

Moving Beyond the Tsunami: The WHO Story

Moving Beyond the
tsunami
The WHO Story



World Health
Organization
REGIONAL OFFICE FOR
South-East Asia









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Acknowledgements

If the word 'tragedy' sums up the tsunami, then the word 'generosity' describes the immediate post-tsunami response. The health sector response to the tsunami — everything related in this book — could not have happened without the tremendous support, financial and otherwise, from across the world. The support of all donors and development partners is gratefully acknowledged.

The role of health workers in tsunami-affected countries is also deeply appreciated. Their courage, experience and determined attitude in the face of such adversity have been a source of inspiration.

All partners, especially health NGOs in the tsunami-affected countries, deserve a special mention. They played a key role in the rehabilitation and reconstruction phase following the emergency.

A special thanks to all the photographers — Pallava Bagla, Gary Hampton, Jim Holmes and many others — who recorded these historic efforts, and Dermot Tatlow of Panos Pictures for the cover photograph.

The valuable comments by Dr M.A.L.R. Perera have added to the quality of the publication.

Finally, our gratitude to Poonam Bevli Sahi at Facet Design, India, for designing this book.

WHO Library Cataloguing-in-Publication data

World Health Organization, Regional Office for South-East Asia.

Moving Beyond the Tsunami: the WHO Story

1. Natural Disasters.
 2. Emergency Medical Services - organization and administration.
 3. Needs Assessment.
 4. Relief Work.
 5. Rescue Work.
- I. Title.

ISBN 92 9022 242 5 (NLM classification: HC 79.D45)

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Printed in India

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Preface



Some dates and events are stamped forever in the world's collective memory. 26 December 2004 is one such date, when hundreds of thousands of people were killed, and millions were affected, by a severe earthquake and tsunami. Among the countries affected were six Member States of WHO's South-East Asia Region. The scale of devastation and the large number of people affected, across so many countries, was unprecedented.

The disaster left in its wake formidable public health challenges which needed immediate response. For example, thousands of injured people needed medical aid. The health infrastructure was totally destroyed in some areas. Health personnel were among those who were adversely affected; many lost their lives, many more lost family members, friends, homes and entire neighbourhoods. People were crowded into relief camps, leading to the risk of outbreaks of communicable disease. There was an urgent need for safe drinking water and medicines. The mental health of

survivors, traumatized by the severity of their loss, also demanded special attention.

In this grim scenario of death and destruction, the health sector had to restore a semblance of order as soon as possible, and have health systems functioning again. No national or international organization could do this alone. Goodwill and support poured in from the global community, from neighbouring countries as well as from people in villages and townships near the affected areas. There was an unprecedented degree of cooperation and collaboration between governments, international and national agencies, the private and public sector, as well as civilian and military forces. The tsunami brought out the best of the human spirit.

One of WHO's most important roles was in assisting the health authorities and coordinating the work of hundreds of health agencies and nongovernmental organizations involved in tsunami relief work.

For WHO, this was a unique learning experience. Never in its history had it responded to a natural disaster of such scale and geographic spread. The challenge was to ensure timely assistance to the affected countries while maintaining standards, norms and procedures and ensuring accountability.

Within hours of receiving the information about the tsunami, a WHO Tsunami Task Force was established and

a 24-hour Operations Room activated in the Regional Office. Human resources and emergency medical supplies were mobilized. Technical guidelines were compiled, updated and disseminated for use by emergency teams in the field. WHO facilitated logistics, restored medical supply chains, and helped set up surveillance systems to monitor any possible outbreak of diseases. Water and sanitation experts monitored water quality to ensure its safety.

Over the past few months, the affected countries have faced unprecedented challenges. These challenges, however, have been used as opportunities to improve health systems to address the needs of the people in the long term. As we move from the emergency phase to the rehabilitation phase, local health capacity and infrastructure have been fortified, and people trained to serve their communities better.

As always, the welfare of the people has been our priority. "Moving beyond the Tsunami: The WHO story" narrates how the health needs of the affected people are being met. As we move ahead with the tasks in hand, this book enables us to reflect on our activities of the past few months, to take a critical look at ourselves and to keep in mind the lessons learnt from the disaster, so that we may serve the people better.

Samlee Plianbangchang, M.D., Dr. P.H.
Regional Director



Chapter 1
The Emergency
and its Aftermath



Black Sunday

In most of South-East Asia, Sunday, 26 December 2004, probably began as a deceptively ordinary day. The sun shone brightly, and people were in cheerful holiday spirit. At the WHO Regional Office for South-East Asia (SEARO), in New Delhi, the first inkling that there was something amiss came with a phone call from the Maldives. "We're being flooded! Male is being flooded," the voice, laced with panic, crackled on the telephone. Immediately, the Regional Director, Dr Samlee Plianbangchang, took charge and set into motion a series of actions to launch emergency response measures. Dr Samlee assigned the Deputy Regional Director, Dr Poonam Khetrapal Singh, to be responsible for all aspects of the operation.

This was no ordinary flood affecting one city in an island country. What had been described was a disaster of cataclysmic proportions, among the worst in recent memory. In an area of the world which has witnessed more than its fair share of tragedies — natural and manmade

A bereft man surveys the remnants of his home after the tsunami.



— the type of disaster was unusual. A massive earthquake (8.9 on the Richter scale) near Indonesia had generated a tsunami; in some places, the waves were over 10 metres high. The epicentre of the earthquake was about 22 km off the western coast of Sumatra.

Speeding across the ocean at 500 km per hour, almost as fast as an aeroplane, this wall of water brought terrible devastation to several countries in the Region. In Indonesia, the water pushed as far inland as 12 km. Sri Lanka, Thailand and India saw waves reach four kilometres inland. By the time the tsunami reached the Maldives, the waves were only three or four metres high. However, since the Maldives only has a maximum land height of 1.5 metres above sea level, the impact was extensive. The devastation was all the worse because the phenomenon of a tsunami is so rare in this part of the world. One sign of an impending tsunami is a receding sea. Few people realized the danger, however, and instead of running away, many ran into the sea to investigate this curious phenomenon, and were swept away by the giant waves.

Anywhere in the world, whenever disaster occurs and regardless of its cause, the fear of a health crisis looms large. Calamities, natural or otherwise, usually kill people, injure a substantial number, disrupt, and may even overwhelm, health systems. They leave vulnerable people exposed, often with limited or no access to safe and nutritious food, safe water, or sanitation facilities. This combination is lethal and is ideal for outbreaks of communicable diseases such as cholera, dengue, skin infections, viral fevers, and others. Frequently, in such chaotic situations, medical supplies get lost, and medical treatment is very basic at best, if available at all. Thus, the tragedy gets compounded as the people who survived a disaster may succumb to disease.

As the apex international agency for public health, the World Health Organization (WHO) has had long experience of dealing with the health aspects of some of the worst disasters in recent human history. Even with its

Millions of people were affected. A man who lost his wife in the disaster looks after his child.



A massive earthquake (8.9 on the Richter scale) near Indonesia had generated a tsunami; in some places, the waves were over 10 metres high. The epicentre of the earthquake was about 22 km off the western coast of Sumatra.

Impact on Women

There has been some evidence to show that tsunami-related injuries and deaths had a strong gender imbalance. In Aceh as well as parts of Sri Lanka and India, more than 80% of those who died were women. In India, three times more women than men died in the tsunami, and in Sri Lanka, that ratio was four to one. Children were also more vulnerable. ■

Mother and child at a temporary shelter.



The WHO Director-General, Dr LEE Jong-wook (right) and Dr Samlee Plianbangchang, Regional Director, WHO South-East Asia Region (left), arrive in Indonesia to survey the impact of the disaster.



vast experience, however, the tsunami of 26 December 2004, posed a particularly singular challenge.

The number of people affected — those who had lost family and friends, homes, livelihoods, almost everything that defines a human existence — seemed almost overwhelming. And every hour, almost like a diabolic scorecard, the statistics mounted: the numbers of those dead, those missing, kept rising. Seasoned health professionals are trained for emergencies, and to that degree anticipate large numbers of affected people after a disaster. What made this tsunami unique was that it hit several countries almost simultaneously. The worst affected countries in this Region were India, Indonesia, the Maldives, Sri Lanka, Thailand, and to a lesser extent, Myanmar. It was, as one WHO official was to put it, "as if six fronts had simultaneously opened in a war", with each front requiring equally urgent attention. Matters were further complicated by the fact that all the affected countries were middle and low income countries, with a significant proportion of the population living in poverty. Some of the affected areas had suffered from domestic unrest, and were not always easily accessible. As one senior official remarked, it almost felt like "Mission Impossible."

Like a giant steamroller the tsunami flattened everything in its path ▶

A man tries to absorb the scene of devastation all around.
(Photo overleaf)







With hospitals damaged, many injured people were treated in make-shift clinics.

The searing statistics

The tsunami-affected countries of the South-East Asia Region are diverse, geographically, culturally and economically. Though all were affected, the impact and the response were manifest in different ways and in different degrees.

The country closest to the epicentre of the earthquake, Indonesia, was worst affected. In Aceh, once bustling urban centres were flattened leaving behind only skeletal outlines of the foundations of human habitation.

The numbers said it all. In the final count according to the Indonesian government, more than a million people were affected, in two of the country's 33 provinces, predominantly in Aceh, where 14 of the 21 districts were devastated. More than 128 000 people died, and another 93000 were officially missing. This included almost 700 health personnel. Over 500 000 people were displaced and more than 149 000 were injured. Yet, there were few health facilities where the injured could go for medical attention — for the health infrastructure was left crippled. A total of 693 health facilities in Aceh were incapacitated

(66% were destroyed and 6.2% sustained major damage), according to a survey done in collaboration with the Directorate-General of Human Settlements, Ministry of Public Works, Indonesia. There was severe damage to the Provincial General Hospital, Provincial Health Office, Provincial Public Health Laboratory, district hospitals, district health offices, health centres as well as health posts. The few surviving health facilities could barely cope.

In Sri Lanka, it was the worst disaster the country had ever experienced. According to the figures released by the Sri Lankan government, the tsunami displaced more than 515 000 people immediately and took a toll of around 31000 lives. As many as 23000 were injured, while over 4200 people are still reported missing. In addition, 92 health facilities were destroyed, including 35 hospitals. The damage was mainly restricted to the coastal area, extending from Jaffna district in the north, along the east coast affecting Kilinocchchi, Mullaitivu, Trincomalee, Batticaloa and Ampara districts, Hambantota,



Many wells, a key source of fresh water in some areas, were contaminated by the sea water.

There were few health facilities where the injured could go for medical attention — for the health infrastructure was also damaged. The few surviving health facilities could barely cope.



Matara and Galle districts in the south and Kalutera, Colombo, Gampaha and Puttalam districts in the west.

Senior district officials record details of tsunami-affected people.

In India, the Andaman and Nicobar Islands bore the brunt of the tsunami's fury. In the mainland, the southern Indian states of Tamil Nadu and Andhra Pradesh, as well as Kerala, were primarily affected, as was the union territory of Pondicherry. While approximately three million people were affected, over 10000 died, with more than 5000 reported missing and 7000 injured. The major damage was to the coastal infrastructure such as dwelling units, fisheries, jetties, and shipyards. The damage to the health infrastructure included 80 sub-centres, 13 primary health centres and seven partially damaged district hospitals. The overall damage and reconstruction bill is estimated at 2 billion USD.

◀ *The tsunami left many children orphaned.*

In Thailand, six provinces — including popular international tourist destinations like Phuket, Ranong, Satun and Trang, Krabi, Phang-Nga, — were almost flattened by the giant waves. The tsunami affected 66600 people, and claimed over 5300 lives. While 3000 people were reported missing, more than 17000 were injured, according to the Thai Ministry of Public Health.

Former US President Bill Clinton chats with tsunami-affected children.

The Republic of Maldives faced a peculiar predicament. An archipelago of 198 widely dispersed islands which are at a maximum of 1.5 metres above sea level, even in normal times, 88 of those islands record



perennial beach erosion. It was not surprising, then, that the tsunami affected all the islands, totally destroying some of them. The death toll reached 82, the highest in the history of the Maldives in a single disaster, with another 26 people missing. Over 11000 were left homeless, of which nearly 5000 had to be evacuated to other islands. The population of 13 islands had to be evacuated in its entirety. Although the number of casualties was low compared to other tsunami-hit countries, the magnitude of the disaster was perhaps greater — one of every three Maldives residents was affected. With 2214 people confirmed injured, it was imperative that adequate health facilities and treatment reached them. Yet, providing relief was logistically difficult as many of the islands are not easily accessible. Moreover, the existing health infrastructure had suffered severely, with one regional hospital, two atoll hospitals and 20 health centres totally destroyed.

