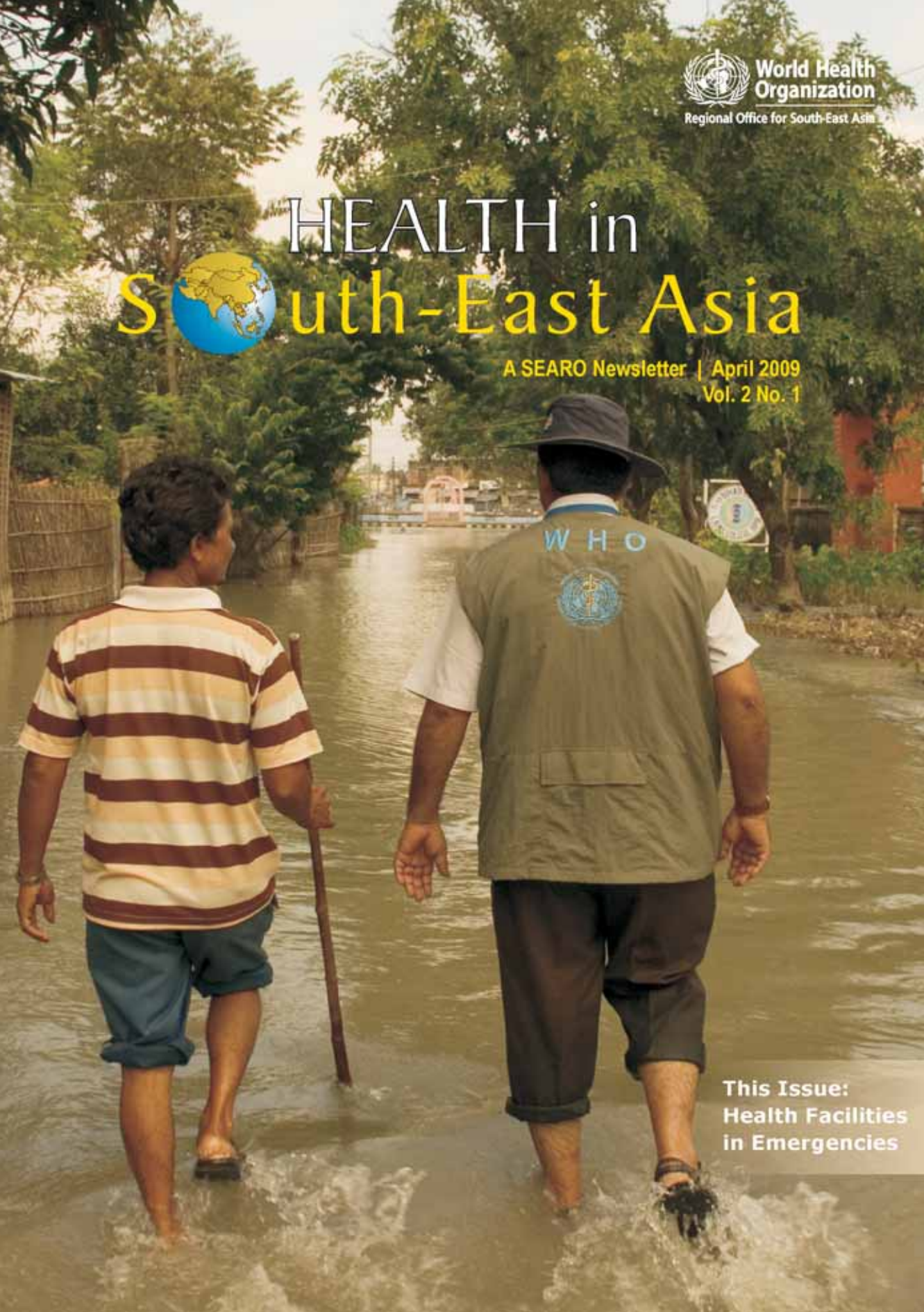
World Health Organization
Regional Office for South-East Asia
HEALTH in South-East Asia
A SEARO Newsletter | April 2009
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WHO
This Issue:
Health Facilities
in Emergencies

Message from the Regional Director

This issue of the SEARO Newsletter, *Health in South-East Asia*, looks at the theme of World Health Day 2009: health facilities in emergencies.

This is a theme that has manifested itself too often in the countries of South-East Asia. In the recent past we have seen several emergencies. During the earthquake and tsunami of 26 December 2004, we saw the destruction of various types of health facilities in Indonesia, India, Maldives and Sri Lanka. The recent cyclones in Bangladesh and Myanmar damaged a great majority of the health facilities.

With every emergency there is one thing we need to ensure: health facilities should not be casualties. Indeed, as the slogan of this year's World Health Day says: "Save Lives: make hospitals safe in emergencies". We can only save more lives if our health facilities continue to stand and function during and in the aftermath of an event.

