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DISASTER MITIGATION IN HEALTH FACILITIES

In the past 15 years, 93 hospitals and 538 health units in the Region have suffered damages as a result of natural disasters. The reason that natural disasters have had such an impact is because the majority of the 16,000 health facilities with more than five beds were built or modified without taking safety or vulnerability considerations into account.

In an interdivisional effort, PAHO has been conducting a project on disaster mitigation in health facilities. However, despite the substantial scientific and technical achievements of both this project and national initiatives, the magnitude of the problem in the Region is still alarming. Most of the countries lack a multisectoral political commitment to give priority—that is, allocate resources—to reducing the vulnerability of the health sector to disasters.

It is proposed that this topic be placed on the agenda of the high-level meetings of the Region, so that not only the health sector but other sectors and the political authorities of the Member States heed the recommendations of the International Conference on Disaster Mitigation in Health Facilities (Mexico, 1996).

The Subcommittee on Planning and Programming is requested to furnish guidelines and provide support for the strategy to be followed to ensure that disaster mitigation criteria are included in the hospital accreditation process and in the prerequisites for the investment projects of country institutions and international financing agencies.

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EXECUTIVE SUMMARY

The Region of the Americas is frequently ravaged by natural disasters that damage not only the health of the population but the health infrastructure, which includes health care facilities.

Several studies have been conducted on the economic implications of the destruction of health care facilities or the interruption of their services after a disaster of a certain magnitude. ECLAC notes that in the past 15 years, some 93 hospitals and 538 health units have been damaged as a result of natural disasters. The cumulative direct losses from disasters in the Region have reached US\$ 3,120 million.

The present document analyzes the experience in disaster mitigation currently available in some of the countries of the Region, ranging from basic vulnerability studies for new hospital construction to the structural reinforcement of existing hospitals. It also analyzes disaster mitigation measures in the structural, nonstructural, and functional components of hospitals. From this analysis it can be observed that the cost of including prevention measures in hospital construction from the planning phase on increases the total cost by 2%.

The document points out that the objective of disaster mitigation is to protect the life of building occupants, ensure the uninterrupted and proper operation of the services, and limit damages to facilities for a quick return to normal.

It analyzes the persistent problems that have kept the countries of the Region from developing more aggressive disaster mitigation policies, noting that discussion of the topic has remained at the purely technical level without reaching the policy-making levels, that the countries do not allocate budgetary resources for disaster mitigation programs, and that there is a serious lack of information dissemination on the topic, since in many sectors it is virtually unknown.

Another underlying problem is the existence of building and safety codes that do not incorporate modern aspects of disaster mitigation. These codes are designed to protect and save lives in disaster situations but not to keep health care facilities in operation. Similarly, disaster mitigation is not included in the criteria governing the quality of care in the services. One problem that is underscored is the failure of bilateral financing institutions to insist on safety criteria in new construction projects.

The document emphasizes the recommendations formulated by the countries represented at the International Conference on Disaster Mitigation in Health Facilities (Mexico, 1996), and it highlights the recommendations that request immediate fulfillment by the countries, together with those that should be fulfilled by the year 2001, in compliance with a plan of action.

It proposes a plan of action calling for improved institutional coordination, stronger policies and programs for disaster mitigation, and reinforcement of aspects related to training and information dissemination about the topic in the health sector and other related sectors.

The document concludes by emphasizing that the problem of disaster mitigation in health care facilities extends beyond the health sector, and it suggests that the sector seek a political opportunity at the presidential summits to ensure that this topic, which implies an investment in the health and life of the population as well as in the protection and safety of health care facilities, is accorded the importance it deserves in the social development agenda of the countries.

1. Introduction

Latin America and the Caribbean are regions frequently ravaged by natural disasters that not only result in loss of life, injuries, and public health problems but also inflict severe damage on the health services infrastructure.

According to ECLAC, in the past 15 years, some 93 hospitals and 538 health units have been damaged as a result of natural disasters. The cumulative direct losses from disasters in the Region have reached US\$3,120 million.¹ This figure is comparable to 20 countries in the Region each losing 6 first-level hospitals and 25 health units.

When a hospital ceases to function, the social and political impact is enormous, for it represents the loss of one of the facilities that the community considers vital to its security.

Most hospitals have been planned and built without taking safety and vulnerability considerations into account. These facilities and their operations are then successively modified, thereby increasing their vulnerability. For example:

- At great cost, the number and complexity of the services provided are increased, usually resulting in the haphazard growth of infrastructure and equipment without consideration for mitigation measures.
- Most hospital facilities lack systematic programs for preventive maintenance, which increases the possibility of damages in lesser events.

