

The Central American Network Disaster Health Information

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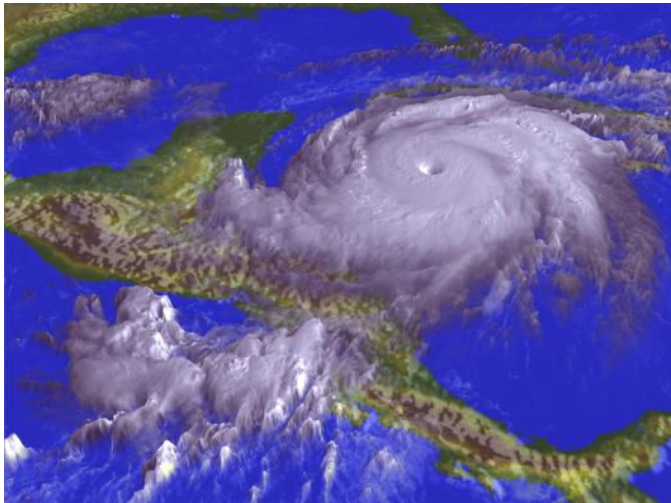
History and Background

Throughout the world, the demand for information has risen among the growing number of disaster preparedness planners and, in recent years, the availability of information on health issues related to disasters has increased in volume and improved in quality. Information produced about health issues in disasters in the Latin American and Caribbean region, in particular, has seen important advances in terms of usefulness in preparedness planning, strategic decision-making, and operational coordination of humanitarian emergencies. This is in large part, due to the attention that has been placed on information collection and management throughout the last decade by such groups as the Pan American Health Organization (PAHO), the United Nations International Decade for Natural Disaster Reduction and its successor the International Strategy for Disaster Reduction (ISDR). These institutions and others have called to attention, the fact that many of the “lessons learned” during disasters do not find their way into the mainstream of health and medical literature. This is because the experience of many health professionals engaged in disaster work frequently goes unpublished or consists of needs assessments by NGOs or agencies of the UN System which often have limited circulation; presentations made at conferences, of which there is little record; or in academic or other training courses, for which there are often no recorded curricula.

It is also the case that because of inadequate access to information technology, lack of training in how to find and manage information, and lack of awareness of what information is available, communities and local authorities are frequently uninformed about health issues important to their well being.

The Central American Network on Disaster Health Information, created through the partnership of the *Centro Regional de Información Sobre Desastres (CRID)*, the United States National Library of Medicine (NLM) and PAHO, is now successfully operational throughout Central America.

The project began in Honduras and Nicaragua in 2000 in the wake of hurricane Mitch. A year later, after suffering devastating earthquakes, El Salvador was added to the “network”. Two years ago Guatemala joined the network with funds from the UK Department for International Aid, and last year Panama and Costa Rica were added with funds from the European Commission on Humanitarian Aid (ECHO) [1].



Hurricane Mitch, October 1998. Storm model courtesy of NASA GSFC.

The principal goal of the CRID/NLM/PAHO project is to contribute to disaster reduction in the region. This is being achieved through capacity building activities in the area of disaster-related information management. Through participation in the project, target countries have improved their capacities to collect, index, manage, store, disseminate, and share public health, medical, and other information related to disasters. The project strategy provides information centers with the required knowledge, training and technology resources in order to have sufficient capacities to act as reliable information providers to a host of other users in these countries. In the longer term, the establishment of disaster information centers should also facilitate the development of improved disaster prevention and mitigation policy and planning in participating countries [2].

Before the CANDHI initiative, CRID counted its regular users, worldwide, at approximately 6,500. These were mainly professionals from health and environment, academic, humanitarian, grass roots and civil defense sectors. Information provided by CRID was frequently used for planning and decision-making purposes, as well as for training.

CRID’s collection is comprised primarily of non-conventional or grey (unpublished, non-peer reviewed) literature resulting from expert meetings; case studies and evaluations; university research and assessments; guidelines and technical reports issued by

governmental authorities; and publications, resolutions, journals or bulletins and technical proceedings. Many of these materials were prepared by United Nations and other specialized organizations (for example, PAHO, the World Meteorological Organization, and the Economic Commission for Latin America and the Caribbean). All documents are available from CRID in full text.