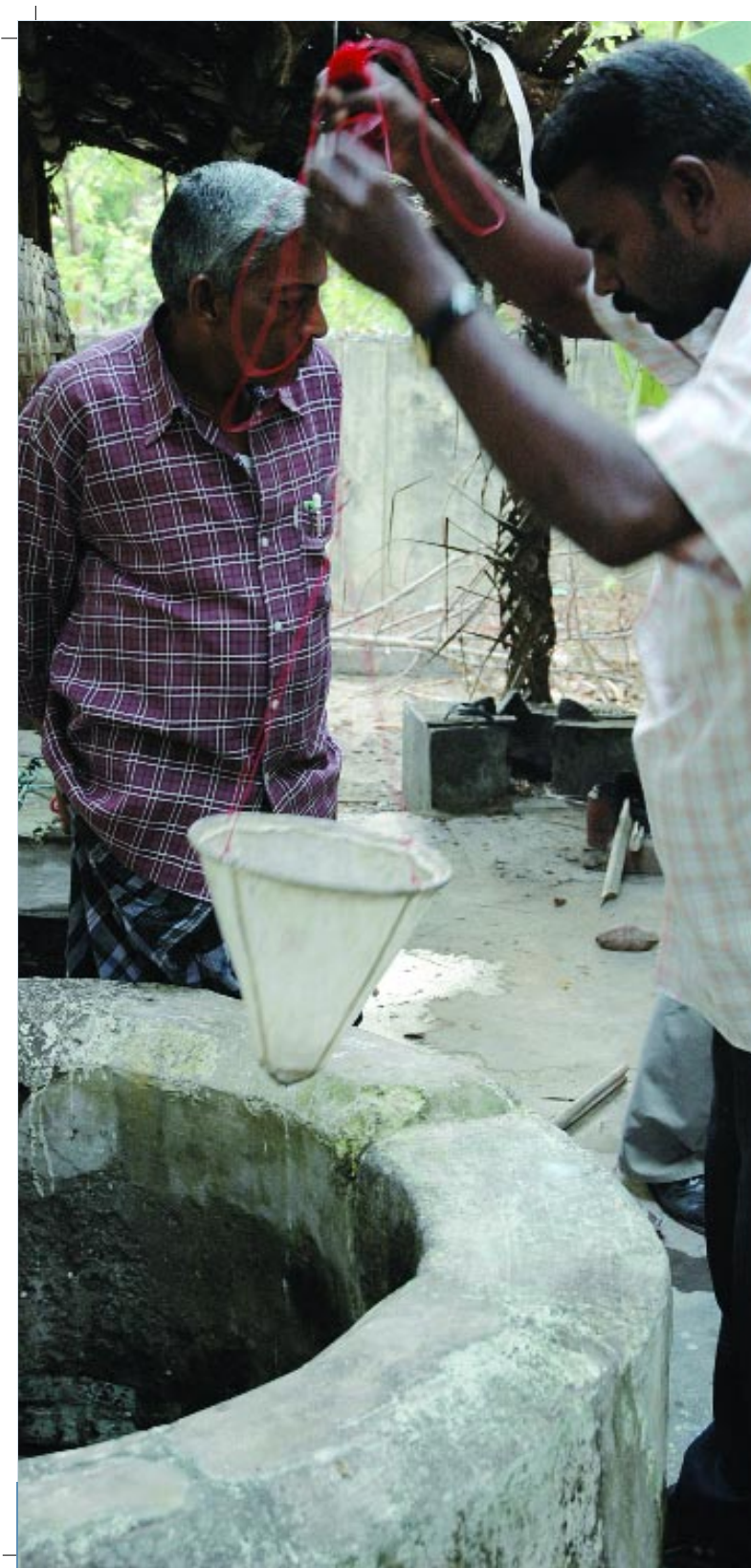
Dr Samlee Plianbangchang, Regional Director (second from right), South-East Asia Region, visits a damaged hospital, accompanied by Dr Kan Tun, WHO Representative to Sri Lanka.

In Myanmar the impact of the tsunami was comparatively milder. Even so, at least 61 lives were lost, and communities in 12 townships were affected.

Predicting Disease following the Emergency

Phases	Anticipated health problems	Possible Interventions
Days 1-3	Injury/drowning and deaths	Safe disposal of corpses Injury management Needs assessment for health
Days 3-5	Diarrhoeal diseases Acute respiratory infections	Health promotion <ul style="list-style-type: none"> • Sanitation, environment • Water purification • Personal hygiene • Immunization (measles) • ORS Emerging disease surveillance (morbidity/ mortality)
5-10 days	As above plus: Dehydration, Pneumonia, conjunctivitis, and skin infections	As above plus : Antibiotics for pneumonia Drugs for skin infections and conjunctivitis
>10 days	As above plus: Vector-borne diseases (malaria, DF), Typhoid fever, Measles, and Malnutrition Psychosocial problems	Ongoing surveillance, Health education, measures for vector control, antimalarial, Supplementary feeding programme Psychosocial support Rebuilding health infrastructure

Disease / Health event	Risk Factors
Acute respiratory infections	Inadequate shelter Poor health care services Overcrowding Lack of food, malnutrition Age group under one year Elderly people Rainy season
Diarrhoeal diseases/ Hepatitis A,E	Overcrowding Inadequate quantity and/or quality of water Poor personal hygiene Poor washing facilities Poor sanitation Insufficient soap Inadequate health care services
Measles	Measles immunization coverage rates below 80% in area of origin Population movement Overcrowding Malnutrition
Malaria and other vector-borne diseases (Japanese Encephalitis, Scrub Typhus)	Movement of people from areas of low endemicity to hyperendemic areas. Exposure to areas where vectors are more present Increased population density promoting mosquito bites Interruption of vector control measures
Meningococcal meningitis	Overcrowding High rates of acute respiratory infection
Dengue haemorrhagic fever	Dengue haemorrhagic fever/endemic areas Vector breeding sites (water pools, water storage, pounds, etc.) Poor vector control
Zoonosis	Poor control of slaughtering Contact with infected animals due to lack of veterinary control Increased rate of diseases in animals
Neonatal Tetanus, Adult tetanus	No safe procedures for traditional births attendants Disruption of immunization programme Open wounds (due to trauma) Poor hygiene
Leptospirosis	Contamination of water by rat urine Contact with infected domestic and other animals (dogs, pigs, rats) Inadequately treated drinking water sources Poor hygienic conditions in shelters and immediate environment.



Keeping sickness at bay

Shocking as they were, the statistics meant little to the affected population immediately after the tsunami. Deprived of home and hearth, survival was a priority. For public health officials, the task at hand spoke for itself; they needed no numbers to tell them of the crisis. Many people had died, but many more were homeless, and in relief camps. This meant a large vulnerable population, in crowded living conditions, with limited scope for safe water, sanitation and food. There was, therefore, a serious threat of disease outbreaks. The potential threats included malaria, cholera, influenza, diarrhoea and acute respiratory tract infections.

Providing safe water was an urgent issue in all the devastated areas. What made matters worse was the contamination of fresh water sources by sea water. In coastal Sri Lanka, for instance, wells are often the sources of fresh water. Yet, more than 12000 shallow wells were contaminated. Groundwater in the Maldives was similarly polluted. In Thailand too, fresh water shortage had become a problem due to sea water contaminating the underground and surface sources. The Thai media reported concerns about large volumes of untreated municipal waste water being dumped into the Andaman Sea, as the treatment plant's pumps and regulator controls had been destroyed.

The sea water posed a second problem. The receding sea left pockets of brackish water which provided ideal breeding grounds for disease-causing vectors, in countries with endemic dengue and malaria. In addition, as sewage plants and water treatment plants were damaged, the risk of water-borne communicable diseases increased. Immediate and effective action was needed.

Everywhere in the affected areas, people were not merely at a physical risk—emotionally, they were traumatized. The mental health of the tsunami-affected population emerged as a major concern.

◀ *A health worker checks to ensure that there are no breeding mosquitoes which could cause diseases like malaria and dengue.*

The fightback begins

With six countries in the Region reeling from the impact, SEARO was appointed the nodal point for coordinating WHO's efforts in the affected countries, with constant support from WHO headquarters, particularly Health Action in Crises (HAC), in Geneva. Emergency response plans were set into motion at a meeting on 27th December 2004. Soon, senior WHO staff from across the world began to arrive in New Delhi.


A 100-day strategy for dealing with the emergency was adopted, taking advantage of WHO's long-established knowledge of prevalent conditions and partnerships with national and local authorities in each of the affected countries. WHO's purpose in supporting the national authorities and local health sector partners was as simple as it was single-minded: to protect the health of survivors and other vulnerable people affected by the disaster. In each of the affected countries the WHO Representatives were in close touch with the Ministries of Health and staff worked with their counterparts on strategies for immediate and longer term responses.

The strategy focused on monitoring public health to prevent or contain outbreaks, replace lost health assets and supplies and provide technical expertise to fill key gaps. The target was health coverage for four million people in the Region, including the two million internally displaced and 100 000 injured. The initial emerging priorities encompassed technical assistance for safe drinking water, setting up or reactivation of communicable disease surveillance and response systems, and action to re-establish the basic health care system, including hospital-based care.

During this 100- day period, the focus of WHO's operational activities was in Indonesia, Sri Lanka



*26 December 2004.
The day time stopped
for thousands of
people.*

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Main Objectives of the 100-Day Strategy



The WHO tsunami operations team discussing the 100-day strategy.

- Monitoring public health to provide early warning of emerging health threats and to enable the timely organization of any necessary response.
- Replacing lost assets, infrastructure, and supplies that are crucial to meeting additional health needs consequent to the disaster, as well as the reactivation of key previously-available health services.
- Providing technical expertise to health authorities to enable key gaps to be filled.
- Establishing and sustaining effective regional, national, and local health coordination arrangements, to enable efficient deployment of assistance.
- Ensuring up-to-date communications on the health situation is available to all local and international stakeholders.
- Refining health needs assessments over the coming period, and facilitating early recovery and rehabilitation.

and the Maldives, with increased support from the WHO Regional Office. India and Thailand did not request, or require, financial help. The WHO office in Yangon joined the international efforts to provide the required support.

Meanwhile, in the affected countries too, the WHO staff — many of whom had been on leave as it was peak holiday season — had been galvanized.

In the early days of the disaster, the need to have effective communication systems was seen as an essential step. Local telecommunication infrastructure in the affected sites was seriously damaged, and the disrupted communication services were impeding relief operations. Measures were put into place to improve inter-agency coordination in this area.

As all communication lines were down, for two agonizing days, there was no news of the staff stationed in the WHO office in Banda Aceh, the capital of the tsunami-hit Aceh province in Indonesia. Fortunately, they were safe. It was only after several days that the health sector teams from Jakarta could land at Sultan Iskandar Muda Airport in Banda Aceh.

The WHO offices in Jakarta and Banda Aceh have been very busy since. With the old office in Aceh destroyed, a new office at a new location was soon established, with more staff and emergency facilities to assist the relief operations. Those affected by the tsunami included many local health workers as well as WHO staff. Like so many others in the province, they had lost life-defining reference points -family members or homes or businesses, or perhaps the landscape of the only world they had ever known. Yet, they found the resolve, the courage to fight on, and work for a better future and a new Aceh. Indeed, some of them spoke of how working to help others enabled them to cope with their own loss and grief. In country after country these stories were among the most inspirational to emerge from the debris of the tsunami.

Immediately after the disaster, WHO collaborated with both the Provincial Health Office (PHO) in Banda Aceh and the Ministry of

The Concern Over Bodies

Immediately after the disaster, as the number of bodies began increasing rapidly, many were buried hastily, sometimes even in mass graves, for fear of disease. WHO, working closely with the national governments, effectively disseminated the message that dead bodies do not spread disease, so there was no need for a hasty burial. ■

Dead bodies do not cause disease.



Those affected included many local health workers as well as WHO staff. Like so many others in the province, they had lost life-defining reference points - family members or homes or businesses, or perhaps the landscape of the only world they had ever known. Yet, they found the resolve, the courage to fight on, and work for a better future.

United in grief, two women support each other as they try to come to terms with their loss.



Health in Jakarta. Aceh is not easily accessible from other parts of Indonesia, and WHO's prior presence, and knowledge of the area proved an asset in understanding its complex needs. The PHO too had lost approximately 15 per cent of its staff to the tsunami. In the early days, disaster management meetings were held regularly to formulate strategies with the government, other UN agencies, as well as non-governmental organisations.

To help doctors, nurses, midwives and other professional health workers in Aceh cope with their trauma of loss, WHO Indonesia has been conducting and facilitating several workshops and training sessions for the local health staff to address these concerns. As hundreds of health agencies also began to arrive in Aceh to help with the relief and rehabilitation



efforts, WHO, at the request of the Aceh health authorities, played a major coordinating role to ensure effective and efficient action in the field.

As in the case of Aceh, some of the worst-hit areas in Sri Lanka were also among the country's most inaccessible. The WHO country team was in constant contact with the Ministry of Health, supporting them with technical guidance as well as emergency material. Emergency health kits and water purification tablets from available stock were dispatched immediately to the affected areas.

As in other affected countries, WHO in Sri Lanka was appointed the health sector co-ordinator within the UN. The Organization co-ordinated domestic and foreign mobile teams to effectively restore basic health services. An Emergency Task Force and an Operations Room was set up, which mobilized resources such as relief material, funds and technical expertise.

Clinging to hope, relatives put out pictures of their loved ones who were missing after the disaster.



UN Secretary-General Kofi Annan visits tsunami-affected areas.

WHO was able to support the national efforts due to the Organization's first-hand knowledge of the affected areas, and its involvement in strengthening the health system in those regions prior to the tsunami.

In the past, the country office had worked with the Ministry of Health following calamities like floods. Hence the Organization understood the district-level capacity for disease surveillance, health information and laboratory services. A good understanding of local cultures, and the relationship built between WHO staff and the district health sector representatives and communities, proved invaluable. So did technology. GIS mapping helped pin-point areas most in need of aid, and fine-tune relief and rescue strategies. These accumulated experiences, information and relationships definitely assisted in mobilizing a swift response.