The cost of disaster mitigation in hospital facilities varies widely, depending on the type of risk and the extent of the intervention measures. For example, the costs associated with retrofitting for hurricanes are significantly lower than for earthquakes. The cost of the mitigation projects conducted in the Region between 1979 and 1993 ranged from 4% to 8% of the total value of a hospital already built (including the equipment).²

In contrast, estimates indicate that the investment required to take the necessary preventive action to strengthen a hospital that is about to be built can raise the total cost by about 2%.³

In addition to protecting the investment made, incorporating mitigation measures into a hospital facility ensures health service delivery in the wake of disasters.

The object of disaster mitigation is to protect the life of building occupants, ensure the uninterrupted and proper operation of the services, and limit damages to facilitate a quick return to normal.

Disaster mitigation involves organizational and physical aspects. The former include the organization of personnel, the site (access route, continuity of supply, etc.), and the architectural distribution of the medical services, while the latter include both structural features (beams,

columns, concrete slabs, and walls) and nonstructural features (lifeline services, architectural elements, and equipment).

It should be noted that preparing hospitals for disasters has a distinct purpose in which an impact on health is accepted, but the activities are intended to enhance the emergency response capability of the health services. This is accomplished by formulating plans, training staff, conducting simulation exercises, and ensuring stocks of relief equipment.

Different mitigation measures entail different modes of implementation and different costs. Nonstructural and functional/organizational measures are the simplest and most economical of these, while structural changes are the most complex and expensive.

The estimated cost of a hospital vulnerability analysis (structural, nonstructural, and functional aspects) is no more than 0.3% of the total cost of a hospital.⁴⁴ While this figure may seem moderate, often the cost of a vulnerability analysis is considerable and will depend on the size and complexity of the hospital.

2. Mitigation Experiences in the Americas

During the current decade, in some countries of the Region, especially those that have been devastated by major disasters, multidisciplinary teams of disaster mitigation experts have been formed that have gained experience in hospital vulnerability analysis.

Some activities conducted before and after natural disasters have translated into policies and techniques for implementing mitigation measures. In Mexico, after the impact of the earthquake of 19 September 1985 on the capital's health facilities, the principal institutions in the health sector reinforced damaged structures and drew up new design standards that will make it possible to ensure the seismic response of future buildings. As a result, the Ministry of Health and PAHO developed a project to certify the safety of hospital facilities in the face of different natural phenomena—a project in which hospital participation was voluntary. The voluntary nature of this participation has meant that the “certification” has not had the administrative clout needed to make the process sustainable.

As a result of the damage to hospital infrastructure reported after the earthquakes in Mexico (1985) and El Salvador (1986), the Social Security Fund of Costa Rica, with its own resources and PAHO technical cooperation, conducted a vulnerability analysis of its hospitals. Those facilities identified as vulnerable were reinforced structurally and nonstructurally.

In 1995, with financing from the European Commission's Humanitarian Office (ECHO), PAHO collaborated with Colombia, Chile, Ecuador, Peru, and Venezuela on a project to analyze vulnerability in hospital facilities. As a result, disaster mitigation measures were designed in order to reduce the vulnerability of the respective hospitals. Based on the findings of this project, Chile and Peru have drawn up plans for national programs for disaster mitigation in hospitals, seeking approval for their financing at the national level. The objectives of these programs are: to strengthen priority hospitals identified as vulnerable; to draft health sector regulations for the

design, maintenance, and retrofitting of the various components of hospital infrastructure; to conduct vulnerability analyses; and to train health sector professionals.

In the majority of the countries in the Region where hospital vulnerability analyses have been conducted, implementation of the respective mitigation measures still depends on the will of the political and technical authorities of the health sector.

There are few initiatives to include disaster mitigation measures in the design of new hospital facilities, owing to the scarcity of new construction and a lack of interest or commitment on the part of financing agencies (for example, the international banks) to require stringent standards for such structures to enable them to withstand natural disasters. In Colombia, however, a special chapter on hospital facilities has been included in the new regulations governing the design and construction of seismic-resistant structures.

