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PROPOSED ROLE OF THE PAN AMERICAN HEALTH ORGANIZATION  
IN DISASTER RESEARCH

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XVII MEETING OF THE ADVISORY COMMITTEE ON MEDICAL RESEARCH

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PROPOSED ROLE OF THE PAN AMERICAN HEALTH ORGANIZATION IN DISASTER RESEARCH \*

The objectives of this paper are:

- A. To review the present state of art in disaster research.
- B. To identify areas where research should be undertaken.
- C. To submit, for the discussion and endorsement of the Advisory Committee a proposed role and strategy for the Pan American Health Organization.

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## A. PRESENT STATE OF DISASTER RESEARCH

### 1. Natural Disasters in the Americas

Natural disasters are a recurring problem in many countries of the Americas causing much loss of life and property. A natural disaster is defined as an ecological disruption exceeding the adjustment capacity of the community and calling for assistance from outside the affected area.

The Americas are affected by almost all types of natural disasters.

Earthquakes: Of all natural disasters, earthquakes inflicted the greatest loss of life and the largest public health problems. The most seismically active areas of Latin America lie along the boundary between the Pacific plate which includes most of the floor of the Pacific Ocean and the American Continent, the North American plate, the Caribbean plate and the South American plate (Fig. 1). Table 1 shows the most damaging earthquakes in Latin America during the period 1970-77.

Hurricanes: Most Member Countries north of the equator have experienced devastating hurricanes in this decade. Hurricane Fifi in Honduras caused over 8,000 deaths and US\$ 500 millions of damages in 1974. In 1976, Hurricane Liza hit the province of Baja California Sur in Mexico claiming over 400 deaths. In the history of Latin America, there is a long catalogue of meteorological disasters. A high proportion of the lives lost can be attributed to tropical cyclones or hurricanes.

Floods: Almost all Member Countries periodically experience devastating floods. The primary consequences of floods are of a social and economic nature, and health programs have been significantly hampered either directly by the natural event or indirectly by the diversion of resources to ineffective emergency measures.

Droughts: Severe droughts have severely reduced the food production of several countries. Haiti was particularly affected in 1975 and 1977. As a consequence, a major food shortage and epidemic malnutrition developed in the northern part of the country leading to massive international assistance.

### 2. Effects of Natural Disasters

Traditionally, several indicators are used to measure social and health effect:

Mortality data: The number of deaths caused by disaster is a measure of its immediate impact on the human community. The death toll depends on many variables; e.g. the physical characteristics of the disaster, the time and place, the density of the population, the type of human settlements, and the extent of mitigation or preparedness measures. Data are often fairly accurate but bear little immediate relevance to relief and rehabilitation activities.

Morbidity data: The number of persons injured is an additional usual measure of the short-term health effects. Its usefulness is limited by the lack of consistency and standardization of diagnostic criteria. Mortality and morbidity data are closely related. For example, the ratio of injured to deaths