Following a disaster, there is always a threat of disease outbreaks. WHO responded immediately and an effective response helped prevent any major outbreaks.





The Organization's first task was to provide necessary supplies requested by the government: oral rehydration salts, chlorine powder, as well as emergency medicine and surgical kits.

Amidst the debris, graffiti on a now-disused well records the date of the disaster.



For most countries, the tsunami represented a new type of disaster; in the Maldives, the very idea of disaster was new. According to eyewitness accounts, in Male the capital the waters brimmed over the sea wall and flooded the land. Bystanders realized there was something amiss but did not know what to make of this phenomenon. Senior WHO staff were apprehensive. The first warning of impending disaster was sounded by them and within minutes they were on the phone and were the first to warn the WHO Regional Office in New Delhi of the sea's strange behaviour.

Initial reports from the Maldives were hazy, due to the breakdown of the telecommunications network. For hours, this almost idyllic collection of islands virtually dropped off the radar. There was no news, no way of getting news. However, within the country, a UN Country team was established immediately to coordinate the UN's support to the government efforts. A National Disaster Management Centre was also set up.

WHO Maldives made some significant contributions in this period. The Organization's first task was to bring in necessary supplies requested by the government: oral rehydration salts (ORS), chlorine powder, as well as emergency medicine and surgical kits. Soon after, WHO deployed experts in disease surveillance and outbreak response, water and sanitation, logistics and management, not only to support the local government counterparts, but also to bolster the country office.

As can be expected, the tsunami made life very busy at the Maldives country office, and it became necessary to expand existing operations. There were copious amounts of data to deal with, and insufficient manpower. As such, technical assistance was vital. A pressing urgency in the weeks following the tsunami was the water and sanitation issue. In a country where water was a scarce resource at the best of times, the widespread contamination of existing water sources set alarm bells ringing. Among WHO's first tasks was to despatch a team of water and sanitation specialists to the affected islands. A quick, comprehensive



Dr Georg Petersen, WHO Representative to Indonesia (left) discusses the tsunami with WHO Regional Director for South-East Asia, Dr Samlee Plianbangchang (right), at Banda Aceh in Indonesia.



assessment was made, helping WHO and the national government to get "a clear picture". Long-term solutions were also formulated.

In India, the tsunami affected both the relatively less accessible Andaman and Nicobar Islands as well as the sprawling eastern coastline of the mainland. India did not seek external assistance — in fact it assisted WHO in its efforts in other tsunami-affected countries. WHO worked closely with the Ministry of Health, maintaining daily communication.

WHO drew upon its reservoir of technical expertise to support the national team. Four national staff and nine consultants from the polio and tuberculosis projects were deployed for field operations in the states of Tamil Nadu, Andhra Pradesh and Kerala. Twenty-eight Technical Guidelines were provided to the Central Government, state governments and partners. Four Disease Surveillance Units were established and adequately equipped in Tamil Nadu in the worst-affected districts of Nagapattinam, Kanyakumari, Cuddalore and Kancheepuram, to report daily on the status of communicable diseases in the affected areas. WHO, along with UNICEF and UNDP, developed a framework for providing psychosocial support to affected populations. Medical supplies and assistance were provided, particularly for immunization of children.

The immediate response in Thailand followed a similar pattern. Upon hearing of the tsunami tidal wave having wreaked havoc in southern Thailand, the WHO Country Office immediately got in touch with the Ministry of Public Health. WHO's resources and expertise were placed at the disposal of the Royal Thai government. For television news channels reporting 24 hrs a day the Thailand disaster was the first to draw international attention. This story was breaking news on all channels, because among those affected were numerous tourists—from Europe, USA, the rest of Asia, indeed everywhere—who were

◀ *Several islands in the Indian Ocean were completely devastated by the tsunami.*

The mental health of the affected population was another key concern. Here, activities help affected children cope. ▶



holidaying at its beach resorts. WHO was closely involved in the coordination of disaster relief for the international organizations, a process that was facilitated by the Foreign Ministry.

A major concern was the disposal of countless corpses, many left without a family claimant. The issue of dead bodies haunted all government and health agencies and countries. On the one hand, people worried about the possible health and environmental implications with regard to handling of dead bodies, and, if not handled properly, this could have become a cause for panic. At the same time, WHO recognized the need for great sensitivity to local cultural needs and psychological reassurance in disposing of bodies with due respect and regard to local customs. WHO played a key role in explaining that corpses did not pose a disease threat. "Despite popular belief, there is no significant risk of epidemic disease from unburied corpses, although workers handling corpses should use protective



An injured child in a camp soon after the tsunami.

clothing, masks and gloves for protection against some non-epidemic diseases such as tuberculosis," WHO officials explained. In times of disaster, the best weapon is often clear and concise information. The Country Office also provided the Thai government with WHO's guidelines on appropriate management of dead bodies, and assisted in bringing in some of the forensic experts who had dealt with large numbers of dead bodies after the New York 9/11 terrorist attacks.

The Thai government mobilized over 200 doctors and nurses to the affected areas within 24 hours of the disaster. Fortunately, very little damage was done to the health facilities, as they were located further inland, and services could continue, uninterrupted. More than 10000 people were treated in public facilities for injuries, including major trauma, with the severe cases being evacuated to big cities, mostly Bangkok. However, the immediate health challenges were well taken



Overnight, life changed. Searching for loved ones among the debris.

In times of disaster, the best weapon is often clear and concise information. WHO provided guidelines on appropriate management of dead bodies, and assisted in bringing in some of the forensic experts who had dealt with large numbers of dead bodies after the New York 9/11 terrorist attacks.



care of. The mortality rate of those patients who reached hospitals was only 0.3%.

A few days after 26 December, WHO officials formed a part of the the UN's OCHA (United Nations Office for the Coordination of Humanitarian Affairs) team that left for a preliminary assessment of the impact of the disaster. This enabled them to make a first-hand appraisal, gathering empirical evidence from residents of Ban Nam Khem fishing village in Takua Pa District of Phang Nga Province. Officials remembered the somber, nervous mood: "People still lived in fear and uncertainty. They fled their temporary shelter every time there was a rumour that another wave would strike."

There was major concern in the Ministry of Public Health over the psycho-social needs of traumatized victims, particularly children, migrant workers and their families. Over 10000 people surveyed in the first two weeks of the disaster reported no major psychological disease, though in the initial phase, many patients were treated for trauma, stress and depression. In Thailand and all the affected countries, mental health became a short-term priority and long-term mission.

Emotional sickness is often invisible, but physical ill-health is more tangible. Within a week, the Thai Ministry of Public Health also introduced a disease surveillance system to guard displaced persons from diarrhoea, food poisoning, and respiratory and wound infections. It deployed Surveillance and Rapid Response Teams (SRRT) to four of the six provinces most severely affected - Phuket, Phang Nga, Krabi and Ranong. They assessed cases in hospitals and in the communities. The information was shared with WHO on a routine basis.

In Myanmar too, a tsunami assistance coordination group was set up, with UN agencies and international NGOs as participants. WHO worked in close coordination with these agencies, and provided technical support to the Ministry of Health.

◀ WHO staff with tsunami-affected patients.

The Operations Room

The Operations Room in the Regional Office for South-East Asia formed the heart of WHO's response to the tsunami. Set up immediately after the disaster, it was led by the Deputy Regional Director, Dr Poonam Khetrapal Singh, at the behest of the Regional Director, Dr Samlee Plianbangchang. The Regional Adviser for Emergency Health in Action (EHA), Dr Luis Perez, managed the Ops Room (as it was commonly referred to).

The team, which, in the early days, consisted of the Ops room coordinator, an information manager, an epidemiologist monitoring the public health situation, another person monitoring supplies, a person following the Flash appeal, and a communications professional to deal with the media, worked round the clock. All the people in the Ops room were volunteers, including all the support staff. Even late at night, people were found typing furiously at workstations set up across the room. The Ops room functioned 24 hours a day. With the television in the background, to keep tabs on the latest news, the team was constantly in touch with the affected countries, trying to meet their demands — be it human or material resources, or advice.



WHO staff at work in the Operations Room.

The day began early in the morning, with a meeting to decide the main tasks for the day. This was followed by video conferences with the countries. The phones would be constantly busy as the Ops room team alternately kept track of developments in the affected countries, and followed up on how the demands of these countries were being met. As the response got underway, the number of people in the Ops room swelled, and it became the first stop for all those heading for the field. Situation reports from each of the affected countries were analysed here, and a regional summary situation report sent out by the evening to key people, including donors, as well as posted on the website for the public to access.

Over time, as the response moved away from the emergency phase to the rehabilitation phase, the Ops room also became the place where everyone came back and spoke of their experiences following the tsunami, before heading back to their normal routine. ■

Military helicopters were used to assess the damage and provide food and supplies to inaccessible areas.



First line of defence

As with every disaster, the tsunami was a very human tragedy. It required coping with death, sorrow and misery, getting the injured medical care, safe drinking water, clean living conditions and protection from communicable diseases. All this required material resources; it also called for trained people. A human tragedy cried out for a human solution.

To treat the injured, for example, doctors, nurses and health professionals and medical supplies were needed. Getting the right people with the right experience at the right place was critical for effective response. As an international organization, WHO mobilized resources immediately, from all over the world. The Organization learnt to recruit and deploy the best experts from around the world quickly, as per the expressed or anticipated needs of countries. Databases of the best resource people were created, and likely candidates woken up at strange hours — with an offer of a WHO consultancy. WHO had to rapidly recruit epidemiologists, water and sanitation experts, communicable disease experts, logisticians, information technology and media/communication experts. More than 250 WHO staff and consultants were mobilized in the relief work in the three most-affected countries, Indonesia, Sri Lanka and the

Boats bring essential supplies to tsunami-affected islands and atolls. ►



Getting the right people with the right experience at the right place was critical for effective response.



Maldives. Experts also arrived from Europe and the USA. To move men and material and to smoothen procedures, a whole new, parallel administration was set up. Through all this, the Operations Room worked around the clock.

A Tsunami Technical Group (TTG), headed by the Communicable Disease Director, was established and coordinated mobilization of expertise, guidelines, and tools and other resources. A database of experts who could be approached was put together. The TTG anticipated implications not only for communicable diseases but for all health matters. Daily meetings and a representative in the Operations Room made the TTG's work effective and efficient.

Four technical working groups were established to cover:

- development and adaptation of guidelines and tools;
- mobilization of technical experts;
- data management;
- communication and updates.

Consequently, more than 80 technical guidelines, outlining best practices to follow, were produced, transmitted to the field and posted on the web. Many were summarized into succinct "ready-reckoners" for those in the field.

While emergency health kits were immediately sent wherever they were needed, vaccines and lifesaving drugs were also sourced. Supplies poured in from all over the world. But this generated further problems — the medicines were marked in different languages, were of different doses, and not always relevant to the tsunami-affected populations. These had to be sorted, and transported. This was not always easy in areas that were totally devastated and quite inaccessible, and required great logistical skills.

Surveillance data was compiled and used to signal any likely disease outbreak or unusual health event. Regular communication was

◀ Two young survivors survey the staircase of what was once a home.

maintained at all levels. Every morning, the Operations Room at SEARO began the day with a teleconference with headquarters, and the WHO offices in Banda Aceh, Colombo, Male, Bangkok and Yangon. On the basis of new information daily situation reports were compiled and posted on the web.

From day one, global media from all corners of the world sought WHO's expert information about health concerns, latest information and outbreak precautions. WHO senior management at the Regional Office, Headquarters and countries as well as the technical and communication units constantly fielded media queries. The Organization's expert comments were beamed around the globe.

With teams, strategies and resources in place, WHO was ready for any possible disease threat. The vigil had begun.

WHO staff make assessments of the health situation following the tsunami.



From day one, global media from all corners of the world sought WHO's expert information about health concerns, latest information and outbreak precautions. The Organization's expert comments were beamed around the globe.

Chapter 2

The Response



If the tsunami saw nature at its worst, it was trumped by humanity at its best. This was also a crisis without controversy, or politics. There was a rare non-divisiveness.

Donations poured in from all over the world.



The globe gets together

One heartening aspect of the tsunami was the tremendous global response. As the giant waves and their horrific impact found their way to living rooms across the world through 24-hour television channels, people, and nations, from southern Africa to southern America, the Midwest to the Midlands, reached out to those affected, with their hearts, cheques and material donations. It was an unprecedented and spontaneous show of generosity and solidarity. If the tsunami saw nature at its worst, it was trumped by humanity at its best. When the United Nations launched its Flash Appeal, it brought WHO over 50 million dollars for tsunami relief and rehabilitation. Medicines, clothes, baby food and other supplies poured in, whether sent by charities, business corporations or simply by caring individuals. In Indonesia, for example, at the height of the relief operations, 20 metric tonnes of medical supplies were coming in, every day.