Although the slogan uses the term "hospital", our concern extends to all health facilities covering all levels of health services. They may be community health centres, district hospitals, referral hospitals or tertiary hospitals.

In addition, the integrity and functioning of the whole line of services that make up the health system should be intact as disasters and emergencies can strike anywhere, anytime.

Before examining some key aspects of the issue, it is important to recall why health facilities are essential in crises. They have social and cultural impact – they are safe havens for the injured and the affected. There is also an economic issue: a health facility destroyed is an investment lost, and one that is difficult to recoup. Lastly, there is a development issue; as the point of service for the community in terms of its health, the loss of the hospital or facility means a regression in achieving the health goals of the population.

There are three key features to risk reduction for health facilities. First is physical integrity of the health facility – a safe health facility should not collapse in disasters, killing or injuring patients and staff. There are both structural aspects pertaining to the building and its design, and nonstructural features such as equipment, furniture, and other parts that may cause harm if wrongly placed or left unsecured.

The second aspect is continued functionality. A safe health facility should provide critical services and meet extra needs when there is an emergency.

Third, facilities require a system of trained and prepared people who will function well during crises. A safe health facility has contingency plans and a well-trained health workforce that is ready and able to deal with the health consequences of emergencies.

This issue of *Health in South-East Asia* also talks about the solutions that can be applied

in the context of the resources available in the Region. Some good practices are explained by experts in the interviews here included. WHO has also created a resource, the Hospital Safety Index (HSI), which can help assess and guide the user in prioritization of what intervention to take to keep a health facility safe. This issue also features one of the 12 SEA Region Benchmarks for Emergency Preparedness, which focuses on safe health facilities. In this framework, various sectors and experts can use a set of health sector and non-health sector indicators to ensure progress in this area. We are committed to support countries in achieving this benchmark.

We need to work together with other sectors and experts in various fields to bring about not just awareness, but more important, action to keep health facilities safe. I would like to emphasize that this is not the work of the health sector and health professionals alone. Key partners in this initiative include decision-makers in countries worldwide, architects, engineers, local and national leaders, development banks and lending agencies able to finance construction or retrofitting of health facilities, and donors and health development programmes.

It is clear that keeping health facilities standing and functioning during emergencies requires the involvement of many interested groups and parties. Raising their awareness will also be paramount to address this public health issue. Not least, the general public needs to be involved, as this is an issue that concerns everybody.

On the occasion of World Health Day, we hope that all our readers become advocates for keeping health facilities safe and functioning in disasters. Safe facilities will save lives in our communities.

Samlee Plianbangchang

Dr Samlee Plianbangchang
Regional Director

Inside:

How Do We Make Hospitals Safer?

How Do We Make Hospitals Safer?

When a disaster strikes, everything that happens to a community happens to its health facilities as well. This obvious fact can have devastating consequences. Consider that in Gujurat, India in January 2001, a magnitude 7.7 earthquake damaged 3812 health facilities. That means the 37.8 million people affected by the earthquake had 3812 fewer places to turn for help. This example illustrates why it is so important to make health facilities safe in disasters.

