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DISASTER PREPAREDNESS AND EMERGENCY RELIEF: PAHO'S RESPONSE TO HURRICANES GEORGES AND MITCH

In 1998, Hurricanes Georges and Mitch became two of the most devastating natural disasters in decades; Hurricane Mitch is considered to be the worst disaster in Central America in the past 200 years, with tremendous damage to all sectors. Thousands of deaths and missing were reported, and millions were affected. Development in the countries, a difficult process in itself, was seriously threatened by the economic and social damages caused by these disasters.

Similar disasters may occur again at any time. Having been hit yesterday does not reduce the chance of being hit tomorrow.

Despite the rapid response from the health sector, the magnitude of the events revealed certain deficiencies which should be corrected, especially in the areas of gathering and analyzing epidemiological information, emergency supply management, institutional organization, electronic information management and coordination with other sectors and organizations, rehabilitation, and reconstruction policies.

The Executive Committee may wish to consider the recommendations from the Evaluation Meeting on the Preparedness and Response to Hurricanes Georges and Mitch (15-19 February 1999, Santo Domingo, Dominican Republic), with a view to strengthening disaster health management at the national level and within PAHO/WHO.

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1. Introduction

In the last two years, natural disasters such as those caused by El Niño, the earthquakes in Bolivia, Colombia, Ecuador and Peru, and Hurricanes Georges and Mitch, were forceful reminders that the countries of the Americas are perpetually at risk from an array of natural hazards. Hurricanes, floods, landslides, earthquakes, volcanic eruptions, tsunamis, drought and bushfires occur regularly throughout the Region. Rampant poverty, rapid urbanization, ecological degradation, and inaccessibility to land seriously intensify the population's vulnerability.

Despite the frequent occurrence of disasters in the Americas, it is evident that the government agencies charged with preparing for and managing the impact of disasters are ill prepared for events of such magnitude. However, it is clear that some disasters, such as Hurricane Mitch, would have overwhelmed even the best-prepared disaster management agencies. Disasters have clearly revealed the prevailing strengths and weaknesses within both governments and society in terms of addressing the effects of a major event. They have also highlighted the fact that the initial response to these disasters included, inevitably, a high degree of improvisation.

2. The Effects of Hurricanes Georges and Mitch

2.1 *Hurricane Georges*

Tropical Depression Number 7 of the 1998 hurricane season developed from a tropical wave over the Eastern Atlantic, south-southeast of the Cape Verde Islands, on 15 September 1998. The system rapidly intensified to form Tropical Storm Georges on 16 September 1998 and reached its peak as a category 4 hurricane on 19 September.

Damage was recorded along the path of Hurricane Georges. Saint Kitts and Nevis, Antigua and Barbuda, Montserrat, Anguilla, the British Virgin Islands, and Puerto Rico were all affected by this system. However, most of the damage occurred in Saint Kitts and Nevis, Cuba, the Dominican Republic, and Haiti.

Specific damages to the health sector included the loss of 90% of the Joseph N. France Hospital in Saint Kitts. Since opening in 1966, this hospital has suffered significant hurricane damage on 10 separate occasions, the previous most recent caused by Hurricane Luis in 1995. Of 11 health centers, six were damaged, and the Alexandra Hospital in Nevis was flooded. The water supply system suffered less damage. In Cuba, 13 of the 14 provinces suffered varying degrees of damage; however, because of efficient planning, damages to the health sector were not as severe. Six deaths were reported and more than 800,000 persons were evacuated as a precautionary measure. In Haiti, only the

Jacmel Hospital was damaged, although it remained operational during the emergency. Two health units lost their roofs in Nippes. The pre-existing water supply problems in Haiti were aggravated by floods, which, together with overcrowded shelters and a lack of basic sanitation, were the main health risks. In the Dominican Republic, floods destroyed equipment at the Tamayo Hospital, which was unable to function, and 87 health facilities were damaged. Some of the water distribution systems were either damaged or destroyed; all were incapacitated in the first 24 hours after the hurricane because of loss of power.

In Puerto Rico, 78 civil divisions reported extensive damage to houses and approximately 28,000 persons were temporarily housed in emergency shelters. More than 700,000 persons were without water services for varying lengths of time and more than one million without electricity. Most of the health facilities remained functional after the hurricane.

All deaths (8) occurred during the post-impact phase, due to structural damage, power outages, and injuries sustained during clean up. The fact that no deaths were attributed to the direct impact of the storm itself shows that hurricane warning systems have improved substantially in Puerto Rico.