3. Problems Remaining

Despite the efforts in some countries, PAHO activities to promote disaster mitigation, and the international recommendations adopted by the Member States to ensure safer hospitals in the Region by the close of the century, the following problems remain:

- This topic is discussed almost exclusively at the technical and middle-management level of the health sector. Its absence at the presidential summits, meetings of the ministers of health and other sectors, such as finance, public works, and planning, is one manifestation of the lack of political support for disaster mitigation measures in the sector. Significant changes will not occur without political support.
- In the majority of the countries, the failure to allocate specific resources has prevented implementation of the vulnerability reduction policies and activities proposed by national and international experts.
- The absence of a strategy for disseminating information on disaster mitigation and its low cost that would permit an improvement in daily operations and disaster situations has limited the initiatives of politicians and the population alike.
- Most of the current building codes and standards aimed at reducing the impact of natural disasters have been drafted with a view to protecting the life of the occupants only and not to keeping services in operation.
- The absence of disaster mitigation criteria in the procedures to guarantee the quality of the health services, such as hospital accreditation and health sector development and hospital maintenance plans, heightens vulnerability. This becomes critical in places such as the Caribbean countries, where there is only one hospital facility.
- The inability to establish mitigation processes, due to the difficulties involved in coordinating a large number of complex elements (organizational systems, structural and nonstructural features, equipment, etc.) that require the work of a multidisciplinary multisectoral team.

- The lack of a coordinator and support between the various technical departments that have disaster coordinators and the policy-making levels of the national health institutions has made it difficult to turn disaster mitigation into an interdepartmental priority, since the topic involves different departments, units and/or divisions of the health institutions.

- The tendency to use simplistic financial criteria—for example, using only the immediate cost of implementing mitigation measures without considering aspects related to equity or the social and political cost of future disasters—has impeded the launching of vulnerability studies and mitigation projects.

- The failure to insist on minimum disaster safety criteria in projects that are financed by international financing agencies and bilateral institutions does not encourage the incorporation of these concepts into such investments.

4. PAHO Policies and Strategies

As a result of the proclamation of the International Decade for Natural Disaster Reduction (IDNDR) 1990-1999 by the United Nations General Assembly, PAHO expanded its Program on Emergency Preparedness and Disaster Relief. A new component on preventive measures for disaster mitigation was created, aimed at boosting the capacity of health facilities to withstand natural disasters. In 1993 events marking the International Day for Natural Disaster Reduction emphasized protecting hospital and school infrastructure and recognized the need to define actions and join forces to protect hospital facilities from natural disasters in Latin America and Caribbean. It should be noted that other regional agencies have also launched similar programs for schools and other educational facilities.

In a joint effort, the Division of Health Systems and Services Development and the Program on Emergency Preparedness and Disaster Relief have prepared technical materials that contain a methodology for vulnerability analysis, retrofitting measures, and general guidelines for multidisciplinary work. These materials can serve as basic tools for the adoption of disaster mitigation measures in health services infrastructure in both new and existing hospitals.

Currently, in most of the countries of the Region the institutions that deal with disaster prevention have professionals familiar with vulnerability analysis; however, only a small number of hospitals in Latin America and the Caribbean have carried out vulnerability studies, and only a few have undertaken retrofitting projects.

5. The International Conference on Disaster Mitigation in Health Facilities

In 1996 under the auspices of the Government of Mexico and with support from the Secretariat of the International Decade for Natural Disaster Reduction (IDNDR), the United Nations Department of Humanitarian Affairs (DHA), the Economic Commission for Latin America and the Caribbean (ECLAC), the Organization of American States (OAS), and the World Bank, the Pan American Health Organization World Health Organization convened the International Conference on Disaster Mitigation in Health Facilities.

At this conference, the health authorities of the Region for the first time made a commitment to reduce the impact of natural disasters on priority health facilities during the period 1996-2001, as permitted by the vulnerability situation and the political, economic, organizational, and logistical resources of each country.

Some of the most important commitments are:

5.1 For Immediate Fulfillment

- Formally identify which of the existing health facilities are of greatest priority for conducting vulnerability analyses and adopting measures to reduce the impact of disasters.
- Include disaster mitigation measures in the design and construction of new health facilities or into the remodeling and expansion of existing ones.
- Include measures for nonstructural mitigation in all plans for maintenance, inspection, remodeling, and upgrading of existing hospitals.
- Identify budgetary resources and have mitigation plans for hospitals classified as “priority.”

5.2 To be Fulfilled by the Year 2001

- All hospital structures considered “priority” will be able to withstand moderate- to high-intensity events without suffering functional damage and the maximum established probable event for their designs without danger of collapse, within the useful life for which they were designed.
- Vulnerability to natural hazards, as well as the level of preparedness, will be criteria to be considered in hospital accreditation.

Similarly, the strategic guidelines for the drafting of integrated plans and programs for disaster mitigation in health facilities were defined. Countries such as Chile, Colombia, Mexico, and Peru have developed projects for partial or full implementation of the recommendations of this Conference.