This was also a crisis without controversy, or politics. There was a rare non-divisiveness; almost every international organization wished to assist. Hundreds of volunteers from nongovernmental agencies reported for duty in the affected areas. Assistance of the military services was also offered by many countries — making this possibly the first natural disaster to have seen such high degrees of seamless civil-military cooperation. Other than money and material, many private business groups contributed key human resources — such as water and sanitation engineers, and logisticians — who could provide practical assistance. There was even cooperation between parties to internal conflicts. For example, in Sri Lanka, the security forces helped civilians in LTTE controlled areas. In Aceh, where a significant part of the international relief efforts was focused, every nationality in the world was represented by NGOs, the military or just individuals who were there to help. The Indonesian authorities welcomed everyone with an open door — unprecedented in recent history with the province having been cut off from the world until now because of long-running civil strife.

Work began, to clear up the rubble.

Traditional Therapy

As part of the health sector response to the tsunami, the Thai government included a time-tested and traditional form of therapy — the Thai massage. Three teams of massage therapists providing the traditional Thai massage, accredited by the Thai Ministry of Public Health, were part of the emergency teams deployed to the tsunami-affected areas. The role of the therapists was to provide relief to the workers and displaced persons. ■

Assessing needs

Right after the disaster, WHO offered its assistance to the Health Ministries in the affected countries. At the same time, in-house, it drew up strategic plans to provide effective support. The focus was on a few core concerns: 1) making a rapid assessment of the situation so that further action would be tailored to the actual needs of the people; 2) meeting the immediate needs of the survivors; 3) preparing for the aftermath, such as any outbreak, or malnutrition; 4) mobilizing human resources to meet the immediate challenges.



◀ *A health worker assessing the situation in a camp.*

Within a day of the disaster, WHO had mobilized 190 emergency health kits. Each individual kit is geared to serve 10 000 people for three months. In total, therefore, these kits, meant for medical personnel, had enough medical supplies to cover the essential medicine needs of approximately two million people for three months. Nine such kits, which were immediately available, were distributed in the Region. Similarly, 140 other kits, to treat diarrhoea and for use in surgery, were also put in place.

In the meantime, in all affected countries, small teams had been sent to make a rapid assessment of the extent of the impact to the health infrastructure, the number of people displaced, the conditions they were living in, their access to safe water, sanitation and food. In Sri Lanka, for example, three rapid assessment teams set off to the south, east and north of the country. In addition to a Ministry of Health

official, each team consisted of one national professional working in the WHO Sri Lanka Office, and one or two WHO staff from either headquarters in Geneva or from SEARO. Some of the international WHO staff who had been holidaying in Sri Lanka when the disaster occurred, immediately volunteered their services, ensuring that valuable time was not lost in travel. While these assessments were being carried out, and information collated, the core tsunami team in the WHO Country Office held regular emergency planning meetings

with both the UN Country Team and the Ministry of Health, and helped prepare guidelines to deal with the scale of disaster. The human efforts were complemented by technology. Although Sri Lanka had a good network of roads before the disaster, with a density of 1.53 km per sq km, most of the roads in the affected areas had been severely damaged. In some cases they were rendered unusable. Here, satellite imaging technology, through Sri Lanka's well-established GIS mapping framework, came in useful in studying infrastructure damage.

In Thailand, the Ministry of Public Health rapidly activated mass casualty plans and deployed appropriate personnel and resources. On 26 December, a central command centre was set up in Bangkok, with similar centres in each of the affected provinces. More than 100 teams were deployed to provide emergency medical care, while 12 other teams provided technical support and health education. So speedy was



their response that the first team from Bangkok reached the field only six hours after the tsunami struck.

Not every country was as fortunate. In Indonesia, rocked by the original earthquake that began the trans-continental chain of death, it was difficult to assess the full impact of the tragedy in the days immediately following the tsunami. In fact initial media reports only reported that a few hundred people were killed. It was several days before the enormity of the tragedy was revealed. The WHO report at that time reveals that the worst was expected:

The situation in Aceh may turn out to be grim, not just because of the current crisis, but also because emergency supplies have dwindled in recent months due to a series of emergencies in various parts of Indonesia. Aceh is further suffering from various vector-borne diseases, such as malaria and dengue. Lastly, many areas are difficult to reach due to conflict. This may also slow down communication with some remote areas in Aceh.

Army helicopters were initially used to survey Aceh's affected zone. The scenes they saw were horrifying. For miles on end, once vibrant towns and villages were razed to the ground — almost as if they had been pounded by extremely powerful bombs or a giant steamroller. The terse situation report sent from WHO Indonesia on 5 January summed up the sense of gloom:

Health situation:

- 50% of health facilities in the districts were destroyed or damaged.
- The Provincial General hospital is not functioning and is under cleaning process. Military will help.
- 50% of the health staff of the Provincial Health Office were dead or missing. Only 17 officially reported so far.
- Three out of six health centres in Banda Aceh partially functioning.
- The provincial and the municipal as well as Aceh Besar district health services had collapsed. Health services at the moment running at 20-30% capacity. Before the earthquake, it was 50-60%. The MoH is relocating staff from other provinces and from Jakarta to Banda Aceh. A total of 200 staff are working in the province.
- There is no surveillance system in place. The Government had sent staff from Jakarta and other provinces' to start the surveillance with support from WHO staff.

◀ The WHO Director-General, Dr LEE Jong-wook (right) meets injured patients.

A mother and daughter who lost almost everything to the tsunami. ▶



For miles on end, once vibrant towns and villages were razed to the ground — almost as if they had been pounded by extremely powerful bombs or a giant steamroller.

- No laboratory left in Banda Aceh.
- Need a totally new set up including the laboratory staff.
- CDC MoH sent a 20-member team for disinfection and spraying in IDPs camps.
- The limited capacity of the warehouse and distribution of supplies are a problem.
- The Provincial health Office has found a house and will reopen.

Aceh had experienced an epic tragedy. It was beyond description.

The tsunami seemed to unite India and Indonesia in an altogether sombre context. The death waves that reached India's eastern shore brought with them some of the devastation they wreaked on Aceh. In India, the Disaster Management Plan was activated and the established institutional mechanism at the federal, state and district levels began to be put into practice. The affected coastal areas in the mainland were fairly easily accessible, and relief efforts got underway immediately. India was lucky — if that word could be used at all on 26 December — in that only the southeastern coastal strips had been affected. It was a



A hand holding clean water.



different story, however, in the Andaman and Nicobar Islands, India's worst-hit territory that Sunday morning, with locations that are, at the best of times, difficult to reach. The Ministry of Home Affairs, the nodal ministry, along with other concerned ministries, worked in tandem with the state governments and, together, evacuated (to quote Indian government figures) 645 000 people, rescued 28 734 more, mobilized 7400 metric tonnes of relief material and set up 881 relief camps. This barrage of numbers at once amplifies and hides the enormous public system response to the disaster. It was the largest such effort in Indian history, working with a matrix of political, administrative and societal impulses and extreme logistical challenges. By 31 December, 856 metric tonnes of relief material had been

Military staff help unload boxes of medical supplies.

mobilized for delivery to the Andaman and Nicobar Islands, and navy boats and ships were being used to ferry supplies. By 4 January 2005, 111 stationary and 53 mobile medical teams were functioning in Tamil Nadu and Andhra Pradesh, with 92 additional camps in Kerala.

Great tragedies are never without great ironies. The Maldives was in the process of preparing a Disaster Management Plan when the tsunami struck. Theory was put to practice faster than anticipated. Indeed, this country had officially been taken out of the list of least developed countries three days before the tsunami struck. The tsunami put them back on that list. But their response was laudable. On the day of the earthquake-tsunami itself, the government instituted the National Disaster Management Centre. By 10 pm on 30 December, WHO procured five emergency health kits (each kit being adequate for 10000 people for over three months) and had delivered them to the Ministry of Health in Male.

In Myanmar, too, the Ministry of Health and WHO collaborated closely. Five sets of new emergency health kits were handed over to the Ministry, along with 22680 treatment courses of antimalaria drugs donated by a major pharmaceutical company. WHO's response during the emergency phase has been closely coordinated with the UN disaster management team and with the international NGOs, through the Red Cross-led Tsunami liaison group. WHO's primary role in providing technical support to the Ministry of Health was maintained throughout the emergency phase and all the technical guidelines for emergencies were disseminated.

In all of these countries, IT played a crucial role in supporting the assessment of disaster situations. Several information systems were used for such assessments. Dissemination of accurate information was achieved effectively using electronic means such as Web portals and list servers.

◀ *Two health workers check for the presence of disease-causing vectors in stagnant pools of water.*

Fatwa on Fish

Soon after the tsunami, there were reports that people in the Maldives, and later, in Indonesia, were refraining from consuming fish caught in the sea. The reasons for this were not only related to the presumed risk of potential food-borne disease, but also had cultural and religious implications. It was thought that the fish may have fed on the dead bodies swept into the ocean. WHO and the Food and Agriculture Organization (FAO) investigated and found that the fish did not contain any harmful substances. Moreover, this ban on eating fish was worsening the economic impact of fishermen who had survived the tsunami and were trying to make a living once again. The FAO and WHO approached the religious authorities for their assistance. After studying the situation, the International Union for Muslim Scholars, issued a fatwa "that it is perfectly permissible from the Islamic point of view to eat sea fish. Indeed, it encourages them to do so in order to protect their health and preserve their energy so that they can carry out their duties and functions in obedience to God, and guard themselves against any disease that may affect them as a result of malnutrition, should they refrain from eating fish. They should consider sea fish as part of the sustenance God has provided for them, as it gives them what they need of proteins and energy." ■



Fish on display at a roadside stall.



A man who was injured during the tsunami, being treated in a hospital.

Coping with Injuries

Like any disaster of this magnitude, the tsunami will perhaps always be remembered for the many thousands it killed. Yet, the human cost was actually far greater, and will perhaps be better appreciated when one considers the numbers injured — taking into account both major and minor injuries — in all the affected countries. The dead need a dignified burial or cremation; the injured often need that critical care between life and death, between recovery and a lifetime of pain. An example may be illustrative here. In Aceh, 1051 inpatients and 22242 outpatients had been admitted to hospital by 5 January. True, this number seemed small compared to the number who had died — estimated at the time at 94200 — yet it meant an emergency medical system that could cope with thousands and thousands of wounded bodies, and traumatized minds.



An Australian doctor at one make-shift hospital in Aceh vividly described the injuries as “The tsunami waves have churned and whipped the victims.” He further elaborated, “Imagine a person being churned in a large blender — and then throw in branches and debris which lash the person being churned, and the water is full of sewage and chemicals. Such victims suffer not only multiple injuries but the cuts are badly infected and many may need amputation.”

Many people suffered multiple injuries, and badly infected cuts.



Similarly, in Sri Lanka, the National Disaster Management Centre (NDMC) estimated the number of injured at 23189, with an injured to death ratio of 1:1.53. Roughly, that meant that for every three people who had been killed by the tsunami, two had been injured. No data were available in Sri Lanka regarding the exact nature of injuries. Even so, in general, they were in line with injuries likely after flooding, or collapse of buildings — fractures, cuts, bruises. This was not a uniform experience, though. Indonesia also reported respiratory tract infection and aspiration pneumonia cases. Unlike normal flooding, in this case, due to infusion of sea water, many people had lung injuries and often life-threatening pneumonia.

Within hours after the tsunami struck, the number of injured people needing medical help had shot up. At the same time, the facilities to cope with this increased health burden had decreased sharply, as hospitals and health centres had been destroyed by the tsunami, and, most tellingly, many health workers had died. So the first task was to set up even temporary medical facilities and bring in additional health workers from unaffected areas.

In all the affected countries, WHO worked closely with the national ministries of health as well as with the provincial health authorities to ensure that there was adequate access to medical treatment. In addition to mobilizing medical and surgical kits and other resources, WHO also compiled and disseminated guidelines for appropriate care and treatment for post-tsunami conditions. In India, for example, technical guidelines to the central government, state governments and other partners were provided. The subjects covered ranged from “Tsunami: Anticipated Health Problems” to “Communicable Diseases: Early Warning System” to “Mortuary Service and Handling of Dead Persons”.

◀ A doctor tends to an injured patient after the disaster.

Communicable disease risk

With every disaster comes the added threat of communicable disease. This is particularly so in crowded living conditions in makeshift camps. Also, the immune systems of displaced people are likely to be weakened due to shock, exhaustion and lack of proper nutrition. In a landmark study in 1990, for example, Robert Waldman, currently at Columbia University, and Michael Toole, of the Burnet Institute in



Melbourne, Australia, showed that vaccine-preventable measles infections had pushed the mortality rate of children in Ethiopian and Sudanese refugee camps to 60 times the normal rate. Similarly, in 1994, an epidemic of cholera and dysentery killed 50000 people in three weeks in a camp sheltering Rwandan refugees in Goma, Democratic Republic of Congo. These and other studies show how vulnerable displaced people are likely to be in camps, following a disaster.

Always working with and supporting government health authorities,

There were concerns that diseases could spread rapidly in crowded camps.

A multi-pronged strategy was adopted: taking steps to ensure minimum standards of access to safe water and sanitation; setting up effective surveillance systems that would provide an early warning of any possible threat of outbreak; and ensuring that those who were sick had access to adequate care.



WHO's initial priority was pre-empting any communicable disease outbreak. A multi-pronged strategy was adopted: taking steps to ensure minimum standards of access to safe water and sanitation; setting up effective surveillance systems that would provide an early warning of any possible threat of outbreak; and ensuring that those who were sick had access to adequate care.