Table 1. Damages from Hurricane Georges

	Dominican Republic	Haiti	Cuba	Lesser Antilles	Puerto Rico*
Deaths	283	200	6	5	8
Injuries	596	42		2	
Missing	64	30			
Housing destroyed or affected	171,000	9,924	40,000		82,685**
Affected population	500,000	343,833	200,000	12,000	1,728,000

Source: Office for the Coordination of Humanitarian Affairs (OCHA) Situation Report, National Reports.

*Centers for Disaster Control and Prevention, Morbidity and Mortality Weekly Report, Vol. 47/No. 42.

**FEMA, Information on Hurricane Georges in Puerto Rico.

2.2 *Hurricane Mitch*

Mitch, the most devastating hurricane to hit Central America in two centuries, left behind unprecedented levels of destruction and hundreds of thousands of shattered lives. Apart from reportedly killing some 9,000 people and leaving many thousands without

homes or livelihood, it destroyed or damaged a large part of the health infrastructure, including health centers, hospitals, the vaccine cold chain, and water pipes and sewers.

The hurricane developed in the Caribbean itself as a tropical storm on 22 October and intensified over a period of one week, until it was upgraded to a category 5 hurricane on 27 October. Hurricane Mitch was different in a number of ways:

- The trajectory of this hurricane was particularly erratic: it was expected to hit Belize and the Yucatan peninsula, but actually did much less damage there than to other areas (virtually no damage in Mexico).
- The storm moved very slowly and hovered for two days off the coast of Honduras before touching down on the mainland.
- Damages were not caused by high winds, but rather by heavy rainfall—more than two feet in a single day—which caused rivers to overflow and isolated large portions of the subregion.

Hurricane Mitch affected most of the population of Honduras and Nicaragua, large parts of Guatemala and El Salvador and, to a lesser extent, Belize and Costa Rica. The governments reported some 9,000 deaths, 9,000 missing, and millions of affected or homeless. However, the accuracy of these estimates has been questioned.

The figures reveal just how vulnerable the population is to disaster, an indicator of concern for the future. The damage to health infrastructure was unparalleled. In Honduras, the damages to the water supply system were in the order of US\$ 200 million; 23 hospitals were reported damaged, 123 health centers were affected and 68 of these could not function at a time when more than 100,000 people needed medical attention. In Nicaragua, one hospital, 90 health centers, and 400 health posts were damaged, while 16 health centers in El Salvador and more than 50 in Guatemala were affected.

The following table summarizes the damages:

Table 2. Damages from Hurricane Mitch

	Honduras	Nicaragua	Guatemala	El Salvador
Deaths	6,600	2,447	263	240
Missing	8,000	885	121	235
Housing: destroyed or affected	70,000	36,368	21,111	10,372
Affected population	2,100,000	885,000	105,700	84,000

Source: Office for the Coordination of Humanitarian Affairs (OCHA) Situation Report.

3. The Response to Hurricanes Georges and Mitch

3.1 *Response by the Affected Countries*

Ministries of Health undertook intensive measures to guarantee the provision of basic services to the population affected, isolated or in shelters. The experience gained in disaster preparedness and decentralization was decisive for a rapid response.

The health response by the countries varied according to level of development, stability and experience of the health disaster program in the Ministry of Health (full national health reports have been compiled and are available upon request or on the Web at: <http://www.disaster.info.desastres.net/mitch>). All affected countries faced certain common challenges:

- As usually is the case, information was slow in coming and insufficient for precise resource allocation and setting of priorities in the immediate aftermath. Assessment of damages and needs is an area where increased training is required.
- The number of injuries and trauma caused by the hurricane was modest, as can be expected in flooding.
- Logistical and communication problems were the major constraints, not the lack of local medical personnel or supplies at national level. Foreign medical relief teams were not required for immediate life saving activities.
- The displaced population, many of whom had limited access to health care prior to the disaster, dramatically increased the demand for routine health care in areas in which they were resettled or evacuated. This problem will require sustained attention for 6-10 months.
- Ensuring the quality control and availability of drinking water required large-scale local solutions. Distribution of small containers and chlorine tablets could not comprehensively address the issue.
- The coordination of nongovernmental organizations (NGOs) and the dissemination of information to donor agencies varied and could have benefited from a more proactive role on the part of ministries of health.

The multitude of actors from the relief sector greatly complicated coordination by the national health authorities. Several factors contributed to this situation, among others:

- (a) The number of trained professionals in the health disaster management field is small, and these persons may be assigned to other tasks during emergencies. SUMA trainees are a case in point.
- (b) The number and frequency of disaster preparedness activities (training courses and exercises) has decreased in some countries of the Region in recent years, and this had an effect on coordination after the disaster.
- (c) In some cases, the duplication of tasks or the arrival of unsolicited personnel, material, equipment and supplies could have been avoided by improving the information flow and coordination. This was also true among international agencies and UN System.
- (d) The same applies to communication and coordination between civilian and military groups, both national and foreign.