FIG. 1

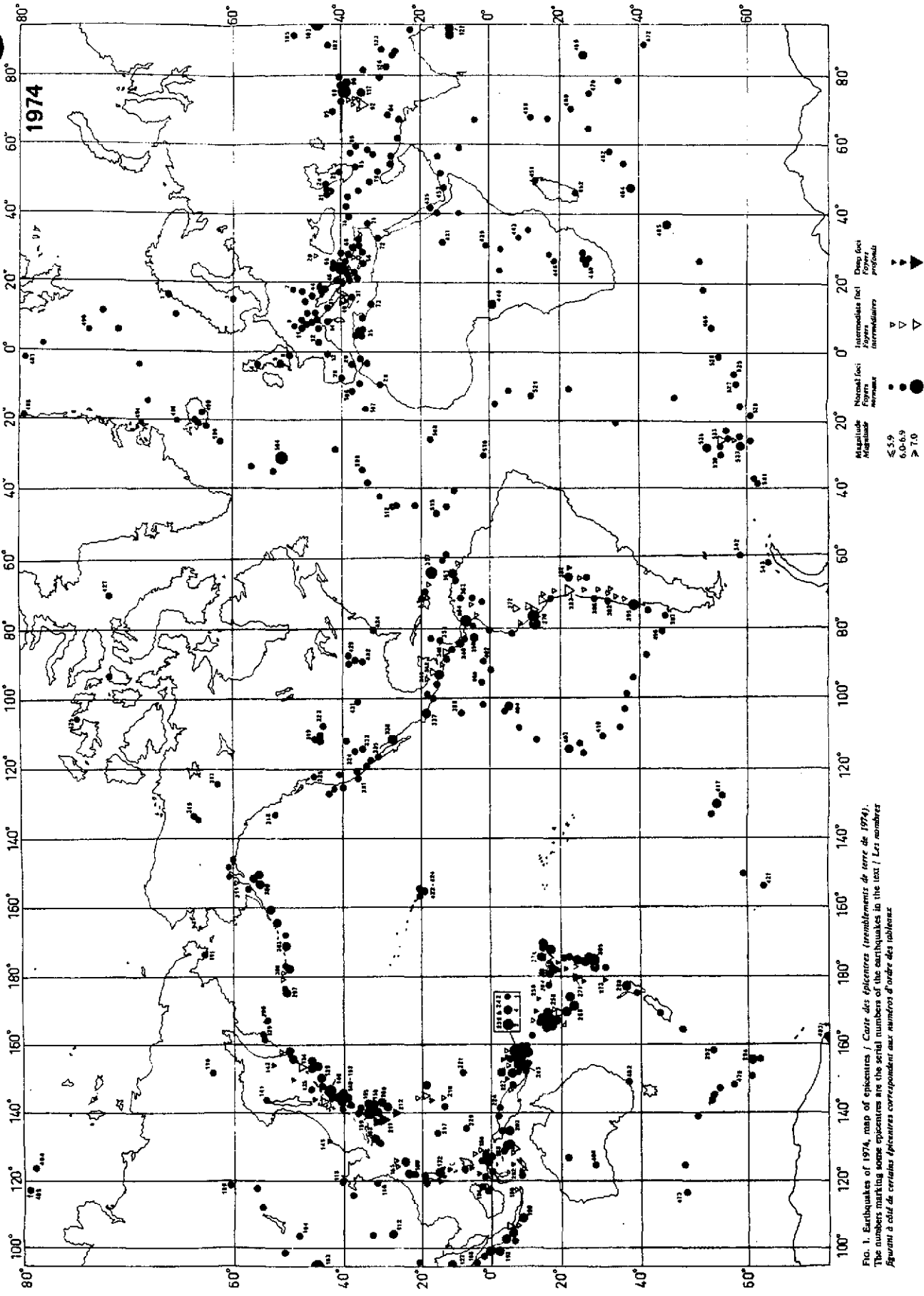


FIG. 1. Earthquakes of 1974, map of epicenters / Carte des épicentres (tremblements de terre de 1974). The numbers marking some epicenters are the serial numbers of the earthquakes in the list / Les nombres figurant à côté de certains épicentres correspondent aux numéros d'ordre des séismes.

Table 1

Severe earthquake in Latin America, 1970-77

| Year       | Country    | Deaths    | Injured  | Damages in thousand \$ |
|------------|------------|-----------|----------|------------------------|
| 1970 (May) | Peru       | 66,794    | 143,331  | 530,000                |
| 1970       | Ecuador    | 29        | N/A      | 4,000                  |
| 1970 (Dec) | Peru       | 29        | N/A      | 2,000                  |
| 1971       | Chile      | 85        | N/A      | 236,400                |
| 1972       | Nicaragua  | 6,000 (1) | 20,000   | 845,000                |
| 1973       | Costa Rica | 21        | N/A      | 200                    |
| 1973 (Jan) | Mexico     | 17        | N/A      | N/A                    |
| 1973 (Aug) | Mexico     | 500       | N/A      | N/A                    |
| 1974       | Peru       | 78        | N/A      | 10,000                 |
| 1976       | Guatemala  | 22,778    | 70,000   | 1,000,000              |
| 1977       | Argentina  | 65        | over 200 | N/A                    |

(1) Estimates range from 6 to 10,000 deaths  
 N/A - Not available

following earthquakes in Latin America has shown to be fairly constant in the last 10 years at approximately 3.5 injured for one death. Present crude morbidity and mortality data do not adequately reflect the significance of disasters in public health in a developing country.

Damage to property: The cost of the replacement or repair of damaged private or governmental property or utilities is a measure of the long-term impact of the disaster on the socio-economic development of the country. More specific data on damages to health services and health related utilities are generally not easily available.

The problems faced by health authorities during the immediate aftermath of a major natural disaster are twofold:

- a. First, there are specific health problems caused directly by the natural event such as the need for treatment of mass casualties, environmental sanitation and communicable diseases control, food supply, provision of temporary shelter, psychological and mental guidance or treatment, etc.
- b. Perhaps more troublesome additional problems are associated with the relative unpreparedness of communities and are often compounded by a chaotic and uncoordinated international relief assistance. These are: lack of reliable information on the extent of damages and actual needs, the disruption of communication and transportation, too often inappropriate and ill-timed foreign material assistance.

### 3. Health Problems Following Natural Disasters

#### a. Introduction

Our scientific knowledge of health problems caused by natural disasters is very limited and based on a few descriptive studies and fragmentary observations on past disasters. Hard data provided by well designed studies is exceedingly scarce due, in part, to the unscheduled nature of disasters and also to emotional resistance to data gathering during an emergency, when relief appears to be a higher priority. In spite of the scarcity of quantified data, a consistent picture of health problems following disasters is emerging in the scientific literature. It is sharply at variance from stereotypes most commonly accepted in the health sector or disseminated by the mass media.

#### b. Management of mass casualties

Not all disasters cause serious immediate health problems and mass casualties.

- . Trauma caused by the collapse of man-made structures are a major problem in the immediate aftermath of earthquakes. In Guatemala, over 70,000 persons were reportedly injured. In spite of the extent of the problem, there are no reliable estimates of the relative frequency of severe injuries nor on their distribution by sex and age.

- . Following hurricanes and floods, severe trauma and casualties requiring hospital admission are few and consistently over-estimated or over-publicized by relief workers.
- . Landslides, a major cause of mortality in some earthquakes cause few injuries. In Peru, landslides following the 1970 quake buried two cities leaving a few hundred unharmed survivors out of over 30,000 inhabitants.
- . Fire, a major cause of death following earthquakes (Japan, Tokyo in 1923 - 143,000 deaths) has been shown to be of little health significance in the Americas.