By 3 January, WHO was in the process of establishing a Global Outbreak and Alert Response Network (GOARN) operational support team in New Delhi. GOARN is a mechanism for technical collaboration among existing institutions and networks which pool human and technical resources for the rapid identification, confirmation and response to outbreaks of international importance. The Network provides an operational framework to link this expertise and skills to keep the international community constantly alert to the threat of outbreaks and ready to respond. The WHO team's task, after the tsunami, was to coordinate the support from GOARN partners. Key people were needed, including team leaders, communicable disease epidemiologists, laboratory experts and technicians, logisticians, data managers, and risk communication experts in outbreak response. By 8 January, GOARN had been activated and 120 epidemiologists were on standby. Twelve expert epidemiologists from GOARN, in addition to 10 from WHO, were on their way to various affected areas in the Region.

Besides technical expertise in the form of manpower for communicable disease alert and response, several structural and operational elements are needed in order to have an early warning system for potential outbreaks. By the second week in February the Epidemic Alert and Response team in WHO Banda Aceh, consisting of six GOARN expert epidemiologists, had in collaboration with the Provincial Ministry of Health (MoH), the epidemiology team, developed a weekly surveillance system that included NGOs, hospitals and laboratories in Banda Aceh, Meulaboh, and other towns.

◀ Children playing at a camp



With many hospitals damaged, the functioning ones carried the burden of treating people affected by the disaster.



WHO officials at work aboard USS Abraham Lincoln.

The system was targeted at identifying diseases with epidemic potential based on syndromic reporting (cholera, shigella, acute lower respiratory infections, malaria, dengue fever, measles and meningitis). It also included tetanus and wound/injury for inpatients.

Reporting from laboratories took place daily for the number and types of specimens received and the pathogens identified.

The system was complemented by a daily early warning system based on SMS, telephone and email reporting of suspect cases of those diseases.

Rapid responses included field investigation (including helicopter missions), specimen collection and testing. Field investigations were conducted jointly by the Provincial MoH staff and the WHO epidemiology team. If needed, relevant action was then taken, such as treatment of the patient, providing a more suitable environment, health promotion, and immunization.

Reporting from laboratories took place daily for the number and types of specimens received and the pathogens identified. This was complemented by a daily early warning system based on SMS, telephone and email reporting of suspect cases of those diseases.



It was important to establish sanitary conditions in camps to prevent disease outbreaks.

Data management and entry was computerized and provincial health personnel were trained on how to use the system.

The system process and achievements were presented and discussed twice a week with provincial health authorities and NGOs during an inter-sector meeting (50 agencies represented). A weekly epidemiological bulletin was published in Indonesian and English and disseminated to Provincial MoH districts, NGOs, MoH Jakarta and WHO.

Public health is essentially about preparedness, with authorities trying to think one step ahead of the deadly virus or bacteria, as the case may be. Consider what happened after 26 December. As a first step, anticipated health problems at different phases of the post-tsunami period were mapped. Based on previous data and experience, a predictive chart was devised, laying out the possible course of disease events, and listing interventions. This became the template for preventive action, leading to improved preparedness for specific diseases. For Indonesia, for instance, WHO had developed a profile of the communicable disease threats based on existing epidemiological information to which the displaced and surviving populations might be exposed.

Dr Salim Habayeb, WHO Representative to India, interacting with people at a temporary shelter.





Representatives of various agencies hold an emergency meeting.

In Sri Lanka, A Simplistic Approach to Sanitation

A key concern within IDP camps has been the issue of environmental health and sanitation. It has been essential to adopt stringent procedures of waste disposal and hygiene in order to minimize risks of illness and infectious disease outbreaks.

The huge scale of this disaster meant that in many areas emergency activities were starting from a very basic level. Accordingly, methods of waste disposal were conducted via rather crude and basic conditions.

In Jaffna, WHO devised a simple yet effective design for utilization within the displaced camp settings for sanitation. Recycling used barrels, each was halved in order to be easily mobile for emptying, and a basic lid was cut into the top and hinges attached in order to ensure that all waste disposal would be contained and the presence of flies, insects and rodent infestation minimized.

Prototypes were created, and local labour from the area was utilized in the production of these self-contained bins, which were then distributed to all the temporary shelters and camps in the affected areas. The bins also had hygiene promotion messages imprinted on them.

These garbage containers provided a cost-effective yet simple solution to a potentially burgeoning problem among the IDP population. It also represented a tiny yet successful step in the wide range of activities undertaken by WHO in its continuing efforts to minimize the risk of disease outbreaks and improve the quality of sanitation throughout the affected areas. ■



Cleaning up after the tsunami.




Keeping Track

An effective surveillance system needed to be in place, so that sickness patterns could be monitored, and any unusually high incidence of disease could alert authorities to possible outbreaks and could be controlled immediately. Greater attention was given to certain identified diseases that were anticipated to pose the highest risk — diarrhoea, hepatitis A, malaria, measles and leptospirosis, for example. The quality of the surveillance systems varied across the countries, depending on how good the existing structures had been before the earthquake and tsunami, and how badly the infrastructure in the area was damaged.

Banda Aceh was an extreme case. Here, health facilities were badly damaged and a significant proportion of the health staff was directly

Camps in tsunami-affected areas were sprayed with insecticides to prevent vector-borne diseases.

 Experts worked together to design a standardized form for recording epidemic-prone diseases, tailored to local conditions. These were then distributed to health workers.

affected. As such, initially surveillance was virtually non-existent. Not surprisingly, the population to be monitored was huge and widely dispersed — there were an estimated 10000 internally displaced persons (IDP) in several smaller camps in Banda Aceh itself. Temporary medical units had been set up by various agencies, and, at that point, there was little coordination or uniformity in function. These units served not only the IDP camps but also the neighbouring communities, many of which had "host" families that had taken in those who had lost their homes. Many Acehnese felt that their brethren were better off with them, living in over-crowded homes, rather than in camps and temporary shelters. In this atmosphere, epidemiologists had to ensure that all cases of diseases, or anything unusual, would be brought to the notice of medical personnel, that it would be recorded, and that these records would be sent to a central unit without delay. In that central unit, the data would then be analysed and sifted to distinguish possible outbreaks from background 'noise'.

For the epidemiologists deployed there, it meant working non-stop, often snatching only a few hours of sleep, wherever they could, even in a sleeping bag on the floor of the office. Indonesian and international experts worked together to design a standardized form for recording epidemic-prone diseases, tailored to local conditions. These were then distributed to health workers, and they were asked to notify authorities, particularly in case of the following categories: measles, cholera, dysentery, meningitis, malaria, acute respiratory infections, jaundice, haemorrhagic fevers, any fever of unknown origin, and any acute clusters of diseases that could not be explained. The framework was also designed to pick up killer diseases of unknown origin.

The next step was to manage and analyse the reams of data now coming through, and establishing communication capability — including computer networks equipped with the requisite data management, analysis and GIS software that were developed onsite by world renowned experts in data management — to help sift through data and track sharp deviations and diseases. Various tsunami-affected



locations were supported with computer networks. In order to support tracking of human, financial and logistical resources, WHO tracking systems were established to provide 'real-time' information and to support comprehensive reporting. Health workers were trained on protocols, guidelines, and standards for smooth operation of the surveillance and response system. This required that the parameters laid down be simple and intelligible. The date of occurrence of a disease, the date it was actually reported, and the date of response was charted out, and if the lag time decreased, it meant that the system was becoming more efficient. A contingency plan for immediate response to reports of emergencies and outbreaks was also developed. The "rumour" information system brought these to the attention of the

As part of the emergency surveillance system established after the tsunami, even 'rumours' of disease in camps were to be reported to the authorities for investigation.

In order to support tracking of human, financial and logistical resources, WHO tracking systems were established to provide 'real-time' information and comprehensive reporting.

Epidemic Alert and Response team so that they were able to rapidly investigate every suspected report of a potentially epidemic-prone communicable disease.

Similar systems were set up elsewhere. By 9 January, Thailand's Ministry of Public Health (MOPH) had mobilized a team of 200 surveillance and response officials to investigate disease outbreaks in the four provinces that suffered the most casualties from the tsunami. Since 1970, MOPH had operated a national surveillance system for infectious diseases by using a standard reporting form, which had 68 diseases under surveillance by 2000.

After the tsunami, MOPH brought in active surveillance mechanisms for 20 of these diseases, as well as for wound infections and electric shock, in all 20 districts of the six provinces affected by the tsunami. Data were collected from all medical facilities (77 health centres, 22 public hospitals and four private hospitals), two shelters for displaced



Data on epidemic-prone diseases were collected from all medical facilities as part of the surveillance system.

people and the two forensic identification centres. Surveillance team members visited each site daily, and collected forms that included information on the syndromes of epidemic-prone diseases, age, sex, and nationality. The information was then analysed, with the population data for 2004 used as a baseline reference for incidences. An ongoing Field Epidemiology Training Programme (FETP) supported by WHO and US/CDC, had created new field epidemiologists every year, and they had become the backbone of the Thai rapid response for SARS and Avian influenza. In this crisis too, therefore, there was no shortage of trained, experienced manpower.

In India, too, WHO provided technical assistance to strengthen disease surveillance systems in all affected states. Four Disease Surveillance Units were equipped, with supportive supervision and training from WHO and the National Institute for Communicable Diseases (NICD). The experience in other countries was also similar.



Existing laboratories were strengthened and played a crucial role in testing for evidence of disease causing agents.

Surveillance team members visited each site daily, and collected forms that included information on the syndromes of epidemic-prone diseases, age, sex, and nationality. The information was then analysed.

Insecticide-treated bednets being used in a hospital. Such bednets were distributed by WHO as a preventive measure against malaria.




Stop and check

Surveillance can never be divorced from prevention. Steps were taken to treat and control communicable diseases of concern, particularly vector-borne diseases like malaria, dengue and Japanese encephalitis. These were endemic in the Region even before the tsunami. However, the brackish pools of water left behind by the tsunami increased the risk of mosquitoes that served as carriers of these diseases. So, while surveillance measures were being set up or strengthened, authorities in affected countries also began spraying large areas with insecticides. By 10 January, for example, the Indian government had sent 15 fogging machines to the Andaman and Nicobar Islands. In district after district, the malaria control wing of the local administration meticulously checked wells, stagnant pools of water, as well as water

stored in drums, for larvae, and provided fumigation services to control adult mosquitoes. Insecticide-treated bed-nets sent to those regions as a protective measure, helped too.

A generous outpouring of donations targeting vector-controlled efforts helped enormously. In Banda Aceh alone, some 10000 insecticide-treated nets, 20000 rapid diagnostic tests for malaria and 150000 treatment courses of artemisinin-based combination therapy — the most effective available antimalarial treatment — were provided by UN agencies and private donors.

While suspicious signs could be picked up by the surveillance systems, laboratory testing was essential to confirm the presence of a disease-causing organism. So, laboratories were also strengthened. WHO sent

 *The local administration meticulously checked wells, stagnant pools of water, as well as water stored in drums, for larvae, and provided fumigation services to control adult mosquitoes, to prevent vector-borne diseases. Insecticide-treated bednets sent to those regions as a protective measure, helped too.*

reliable, validated rapid diagnostic tools for use in local health facilities in Indonesia and Sri Lanka (Maldives being malaria-free), along with drugs for treatment of malaria in accordance with national guidelines in both countries. Three basic laboratories were identified and suitably equipped to diagnose outbreak potential. By the end of February, 500 microscopes had been ordered to equip laboratories in Batticaloa and Kalmunai in Sri Lanka.

Surveillance, laboratory and field response staff was also suitably trained on laboratory operating protocols. In some cases, the training began at the simplest, most basic level: how to collect disease specimens and transport them safely. A cohesive regional network was established to provide local and national authorities as well as WHO with access to reference services for timely and accurate reports. A regional laboratory plan for responding to emergencies and to provide surge capacity services was drawn up.

The importance of a good laboratory is reflected in the lengths to which the Organization went to obtain a mobile laboratory after it was discovered that the Banda Aceh public health laboratory was destroyed. The rehabilitation of the local public health laboratory was a time-consuming process. To meet this urgent need, WHO arranged to mobilize a temporary but fully functional public health laboratory having all the necessary equipment and reagents from neighboring Malaysia and have it airlifted in several containers to Aceh by a UN plane. It was a difficult task which became more difficult when, at the airport in Malaysia, it was realized that the size of the container with all laboratory material was bigger than the ingress of the aeroplane. Changes in the size of the container had to be carried out to permit its transporation by air up to Medan and from there by road to Aceh. The WHO-recruited scientists from Malaysia quickly established the laboratory and provided sufficient support to the epidemiologists in surveillance and control of diseases. The fact that Bahasa Malaysia and Bahasa Indonesia are very similar languages made the interactions more meaningful.

*A scientist at work.
Staff were trained on
laboratory operating
protocols.*

Volunteers Show the Way

The quick, effective Thai mental health response to the tsunami was seen as a model of how a response should be organized and delivered. One reason for this was the existence of Village Health Volunteers — ordinary people, nominated by the community, whose role is to serve as the conduit between the community and the hospital. They are provided basic training on psychosocial support. These volunteers — some 700 000 in all — are from all walks of life, and even in normal times, are a source of support for those in their community who need it. After the tsunami, these volunteers were mobilized from all over Thailand, and played a key role in the recovery process of those affected people who needed a shoulder to cry on rather than clinical interventions.