Before CANDHI, CRID maintained a bibliographic database of documents, but the documents were not available full-text online. One of CRID's major efforts was fulfilling requests for these documents. The majority of requests (80%) came via Internet, with the balance received via fax and post. Most of the e-mail requests came from people using CRID's Web site, and most of these were from outside of the region. Even though there were a significant number of "clients" using the Internet, many of CRID's principal users, particularly those who might have used CRID-derived information for operational purposes, such as Civil Defense and Ministries of Health, were not using the Internet. The primary users of Internet were academics.

Despite increased use of CRID's web site and email, the documents were only available in print and fulfillment of a request for a document at CRID took on the average of from 1-3 weeks. The documents were physically scanned or photocopied and then mailed via regular post or, for short documents, sent by fax. CANDHI provided the opportunity for CRID to develop a digital library of its collection, and now nearly half the collection is available online. This greatly reduces the need to mail or fax documents and provides almost instantaneous access to the literature on disasters and health.

Not only has CANDHI proven to be a good preparedness tool, the project also has served as a catalyst for the modernization of the medical school libraries in the region.

Participating Sites

Original Sites:

HONDURAS

- National Autonomous University of Honduras (UNAH), National Library of Medicine <http://cidbimena.desastres.hn/>
- The Central University of the North Region (CURN), the UNAH campus at San Pedro Sula, Honduras (CIDCURN) <http://cidcurn.desastres.hn/>

NICARAGUA

- National Autonomous University of Nicaragua (UNAN), Health Studies Investigation Center <http://desastres.cies.edu.ni/>
- National Autonomous University of Nicaragua (UNAN), Medical School Library, <http://desastres.unanleon.edu.ni/>

Following the two earthquakes in 2001, NLM provided funds to add El Salvador to CANDHI.

EL SALVADOR

- Documentation and Health Information Center of El Salvador's PAHO Office.
<http://desastres.ops.org.sv/>
- Center for the Protection against Disasters (CEPRODE)
<http://desastres.ceprode.org.sv/>

In 2003, PAHO obtained funds from the U.K. Department for International Development to add Guatemala to CANDHI.

GUATEMALA

- University of San Carlos, Library of the School of Medicine.
<http://desastres.usac.edu.gt>

In 2004, PAHO applied for funds from the European Commission Humanitarian Office (ECHO) to expand the Network to all the Spanish-speaking Central American countries and in 2005, Costa Rica and Panama were added to CANDHI.

COSTA RICA

- National Emergency Commission (CNE) Documentation Center,
<http://www.cne.go.cr/documentacion.htm>

PANAMÁ

- The National System for Civil Protection (SINAPROC),
<http://www.sinaproc.gob.pa/>

Areas of Work

The goal of the Central American Network for Disaster Health Information (CANDHI) is to promote disaster reduction through capacity-building activities in the area of disaster-related information management. Through CANDHI, the participating libraries and information centers have been strengthened in several areas:

- Technological Infrastructure (Internet connectivity and computer equipment)
- Information Management (Training of health science librarians)
- Information Product Development (Digital Library, Web site development)

CRID coordinates these activities, with the assistance from NLM and PAHO.

The participating countries have established local Disaster Information Centers to collect, organize, store, and disseminate public health and medical information related to disasters. The selected libraries and information centers now have the knowledge, training, and technology resources to establish them as reliable information providers to health professionals and others in their countries.

Information Technology Development

One of the first objectives that needed to be addressed was the development of information technology capabilities. The institutions invited to join the project were selected based on assets that they were expected to contribute to the project, including institutional reputation and ongoing roles in the health and/or disaster areas in their countries. However, in general they had very limited information technology (IT) resources at the onset of the project. CANDHI provided training, technical support, and technological tools that have allowed the sites to develop their information technology resources and create electronic information services that they make available to their communities.

The project's IT technology development process was planned primarily by CRID, with technical assistance from NLM. Due to the many differences between the capabilities and logistical resources available at each participating site, the development was not homogeneous, except that all centers noticeably increased their information technology resources, information services, and skills.