Following sudden-impact disasters dealing with mass casualties is often the first priority which the affected country has to face. Treatment of mass casualties is a short-lived problem: critically injured victims are either treated within a few days or on the way to spontaneous recovery if still alive. Within 5 days following the earthquake in Managua, Nicaragua and 8-10 days following those in rural Peru and Guatemala, the type of patients attending or admitted to hospitals and temporary facilities closely paralleled those found in any general hospital during normal times.

During the first 24 hours, the burden of rescue and relief remains for the most part with the affected community. After this time the medical personnel and material resources mobilized at national and international levels arrive, and often exceed the capacity of the affected region to absorb them. The major problem is mainly monitoring resources such as available bed space within the country and controlling the vast number and amount of personnel and supplies entering the country. The effectiveness of field hospitals, the actual need for blood, plasma and for sophisticated surgical equipment are largely undocumented, although millions of US dollars are spent for this purpose during each major natural disaster.

#### c. Environmental Sanitation and Communicable Disease Control

Outbreaks of communicable diseases are of major concern to the population and authorities in the wake of disasters, although in the last decade no dramatic increase of waterborne diseases have been documented or reported following disasters. Epidemiological surveillance or periodic investigations carried out by the WHO, the Center for Disease Control and other institutions have failed to demonstrate an abnormal incidence of gastroenteritis or typhoid fever following natural disasters in Latin America.

Infectious diseases are dramatically increased during acute food shortages and famines; Priority should be given to preventive medicine. Severe malnutrition, overcrowding in refugee camps and poor sanitation may be common following man-made disasters (for instance civil wars in Bangladesh and Nigeria) and are often associated with high incidence of gastroenteritis.

The lack of unusual occurrence of outbreaks following natural disasters in the Americas suggests either that the risk is grossly exaggerated or that the effectiveness of the emergency sanitation measures immediately carried out by the authorities is underestimated.

Experienced epidemiologists do not regard indiscriminate mass immunization as an appropriate method of disease control in the emergency stage, although this measure is widely applied under public pressure.

- . Mass campaigns are rarely necessary as the potential for transmission is not significantly altered by earthquakes, floods or cyclones.
- . Mass campaigns drain off valuable manpower and resources which are necessary to maintain routine programs at an effective level.
- . The logistics of mass campaigns often pose impossible problems after a disaster. Proper recording is generally not possible under disaster conditions nor is follow-up for subsequent injections.
- . The groups at greatest risk are usually missed.
- . Vaccines against typhoid fever and cholera, the most feared diseases following disasters, afford a low level of short-lived individual protection that plays little if any role in reducing disease transmission.

The nature of diseases regarded as potentially epidemic following disasters often bears little relevance with the country epidemiologic situation. Cholera and smallpox are widely quoted as imminent threats in spite of their currently nil prevalence in this continent.

Higher priority should be given to emergency surveillance of communicable diseases, of epidemic potential in the country, restoration of water-supply, waste disposal and food sanitation. Burial of the dead is required more on socio-cultural and psychological grounds than for the prevention of outbreaks of communicable diseases.

Disease control has probably attracted more attention from disaster scientists than of any other field. Nevertheless, reliable standard techniques and methods are not available. Epidemiological studies supporting the views presented here are mostly of a descriptive and fragmentary nature and need to be confirmed by qualified investigations.

#### d. Food Supplies

Natural disasters have some potential impact on food production and/or distribution. Earthquakes do not significantly affect staple food production in rural areas, though they may disturb the normal food distribution network in urban centers considerably and the population's capacity to prepare and cook meals under emergency conditions.

On the contrary, climatic disasters may present long-term effects on food production and subsequently on the nutritional status of the most vulnerable groups in the affected population.

Mass feeding and food distribution in the early relief phase of a sudden impact are often justified on a social or practical rather than nutritional basis. Little is known on the long-term nutritional effects -if any- of natural disasters and/or of massive food donations.

Droughts and associated food shortages represent entirely different set of problems. Although relief programs aim to mitigate or prevent nutritional deficiencies, the present scientific information and technology available in the field of early warning and nutritional surveillance system is limited.



e. Mental Health

Sudden impact natural disasters do not, in general, create a new pattern of social behaviour but rather heighten or exacerbate the social problem existing prior to the event. For example, panic is uncommon and looting is very rare in rural areas.

Emotional disturbances are frequent and may persist for several months or years. Increased occurrence of depressive reactions and anxiety has been reported in young children. Following the Managua earthquake few new cases of psychosis were detected although individuals with psychotic antecedents were shown to have relapsed or deteriorated.

f. Disruption of control programs

Essential health services can be profoundly disrupted by the physical impact and, more significantly, by the relief effort itself. Routine control programs may also be hampered by an over reaction to the emergency. Observations suggest that long-term effects of disasters are of far more significance to public health than is the immediate impact. Long term problems are too often overlooked by recipients and donors responding to the most visible and pressing needs. Sound studies on the long-term effects of natural disasters are extremely important and are urgently needed.

4. Operational Problems

Operational problems usually preclude the orderly use of existing health resources and impede the optimal management of health problems during the first weeks following a major earthquake, cyclone or flood.

Flow of information

The most significant cause of poor disaster management in most instances is the lack of information on the extent and effects of the impact. The approximate number of death and injured cannot be ascertained in the first week after the catastrophe. Figures and lists of affected localities have to be steadily revised. Misleading rumors and unsubstantiated information on the need for medical care or outbreaks of communicable diseases contribute to the confusion and the waste of resources.