In the Maldives, too, after the tsunami, the government followed a similar concept. They launched a well-organized community-based campaign, mobilizing volunteer groups of local Maldivians to provide psychosocial support to the affected people. These volunteers spoke the local language, and were familiar with the local culture, and could therefore empathize with the people. Volunteers who were not counsellors were provided basic training for two days by the Red Cross, UNFPA and UNICEF. They then went to the islands as the Emotional Support Brigade. ■



Trained volunteers provide psychosocial support to tsunami-affected children.

Continuous training of those providing basic healthcare at the grassroots level was an integral part of the strategy.

Managing infections

Whether in laboratories or clinical measures, continuous training of those providing basic healthcare at the grassroots level was an integral part of the strategy. For improved management of diarrhoeal diseases and acute respiratory infections in the displaced populations — WHO assisted in training healthcare workers to recognize and provide emergency treatment for endemic communicable diseases. They were also trained in what is known as the 'emergency triage': in a disaster situation, when there are a large number of people who need attention, this helps health workers place them in three categories, in decreasing order of priority, and then give attention to the most urgent cases first. The health workers and volunteers were also equipped with basic drugs and material for specific anti-infective therapy and supportive care. Following such training sessions, health workers and volunteers became familiar with protocols for notification of infections/ syndromes that could become epidemics. The lessons were invaluable.



Doctors examine patients living in temporary accommodation after the tsunami.

Defence as offence

Past evidence had shown that the number of people dying after a complex emergency could be particularly high in children aged 1-14 years. This was particularly due to infections by vaccine-preventable diseases like measles, or diarrhoeal diseases, malaria, and acute respiratory tract diseases. Following any catastrophe, health authorities tackle this risk by immunizing children, and these measures were followed after the tsunami too. WHO, UNICEF and other agencies worked closely with the state governments and provincial health authorities to begin non-routine immunization campaigns targeting children and vulnerable adults for epidemic-prone, vaccine-preventable diseases such as measles, typhoid, Japanese encephalitis and meningitis. In areas that had not been covered by routine immunization, children were immunized for measles. Immunization took place for other diseases too, if they were detected by the surveillance system, or assessed as a risk. WHO also played a role in providing vaccines, cold chain facilities, material for administration and disposal, and operational costs for campaigns, along with training of vaccinators to replace staff lost to the earthquake and tsunami. By 7 January, measles vaccination had begun in camps in Aceh. In India, WHO provided technical assistance to Tamil Nadu, Kerala, Andhra Pradesh, Pondicherry and the Andaman and Nicobar Islands for measles vaccination, vitamin supplementation for children aged between six and 59 months, and oral polio vaccine for children under 60 months. By early February, 71 338 children had been vaccinated in India alone.



A child being vaccinated. Following the tsunami, non-routine immunization campaigns against vaccine-preventable diseases were launched in many affected areas.




Mothers and children

Among the most vulnerable of the survivors were those under medical surveillance even before the tragedy, such as expectant mothers. The United Nations Population Fund (UNFPA) estimated at least 150 000 tsunami survivors were pregnant at the time. In India alone, more than 4000 surviving women were estimated to have been in their final month of pregnancy on 26 December. Even the tiny population of the Maldives included 1500 pregnant women among the tsunami-affected. The estimates of the number of pregnant women for both Sri Lanka and Indonesia were 15000.

Pregnant and new mothers needed urgent, and specialized attention, amidst the chaos. Their needs were very different from the other survivors who needed medical attention because they were injured. Sensitive to these requirements, 3000 new mother and newborn hygiene kits were sent by 10 January to affected areas. Five hundred safe delivery kits were also provided for midwives.

◀ *Tsunami-affected pregnant women wait their turn to see the doctor.*

A mother with her baby, born after the tsunami.

 *At least 150 000 tsunami survivors were pregnant at the time. Pregnant and new mothers needed urgent, and specialized attention, amidst the chaos. Their needs were very different from those of the other survivors.*



A WHO official checks the water quality in a camp for tsunami-affected people.

Environmental Health

Meanwhile, another crucial area needed urgent attention: availability of safe water, and clean sanitary living conditions. In what could be described as a tragic paradox, water, the killer on that devastating Sunday, was everywhere; yet little of it was safe for human consumption and use. And adequate safe water was essential for sustenance — to keep diarrhoea, cholera and other diseases at bay. As per standard emergency guidelines, 'ensuring uninterrupted provision of safe drinking water is the most important preventive measure to be implemented following flooding in order to reduce the risk of outbreaks of water-borne diseases.' Yet, wells, the traditional sources of freshwater in many places in the Region, had been rendered unusable. In cities, most of the infrastructure, pipes as well as water storage tanks, had been destroyed. Urgent, and sometimes innovative, action was needed.

Sphere guidelines — the key guide for emergency health workers that lay down the basic standards to be achieved following an emergency — had recommended that each person be supplied with at least 20



litres of clean water each day. Yet, initial surveys showed that this was far from being the case.

WHO's main preoccupation in the first days of the disaster was providing information on good practices and safety in restoring water supply facilities. Fact sheets on methods of disinfection of water supplies and testing of water quality were posted on the Internet, and distributed widely. The information had been developed in 2004 as part of an emergency preparedness exercise taken up by the WHO Regional Office, and incorporated with the lessons from the earthquake in 2001 in the Indian state of Gujarat. These fact sheets proved useful to field workers, being translated into local languages, such as into Bahasa Indonesia by Care International.

Along with fact sheets, assistance was also provided to obtain clean water. Tankers were sent to IDP camps by the governments, WHO and other agencies. Chloroscopes — used to measure the quantity of chlorine in a sample of water, and to indicate whether it is safe to use and drink — were dispatched immediately. In India, for example, 1000 chloroscopes were sent to the tsunami-affected areas. Bleaching

Efforts were made to ensure that camps had adequate latrines and sanitation facilities to meet the basic requirements of the internally displaced people (IDP).

powder — used as a disinfectant — was widely distributed. To cite a random case, the town of Cuddalore in Tamil Nadu, India, alone received 30 tonnes of bleaching powder. Environmental sanitation projects — including monitoring of drinking water quality, hygiene education and waste management — were set up in 14 villages in three districts in Tamil Nadu, in collaboration with a local NGO, the Gandhigram Rural Institute. As a model, it was a micro scosm of what happened in countless provinces across the Region.

Providing outlying areas with safe water facilities was, of course, a tougher task. Another example from India illustrates the huge logistical problems. By 8 January, one desalination plant and one brackish water treatment plant had been shipped by the Indian government to the Andaman and Nicobar Islands. In addition, a gigantic 785 metric tonnes of water had also been airlifted.

East or west, water was of supreme concern across the Region. Desalination plants were procured by the Maldives, while eight mobile water treatment plants, 97 water test kits and 2000 squatting plates (for use in latrines) arrived in Indonesia by 8 January.

In terms of providing timely support, it was imperative for the Organization to quickly identify qualified personnel to help in the needs assessment, and emergency water and sanitation assistance programmes in all the affected countries. Three days after the tsunami, WHO moved two sanitary engineers/hydrologists to the Maldives. Another senior water and sanitation engineer was deputed to Sri Lanka. All activities were executed in order to meet the expressed needs of national governments, and and at every stage, the Organization



Providing outlying areas with safe water facilities was one of the challenges.


worked in close consultation with the national governments, UNICEF, and various nongovernmental agencies.

NGOs in particular played a vital role in providing safe water. Oxfam, for example, had water bladders in most affected areas very soon after the tsunami.

The speed with which water supplies were ensured depended as much on the location of the affected area as the

strength of the system prior to the tsunami. In the Indian states of Tamil Nadu and Andhra Pradesh, the tsunami had affected only the coastal region, and the government had the means and capacity to provide relief from the hinterland, within 48 hours. Water sources along the coast had been contaminated by salt water and waste, but water tankers and bottled water could quickly be provided from a few kilometres inland. The Tamil Nadu Water and Drainage Board and NGOs could manage the affairs well themselves. WHO therefore stepped in to fill the gaps and supplement the efforts by providing bleaching powder, chlorine tablets and mosquito nets and advice on setting up camps. WHO also focused on assistance in water quality surveillance through local groups. In the Andaman and Nicobar Islands, however, poor access led to comparative delays in repairing water supply systems.

As with India, other countries too reported sharp variations in water supply restoration. Sri Lanka was hit in three socio-physically different situations. Pre-tsunami, the southwest, which was well developed and urbanized, had an impressive pipe network as well as adequate wells for water supply. Although the wells were contaminated and the


Fact sheets on methods of disinfection of water supplies and testing of water quality were posted on the Internet, and distributed widely. Tankers were sent to IDP camps. Chloroscopes were dispatched immediately.

distribution grid of piped schemes seriously damaged, the main distribution centres were in reasonably good shape. As such, tankers could be arranged quickly. In most instances, with quick public intervention and with spirited action on the part of volunteers, piped supplies could be restored within one or two weeks. On the other hand, southeast and northeast Sri Lanka told an entirely different story. These regions had borne the brunt of almost two decades of civil war; civic life had been profoundly disturbed. Further, shallow wells, the main source of usable water, had been contaminated. So, even when camps were supplied with tankers, sanitation was a problem.

The Sri Lankan story found an echo in Aceh, another area that had suffered internal conflict for some years prior to the tsunami. Here, the piped water supply schemes were not functioning properly even before the tsunami. Landing in Aceh a few weeks after the disaster, the WHO

Women wait outside their tent in a camp.



water and sanitation expert, a veteran of East Timor, discovered that even one month after the tsunami, temporary water storage tanks were mostly empty, toilets were flooded with waste, drains blocked and garbage uncontrolled in the crowded camps.

Maldivians, being surrounded by the sea, are under pressure for fresh water at the best of times. Following the tsunami, wells and groundwater were contaminated, and in many places, the rainwater storage system was damaged as well. So, bottled water, and desalination through a process called reverse osmosis, was the only recourse, for several weeks. It is no surprise, therefore, that in recovering from the tsunami, the Maldivian government has committed itself to setting into place an improved water supply system for the long run.

Inadequate water has a direct relationship with cleanliness — rather, the lack of it. In many affected areas, initial surveys showed that the sanitation facilities were far from adequate in a significant number of IDP (internally displaced persons') camps. Many of these camps were in school compounds or similar institutional buildings and had been converted to makeshift camps. They had little room or provision for additional latrine facilities. According to the Sphere guidelines, in an emergency situation, there should be one latrine per 50 people, the ratio being enhanced to one latrine per 20 people in the post-emergency phase. But in the chaotic, crowded conditions, these benchmarks were often a forlorn hope. In the first 10 days, one camp in Batticaloa, Sri Lanka, was found to have only one water tank and three toilets for use by 1135 people. Clearly, sanitation facilities were not adequate. In the next couple of days, 3000 squatting plates and 300 shovels arrived.

Tsunami affected children playing a game. Such activities were used to help them cope with their grief. (Photo on pages 82-83)



A woman collecting water supplied by WHO.

Cleaning Medical Waste

Health care waste was a concern expressed in all affected countries. Substantial efforts were made in Aceh and the Maldives where pilot projects are undertaken for the clearing of the initial hazardous waste. WHO promotes non-burn technologies for clinical waste management and suitable guidance has been developed for increased application of non-burn technologies in Member States. To date, over 50 hospital staff have been trained in M.S. Ramaiah Medical College, Bangalore, enabling improved handling and ecologically sound management of hazardous hospital waste in the Maldives. ■



 WHO supported food safety efforts through posters in local languages, by posting guidelines and fact sheets on the web and by providing technical assistance and equipment to authorities.

The Right Food

If clean water and a healthy living environment are important, so too is the need to stave off hunger by providing adequate food. An important task that WHO conducted was the assessment of the post-tsunami magnitude of severe malnutrition, the evaluation of the existing capacity, expertise and resources to adequately address the problem, and a strategic plan for effective management of the increasing incidence of severe malnutrition. One of the immediate needs identified to prevent nutritional complications and deaths due to severe malnutrition was to train and prepare tertiary and secondary health facility workers to manage children with severe malnutrition in the first phase.

In Indonesia, based on the field assessment and consultations, a three-pronged strategy was developed with partners involved in this area, particularly the province's Nutrition Directorate, UNICEF and some NGOs. The strategy has built on previous experience and involved three levels of the health care system. At the primary level, screening and first evaluation of severe cases of malnutrition would be carried out and referred to health centres. In health centres, cases would be closely evaluated and either treated locally or referred to hospitals for life-threatening complications. Subsequently, the patient would be referred back for rehabilitation at the community level.



Providing nutritious food for tsunami-affected children was a concern.

WHO was appointed to provide training, capacity building and logistic support for the clinic-based management of severe malnutrition, in addition to provision of technical support and expertise at the

ambulatory and community levels. UNICEF, in collaboration with some experienced NGOs, opted to work at the community level. In almost every way, the support of the community was the key to recovery from physical and mental devastation.

Nutrition was one aspect of providing the right food. The other aspect was food safety. WHO supported food safety efforts through posters in local languages, by posting guidelines and fact sheets on the web and by providing technical assistance and equipment to authorities in Aceh, Sri Lanka and the Maldives.