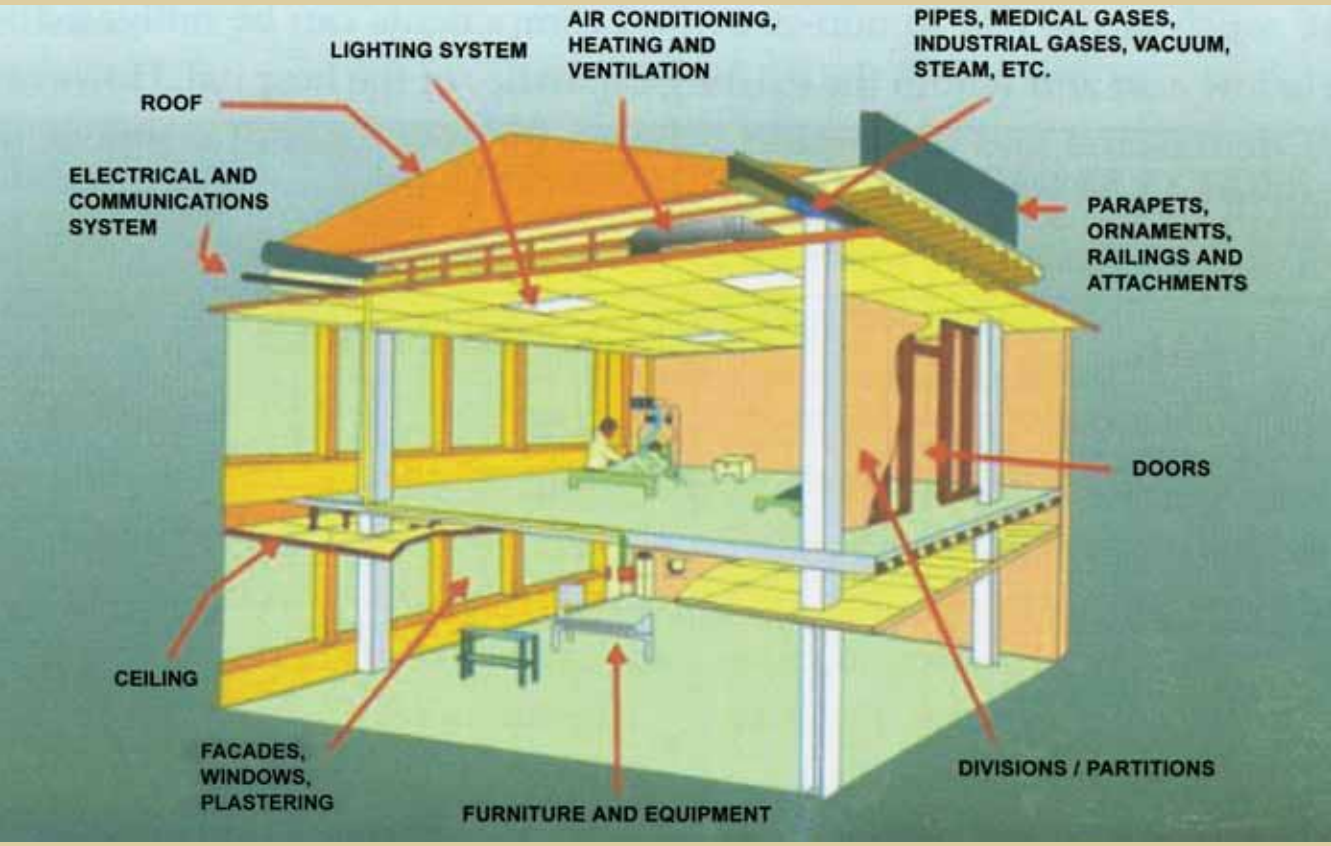
Natural disasters are unavoidable, but we build the facilities that fail—as well as the ones that don't. But what does "safe" mean in the context of health facilities? How do we measure it? In answer to this challenge, WHO has created a quick, low-cost method for evaluating the safety of health facilities in disasters. Known as the Hospital Safety Index (HSI), it provides a checklist of 145 questions that an evaluation team can use to determine how safe a health facility is. It was developed and tested over a period of years, mainly in the Americas. The

SHI is a comprehensive tool to measure the safety of a health facility, including structural, nonstructural and organizational aspects.

A safe facility has been defined as one "whose services remain accessible and functioning at maximum capacity and in the same infrastructure, during and immediately following the impact of a natural hazard".

The HSI kit includes a program that calculates the facility's score. Based on the score, it can be placed in one of three categories. Category A facilities are considered likely to withstand a disaster and continue functioning afterwards. Category B facilities can resist a disaster, but require improvements because staff, patients, and the ability to function in a disaster are at risk. Category C facilities are more seriously at risk and require urgent intervention.

The evaluative questions solicit detailed information about both structural and non-structural elements of health facilities, which together will determine the survivability of the building in the event of an emergency as well as the facility's capacity to continue to provide services. The evaluation begins with the geographical situation of the facility and the likelihood of natural and manmade hazards. Then the condition of the building (including damage or repairs following past events), the construction materials used, and other factors are assessed. Some of the possible risks are not so obvious. For example, irregularities in the plan of the structure can increase risk, because "during extreme phenomena such as earthquakes or high winds, poorly distributed mass can cause excessive loads", resulting in collapse. Sometimes remodeling has been carried out that changes the pattern of loads without due regard to such risks.



Nonstructural elements are also important so evaluators look at the adequacy of backup systems, such as generator capacity, fuel and water storage, and communication systems (as well as whether these backup systems are themselves protected from damage in a disaster). Medical and other equipment—from gas cylinders to desks to computers to shelving—can become lethal in a disaster and need to be firmly anchored. Externally, access to the facility is also considered. The position of trees, lampposts and storm drains could determine whether a facility that has survived a disaster can actually be reached by those in need.

Since hospitals are functional because of the people who run them, evaluators assess what emergency preparations and plans have already been made. Looking below the surface, they consider whether the plan exists only on paper, or whether the staff have been trained in implementing it and if the resources to carry it out have been put in place.

It has been estimated that half of the hospitals in Latin America and the Caribbean are in areas that are at high risk for disasters. The comparable figure for the South-East Asia Region is unknown—though we do know that the Region is disaster-prone, as the 2004 tsunami, the Gujarat earthquake and cyclones Sidr and Nargis tragically demonstrated. WHO's Hospital Safety Index will be an invaluable tool in assessing the Region's health facilities and making them safer, hopefully before disaster strikes again. Several initiatives are already on-going in Gujarat to test the HSI and adapt this useful tool to particular conditions and needs in South-East Asia.