3.2 *Panamericanism in Action*

Despite certain coordination problems, which are bound to arise in disasters of this magnitude, the humanitarian assistance that arrived following Hurricanes Georges and Mitch demonstrated generous and impressive solidarity on the part of the countries of the Region or, in other words, a strong sense of panamericanism. Practically every country sent some form of collaboration to the hurricane-affected countries, personnel as well as supplies. It is important to note that almost every country took the time to determine—before sending anything—what exactly was needed and then tailored their donations to these requests.

Argentina, Chile, Colombia, Costa Rica, Cuba, Ecuador, Mexico, Panama, Peru, Uruguay, and Venezuela, among others, provided medical and epidemiological equipment, and supported the national efforts in medical care, disease surveillance and control, vector control, safe water, transport and communications, safe food handling, nutrition, and mental health.

In addition to sending essential drugs, equipment to make water potable, and other supplies to meet immediate needs, these countries continued to collaborate in longer-term health programs.

3.3 *Response from PAHO/WHO*

Hurricanes Georges and Mitch posed an enormous challenge to PAHO's response capacity. In each case, PAHO/WHO Representatives, assisted by their country-level

disaster focal points, the subregional advisers from the Emergency Preparedness Program and the Organization and other staff, collaborated with national authorities in five principal areas:

- epidemiological surveillance and control;
- information for the donor community;
- needs assessment;
- implementation of the SUMA system;
- mobilization of resources.

3.3.1 *Epidemiological Surveillance and Control*

During the disasters of 1998, surveillance efforts focused on specific diseases considered to pose the greatest public health risk: water and foodborne diseases including cholera, and vector-borne diseases such as malaria and dengue. Leptospirosis surveillance was implemented specifically in Central America.

Limited surveillance information prior to the disasters made it difficult to separate the incidence of disease into pre- and post-disaster periods. Specific instruments designed to monitor deaths, injuries, and diseases in temporary shelters were clearly insufficient because of the magnitude of the events. Consequently, some information was incomplete or misleading. This led to the spread of rumors, including false reports of outbreaks of communicable diseases, a call for mass vaccination campaigns that were not required in the Region, and warnings of mass outbreaks caused by cadavers (which in fact pose little risk).

However, improvements were gradually made to epidemiological surveillance and reporting systems following Hurricanes Georges and Mitch, to a point where daily summaries were published and used broadly. The assignment of a PAHO epidemiologist to each department in Honduras was very valuable. Perhaps, in future disasters PAHO should continue to establish an operational presence at the department or district level.

Epidemiological surveillance was complemented by disease control measures. Although no outbreaks were documented during the immediate emergency period following hurricanes, it is important to note that there is indeed an increased risk of outbreaks in the first few weeks, especially of diarrheal diseases and respiratory infections. Leptospirosis, reported in Nicaragua, is a common occurrence after flooding.

The number of cases of cholera did not increase significantly and were mostly attributed to food contamination in pre-existing foci. In some cases a decrease in reported cases was noted. The lack of major outbreaks in the immediate aftermath of Hurricanes Georges and Mitch should not lead to a false feeling of security. In the medium term, with the deterioration of the environment, the lack of resources and the subsiding public concern, the possibility of secondary outbreaks remains serious. As a result, PAHO and UNICEF jointly launched an international appeal for cholera surveillance and control in Central America. This initiative will help to strengthen the country effort to carry out control measures long overdue before the hurricanes.

3.3.2 Information for the Donor Community

The Internet, and particularly the use of electronic mail and the World Wide Web (including databases, and text and graphics files), has become an important part of most day-to-day business applications, and disaster management is no exception. It has also contributed to reshaping the traditional relationships among humanitarian actors in terms of the collection and management of data and the production and use of information.

There was a substantial increase in the local use of Internet for early warning purposes to track the progress of Hurricanes Georges and Mitch and, for a one-month period following Hurricane Mitch, information was also circulated daily, via an Internet-based listserv, to more than 3,000 persons and institutions worldwide, both in English and Spanish. However, this service was not fully operational the first week after the disaster due to the slow influx of information from the field and the need to streamline the analysis of the data received. By the second week, a special web site was created to post epidemiological reports and guidelines prepared by many PAHO technical programs (see the web site: www.paho.org/english/ped/pedmitch.htm). As a result of these experiences, a permanent mechanism has been left in place whereby PAHO's technical programs maintain contact and are ready to present a more speedy and coordinated response to any new disaster situation.