Computers, peripherals, and basic software tools

Initially, the project provided the new participating sites with one server-class computer and two personal workstations. As the project evolved, and new funding sources became available, additional computing equipment has been made available to new sites. The sites received general guidance for the configuration of their server platforms, but they had freedom to decide the configuration that best fit their local environment. Most of the servers use a version of the open-source Linux operating system with the Apache web server software, but two locations use the Microsoft Windows server product with Microsoft Internet Information Services. One site is currently using an open-source version of the BSD operating system.

PAHO also made available database management systems and other information products and tools developed or adapted by BIREME, mostly related to their Virtual Health Library initiative. These products enabled the publishing of electronic documents and the access to databases developed by CRID, BIREME, or the participating sites.

The two (or more) workstations provided to the sites are used by information specialists or librarians to maintain the local information services or provide service to customers, or directly by customers to find information on the local disaster information web site.

The project supplied supplementary equipment, as well. In order to protect the equipment, uninterruptible power supplies or other similar protective equipment were purchased. The sites were also equipped with printers and document scanners. These document scanners play an important role in making new relevant local documents available electronically via the local web server. Over time, the participating sites have purchased additional equipment through the project or other funding sources. In some cases, the centers have been able to acquire a large number of personal workstations that are used for training and on-site user access to information.

Local-area networking

All the computer equipment and peripherals were interconnected via a Local Area Network using 10/100 Mbps switches and twisted-pair Ethernet cabling. This connectivity is fundamental to allow the access to the server and other information sources via the local workstations, or the sharing of computer peripherals such as printers and scanners. The local networks at the disaster information sites are commonly connected to other existing networks in their institutions for greater functionality.

Internet connectivity

The project initially provided permanent (not dialed) Internet access links to all participant sites. One of the sites had no Internet access and the others had limited and often unreliable Internet connectivity. Over time, the sites have improved the quality and speed of their Internet links from their original 128Kbps, to 256Kbps, 1Mbps and higher bandwidths. The link speeds vary per site. In some cases, the site's parent institution has made available a faster Internet connection, making unnecessary for the project to continue funding their Internet link.

Technical skills

The participating sites usually have a limited number of trained IT personnel, usually one person who usually assumes multiple roles within the institution. The limited institutional resources make it difficult for the sites to develop and maintain an IT professional team that can carry out all their project activities, as well as many other institutional responsibilities. The project has performed a number of IT training sessions that have helped the participating IT personnel acquire additional skills, and also allowed increasing the exchange among their project peers. The IT training have included Linux management, search engines, web sites development, maintenance and metrics, IT security, content management systems, among others. As the relationships between the participating sites increase, the cross-institutional IT support also has increased.

Current IT developments

Every site has its own valuable collection of resources, experience and skills to offer to their user communities. The accessibility of these resources, however, depends on how easily the information can be found using information searching capabilities available on the electronic networks. The project is working in two areas to make the information from the sites more accessible: improve the indexing of the electronic information on the participating centers web sites by popular search engines (such as Google or Yahoo!), and the implementation of a CANDHI-wide information search capability. The sites make their information more "visible" to such search engines by improving the meta-information available in their sites about their electronic collections, submitting their sites to public search engines, and formatting their electronic information appropriately for easy automatic identification.

On the other hand, the CANDHI-wide search engine (also known as the CANDHI multi-site search engine) will allow any user visiting any of the CANDHI web sites to search information on any or all the participating sites via a single search tool. This tool will enable a virtual, region-wide disaster and health information resource enabled and maintained by the synergistic contributions of the participating sites. Users will be able to access information from any of the participating sites where the information is available.

Information technology evolves rapidly, and therefore it has become difficult for IT professionals in any setting to keep current with all relevant developments. In order to help the participating sites keep abreast of technologies that can help them implement, maintain and develop their electronic information resources, the project is helping implement virtual courses and specialized electronic forums. The virtual training will be developed using open-source virtual education tools, with voluntary support from the sites, project contractors, and other project collaborators. The discussion forums, which cover a variety of technical topics, are being developed via web-based, open-source tools made available by CRID and project participating sites.