For more information on the HSI, see www.safehospitals.info and www.paho.org/disasters.

An Interview with
Claude De Ville de Goyet

Dr Claude De Ville de Goyet is a recognized expert in managing public health issues in disasters. For over 20 years, his work in the Americas as Director of Preparedness for Emergencies and Disasters Area in the Pan American Health Organization/WHO provided guidelines to issues encountered in disasters, such as management of the dead and missing, preparedness programming for countries and safe hospitals. Dr De Ville continues to work in the area of disaster management as an independent consultant.

When did WHO's efforts toward the construction of safe health facilities begin?

For many years, WHO and PAHO trained nations how to respond to disasters. This meant having good emergency services, having good rescue capacity. A turning point was the earthquake that devastated Mexico City in 1985, when the Hospital Juarez collapsed and killed the patients, visitors and most of the doctors trained in disaster management. Then we realized that it is important to have safer hospitals, not just rescue capacity. From this arose a new concept for building safe hospitals which would not only protect the life of the occupants but would remain operational when most needed. It took some seven or eight years for WHO to convey this message, and we got a very interesting response from the countries.

At first it was a bit confusing for medical professionals, and we did not receive encouraging responses from our donors, partners and other agencies. It took us some time to educate decision-makers, donors and nations.

A conference organized in Hyogo, Japan (2005) by the International Strategy for Disaster Reduction (ISDR) developed the Hyogo Framework for Disaster Reduction. In that framework, it was decided to make "safe hospitals" one of the global indicators of disaster reduction. This was because of the effort by WHO, the visibility and pressure from WHO. As a follow-up to this joint effort by WHO and ISDR, a campaign for public awareness at the global level was carried out through the International Strategy for Disaster Reduction in cooperation

with international agencies and NGOs The first level was aimed at building safer schools (2006-2008) and safer hospitals (2008-09). WHO launched a two-year campaign to educate the public and decision-makers to build safer medical facilities. The challenge before WHO was to convince the hospital and emergency professionals that it is important to talk to management and to survey the hospital to find out whether it is safe, and how its safety can be improved. This campaign was started in Mexico and spread to the rest of the PAHO region. Now WHO has taken this initiative to a global level.

Can you describe the challenges?

The health sector is really concerned about the safety of hospitals. The challenge is to convince the ministries of health that they must be advocating and pushing for it. But they will have to approach and bring in the resources and expertise of the other ministries, such as the ministries of finance and planning, to involve them in the health sector. The next step is to have a national-level consultation involving health professionals, the media and public-private partners and start spreading this concept on behalf of the health sector.

How will the partners and agencies be involved?

In the event of a disaster, the health sector's task is to respond. This tends to be through medical aid, rescue, and control of communicable diseases—it is all response-oriented. So before the disaster and after the disaster, you have to say, "look, your hospital itself is at risk". Now you have to look at the prevention in your own health facilities. It works. Yes, the health sector is too much response-oriented, and when we talk about safety of hospitals you have to consider structural safety, nonstructural safety and preparedness.

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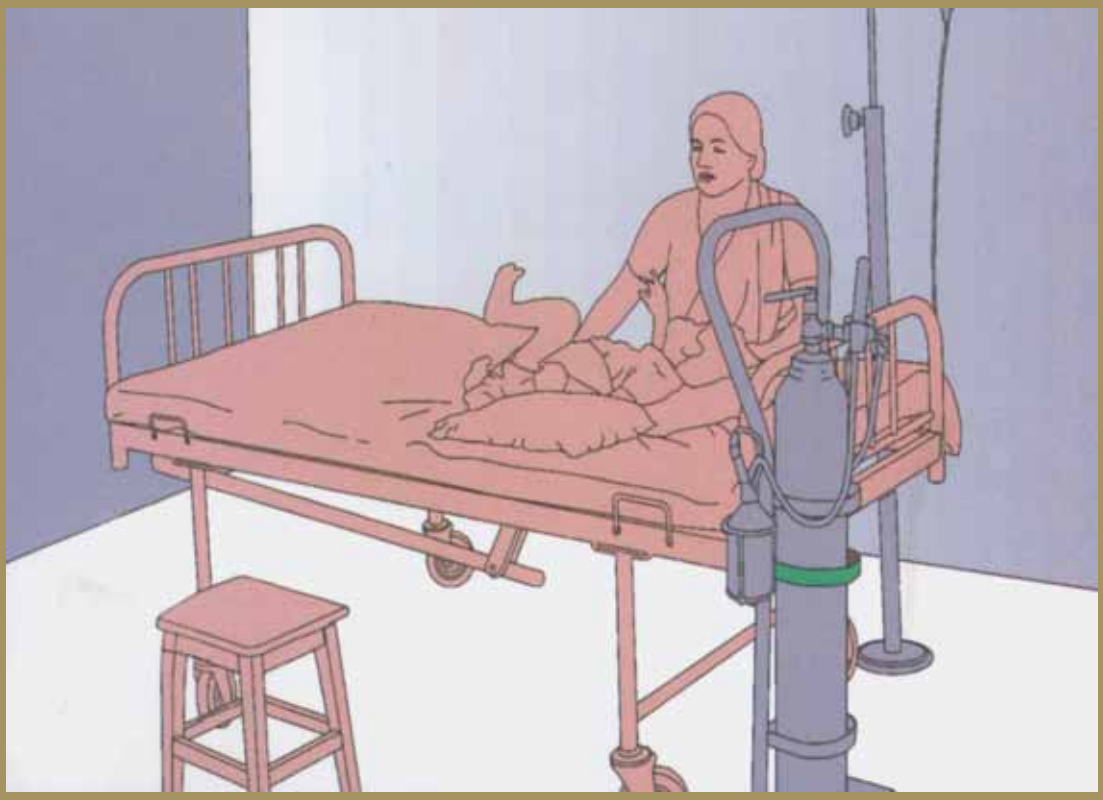
There is always a tendency to go back to the emergency room, to focus on the staff on duty and the victims–the response aspect. It is what they know best because they are more familiar with emergencies.