In Aceh, these concerns were attended to early on. As the situation there was grave, the risks to individuals and households was greater. However, apart from one outbreak that required investigation, no food-borne diseases were reported. One health official observed, "All available literature and educational materials stress the critical importance of handwashing in reducing the risks of disease transmission. Yet, the basic infrastructure needed to accomplish this relatively easily, i.e., running water taps, is rarely available or is so constructed as to make it difficult if not impossible to achieve. Using simple and relatively inexpensive materials, it is quite feasible to add hand-washing stations in communal food preparation and (with somewhat more difficulty) latrine areas."



Food being provided to tsunami survivors



It's in the mind

Shock, horror, grief, despair: it was a range of emotions that most survivors experienced in the immediate aftermath of 26 December. Each and every person was psychologically affected by the disaster to some extent. In terms of numbers, therefore, the magnitude of the problem of psychological trauma of the disaster-affected population could be said to be as large as the size of the population.

To medical practitioners this was to be expected - it was even normal. It was recognized that any neglect of psychosocial support could impair efforts in physical rehabilitation. Providing psychosocial support to communities affected by the tsunami was a key component of WHO's short, medium and long-term strategy to address the damaged public health infrastructure.

Providing psychosocial support to literally millions in a state of terror, trauma and shock was crucial — but to be effective, the support had to be appropriate and culturally sensitive. It was also important not to 'medicalize' the problem, that is, to prescribe a pill when sympathetic hearing or kind words of support would suffice. Another real, albeit lesser worry in the frenzied action following the disaster, was the possibility of staff burnout. Stress levels and the exposure to wrenching scenes posed a mental health hazard.

The psychosocial needs of the affected people vary over time, and support has to be provided accordingly. WHO guidelines emphasize this point. The shock, panic, anxiety or confusion immediately after the disaster gives way to feelings such as despondency, guilt, irritability within days to weeks. Sometimes, survivors continue to feel emotions like anxiety, restlessness, pessimistic thoughts and intense sadness three weeks after the disaster. While such people need support from community level workers, it does not mean they are suffering from a mental disorder. 'Emotional first aid' in the form of empathy and

◀ *A young tsunami survivor, hanging on to the skeleton of a building*



A community nurse consoles a grieving mother who lost her child in the disaster.

practical support is usually sufficient to set them on the path to recovery. However, after some months, some survivors do show symptoms of full-blown mental disorders, such as grief that may lead to severe depression, alcohol and drug abuse, a relapse of pre-existing mental disorders. Others display psychosomatic illnesses, such as headache, tiredness, unidentifiable pain, which have a psychological basis. Such cases need to be referred to specialist mental health care.

However, in every society there are some people who would have a preexisting mental disorder. During an emergency such as the tsunami the population rates of mental disorders are expected to go up by 5-10%. A misconception is that Post Traumatic Stress Disorder (PTSD) is

A shattered woman with her child.



A devastated mother and child in their newly allocated temporary accommodation.

Providing psychosocial support to literally millions in a state of terror, trauma and shock was crucial — but to be effective, the support had to be appropriate and culturally sensitive. It was also important not to 'medicalize' the problem.

the main or most important mental disorder resulting from a disaster. PTSD is only one, and moreover, small component of a range of common mood and anxiety disorders which can occur after a disaster.

In the various affected countries, WHO worked closely to support governments to tackle the problem of psychosocial trauma. One of the first acts of the WHO mental health team was to provide technical guidelines on topics such as emergency phase, suicide prevention, and child and adolescent health. These were uploaded on to the SEARO website. In India, for example, the WHO National Programme Officer for mental health led a UN Disaster Management Team to Chennai for an assessment and developed a framework for psychosocial support along with UNICEF and other agencies. The Organization continued to provide technical assistance in this regard to state and local governments, and initiated contact with reputed mental health institutes like the National Institute of Mental Health and Neuroscience (NIMHANS) in Bangalore, Vidyasagar Institute of Mental health and Neuroscience (VIMHANS) in New Delhi, the Medical College, Alleppey,



After the tsunami, more than 700 000 village health volunteers were mobilized for community-based psychosocial support. The coordination between the authorities and the service providers was exemplary.

and others. The selected agencies would then provide training to local service providers — teachers, *anganwadi* workers, community level volunteer workers — who would work within the affected communities using standard manuals. Subsequently, Jawaharlal Institute of Post-Graduate Medical Education and Research (JIPMER) Pondicherry, trained 100 teachers in 10 sessions. The Schizophrenia Research Foundation (SCARF) trained 766 people and provided them with printed material in Tamil. The community level workers then reached out to the devastated people.

In the Maldives, the 'depressed spirit' once seemed like an alien concept. Travellers and social observers alike have marveled at the Maldivians' ebullience and spirit of optimism. Yet, this suffered quite a blow after the tsunami. The government launched a well-organized, community-based programme to provide psychosocial support to disaster-affected persons. A Psychological Unit was formed in the National Disaster Management Centre. This unit mobilized groups of volunteers — all local Maldivians who knew the language and culture, and also had some previous training as counselors — to reach out to the community.

In contrast, Aceh already bore the burden of history — its people had been affected psychologically by the civil conflict, and the tsunami trauma was the second, shattering attack. In early January, soon after the tsunami, an advance team of 15 people — psychiatrists, psychologists and nurses — was sent to Banda Aceh and reported that many survivors were depressed and apathetic. A number



A mental health expert trains community leaders on ways to effectively provide psychosocial support to the tsunami-affected people.

of NGOs were providing counseling. By the end of January, Indonesia had drawn up a draft plan to address psychosocial and mental health needs in the tsunami-affected population in Aceh. However, this plan was modified by the provincial government of Aceh to suit their local needs.

Sri Lanka faced problems similar to Aceh. Following an intense debate of the benefit of community-level work, a plan endorsing the mobilization of community-level workers was finally accepted by the government of Sri Lanka, local technical experts, NGOs and international organizations. These community-level workers will link to a proposal to develop a community mental health system.


It was the Thai government's response, however, that came to be seen as a model. It helped that the country already had a well-developed mental health care delivery system integrated within the health system. After the tsunami, more than 700 000 village health volunteers were mobilized for community-based psychosocial support. The

coordination between the authorities and the service providers was exemplary; and now that the emergency phase is over, the government is ready with clearly-defined, long term objectives.

In time, the Thai survivors of the tsunami will heal those intangible yet deep emotional wounds. May it be so for all of South-East Asia!

Chapter 3
Management and
Coordination



 All UN agencies, including WHO, were keenly aware that smooth coordination was the key to effective management of the massive international relief and rehabilitation effort.

Hundreds of NGOs arrived in tsunami-affected countries to assist with relief work. Their skills and standards varied greatly.



In it together

In many ways, the tsunami of 26 December 2004 was unique. It was the first time that a natural disaster had hit so many countries simultaneously, wreaking devastation on widely varied landscapes, geopolitical situations, and people of diverse cultures, languages and religions. As the stunned survivors and their governments attempted to patch together a new fabric of existence, sensitive, coordinated assistance was crucial to ensure that the threads would not come apart again.

All UN agencies, including WHO, were keenly aware that smooth coordination was the key to effective management of the massive international relief and rehabilitation effort. As WHO swung into relief and rehabilitation mode, one of its major roles was coordination—internally, between departments, and the country, regional and headquarters levels; with the governments and health authorities of the concerned countries; among various health agencies, including



NGOs, and those in the private sector. The matrix was extremely intricate.

From the onset, coordination was integrated into WHO's plans. When the Operations Room was set up in the Regional Office on 27 December, video-conferencing facilities connected the Room to Headquarters in Geneva as well as to the new Country Offices and, later, with Banda Aceh. During the early phase of the emergency, these three-way video-conferences took place every day, when WHO staff from the affected countries would update the Operations Room and the Health Action in Crises (HAC) unit in Headquarters on the latest situation, as well as the urgent requirements. HAC, and the SEARO Operations Room would then inform the individual countries about progress regarding provision of material or human resources. To

There was tremendous civilian-military cooperation during the relief efforts following the tsunami.



WHO worked closely with the health authorities in the affected countries.

ensure that communications systems were effective in key areas, VSAT satellite telephones were also procured as early as the New Year.

WHO staff did not just talk to each other. More importantly, they were in close touch with the health ministries of the affected countries, at the national, provincial and local levels, advising and providing technical guidelines on health issues, and, where needed, operational support. Despite the need for urgent response, the aim was to weigh and consider the best measures before rushing into action. For example, there were decisions that needed to be taken, in each area, about what type of preventive measures would be suitable. In Sri Lanka, as a health official recalls, there were discussions about whether it was necessary to immediately organize an emergency measles vaccination campaign for the 850 000 people living in temporary shelters. The standard WHO recommendation is to immunize in such cases. But, given the very high measles coverage in Sri Lanka and the capacity to begin routine immunization at that point

WHO was in close touch with the health ministries of the affected countries, at the national, provincial and local levels, advising and providing technical guidelines on health issues, and, where needed, operational support.



Washing cooking utensils. Food was cooked in camps.

in time, it was decided that an emergency campaign was not necessary. Another example of appropriate action is food. Sri Lanka discouraged sending cooked food to welfare centres. Food was cooked in camps.

Perhaps the most important role WHO played was in coordinating the work of hundreds of NGOs and health agencies involved in relief work following the tsunami. There was the danger that the overwhelmingly generous response from across the world could actually slow down the relief progress, unless channeled properly. Just two days after the tsunami, for example, 300 international medical doctors had landed in Sri Lanka. They were eager to help, and their skills were needed. But in order to be useful, their work needed to be deployed as per the host country's needs and the volunteers' specialization. In the following days, relief agencies poured into the affected areas of all the countries by the hundreds. In Aceh, for instance, there were more than 350 NGOs in the field. Some were experienced in disaster management. Others were not. Their skills and standards varied greatly.

There was the danger that the overwhelmingly generous response from across the world could actually slow down the relief progress, unless channeled properly.



Dispatched to Sri Lanka to assist with organizing the WHO Emergency Response Team there, a senior WHO official observed a typical scene in Kalmunai, on the eastern coast of the country. As he joined the crowd in the small office of the Deputy Provincial Director (which, poignantly, had a list of people missing, dead and homeless), the primary public health official in the district seemed overwhelmed. He was "trying desperately to cope not only with the enormity of the situation, but the onslaught of NGOs... dozens of small, well-meaning but often inexperienced groups which acted independently". Another WHO officer, who had been in the area for the past week, was helping the District Health Office work with the multitude of NGOs and had organized the first Health Coordination Meeting. WHO was then in the process of establishing a temporary working base in nearby Ampara, and as he recalled, "We promised the DPDHS (Deputy Provisional Director for Health Services) that we would continue to have a field officer to help communicate with the international presence."

The dangers of lack of coordination became very apparent for the WHO official the very next day when, in Colombo, he visited a colleague who headed the Epidemiology Unit in the Sri Lankan Health Ministry, which also covered immunization services. He found the health official perturbed — it turned out that some international medical teams had begun typhoid and hepatitis A vaccination in Galle without any authorization from the Sri Lankan medical officials. Besides the fact that the teams were operating outside the medical system, the efforts were unnecessary, and potentially risky. To avoid similar situations, WHO immediately agreed to provide written guidelines for typhoid and hepatitis A vaccination in emergencies, which the Ministry of Health could use as technical documentation. Discussions also took place on establishing a simple emergency surveillance system that would focus on key diseases of epidemic potential. By the following



◀ A busy hospital ward following the disaster.

▶ Arrangements were made to store vaccines, and other medicines, in conditions where they would remain effective.

Relief agencies poured into the affected areas of all the countries by the hundreds. In Aceh, for instance, there were more than 350 NGOs in the field. Some were experienced in disaster management. Others were not. Their skills and standards varied greatly.

The private sector also contributed generously. Many pharmaceutical companies donated drugs.

day, the WHO Sri Lanka office had drawn up the forms and distributed them to all tsunami-affected districts.

As the lead international health agency, WHO was requested to coordinate the health-related aspects of the disaster for the UN. WHO also worked closely with other foreign government agencies involved in health-related activities, as well as with the private sector.

One unique characteristic of the operations following the disaster was the vital assistance provided by military agencies of several countries and the close coordination between them and the civil authorities. In Aceh, for example, travel along the ravaged coastline was initially extremely difficult. Many governments sent military and civilian assistance. For example, France sent two ships, a helicopter and a frigate to help aid efforts in Indonesia. The US Navy assisted, amongst others, with the presence of the USS Abraham Lincoln. In collaboration with the US Navy, multi-sectoral teams were constituted. There were five people per team with expertise in public health, water and sanitation, primary healthcare, maternal and child health, nutrition and food security. These teams were flown by helicopter to different areas in Aceh, to make assessments of the survivors. Back and forth the helicopters flew, over miles of devastation, first to check access and report, and then fly back to analyse the situation in those areas. The WHO Field Security Officer had a military background and helped schedule the helicopter missions. Military hospitals also played their role in tending to survivors.

The private sector also contributed generously to the relief and rehabilitation efforts. They made their contribution in various ways; writing out impressive cheques was only one of them. Many companies allowed their employees to take a break from regular work for extended periods to assist in the post-tsunami efforts. Others provided advice and expertise. For example, a high-ranking medical team from a multinational pharmaceutical company visited many of the tsunami-affected sites in India, Indonesia and Sri Lanka, and offered technical advice. Most contributed in kind, and not just in the



medical field. One company extended free bandwidth to WHO Country Offices and field offices; another telecommunications company donated 1300 mobile phones to be used by aid agencies; another company provided free airtime through mobile and satellite phones to enable survivors in Sri Lanka to connect with their families in the rest of the world. Medicines were donated liberally. Following a request for nebulizers by the Siti Fakinah Hospital, one pharmaceutical company donated 100 nebulizers in Aceh. Another sent 1500 Anti Tetanus ampules. Some companies provided vaccines. From antibiotic eardrops to sheets of paracetamol — pharmaceutical companies gave generously. So did people and nations rich and poor, from all over the world.