The chaos is often made greater by the lack of coordination of the various sources providing assistance. An objective assessment of the needs, using simple techniques, is probably the most useful contribution epidemiologists can offer to the management of post-disaster situations. Neither the nature of the information required, the indicators to monitor the situation nor the techniques and methods to collect, interpret and disseminate information under emergency conditions have been developed at national or international level.

Logistic problems created by foreign assistance

During the relief operations large amounts of donated medical supplies need to be identified, sorted, and distributed. In some cases, warehouse

keepers and pharmacists may be able to render greater service than physicians. Relatively few of the drugs donated by private organizations from foreign countries -in particular USA- arrive already sorted, that is, in packages holding a single type of drug or in drug containers, properly identified and marked. Furthermore, only a very small proportion of the sorted drugs are needed at once; vitamins, antacids, and nasal sprays are by no means "emergency drugs" worth rushing in by air. The timing also needs to be appropriate as medical care of casualties is a very transient priority.

A similar problem is created by the humanitarian appeal of earthquakes: volunteers frequently arrive on the scene with inappropriate qualifications or skill and in some cases without a basic understanding or familiarity with the health problems, language and customs of the affected community.

In famine conditions the situation is similar. The common belief "they are starving, they will eat anything" is erroneous and the consequence on food acceptability and effective assistance are well known. At the risk of repetition, one should note that although the problems have been identified, their systematic study has not yet been undertaken. Substantial progress in disaster management and considerable savings in wasted expenditures on health care following major disasters cannot be expected without systematic research studies.

## B. PRIORITY RESEARCH AREAS

The following research areas need, for instance, urgent attention:

### Epidemiologic analysis of risk factors

In the two major earthquakes in Latin America 90,000 persons were killed. Besides the fact that most have lived and died in non-earthquake resistant low-cost housing, little is known on the risk factors. Some data would suggest that children under 5 and adults over 50 are at much higher risk. If this is confirmed, this factor has direct implications on the rescue-relief activities and the medical supplies that will be required. Type of housing, time and place of the quake are additional variables to be investigated. In Guatemala, mortality caused by the earthquake ranged from virtually nil to 21.5% in different villages, apparently with similar rate of material damages. Provided there are no gross errors in the recorded number of deaths, the lack of adequate explanation of those statistically significant differences underline the gap in our understanding of earthquakes. The same situation prevails in regard to cyclones, floods, and other sudden disasters.

### Type of pathology

Basic knowledge of the type of trauma and injuries caused by earthquakes is essential to determine the appropriate relief supplies, equipment and personnel needed in similar situations. Representative and objective data are presently lacking. For instance, a high rate of crush-syndrome is usually expected following earthquakes. From partial observations, it seems that almost no cases have been detected following the Managua and Guatemala disasters. Such a finding deserves careful confirmation.

Similarly, research is required to document the observation that cyclones and floods do not cause a high rate of injuries. The determination of anticipated rates of various types of injuries per 1000 persons in an affected area will greatly improve the preparedness of health services and relief organization and is an essential step towards a planned and rational response.

### Rescue activities

Most valuable scientific research on rescue of persons trapped under debris (techniques, survival type, composition of rescue teams) have been carried out in Europe during World War II. Similar research is required under the existing conditions of rural areas of developing countries.

### Management of casualties

Our present concepts result from military medicine; their applicability to civilian natural disasters remains to be investigated. Research might be focused on how the various hospitals handle the influx of patients, the allocation of resources, the operation of temporary facilities, the record keeping and the arrival and integration of foreign medical personnel and supplies. The average period of time elapsed between field rescue, evacuation, medical diagnosis and treatment, is a decisive factor, study of which can deeply influence future relief operations.

### Field hospitals

Either fully staffed military hospitals or packaged disaster hospitals are routinely requested or sent to the affected country. Their appropriateness (timing, site of operation, nature of services, actual cost to the affected country) should be regarded as an important topic for research. Similarly, studies could be carried out to facilitate the standardization of field hospitals existing in the disaster-prone countries. Alternatives to the costly airlifting of fully staffed army hospitals should be explored.

### Medical supplies

Operational research is needed to determine what medical supplies are:

- . actually needed (based on number and nature of injuries and standard acceptable treatments)
- . most commonly requested at local and national level
- . provided by the national or international community.

The three categories are likely to differ significantly. Techniques for rapid inventory, sorting and distribution of medical relief supplies should be developed. The need for specific supplies such as blood, plasma, antibiotics, and casting material must be determined on a rational basis.

### Disease control and sanitation

The question of the actual risk of increased disease transmission following natural disaster requires extensive, current and retrospective field study. The effectiveness of control measures and the techniques of epidemiological surveillance are areas of considerable practical interest. Expensive and sophisticated emergency measures are taken to distribute drinking water in affected rural areas. However, no systematic attempt has been made by scientists to estimate the vulnerability of water supply systems to contamination by specific infectious agents and determine the significance of such contamination. Results of chemical and bacteriological analysis of water samples performed before and after the earthquakes in Managua and Guatemala City are a valuable untapped source of research material. The role played by other factors (unburied bodies, rodents, insects, etc.) remains to be documented.