IT issues

Although the IT services have grown tremendously since the project began, there are still several issues to be resolved. For example, some sites still suffer from institutional policies that limit the availability of their web sites during certain periods of their institutional calendars. Particularly, during vacation time and holidays, some sites are forced to shutdown their computing equipment, making their information services unavailable to their audiences. NLM is periodically monitoring the availability of the project web sites, in order to evaluate the impact of these “down-time” periods, and also to help the sites monitor the health of their own information services. Also, efforts are being made to improve the routine technical management of the server platforms.

Information Management

One of CANDHI’s objectives is to train health science librarians to develop and manage collections of health-related disaster information and to promote and provide access to this information. Since 2001, five training courses have been developed by CRID and taught by staff from CRID, NLM, PAHO, and BIREME.

The first course was held in Costa Rica in April 2001 and included Internet searching, and online health and disaster resources from NLM, PAHO, and CRID. The second training course, held at NLM in October 2001, focused on NLM information resources such as MEDLINE/PubMed, MedlinePlus, and TOXNET. Subsequent courses in Nicaragua (2002), Guatemala (2004), and Panama City (2005) further enhanced the librarians skills in information management by covering BIREME database management tools, web site design, development, and maintenance, and digital library development (digitization and management of electronic documents).



Project participants during training event in Guatemala, February 2004.

These training courses have prepared the librarians to develop and manage collections of health-related disaster information, access various online resources, create and maintain web sites and databases, and create and provide access to electronic documents via the web and on CD-ROM. In addition, these training courses also offered an opportunity for the IT specialists to learn more about a number of practical IT topics (see section on Information Technology).

Information Product Development

Digital Libraries

In addition to assisting in the development of local Disaster Information Centers and the CANDHI network, CRID has also been responsible for developing procedures for creating a digital library of key documents related to health and disasters. CRID now has nearly half of their extensive collection (7,000 of 15,000 documents) stored electronically. These documents are searchable via the CRID web site and also from each of the participating sites.

In addition, CRID has developed technology to create searchable CD-ROMs of electronic documents in specific subject areas such as volcanoes, water resources, and human settlements. Based on training received during the courses, several participating sites have also created specialized CD-ROMs including two CDs on Disasters in Honduras, and Lessons Learned in the 5 years following Hurricane Mitch.

Web Sites

The participating sites in Honduras, Nicaragua, El Salvador, and Guatemala have all developed their local CANDHI web sites. These sites are created and maintained locally. Although each web site has its unique features, all provide access to the CRID bibliographic database on disasters, the CRID digital library, their own digital library of local documents, as well as local resources and contacts. Over the next few months,

SINAPROC in Panamá and CNE in Costa Rica will be designing web sites and joining CANDHI.

Accomplishments

The original participating sites are operating successful and useful local disaster information centers as well as participating in an international network designed to link and support disaster prevention efforts in the entire region. The centers now have the tools and skills to design and maintain web sites, create directories of local resources, and develop digital libraries. With the wealth of information now available, the participating sites are working to educate disaster managers, health professionals, and government leaders about these new resources. They have taught courses and conducted demonstrations for government agencies, non-governmental organizations, and hospital and university staff. In addition, Mr. Roberto Matute, CURN Library Director in San Pedro Sula, Honduras, has brought teachers and students to the Disaster Information Center to teach them about information resources for disaster reduction activities. Some of the students attending the training sessions were orphaned during Hurricane Mitch.



School students being trained on disaster preparedness at the San Pedro Sula, Honduras, CANDHI center.

The participating sites recently had an opportunity to assist with preparations and response to a potential disaster. An unusual storm, Hurricane Adrian, moving across the Pacific, struck Central America in May 2005. As soon as they learned of the storm, CANDHI sites quickly added up-to-date information on the storm to their web sites, highlighted useful resources on hurricanes, identified potential target areas, and met with local officials and provided much needed documents and resources.