Prevention has always been difficult to address. But what you are doing in WHO-SEARO to approach these issues is the way it should be.

Could you elaborate more on technical aspects of functional preparedness and structural preparedness?

There are three aspects. One is structural. You want to make sure that the structure does not collapse and kill patients and doctors. That depends on the expertise of engineers trained specifically to incorporate the most appropriate technologies and methods for the seismic safety of structures. Non-structural preparedness refers to the lifelines– when everything is safe, like water and electricity supply, to the hospital. If you have a situation where oxygen cylinders are falling on the patient, obviously it is not safe. If you have lights falling and chemicals on the floor in a lab, these are nonstructural failures.

You can also have the hospital safe and sound, and electricity and water supply intact, but still complete chaos because doctors and nurses don't know what to do; and that brings in the functional aspect, which means planning and organization. Mock exercises should be conducted to face disaster situations. But you need to do all the three. You need a safe hospital; you need lifelines and equipment operating; and you also need the staff to be trained and know what they have to do, which will be different from



their roles in daily life. After the disaster you cannot have one at the cost of the other two; hence you have to convince the responders that they need to have all the three aspects in place and they have to care about all the three—even if it is not your line of expertise. An example I give is that you have trained to drive your car, but you still have to be concerned that your mechanic has given your vehicle proper maintenance and you have to know where to go and you have to be concerned about safety, such as whether the petrol tank is full or not. This is what we were *not* doing in the health sector. We know how to drive in emergencies, but we don't know whether the car is safe and working, and that is what we try to change.

Public awareness is important in safe hospitals and health facilities

Is this mainly an issue for health professionals?

No. A very important thing is to have public opinion behind you. If the public doesn't believe that it is important, then you will not get decisions taken politically and you will not get funding. So public awareness is important in safe hospitals and health facilities because this is what puts pressure on the decision-makers. You will have to get the mass media on your side. One example is air crashes. When we see this on the news, people are sensitized and are aware of the risk of air travel. I would like to see hospital-based fatalities and injuries in disasters have the same coverage and achieve the same sensitivity.

An Interview with
Amod Mani Dixit

Amod Mani Dixit founded the National Society for Earthquake Technology (NSET) – Nepal in 1993 and has served as its executive director since then. Mr Dixit established the organization after an earthquake in 1988 in Nepal to advocate and implement activities that reduce seismic risks for critical infrastructure. With his leadership, NSET has become known worldwide for its technical excellence and innovative programmes, including community-based initiatives such as training of masons for proper construction. NSET received the 2001 United Nations Sasakawa Award for Disaster Reduction and was also honored as one of the laureates to receive The Tech Museum Awards 2004 (Microsoft Education Award Category) for its innovation of "Shake Table" technology. NSET has been associated with WHO SEARO for its work in developing methodologies for assessing structural and nonstructural vulnerability of health facilities in the Kathmandu Valley.

Can you describe some of your experience related to the 2001 earthquake in Gujarat, India, and some of the lessons learned?

An earthquake is a very specific type of natural hazard, with two particular characteristics. One is that a devastating earthquake does not take place very frequently, so society usually tends to forget about this threat over time. The other is that the impact is so huge that if a devastating earthquake occurs even 50 years after the last previous event, it compensates for that absence, unfortunately, in terms of its destruction. Social memory is so short–people tend to forget about the earthquake, and psychologically nobody wants to remember the huge stress that an earthquake produces. So when the next devastating earthquake occurs, its catastrophic impact overwhelms people, and they become fatalistic, as if they can't do very much about it.

But amazingly, a third characteristic about earthquake hazard reduction is that it is achievable and cost-effective–and in the last decade or so even in developing countries, several good practices have been implemented. There is adequate knowledge to reduce the disaster resulting from a devastating earthquake. Up to 80-90% of the risk reduction measures can be implemented at a low cost of investment.