### International relief

The effectiveness and/or problems associated with the influx of large quantities of relief supplies and relief personnel need to be studied thoroughly and the results disseminated. Research should be undertaken in the affected countries, as well as in the countries providing assistance. The mechanism and motivation of the often burdensome response of the general public of developed countries (especially the medical community) are not fully understood. Research must be done on the problem of unacceptable or useless supplies so that organizational alternatives can be identified. Multidisciplinary studies of the role of foreign medical volunteers following earthquakes in Latin America will hopefully settle the controversy or their usefulness and provide the public health authorities and medical associations with guidelines and criteria

for a constructive approach. The investigation of the coordination among relief organizations and governmental agencies is likely to be more complicated. Authoritative studies and constructive suggestions of the scientific community are, however, essential to improve coordination, the key factor to efficient relief activities.

C. PROPOSED ROLE OF THE PAN AMERICAN HEALTH ORGANIZATION AND RECOMMENDED

1. Disaster Research in the Region

Health research on disasters has remained very limited in Latin America and the Caribbean where very few scientific articles or reports have been published. Extensive searches of literature either through available indexing services or regional libraries in Latin America turned up few references. In a comprehensive review of biomedical documents published in 1973 in Mexico, 2164 articles or documents were identified. A single 3-page article briefly reviewed the principles of mass treatment and triage in a hospital, even though Mexico experienced several flash floods and earthquakes in 1972 and 1973.

Several factors contribute to the present situation:

a. The need for reliable scientific knowledge is not generally perceived. Traditional cliches on explosive outbreaks of communicable diseases, mass hunger, social unrest and mass casualties being unattended for days by lack of medical supplies and personnel, are still widely accepted by the public, including health professionals.

b. The emotional impact of disasters calls for immediate relief, not for research. Strong personal involvement and commitment during the emergency preclude the necessary scientific dispassion and impartiality. During the acute emergency, observers and scientists may not be readily tolerated, unless officially sponsored or endorsed by reputable organizations.

c. Proper planning of research projects on health situations following catastrophes is complicated by the unpredictable nature of the natural event. Time and place of investigations remain unknown until the last moment.

d. Most investigators lack previous field experience. Stability and continuity in this line of research are difficult to achieve due to the relative scarcity of major disasters and the fluctuating funding sources. In the world, only two research groups have succeeded to achieve continuity over the last 5 years in the study of the health impact of natural disasters in developing countries(\*).

e. Lack of direct applicability and relevance of some scientific studies carried out on disasters. Greater concern for the short term usefulness of the investigations should be developed. Health scientists share responsibility for a lack of dialogue and mutual distrust between relief officials and researchers.

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Research Center on Disaster Epidemiology, Brussels, Belgium

## 2. PAHO's Current Activities

The scope of operational research needed for better disaster management greatly exceeds the present technical and material resources of the scientific community. Priorities need to be determined and a regional or global policy be developed in this new field. The relevance of the research to the needs of disaster-prone countries and relief organizations should be the key factor in determining research priorities. Small disaster-prone countries cannot be expected to carry out relief activities concomitantly with scientific research in the aftermath of a major disaster. Inter-country research projects will make better use of local scientific resources and will ensure that maximum knowledge is drawn from short-lived emergency situations.

The XXIV Meeting of the Directing Council held in October 1976 approved the Resolution X in which is requested the Director to set up a disaster unit whose functions, among others, would include the promotion of operational research to meet the needs of the countries in disaster situations.

Currently PAHO is funding a research project carried out on mental health problems caused by the Managua earthquake (1973). In addition, INCAP is participating actively as co-principal investigator in a major three-year National Science Foundation supported research "Longitudinal and cross-cultural study of the post impact phases of major national disasters (The February 1976 Guatemala Earthquake)!"

### 3. Proposed Role of the Pan American Health Organization

The Organization should play a leading role in the promotion and coordination of multidisciplinary and multinational research projects on the management of health problems following natural disasters.

The management of health problems cannot be significantly improved unless our scientific knowledge and understanding of emergency situations are considerably upgraded. Consequently, it is recommended that the Committee stress the importance of operational research to be carried out during the initial phase of emergency situations.

The following strategy is proposed:

#### 3.1 Promotion of disaster research as a topic for health research at national level

National health scientists in Latin American and the Caribbean disaster-prone countries should be actively encouraged by PAHO's technical divisions to consider disaster and emergency management as an essential research field. It should be implemented by allocating PAHO research grants to selected research projects, translating and publishing the results and conclusions of the relevant studies in the Bulletin and in specialized disaster journals.

#### 3.2 Organization of a regional or global meeting to determine priority research areas to be supported by the Organization.

The organization of a regional or global meeting of selected experts is recommended in late 1978 or early 1979 in order to propose scientific guidelines and advise the Organization on priority research topics of particular relevance to the management of health problems. Emphasis should be placed on research to be carried out during the emergency phase when most health problems, mismanagement and wasted expenditures take place. The cost of convening a working group is estimated at, approximately, \$10,000 which should be made available for the above purpose on the recommendation of the Committee.



### 3.3 PAHO Support of priority research projects

The peculiar nature and specific problems of disaster research require inter-country cooperation and especially among countries exposed to the same type of disasters. In addition to providing scientific guidelines and proposing priorities, the Organization should actively support valid priority research projects. This support should take the following forms:

- . Technical review of the proposed projects in the light of the guidelines and policies determined at the experts' meeting.
- . Technical endorsement of the project.
- . Assistance in identifying and approaching potential funding agencies.
- . Assistance in securing advanced approval of disaster-prone countries in order to permit an immediate implementation of the study should a disaster occur.
- . Direct technical, material or administrative field support according to a preestablished plan of action and protocol of research. The direct participation of the Organization in carefully selected research projects will be, in many cases, an essential condition of acceptability by the disaster-prone country and the funding agency, as well as a factor of success of the studies to be carried out during the actual emergency.