In some instances, the unrestricted nature of the Internet distorted some traditional scientific concepts (for instance on epidemiological issues). In other cases the speed with which information was posted (regardless of whether or not it had been verified) contributed to inaccuracies and duplication.

However, on balance, the Internet greatly aided the distribution of information on needs in the wake of these disasters and enabled a fluid dialogue on disaster management issues.

3.3.3 Needs Assessment

The national health authorities received support from PAHO/WHO Offices in the affected countries and from PAHO's Caribbean Program Coordinator to carry out an immediate assessment of needs. After Hurricane Mitch, more than 60 international experts were deployed to the affected countries in Central America. This was in addition to the more than 150 PAHO staff (professional and administrative) permanently assigned to the subregion. Only technical personnel were mobilized, and in the future, they should be complemented with administrative staff (for procurement, finance, personnel issues, etc.). This large-scale deployment of technical cooperation allowed response activities in the health sector to focus directly at the local level. It also enabled PAHO Headquarters to receive, within the first 24 to 36 hours after the disaster, a rapid evaluation of health sector needs and to communicate this information to the donor community. Although there were differences from country to country among the health sector needs, common to all were medicines and essential medical and surgical supplies, safe water, and emergency repairs to health facilities.

In addition to information management and epidemiological surveillance, PAHO also mobilized experts to provide technical cooperation in drinking water and sanitation; food handling and nutritional surveillance; vector control and use of insecticides; immunizations; assessment of damages; project and proposal preparation; maternal and child health in emergency situations; disaster management; management of supplies; and mental health.

3.3.4 *Implementation of the SUMA System*

SUMA, the humanitarian supply management system, was very effective in meeting the challenge of a multicountry disaster. The SUMA system was created by PAHO in 1990, with support from the Government of the Netherlands, to address the management problems caused by a large influx of donations in the wake of major disasters. Today, a humanitarian NGO, FUNDESUMA, manages SUMA. Under a contract with PAHO following Hurricanes Georges and Mitch, the SUMA system was set up and helped each interested country to achieve transparency and accountability in the supply management process—from receipt of donations, through warehousing and distribution. The chart below illustrates how SUMA was able to mobilize additional human resources from unaffected countries to bolster the management of supplies in Central America.

The post-disaster efforts in Central America have helped to highlight issues that will require further work.

- Supply management is best begun as soon as possible after the impact of a disaster as, thanks to modern communications and improved transportation, there is less of a gap between the impact of a disaster and the arrival of supplies.



- Although SUMA has trained almost 2,000 individuals throughout the Americas, few of these volunteers are available within their own country at the time of a disaster, so SUMA must mobilize teams from neighboring countries. However, although they might not be able to directly execute SUMA activities, the trained nationals do offer indispensable support and make possible the rapid acceptance of SUMA in their country.
- In large disasters, the international community sees the adoption of a supply management system by disaster-affected countries as a very clear indicator of a country's willingness and commitment to transparency and good governance. Problems and delays encountered in some countries coincided more often than not with a reluctance of some institutions to openly share information on exactly which supplies they received and where they were directed.

3.3.5 *Mobilization of Resources*

Immediately after Mitch, PAHO made US\$ 350,000 available from its regular funds to Honduras and Nicaragua to deal with the immediate health problems. The chart below details the financial resources received to date from the international community.

These emergency funds were used to procure pharmaceuticals and vaccines, and to support activities such as epidemiological surveillance, control of vector-borne diseases, immediate assistance to victims, etc.

Later, based on the joint damage assessment carried out by PAHO, the Ministries of Health and UNICEF, PAHO's Director assigned US\$ 1 million in additional resources to the countries of Central America for cholera control. The contribution was matched by UNICEF and a joint appeal was launched. The rapid evaluation of needs was instrumental in allowing PAHO to issue an immediate humanitarian appeal. It is very important to note the close cooperation between UNICEF and PAHO/WHO in the formulation of projects and the identification of the health priorities.

At a later stage, WHO's Director General issued a follow-up appeal.

Table 3. Mobilization of Funds in US\$ by PAHO/WHO

DONOR ¹	HURRICANE GEORGES	HURRICANE MITCH	TOTAL IN US\$
CIDA	127,220.91	321,330.72	448,551.63
OFDA	750,000.00	2,000,000.00	2,750,000.00
DFID (approximately)	*580,000.00	769,000.00	1,349,000.00
ECHO	692,860.00	---	692,860.00
NETHERLANDS	309,549.08	25,000.00	334,549.08
SIDA	---	500,000.00	500,000.00
NORWAY*	---	511,247.00	511,247.00
IRELAND*	---	145,695.00	145,695.00
Grand Total	2,459,629.99	4,272,272.72	6,731,902.71

* In response to the appeal issued by WHO's Director General.

