loupa
Director of Public Health for the Western Region, Department of Attica, Athens
- Mr M. Stathopoulos
Director-General for Social Welfare, Ministry of Social Services, Athens

ITALY

- Dr F. Cannavo
Federation of the Order of Italian Pharmacists, Rome
- Dr V. Carreri
Director, Public Health Department of the Lombardy Region, Milan
- Dr L. Carrino
International Centre for Research and Intervention, Naples and Social Medicine Centre,
Giugliano
- Dr V. Costigliola
Department of Public Health, Ministry of Health, Rome
- Mrs G. Dario
International Centre for Research and Intervention, Naples and Social Medicine Centre,
Giugliano
- Dr F. Ghislanzoni
Federation of the Order of Italian Pharmacists, Rome

Dr A. Imbriano
Public Health Officer at Sant'Angelo dei Lombardi from 24 November 1980 to 24 January 1981,
Monza, Milan

Dr G. Leopardi
Federation of the Order of Italian Pharmacists, Rome

Dr A. Molfese
Ministry of Health, Rome

Dr M. Orsini
Director, Health Service, Military Authority for the Southern Region, Naples

Professor F. di Raimondo
Clinical Tutor and Director, Epidemiological Centre, L. Spallanzani Hospital for Infectious
Diseases, Rome

LEBANON

Dr M.G. Nasser
Faculty of Medicine, American University of Beirut

MOROCCO

Dr Abouzaid
Head, Laboratory for Water Quality Control, National Office of Water Supply (ONEP), Rabat

Mr L. Abtal
Department of Emergency and Disaster Relief Medicine, Avicenna Hospital, Rabat

Mr T. Badre
Divisional Commissioner and Head, Social Services, Directorate-General of National Security,
Rabat

Mr Cazhouli Gdoudou Mekki
Deputy Administrator, National Office of Transportation, Rabat

Dr Nesh-Nash
Officer for Health Establishments in the Northern Provinces, Red Crescent of Morocco, Rabat

Dr S. Njemi
Head, Microbiology Laboratory, Mohammed V Military Hospital, Department of National Defence,
Rabat

Mr B. Rabbra
Administrator, Department of Civil Protection, Ministry of the Interior, Rabat

Dr M.N. Salah Eddine
Head, Health Service, Department of Civil Protection, Ministry of the Interior, Rabat

PORTUGAL

Mr J. Clementino Pais
National Department of Civil Protection, Lisbon

Mr J.A. Lopes da Nave
Regional Director of Health, Azores

SYRIA

Dr T. Moghrabi
Head, Department of Emergency Surgery, National Hospital, Homs

TUNISIA

Dr M. Yacoub
Director, Medical Emergency Centre, Tunis

YUGOSLAVIA

Professor D. Milovanovic
Director, V.F. Vujic Psychiatric Clinic, Faculty of Medicine, Belgrade

Dr I. Vesov
Director, Medical Centre, Skopje

REPRESENTATIVES OF OTHER ORGANIZATIONS

Office of the United Nations Disaster Relief Coordinator (UNDRO)

Mr R. Souria
Office of the United Nations Disaster Relief Coordinator, Geneva, Switzerland

Commission of the European Communities (CEC)

Mr L. Jones
Administrative Assistant, Commission of the European Communities, Brussels, Belgium

League of Red Cross Societies (LICROSS)

Mr J. Vittani
Acting Undersecretary-General in Charge of Relief, League of Red Cross Societies, Geneva, Switzerland

Dr H. Zielinsky
Chief Health Adviser, League of Red Cross Societies, Geneva, Switzerland

United Nations Development Programme (UNDP)

Mrs L. Hlass
Resident Representative, Rabat-Chellah, Morocco

Mr C. Jaeger
Resident Representative, Algiers, Algeria

Mr Jelonek
Assistant Resident Representative, Rabat-Chellah, Morocco

Catholic University of Louvain

Mrs C. Boucquey-Hachez
Disaster Epidemiology Research Centre, Brussels, Belgium

Dr M. De Bruycker
Disaster Epidemiology Research Centre, Brussels, Belgium

WHO TEMPORARY ADVISERS

- Professor M.T. Alaoui
Director, Technical Services, Ministry of Public Health, Rabat, Morocco (Chairman)
- Mr A. Azizi
Head, Central Department of Sanitation and Environmental Health, Ministry of Public Health,
Rabat, Morocco
- Professor A. Belmahi
Director, Emergency and Disaster Relief Medicine, Avicenna Hospital, Rabat, Morocco
- Professor M. Cara
Department of Anaesthesiology, Necker Hospital, Paris, France
- Professor L. Giannico
Director-General, Ministry of Health, Rome, Italy (Vice-Chairman)
- Professor M.F. Lechat
Disaster Epidemiology and Research Centre, Catholic University of Louvain, Brussels, Belgium
(Rapporteur)
- Professor A. Mantovani
Director, Institute of Infectious Diseases, Prophylaxis and Veterinary Control, University of
Bologna, Italy

WORLD HEALTH ORGANIZATION

Regional Office for Europe

- Dr C. Guttuso
Special Programme Assistant (Secretary)
- Dr B. Velimirovic
Regional Officer for Infectious Diseases

Headquarters

- Dr S.W.A. Gunn
Chief, Emergency Relief Operations