### 3.4 Allocation of PAHO resources to operational research in disasters

An active participation of the Pan American Health Organization in promotion and coordination of operational research in disasters will require that appropriate resources be made available on the recommendation of this Committee.

There is a considerable interest of funding agencies for disaster-related health research. The U.S. National Research Council (National Academy of Sciences), the U.S. National Science Foundation, the European Economic Community and especially the Governments of the Netherlands and Belgium have either funded or consider funding comprehensive research projects.

A leading role of the Organization with relatively limited expenditure will probably trigger considerable support to PAHO endorsed research projects. A high return may be expected in terms of reduced losses of human lives, improved emergency management and decreased unnecessary relief expenditures.

RESOLUTION X

EMERGENCY ASSISTANCE TO COUNTRIES OF THE AMERICAS

THE DIRECTING COUNCIL,

Bearing in mind the assistance given by the Pan American Sanitary Bureau on the occasion of the earthquake that occurred in Guatemala on 4 February 1976, the provisions of Resolution XXX approved by the XVIII Pan American Sanitary Conference in connection with the earthquake in Peru in 1970, and the recommendations concerning natural disasters contained in the Ten-Year Health Plan for the Americas;

Being convinced that similar emergency situations are bound to occur in the disaster-prone parts of the Region and are likely to affect countries that do not as yet possess comprehensive emergency relief plans or need technical assistance in order to update and apply them;

Considering that most of the assistance agencies are not properly equipped to provide help in the health field in carrying out their reconstruction, rehabilitation and planning tasks; and

Being anxious that the international assistance given to countries affected by natural disasters should be better coordinated, rational, and more effective,

RESOLVES:

1. To thank the Director and the Secretariat, and particularly the personnel assigned to Guatemala, for the assistance given to that country in connection with the earthquake of 4 February 1976.

2. To request the Member Governments to develop plans, and, as necessary, enact legislation, set standards, and take preventive or palliative measures against natural disasters and disseminate these measures throughout the sectors concerned, coordinating their action with that taken by the corresponding services of PASB.
3. To request the Director to set up within the Pan American Sanitary Bureau, after first compiling and analyzing the appropriate data and information, a disaster unit with instructions to define the policy of the Organization, to formulate a plan of action for the various types of disasters, to make an inventory of the human and other resources available, to train the necessary personnel, to prepare and disseminate the appropriate guidelines and manuals, and to promote operational research to meet the needs of the countries in disaster situations, and to ensure that this unit establish effective coordination with the United Nations Disaster Relief Coordinator, the International Red Cross, and other national and international bodies providing disaster assistance.
4. To request the Director to set up a natural disaster relief voluntary fund which can be used promptly and readily by the disaster unit.

(Approved at the tenth plenary session,  
1 October 1976)

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OUTLINE OF POSSIBLE RESEARCH AREAS1. Epidemiological Research

1.1 Study of disease and injury patterns following sudden disasters (earthquakes, hurricanes) in Latin America. Part of the study will be carried out immediately following natural disaster in the Americas and will provide data on type of lesions or diseases caused directly or indirectly by the disaster, the cause and time of death, and the age/sex distribution. The results will have a direct bearing on the provision of national and international relief in the health sector. Identification of special risk factors (housing, cultural patterns, geographical features) will assist in pre-disaster planning and emergency preparedness.

1.2 Short and long-term effect of natural disasters on communicable diseases.

Natural disasters are often thought to be associated with a risk of increased transmission of communicable diseases, especially gastroenteritis, and typhoid fever. However, there is little scientific evidence of increased incidence of communicable diseases following past natural disasters. The study will permit the development of a methodology for a disease surveillance system for gastroenteritis and other diseases in emergencies. The data collected will permit appropriate priority to be assigned to disease control activities in emergencies and the statement of a clear policy on mass immunization and other methods of disease control following natural disasters.

1.3 Recording-reporting system on mass casualties. Following natural disasters the normal registration of casualties and attendances at clinics are disrupted. A system, including preparation of guidelines, forms and reporting channels, will be designed to inform the authorities

and scientists on the demand for medical attention or emergency care after different types of natural disaster. After field testing the system may be proposed by WHO/PAHO to and adopted by disaster-prone countries to fit their own resources and needs.

## 2. Operational Research

### 2.1 Mechanism of coordination in the health sector

The second major problem during emergencies is the lack of adequate sharing of information and coordination mechanisms. The problem is particularly acute in the health sector where the need for speedy decisions conflicts with the need for coordination and information sharing. The project would call for the study of existing coordination mechanism and information flow in selected disaster-prone countries, the development of a pilot system and its trial implementation during actual emergency in a cooperating country of the Region.

### 2.2 Relief supplies

Considerable amounts of medical supplies are sent by bilateral or international donors to disaster affected countries. Observations suggest that the amounts of medical supplies sent usually greatly exceed by emergency needs at country level. The most critical factor is the breakdown of the sorting, storing, inventorying and distribution systems. The project aims to develop a PAHO/WHO list of supplies most commonly needed following each type of disaster, study the cost/benefit of local or regional stockpiling based on a prior inventory of existing resources. The project may also include analysis of the entire distribution system (from the port of entry to the first aid post) during emergencies. The

results of the project could be translated into more effective assistance being given during emergencies and an increased availability of medical supplies at the site of the disasters in rural areas.