The UN's Office for the Coordination of Humanitarian Affairs (OCHA) also launched a joint UN appeal for extensive and ongoing humanitarian needs during the

¹ CIDA (Canadian International Development Agency); OFDA (Office of US Foreign Disaster Assistance); DFID (Department for International Development of the UK); ECHO (European Commission Humanitarian Office); SIDA (Swedish International Development Authority).

interim period between the immediate emergency and the concretization of the reconstruction process.

However, in contrast to the very generous response to PAHO's first appeal, there was no response on the part of the international community to the health projects submitted by PAHO/WHO through the joint UN Appeal. Consultations with OCHA and other offices highlighted the need for PAHO/WHO and the Ministries of Health to continue to actively promote their own priorities—at the local and global levels—through meetings with donors, contacts with embassies, and direct negotiations. Participating in the United Nations joint appeal does not lessen the need for active mobilization of resources by each agency.

3.4 *Rehabilitation, Reconstruction*

When the health sector clearly defines and includes disaster prevention and mitigation policies in its regular programs, it should be easier to apply vulnerability and risk evaluation measures in health institutions and other vital areas such as drinking water supply systems, and sewerage systems. The absence of policies places the health sector at a disadvantage, at a time when it should be establishing and negotiating its rehabilitation and reconstruction priorities following natural disasters.

At the international level, efforts have been made to include these policies in the framework of technical cooperation, but this must be done on a continuous basis.

3.5 *Regional Disaster Organizations*

The Region of the Americas has a significant number of national, subregional and regional organizations that develop efforts in the disaster field. In addition to the civil defense organizations or emergency committees, there is the Caribbean Disaster Emergency Response Agency (CDERA), and the Center for the Prevention of Natural Disasters in Central America (CEPREDENAC). Both the Organization of American States (OAS) and PAHO have specific disaster programs. Hurricanes Georges and Mitch proved that this network can and must be strengthened in order to improve coordination before and after emergencies.

However, the two subregional agencies have different roles. CDERA was created as a Caribbean coordinating response mechanism, and as such, performed well after Hurricane Georges. CEPREDENAC, on the other hand, was created as a scientific coordination body for Central America. Lately, CEPREDENAC has made progress in improving and strengthening its disaster preparedness and response role.

There are efforts to create other regional organizations dealing with disasters. PAHO believes that the multiplication of other organizations and/or institutions might diminish and fragment the work that the present organizations are doing.

4. Conclusions

Hurricanes Georges and Mitch were devastating events that caused serious damage to the development of the affected countries. In addition to the considerable loss of life and adverse health effects on the population caused by these hurricanes, some countries were already extremely troubled by a previous high level of vulnerability. Others saw their efforts toward growth and development seriously threatened. Dozens of health facilities and water supply systems were damaged or destroyed, increasing the risk of inefficient urgent care or the outbreak of epidemics due to unsanitary conditions.

The health sector, in spite of having been prepared over the years for disasters, was in many cases overwhelmed by the magnitude of events. This confirms that there is still much to be done in terms of establishing effective policies for disaster preparedness and mitigation.

5. Recommendations for Consideration by the Executive Committee

At the national level:

- (a) The health sector must develop integral disaster management policies which include preparedness, prevention and mitigation programs. These policies must be a part of the health sector reform, and specialized offices must be organized to deal exclusively with the issue.
- (b) The health sector must develop disaster mitigation programs focused on:
 - vulnerability analyses in health facilities and water and sewerage systems.
 - the application of reinforcement and reconstruction measures in accordance with vulnerability studies.
- (c) National disaster preparedness programs must be strengthened through:
 - training;
 - contingency planning;

- coordination with other sectors;
 - supply management programs;
 - technical standards and guidelines on the use of medicines, vaccinations and other disaster supplies;
 - standards for the recuperation and acceptance of donations and arrival of foreign health personnel.
- (d) The sector must develop its communications and information systems to include electronic means of transmitting data and situation analyses (internet).

At the Regional level:

- (a) PAHO coordination must be strengthened with other regional institutions dedicated to disasters, such as CEPREDENAC, CDERA, or having a specific disaster program, such as the OAS, while avoiding the creation of new institutions.
- (b) The Executive Committee may wish to consider endorsing the recommendations emanating from the Evaluation Meeting on the Preparedness and Response to Hurricanes Georges and Mitch and their incorporation into regional PAHO/WHO policy.