The agreements adopted by the countries are geared toward:

- declaring the adoption of measures to mitigate the impact of natural disaster on health facilities a high health, social, and political priority;
- identifying which facilities are a priority in order to conduct vulnerability analyses and adopt the respective mitigation measures;
- monitoring hospitals to ensure that facilities located in areas exposed to natural hazards meet the minimum criteria for nonstructural safety in disaster situations.

Although the majority of the countries in the Region do not have a strong disaster mitigation policy for hospitals, as reflected in the absence of financial resources for this purpose and the failure to heed the calls to promote and implement mitigation, some countries have already applied these concepts to a certain extent. This is clear evidence of political will in the health sector to carry out such policies, and once external problems are overcome, their full implementation will be achieved.

6. Foundations for the Establishment of a PAHO Plan of Action for Disaster Mitigation in Health Facilities

In order to achieve effective institutionalization of disaster mitigation in the health sector development plans of the PAHOWHO Member States, the Pan American Sanitary Bureau, through its interdivisional work, intends to identify resources of its own and intensify the mobilization of extrabudgetary resources to continue pursuing the following activities:

6.1 *Institutional Coordination*

- Promote coordination of activities in health institutions to achieve effective disaster mitigation in hospitals, both in existing facilities and those under construction.
- Promote the inclusion of disaster mitigation criteria in hospital accreditation.
- Promote the inclusion of disaster mitigation measures in hospital maintenance plans and in plans for the inspection, retrofitting, and upgrading of hospitals.

6.2 *Reinforcement of Policies and Programs for Disaster Mitigation*

- Offer technical cooperation to the Member States to enable them to monitor compliance with the recommendations of the International Conference on Disaster Mitigation in Health Facilities, and to implement those recommendations according to the timetable established by the Conference.

- Encourage international financing agencies and institutions such as the World Bank and the IDB to require minimum safety criteria for mitigating the impact of disasters in investment proposals for the development of health services infrastructure.

- Encourage the Member States to use the cost-effectiveness methodology for evaluating hospital disaster mitigation projects.

6.3 Training and Dissemination

- Continue to convene the International Expert Committee on Hospital Mitigation so that it will provide technical assistance to PAHOWHO in developing, advising, and monitoring national programs to reduce vulnerability in hospital establishments.

- Promote and support the activities of the PAHOWHO Collaborating Center for Disaster Mitigation in Health Facilities, as well as other national and regional institutions, in the areas of dissemination, training, research, and information exchange.

- Bolster the capacity of the Caribbean countries to reduce the vulnerability of their most important hospitals to hurricanes and to improve technical cooperation in disaster mitigation among the countries of the subregion.

- Join with other agencies, in relation to the IDNDR, in promoting a regional meeting on disaster mitigation in hospitals in 1999, as part of the activities marking the end of the Decade.

In view of the success already achieved at the technical level and the fact that the objective of PAHOWHO technical cooperation is coordination and promotion and not the execution of structural reinforcement works, the minimum cost would be on the order of US\$300,000 a year (mainly for a regional position for an engineer specializing in disaster mitigation).

It should be understood that PAHO's responsibility to promote safety in health facilities is, by nature, long-term. Reducing our vulnerability to natural disasters, like every ecological crusade, will require a sustained effort.

7. Conclusions

PAHO and its Member States cannot continue to tolerate a situation in which hospitals in Latin America collapse during earthquakes, killing patients, visitors, and health workers, and in which the few health facilities in the Caribbean periodically lose their roofs, interrupting service when it is most needed.

PAHO, as part of its mandate to cooperate in health services development, must continue to strengthen its technical cooperation to reduce the Region's vulnerability to all types of disasters and to improve structural and nonstructural safety in health sector facilities. In order to achieve this, a real political commitment is required at the highest levels of the countries of the Region.

The inclusion of this topic in the discussions of the Subcommittee on Planning and Programming and of high-level meetings in the Region will help make the public and its leaders take an interest in this problem, which was neglected in Latin America and the Caribbean until the earthquake in Mexico in 1985.

¹ "Impactos Económicos de los Desastres Naturales en la Infraestructura de Salud", CEPAL, LCMEXL.291 January 1996.

² Figures obtained from a number of sources. Especially important was the experience of the Social Security Institute of Mexico. See "Lecciones aprendidas en América Latina de Mitigación de Desastres en Instalaciones de Salud, Aspectos de Costo-Efectividad", OPSOMS 1997.

³ Data obtained from the Federal Emergency Management Agency of the United States (FEMA). See "Seismic Considerations - Health facilities" (FEMA 150)

⁴ See "Lecciones aprendidas en América Latina de Mitigación de Desastres en Instalaciones de Salud, Aspectos de Costo-Efectividad", OPSOMS 1997.