Could you give more details about earthquake risks?

An earthquake does not kill people by itself--unlike fire, which itself impacts people, for example by burns. In an earthquake what actually

kills are the unsafe structures that human beings have made. The principal source of risk is the structure, the buildings that you have created, the hospitals that we have created, the school buildings, and the vulnerable nonstructural elements contained in the buildings. The second source is our lack of preparedness and the lack of health response, which can result in death, or poor management of the care for victims. The third source is the general disaster preparedness and preparedness for emergencies.

From the national level right up to the world level, the experience of the last five to ten years has told us that risk reduction is achievable, it is feasible even in developing countries with weak economies. The only disappointing matter is the fact that despite the promise of achievement, the commitment is not at the level we would have desired. There needs to be more commitment at the government level, at the individual level, at the household level, at the community level, at the level of municipality and at the level of district and the central level. Raising commitment requires raising awareness.

From the national level right up to the world level, the experience of the last five to ten years has told us that risk reduction is achievable, it is feasible

What sectors need to come together? What is the resistance?

Everything hinges upon knowledge—knowledge of science, knowledge of technology, indigenous knowledge that our forefathers practiced over a long history of 4000 years. The first problem I see is that of the mystification of knowledge and science. We need to demystify it. When it comes to disaster risk reduction you see this everywhere–the common person is afraid of science and technology and does not know what to ask from knowledgeable persons, such as scientists and engineers. On the other hand, scientists and engineers are pre-occupied with the notion of advancing the frontiers of science rather than explaining it to the people. This has resulted in non-implementation of the knowledge on disaster risk reduction (DRR) that we have developed in every country, especially in the past few decades. This has also resulted in our historical knowledge collecting dust over the years, so that it is not reaching the vulnerable. Second, there is a psychological barrier, a reluctance to accept new realities. For example,

take the case of the Bhopal gas tragedy. I was told that if the people were educated to put a wet towel to cover their mouth they would not have died or have been affected that badly. It is not the fact that this knowledge did not exist, but those who knew did not propagate the knowledge to the people. Obviously, there was a mentality that learned people should not talk about simple measures. This mind-set needs to be addressed!

The art of disaster reduction is to start by doing whatever is achievable, whatever is doable–whatever action you can take, be it small, be it big. In developing countries unfortunately there is the notion to do only those things that cost millions, only those programmes that require involvement of eminent scientists and engineers. This has led to accepting wrong priorities, and scaling our programmes to the wrong levels, which are not comprehendable and are unachievable by the common man. The decision-maker then becomes confused, and starts thinking "I cannot do much, I don't have the capacity" and loses all enthusiasm required for policy leadership. But change that person—the decision-maker, the policy-maker--and the entire scenario changes.

Can you give us some examples of situations you visited where you've seen devastation that could have been prevented? And also some success stories?

I am from Nepal. The Gujarat earthquake was a tremendous learning experience for me, my institution and my people in Nepal. In the post-earthquake theatre of Gujarat we asked: what actually killed those people? The answers we got were many–mostly phrased in difficult engineering terms: liquefaction, "soft storeys", lack of ductility etc. And there were also vague expressions such as poor design, poor consideration of geology, poor construction, practices, and so on. But when we sat down and summarized the problems, we could identify only ten major, most prevalent weaknesses in the buildings, the collapse of which was responsible for more than 70 per cent of the earthquake-related deaths. And these ten weaknesses can be documented very quickly—and not only documented, but they can be corrected very quickly. The first weakness, if you are talking about the columns in a concrete building, was related to the confining steel bars–the stirrups. The ends of the tie bars are usually bent at 90 degrees, as against a 135-degree bend which resists the shear stress. Simply by bending

the stirrups pointing into the columns, at 135-degrees, a lot of building damage could have been prevented as well as the resulting deaths. How much does it cost to bend the stirrup ends into the columns at 135 degrees? Zero additional rupees! This is one case.

Similarly, if you are making a masonry building, say for example a load-bearing wall in bricks, make the building behave like a box. You know those wooden pack-boxes for transporting apples, that even if you throw them from a truck, the apples remain safe? Consider people as apples living in that box-like house. Masonry houses can be built to behave like those apple boxes! How? Provide vertical splints and horizontal bands at strategic places. Actually, this used to be the practice of house construction, as evidenced by many historical buildings in our countries This used to be our tradition in the Himalayas but we have stopped doing it. How much do these extras cost? Almost nothing, a very small amount of money as compared to the strength it gives to the building against earthquakes.