### 2.3 Search and rescue

Available information suggest that in large scale disasters search and rescue are overwhelmingly carried out by untrained local populations (relatives and neighbors). The project will attempt to determine the factors directing search and rescue following earthquakes, and its effectiveness in saving lives and preventing disabilities. Subsequently, modern techniques in emergency transportation and training --of the population, medical and paramedical staff-- will be applied in selected areas to correct observed deficiencies. This project calls for close cooperation with National Red Cross Societies and the League of Red Cross Societies in Geneva.

### 2.4 Management of mass casualties

The occurrence of massive casualties requires that special procedures be adopted. A methodology to handle mass casualties with limited administrative, human and material resources in a developing country has not yet been developed. Triage techniques, role of self-sustaining medical emergency units (e.g. packaged prefabricated hospitals) at national levels, guidelines, etc. should be developed based on the analysis of past disasters and direct observations during the acute initial phase of future disasters, for example earthquakes, urban fires, industrial accidents and major air crashes. Advisory services and training will be part of the project.

## 2.5 Cost-effectiveness of field disaster hospitals

Following major disasters, field hospitals of all types are sent to the affected area. Available scientific evidence suggests that sophisticated field hospitals are often unnecessary or even counter-productive, since they may arrive too late, and are equipped and stuffed for the wrong type of care. The project will collect and analyze data on the need for field hospitals in past and current disaster situations (fully staffed army field hospitals and packaged disaster hospitals) and will compare their cost-effectiveness with that of alternate solutions, such as the development of national emergency services, the establishment and maintenance of small and simple field hospitals at country level, etc. The project will secondarily result in an inventory and eventual standardization of existing field hospitals in disaster-prone countries.

## 2.6 Relief teams and medical volunteers

Following disasters, relief teams and volunteers may play a role in assisting the affected population. However, experience has shown that foreign volunteers or teams must meet some prerequisites to serve efficiently. Individual volunteers without proper knowledge of the language, the local culture or disease patterns are a burden to national authorities. The study will identify the characteristics of medical volunteer personnel, suggest the minimum qualification and training required and develop guidelines and training material. The potential role and cost-effectiveness of preorganized medical teams from developed countries will also be analyzed.

2.7 Sanitation and water supply

Following earthquakes and hurricanes, the provision of basic sanitation facilities to the population is dramatically reduced. Scientific studies are required to assess the vulnerability of existing sanitation and water supply systems (from rural wells to urban distribution network) during natural disasters. The results will permit technical guidelines to be drawn up, the training of sanitary personnel, the proposal and implementation of measures to minimize risks and reduce the effect of the disaster on public health.

2.8 Mental health

Recent studies suggest that disasters may have a definite long-term effect on the mental health of the population. The project will evaluate the mental health problems caused by disasters and assist selected countries in developing their emergency services to adequately meet the immediate and long-term needs of victims.

2.9 Nutritional surveillance in times of food shortage

Considerable food assistance is provided to drought-stricken areas (e.g. Haiti). Indicators and techniques will be developed and implemented to monitor the nutritional situation in areas vulnerable to widespread acute malnutrition. Information on the geographic distribution of severe malnutrition and its evolution with time will assist the authorities in making decisions on the need for food distribution.

2.10 Two-way field radiocommunication network

Radiocommunication is often critically needed following disasters, especially by the health services. The project will review the desirability and feasibility (technical and legal) of the use of a portable radio network by the health services in emergency situations.

## *Inside the Agencies*

### THE PAN AMERICAN HEALTH ORGANIZATION

The Pan American Health Organization (PAHO) has two components. The Pan American Sanitary Bureau (PASB), founded in 1902, serves as the health agency affiliated with the Organization of the American States (OAS). In 1947 the PASB became the Regional Office for the Americas of the World Health Organization. The Organization provides advice and technical assistance to help its thirty-one Member Governments expand health services, better use of community resources and solve specific health problems. Among these problems are emergencies and disaster situations.

#### *PAHO Response to Recent Disasters*

In recent years the World Health Organization has been called upon more frequently to participate in emergency relief operations, especially when natural or other disasters have created threats to public health.

The Americas are particularly vulnerable to natural disasters. Earthquakes such as those that have occurred in Peru (1970), Nicaragua (1972), and Guatemala (1976) occur with relative frequency and are often devastating. Hurricanes strike almost every year in the Caribbean or along the Atlantic Coast of Central America. Floods attract less attention but are probably more damaging to economic and social development in the affected areas.

PAHO emergency assistance is available to the Government of a disaster-stricken country, provided a genuine emergency exists and national or other international resources are not sufficient or not available in practice to meet the immediate health needs. PAHO aid has traditionally consisted in the provision of specialized medical supplies or equipment and technical assistance on specific public health problems such as the prevention of communicable disease outbreaks, the establishment of an emergency potable water supply, vector control, the restoration of medical services, etc. This traditional assistance, although it is of a high professional standard, has up to now had limited impact on emergency preparedness planning and international relief efforts. A more systematic approach which emphasizes national emergency planning and makes maximal use of the Organization's capabilities and resources is currently being developed.