The impact of CANDHI also goes well beyond the goal of information management tools for disaster reduction. According to Dr. Cecilia Garcia, Director of the UNAH Medical School Library in Tegucigalpa, the project also has served as a catalyst for the modernization of the medical school library. Using the skills and tools gained from the project, Dr. Garcia demonstrated to university administrators the importance of access to health information and the need to provide additional support for the library. Before the project began, the medical school library had only one computer with access to the Internet. At CURN, in San Pedro Sula, Honduras, there were no computers with Internet access. Through the work of Dr Garcia and Mr. Roberto Matute of CURN, the medical

school library now has 10 computers and CURN has seven computers, all with Internet access. Other library services at many of the participating sites have also improved, such as access to medical journal articles. Several of the sites have joined the WHO-sponsored Health InterNetwork Access to Research Initiative (HINARI) for free online access to over 2,500 scientific journals. Some sites at medical schools have helped incorporating disaster-related topics in their university curricula.

José Antonio Fúnez, a professor of Hispanic-American Literature, considers the Disaster Information Center at CURN “an indispensable consultation and research resource for the university and the community in general. Since we live in a zone of constant risk, it is necessary that we live informed about disasters and that we know how to prevent them”.

In the long term, the establishment of these disaster information centers should facilitate the development of improved disaster prevention and mitigation activities in the participating countries. Not only will this positively affect health by providing access to timely and accurate health information, it can also, over time, contribute to economic growth and social development.

In addition to assisting several countries rebuild their health information infrastructure, it is expected that this project can be used as a model for collecting and exchanging health information in geographically isolated and disaster-prone environments and for handling non-traditional or unpublished literature, in this case mainly on the health aspects of disasters. CANDHI coordinators were recently asked to conduct an assessment of information centers and resources in regions of Southeast Asia devastated by the tsunami in December 2004. A mission to explore the applicability of the CANDHI model to Southeast Asia is scheduled for September 2005.

Future Activities and Sustainability

A major strategy for ensuring CANDHI's sustainability has been and will continue to be the selection of the partners. The principal criteria for selection have been 1) the prospective partner has standing within the national or sub national health/disaster network, 2) organizational experience pertaining to project development activities and 3) enthusiasm to develop and maintain the information services that the project is designed to enhance. Continuing to use these criteria to select CANDHI partners will ensure that the initiative fits into the core mission of each partner-organization and, therefore, stands a good chance to be incorporated into ongoing strategic plans. Over time, resources to sustain the project are expected to be provided by and sustainable within regular and ongoing budgets of the partners. Also in support of CANDHI partners and the network as a whole, PAHO country offices, and other credible sources of information on health and disasters, will continue to provide ongoing information content and technical assistance to the project.

As additional partners joined CANDHI and other organizations inquired about becoming partners, it quickly became apparent that resources were needed to assist these new partners. This led to the development of a Disaster Information Center Toolkit that is

designed to provide the resources needed for the establishment, development and management of disaster information centers throughout the region [3]. The Toolkit will include the following elements:

- Profile of information centers that specialize in disaster and related issues.
- Actions involved in the creation of information centers, based upon an approach to strategic planning.
- Information center management.
- Information management.
- Methodologies and technological options including technological infrastructure, design and implementation.
- Knowledge management for staff development (training), educational, and outreach activities.

It is anticipated that the Toolkit will provide stability and sustainability to CANDHI as it grows and develops over the next several years. Additional information on the Disaster Information Toolkit can be found in another paper in these Proceedings.

Ultimately, the greatest determinant of whether the CAHDHI initiative will grow and be sustained will be its usefulness in disaster preparedness and mitigation activities.

References

[1] Scott J, Arnesen S. The Central American Disaster Health Information Network. ISDR Informs, 2002, Number 5. Available from:
http://www.eird.org/eng/revista/No5_2002/pagina35.htm

[2] Arnesen S, Scott J, Perez R, and Cid V. Prevention Pays: NLM/PAHO Partnership Helps Health Professionals Get Information Before Disasters Strike In Central America. Proceedings of the 103rd Annual Meeting of the Medical Library Association. San Diego, May 2-7, 2003.

[3] Sanchez I. Creation of an Integrated model for disaster information management. ISDR Informs, 2005, Number 10. Available from:
http://www.eird.org/eng/revista/No10_2005/art23.htm.