So these are the three steps: stop creating the vulnerabilities, reduces the existing vulnerabilities and prepare for the residual risk

A similar case is the proportion of wall to windows. Especially after our countries started to get independent, we began emulating what was happening in the developed countries and we started making our windows very big, but used the same traditional construction material. The ratio of the wall opening to the length of the wall reduced, and so we get less quantity of wall to bear building load, and hence the building becomes weaker. Our forefathers learned this from life, as evidenced by our monuments, our temples in the Himalayas, in the seismic zones. Another factor is that in Nepal 90 per cent of the buildings are constructed, in fact designed and advised by, masons. Only 10 per cent of the buildings are engineered; the rest are non-engineered. I am talking about the entire building stock. Now, how much do we spend to train an engineer and how much do we spend on the training of a mason? In many countries, there is no training for masons in earthquake safety. Yet we are located in one of the most sensitive areas in the world in terms of earthquake safety. Even in many universities, the engineering curricula do not teach earthquake-resistance methods for indigenous building typologies, let alone the method for solving the seismic safety of non-engineered buildings.

These are the anachronisms that create vulnerabilities: we are creating vulnerabilities in our towns, in our cities, in our villages. So the first point in reducing risk is to stop generating further risks, stop creating the vulnerabilities. This can be done! We know how to do it! And we have successful cases to demonstrate that making all types of buildings seismically safer is possible and feasible technically, economically, and socially, if we engage the people. The second is to reduce the already-built vulnerabilities. This is the question of seismic retrofitting, proper repair and maintenance of buildings. Retrofitting can be done, but is relatively expensive and needs a greater level of technical knowledge. In Nepal, even masons, the trained ones, have been guiding retrofitting of simpler buildings at local levels.

Reducing existing vulnerabilities includes addressing the non-structural vulnerabilities such as un-tied partition walls, un-anchored cupboards, fans, fridges, etc. An earthquake damages not only the building's structure but also the contents. And the loss is significant--almost 30% in terms of casualty and lost property. For example, in a hospital, if the MRI machine is not properly fixed to the ground using bolts and in a severe earthquake it falls down, that is a huge loss. The building may stand, but services are lost, functionality is

lost. Reducing non-structural vulnerabilities is less costly—almost no cost! How much does it cost to ensure that your oxygen pipe is flexible at bends so that it stretches if there is shaking? A couple of inches or centimetres of a flexible bend in the pipe will ensure the safety of the patient who is being operated on during the earthquake. One can identify hundreds of such measures that a hospital or institution can take to reduce risk.

However, you cannot reduce all the risk that you have overnight. You have to be realistic. You have to prepare yourself—and preparation for risk is not only physical or through engineering. You have to have the mechanism; you have to have a prepared response plan at the household level, at the institutional level, at the hospital level. What should everybody do in case there is a disaster? If you have made a plan beforehand and if you have drilled that plan by mock exercise, it becomes smooth, not only smooth but it reduces the subsequent impact. So these are the three steps for disaster reduction: stop creating vulnerabilities; reduce existing vulnerabilities; and prepare for the residual risk .

Our health facilities are getting safer every day

What is the level of preparedness of this Region at present?

I must say that the level of preparedness is not high; it is not at the desirable level. In Bhuj the entire health system was totally destroyed. In Nepal, the 1988 earthquake totally razed to the ground at least three or four very sophisticated hospitals. Not only the hospital buildings were damaged and the functionaly was lost, but the earthquake killed or injured the doctors, nurses, and staff on duty. In an earthquake, a hospital is a critical facility that is expected to function at greater efficiency. We cannot afford to have damaged health institutions during disasters. Unfortunately, most hospitals are not safe. This is the case everywhere–the level of destruction of health services due to earthquakes has always been unacceptably high. So one part of my answer to your question is that we are well below, cumulatively–I am talking generally, our Region–we are below not only the desirable level of safety but the achievable level of safety.

On the other side, we are getting much better and much safer; our health facilities are getting safer every day. Today is much better than what we used to have, say three years ago. The Bhuj earthquake would not repeat its impact the same way as in 2001. We are much better educated, better prepared, and all countries have been brought into this process. The level of knowledge, the realization is much better.

But that does not allow us to sit down and wait. We have to take action. This is what is required for disaster risk reduction. I talked about earthquakes but the same thing is true for all natural hazards, the approach is the same. We have to have the policy, the policy should be centralized, and the action should be decentralized to as low levels of governance as possible. Centralized policy, strict policy in the form of building codes, in the form of hospital standards, built into the level of education, standards for training programmes and others. But the action should be decentralized to the grassroots level, the village level, the household level.

I have spent 28 years in disaster reduction and the experience gathered every new year is equivalent to the cumulative knowledge achieved before. This year, I think the activity is richer than the last 27 years of activities. This fact provides a lot of hope. And the last thing to add is that disaster risk reduction is much more efficient in developing countries. You reduce a lot more risk per dollar than in developed countries. That we must also keep in mind.

Indonesia: Dealing with risk

The country of Indonesia is made up of 17 000 islands. As an archipelago, more than 80% of the country's territory is covered by water. Its land area is 1.9 million square kilometers spanning three time zones. The geography of this vast country presents a real challenge to providing health services for its 220 million people.