#### *The Emergency Preparedness and Disaster Relief Coordination Unit*

In October 1976 the Directing Council of PAHO, "anxious

that the international assistance given to countries affected by natural disasters should be better coordinated, rational, and more effective" requested that the Director set up "a disaster unit with instructions to define the policy of the Organization, to formulate a plan of action for the various types of disasters, to make an inventory of the human and other resources available, to train the necessary personnel, to prepare and disseminate the appropriate guidelines and manuals, and to promote operational research to meet the needs of the countries in disaster situations, to ensure that this unit establish effective coordination with the United Nations Disaster Relief Coordinator, the International Red Cross, and other national and international bodies provided disaster assistance"\*. In March 1977 a permanent Unit for Emergency Preparedness and Disaster Relief Coordination was established at PAHO Headquarters in Washington, D.C. The Regional adviser, a medical epidemiologist with extensive experience in disaster relief and operations research, and an administrative assistant, serve as the focal point which will mobilize and coordinate the Organization's technical assistance in emergency preparedness and its response in the aftermath of disasters.

PAHO's resources consist of over 1500 permanent staff members, including 650 professionals in the various public health disciplines who are stationed permanently throughout the Region served by PAHO. The expertise of PAHO's professional staff is diverse; in addition to health administrators, planners, nurses, engineers, and epidemiologists, there are information system analysts, health educators, rehabilitation specialists, radiation and traffic accident advisers, etc. This untapped reservoir of international expertise constitutes a unique resource to the United Nations, and especially the United Nations Disaster Relief Office, for assisting disaster-stricken countries in the assessment of health needs and the management of emergencies.

Material resources have increased recently but remain modest compared with the overall international response following major disasters. PAHO material assistance at the present time consists of:

The Emergency Revolving Fund, which is available for the immediate financing of emergency relief supplies (e.g. vaccines in the case of unforeseen outbreaks). Its use is subject to a commitment by the receiving Government to reimburse the Fund as soon as possible.

\*Tenth Resolution of the xxiv meeting of the Directing Council of the Pan American Sanitary Bureau.

The Natural Disaster Relief Voluntary Fund\*, established 1976, which will finance the provision of essential relief supplies and of technical assistance to the disaster-affected countries in carrying out a realistic assessment of the needs based on epidemiological techniques and in improving national management and coordination of international assistance.

The Emergency Unit's work include the following activities:

Preparation of PAHO to respond to an emergency in a member country

In addition to the formulation of emergency administrative procedures (procurement, recruitment, etc.) for the Organization, a roster is being compiled of PAHO staff and outside experts available for short-term assignments in the event of emergencies. The areas of expertise will include: general assessment of emergency health needs, emergency care, epidemiological surveillance and disease control, environmental health, sorting and inventory of relief supplies, reorganization of laboratories, mental health, etc. The most appropriate experts will be made immediately available to assist the countries in the event of a disaster.

Emergency preparedness on the part of the countries  
Technical assistance (seminars, workshops, exchange of information, short-term advisor services, etc.) are provided upon request from the countries. For example, a multinational seminar was organized in Guatemala in November 1976 on the subject of public health administration in the aftermath of disasters. As a result of the seminar's recommendations, PAHO will prepare guidelines on public health management during emergencies. This authoritative guide will outline the modern concepts of disaster management and summarize recent knowledge in disaster epidemiology.

Training and research

Manuals, guides, and conferences are no substitute for practical experience with the health problems that occur in the wake of major emergencies. The Organization is currently studying the feasibility of providing field training during actual emergencies for PAHO staff and national counterpart personnel.

Operations research — that is, problem-solving research — is essential in the aftermath of a disaster. Key problem areas are being identified and resources will be allocated in advance to selected research institutions or associations. At a time of an emergency the appropriate research grants will be immediately activated.

Not surprisingly, the implementation of this program will require careful planning and additional resources. There is no doubt that more efficient and rational emergency assistance is necessary at the international level.

\*Tenth Resolution of the xxiv meeting of the Directing Council of the Pan American Sanitary Bureau.

## A NEW DISASTER ASSOCIATION IS ANNOUNCED

### *The European Association for the Epidemiology of Disasters*

An association with the title "European Association for the Epidemiology of Disasters" was incorporated in March as a non-profit making organization in Belgium. The Association establishes a formal link between two centres for disaster research: the Center for Research into the Epidemiology of Disasters at the University of Louvain, in Brussels, and the London Technical Group. From the outset, two other organizations will be involved as associate members: the 'International Dispensary Association', Antwerp, and 'Médicines Sans Frontière', of Paris, both of which have been involved with problems of providing medical care after disasters in developing countries.

The object of the Association — which, although it will have a separate secretariat in Brussels, will not become an organization in its own right — is to advance the subject of Disaster Epidemiology through developing scientific and technical expertise for the evaluation of health needs following disasters in developing countries, to bring together groups who are concerned with the subject, and to encourage publication on the subject.

## DISASTER RESEARCH UNIT, BRADFORD

The DRU at Bradford University has announced that it will cease to exist from the Autumn of 1977. Although the University of Bradford has stated its belief that research into the mitigation of human disasters is extremely important and that the work of the Unit should be continued, lack of finance has forced the University to make major economies in the year 1977-78.

The DRU was founded in 1973 under the sponsorship of the Leverhume Trust, the Overseas Development Ministry and the University of Bradford for an initial period of three years. During the period of its existence the work of the Unit, under the leadership of James Lewis, had included a series of "occasional papers" the main thrust of which has been risk analysis and pre-disaster planning. The three members of the DRU hope to be able to continue their work on disasters individually.

We are glad to include an article in this issue by James Lewis which gives an account of the interdisciplinary approach which the DRU has fostered particularly in relationship to pre-disaster planning.