But in addition, it is also highly prone to disasters. For example, the Merapi volcano erupted in May 2006, and an earthquake struck Yogyakarta a month later. The 26 December 2004 tsunami devastated parts of Indonesia, particularly Banda Aceh, and claimed hundreds of thousands of lives.

The geography of this vast country presents a real challenge to providing health services for its 220 million people

Another casualty of the tsunami was health facilities—363 were damaged, and 700 health workers died. Indonesia has been working to increase the ability of health facilities to withstand such disasters and remain functional at these most critical of times.

Over the past several years, Indonesia has been taking steps to improve the survivability of facilities and services. For example, the M. Yunus Hospital was badly damaged by the Bengkulu earthquake on 4 June 2000. The structure was repaired and retrofitted, and when an earthquake struck again on 12 September 2007, damage was superficial and affected only non-load-bearing features.

Indonesia has been working to increase the ability of health facilities to withstand such disasters and remain functional at these most critical of times.

A rapid visual assessment tool has been developed, with which hospital staff can evaluate whether the facility is so badly damaged that staff and patients should be evacuated, or whether the hospital can continue to function normally. The rapid visual assessment can actually be accomplished in as little as 30 minutes.

In terms of structure, the quick assessment looks at vertical, horizontal and foundational damage. It provides tools and measures to determine the vulnerability of the structure and extent of hazard. Depending on the score calculated, health facility officials can decide whether the building can continue to operate or if staff and patients must vacate.

The experience of the Sardjito Hospital during the Yogyakarta earthquake also has been instructive. On the morning of 27 May 2006, the hospital was inundated with earthquake casualties. The building was evacuated and in the midst of several aftershocks, numerous patients were treated outdoors. An emergency team, including an engineer, reached the hospital that evening and began its assessment. On the night of 27 May the building was declared safe and patients were able to return to their rooms. By 4 June, the hospital was back to normal and hundreds of earthquake victims had been treated.

The Indonesian experience has demonstrated the need not only for structural retrofitting but also for planning; understanding when, and when not to, evacuate; a checklist for hospital safety; and practice in executing emergency procedures.

Timeline

1970 Bangladesh: cyclone Bhola claims 500 000 lives.

Efforts to design and construct cyclone shelters/ schools and health facilities that are cyclone resistant begins

1985 Mexico City earthquake: Main hospitals and health facilities in the city fall

The movement to build safe hospitals begins

1991 Bangladesh cyclone claims an estimated 120 000 lives

1994 World Conference on Natural Disaster Reduction, Yokohama, Japan

2001 26 January earthquake in Gujarat, the largest earthquake in India since 1737
USD 57 million was needed to rebuild health facilities damaged after the Gujarat earthquake**

2002–2003

Assessment methods for structural and non-structural vulnerability of health facilities done with NSET–Nepal and WHO-SEARO

Assessments completed for 9 hospitals in Kathmandhu valley

2004 26 December earthquake and tsunami strike 6 SEA countries, one of the worst natural disasters in history

2005 January: 168 nations adopt Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters

Kashmir, India and Pakistan earthquake

November: 11 SEA Region countries adopt 12 Benchmarks for emergency preparedness

2006 Yogyakarta, Indonesia earthquake leaves approximately 1 845 352 million people homeless.

The Ministry of Health reported 6736 dead and 134 396 injured. Across three affected districts 251 health facilities (from hospitals to sub-health centres) were damaged to varying degrees.

2007 7–8 November: Second Asian Ministerial Conference on Disaster Risk Reduction adopts the Delhi Declaration on Disaster Reduction, following up on the Hyogo Framework

15 November: super-cyclone Sidr affects 4.7 million people in 28 districts of Bangladesh—but unlike Bhola, it claims only 3000 lives

- 7 of 16 district hospitals in Khulna and Barisal Division were mildly damaged
- 69 of 247 Upazila Health complexes were mildly damaged

2008 January: WHO and the UN International Strategy for Disaster Reduction (ISDR) mount a biennial "World Disaster Reduction Campaign on Hospitals Safe from Disasters"

April: WHO SEARO Regional Consultation on Keeping Health Facilities Safe from Disasters

May: Cyclone Nargis hits Myanmar and claims 130 000 lives; 57% of health facilities were damaged in the Ayeryawaddy and Yangon Divisions

WHO/Pan American World Health Organization launch the Hospital Safety Index for evaluation of safety of health facilities

November: National Consultation on Safe Hospitals hosted by All India Institute of Medical Sciences, India

2009 7April: the World Health Day theme, *Save lives: make hospitals safe from disasters* draws international attention to reducing the risk posed to health facilities

** Case Studies on Safe Hospitals, WHO-SEARO 2008

For more information visit the website for World Health Day 2009 at: www.searo.who.int/whd/2009

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