Military agencies of several countries provided vital assistance.

Lending a Helping Hand

In a single day, 50000 children were vaccinated in Aceh Besar. A WHO Official recounts how successful coordination was the key.

I reached Aceh six weeks after the tsunami to help in the post-tsunami immunization efforts. The UNICEF Immunization Coordinator in Banda Aceh asked me to help organize



50000 children were vaccinated in Aceh Besar.

the measles campaign in Aceh Besar, the district adjacent to Banda Aceh. I was put in contact with the Head of the District Health Office. We agreed to meet first in the UNICEF Office — a hotel converted into a temporary residence-cum-office. Dr Charul Zulfi, peering genially through his thick glasses said, "We'll finish the campaign in five days." His technical officer, Dr Merdiah, smiled pleasantly and nodded in agreement.

"Good, that sounds good," I said. "How many teams do you think you would need?"

"Maybe 10...No! or perhaps 12," he said. I did a quick mental calculation. Aceh Besar has an estimated target population (6 months to 15 years) of 73,000 children. However, close to 20,000 have been already immunized, thus leaving more than 50,000 children yet to be reached.

"At maximum efficiency, a team can immunize anywhere between 150 to 200 children (per day). Do you agree?" They both nodded. So we worked out roughly how many teams we will need or how to adjust for the number of days for the campaign if we could not have the teams we needed. So, for the next two days, I worked with his team, fine-tuning the microplan for the campaign — team composition, dates, identifying supervisors, estimating vaccine needs and other logistic arrangements. Finally, we agreed to run the campaign from 28 January 2005 to 3 February 2005. Rather skeptically I asked, "You think you can mobilize around 200 health workers?"



A mother holds her child who is being vaccinated.

"Yes, yes. When you come to Jantho tomorrow, you'll see." He was confident; I was worried. Given the devastation I didn't think it possible to mobilize so many vaccinators. Jantho was the district headquarters where we were going to brief the vaccinators about the campaign. Much to my surprise, when I walked into the meeting hall, there were more than 210 health workers waiting. More than 90% were women.

February 27 was a Sunday. But the UNICEF cold store in-charge was there in the store. We made sure that the vaccines, cold chain equipment and vitamin A supplies were ready as planned. I spent the next five days, along with another EPI Coordinator from Jakarta, making supervisory visits. Each day, in the evening, we met in the health centre and reviewed the day's tally of children immunized. Following the completion of the main district, there was still one small island carved from the mainland by the tsunami. It had 28 villages, but I was told that only four now existed with about 6000 people lodged in several camps. I asked for help from the German Army. In addition to the six medical personnel from the German Army, I loaded the vaccines and another four vaccinators from the Ministry of Health on their chopper. They returned happily, after having immunized more than 800 children in one day! "The few remaining will be taken care of by my staff that are there," assured Dr Charul. In six days, 50032 children were immunized! When combined with the children immunized before the mass campaign began, 69583 children were reached with measles vaccine, an impressive 94.5% achievement. And all of this with just a little support. ■


With tonnes of supplies arriving, supply chain systems were set up to ensure that the material reached the affected people quickly.



Logic in logistics

The victims of the tsunami belonged to over 30 countries, making this a truly global disaster. Perhaps that is why, as they watched the horrific scenes on television or heard them described on the radio, people everywhere could, in some manner, identify and empathize with the scale of the tragedy. They spoke through their actions - the response was tremendous, and unprecedented. In cash and kind, the world donated generously. Every day, in all the tsunami-hit areas, hundreds of tonnes of goods arrived, the gift of fellow human beings who had been moved, and shaken. This stretched the capacity of the workers in the field. In Indonesia, at the peak of the relief phase, 20 metric tonnes of medical goods were being delivered daily.

While the globe's gifts were welcome and useful, they needed to be sorted and catalogued. Distribution needed to be arranged so that the material reached the right people in the right place in the shortest possible time.

 *While the globe's gifts were welcome and useful, they needed to be sorted and catalogued. Distribution needed to be arranged so that the material reached the right people in the right place in the shortest possible time.*

By 8 January 2005, eleven logisticians had been deployed in Indonesia, Sri Lanka and the Maldives. The main work of logisticians was to set up a platform from where public health officials could work. In most affected areas, a drug supply chain was established for donated drugs, and it was ensured the drugs were from WHO pre-qualified suppliers, were appropriately labelled and not past their expiry date. This was not always easy, as many foreign donations had the labels written in the language of that country, so one could not always find out

the dose of the medicine, or the printed contraindications. Inventories were conducted to sort out medical supplies. Two WHO SUMA (Humanitarian Supply Management System) experts were in Banda Aceh to assist in training and setting up systems. In Indonesia, as in other places, while a consultant set up cold chain systems for vaccines and drugs in Aceh, epidemiologists completed data entry forms for analysis of medical reports from various functioning hospitals.

The logistics extended beyond medicine. To help with mobility, WHO procured 81 vehicles for use in the affected areas. In Sri Lanka, health volunteers were provided 66 bicycles. So that midwives could move even faster, particularly in urgent cases of delivery, 260 mopeds were procured for them. One hundred motorcycles were also given to public health inspectors (PHIs) to improve disease surveillance, camp management and monitor water and sanitation.



To help with mobility, WHO procured several vehicles for use in affected areas.



IT as force multiplier

A 21st century disaster, fortunately, has 21st century technology to help overcome the aftermath. The initial response to calamities today is highly dependent on Information Technology (IT) and telecommunications. As one health worker put it, "Today you cannot do disaster management without information management." Responders need accurate and timely information to effectively distribute critical supplies, equipment, and resources. Without this, the results are often inadequate, mis-directed or the response is unnecessarily excessive. There is no doubt that in the days following the tsunami, information technology was a critical input that helped save lives.

One of the first tasks, once the Operations Room was functional in the Regional Office, was to facilitate smooth information flow. This was a complex task, from the more mundane sorting of e-mail addresses to providing templates for distributing situation reports to concerned people, as well as uploading them on the website. IT also played a key role in the initial assessment of the disaster situation. Health mapping (GIS) support in Sri Lanka, Indonesia, India and Maldives was an invaluable tool in making assessments of temporary camps, displaced persons, deaths, injuries, affected primary health care centres, and hospitals.

The Information and Communication Technology (ICT) support, infrastructure and staff were deployed for emergency missions, including field operations, to ensure uninterrupted communication at various stages — immediately following the tsunami, and during the establishment of a field office. The support continues to this day. After the tsunami, five WHO field outposts were equipped with ICT infrastructure, two in Indonesia and three in Sri Lanka.

WHO Country Offices and field outposts in Sri Lanka, Indonesia and Thailand, were extended satellite telephone (VSAT) connectivity. Local



Information technology played a crucial role in providing fast and accurate information during the emergency.

◀ *Deputy Regional Director, Dr Poonam Khetrpal Singh (standing, centre) briefs specialist volunteers from private multinational companies in the Operations Room.*

IT and telecommunications were integral to monitoring the health situation; it enabled a prompt response from experts around the world. Surveillance, through health mapping, would not have been possible without suitable technology; and technology was vital in tracking the flow of equipment and material pouring in.

A senior health official with her computer. IT played a key role in managing the situation.

Area Networks (LANs) were established at field offices, and staff members in the field were equipped with portable satellite communication devices such as radio phones, laptops, enabled with e-mail and Internet access. The telecommunication infrastructure provided high-speed data transmission as well as voice and video links within and outside the countries.

The improved connectivity played a vital role in dealing with the post-emergency health situation. IT and telecommunications were integral to monitoring the health situation; it enabled a prompt response from experts around the world. Surveillance, through health mapping, would not have been possible without suitable technology; and technology was vital in tracking the flow of equipment and material pouring in.

The UN family ensured IT resources were optimally used by installing common facilities. For example, WHO installed a 'common service ready' VSAT in Meulaboh, Indonesia, which could be used by other UN agencies. UNICEF agreed to coordinate the sharing and maintenance, including the installation and operation of any inter-agency wireless connections. UNHCR established the UN common calling frequencies.

The private sector also played an important role. Telecommunications companies from both the supply and operation side of the industry provided, installed and delivered a working telecommunications cable between Banda Aceh and Medan in Sumatra, Indonesia. This enabled onward connectivity to Singapore, where much of the disaster recovery was coordinated.

The SEAR websites were instrumental in disseminating prompt updates, daily situation reports, guidelines for health emergencies and other information relevant to the aftermath of the tsunami. Policies, protocols and standard operating procedures were developed for the effective use of ICT resources.

Media message

The tsunami, from the media perspective, appeared to be a 'blockbuster' news event. It was headline news, 24 hours a day, every single day, for weeks on end. At least one media study showed that the tsunami was reported more extensively than any other recent disaster, aside from the attacks on New York and Washington, DC, on 11 September, 2001.

The media interest was understandable. This was at once a disaster of huge magnitude and an excruciating human tragedy, with which readers and viewers instinctively connected. It was also a very unusual disaster — the first tsunami in more than a century in this part of the world. And it was dramatic, almost mythical in its impact — a giant wave rising from the sea, swallowing thousands of people and creating havoc. Because it occurred during the peak holiday season, and affected many popular resorts, and because more than 30 countries were affected, the tsunami became a global media phenomenon.

In many countries, such as Sri Lanka, the live international TV coverage was picked up by the local TV stations who mobilized their own teams. They had successfully launched appeals for help in past disasters and once again launched an instant appeal. The public response was immediate, heart warming & generous beyond all expectations. Public offices were closed on this fateful Sunday. Premises of TV stations were inundated with relief material (raw food, provisions, clothing, medicines, bottled water, roofing material, toiletries, baby food, packeted milk, mats, cooking utensils etc). Transport was made available on appeal. Deficiencies were made known on the 24-hour coverage and immediately responded to. Some well wishers delivered these items by themselves to needy areas. Appeals for medical services were broadcast soon after and volunteer medical teams responded. The armed services carried out rescue operations, assisted by local volunteers. National community-based organizations (CBOs), NGOs and subsequently international NGOs too carried out relief operations. One TV station organized a mobile collecting service criss-crossing

At least one media study showed that the tsunami was reported more extensively than any other recent disaster, aside from the attacks on New York and Washington, DC, on 11 September, 2001.

The tsunami was headline news in the media for weeks after the disaster



the country using convoys of lorries.

After the initial disaster, the interest moved to the health threats. At this stage, the WHO communications team was inundated with calls. WHO communications personnel were deployed immediately in the Region, and placed in the affected countries, from other countries as well as from Headquarters, to deal with the deluge of enquiries, and to meet the immediate needs of the media. Eventually, the communication team at SEARO was strengthened with additional staff and professional communication officers were in place in Indonesia, Sri Lanka, the Maldives, Thailand and in the Regional Office for the longer term. The regional and country information teams worked in tandem with headquarters teams to ensure that global and national media always got a response, and that too, a consistent response.

The media was considered an important partner in disseminating correct public health information, helping steer people through the fog of confusion and fear. As such, particular efforts were made to keep journalists and the public duly informed of events as they developed. Daily situation reports, with details of health sector activity and progress, were posted on the Web. Media briefings on the health aspects of the disaster were held in New Delhi and in affected countries. Whenever the WHO Director-General, Dr LEE Jong-wook, and the Regional Director, Dr Samlee Plianbangchang, visited affected




WHO recognized the important role of the media in creating public awareness.

areas they always made themselves available to brief the media. In addition, regular press releases, faxed and emailed to all major international and national media outlets, served as source material for reportage on issues such as mental health, the state of pregnant women, and the risk of communicable diseases. At the country and

field levels too, WHO experts spoke to media regularly to help ensure, as far as possible, that an accurate message was imparted to the public. In Aceh, some journalists also accompanied health workers on field assessments so that they could see for themselves the progress being made, as well as the real and huge challenges facing health workers.

As the post-tsunami relief work moved from the emergency to the rehabilitation phase, the WHO information unit brought out a publication summarizing WHO's role in the tsunami. The Organization's tsunami-specific website continues to be regularly updated. At a three-day meeting in Phuket, Thailand, to analyze the health sector response to the tsunami, several press briefings, and several one-on-one media interviews were arranged with the national and international media. Media interest continues, however, only a little abated. Even six months after the tsunami, major television channels and newspapers had features on the progress made since the disaster.

 *The media was considered an important partner in disseminating correct public health information, helping steer people through the fog of confusion and fear. As such, particular efforts were made to keep journalists and the public duly informed of events as they developed.*

Managing Information and the Media

The tsunami was undoubtedly one of the most tragic and dramatic events in recent times. Consequently, the intense media interest it generated reached heights that few events could match, with the exception of the 9/11 tragedy in New York. As the health implications of the disaster unfolded, WHO, like many other organizations, was inundated with calls from journalists from all over the world, seeking clarification on the health situation.



The media is invited to observe the WHO Operations Room team at work.

Providing the media with accurate, up-to-date information was crucial — the media was seen as having a big role in informing about important public health issues to the widest possible audience. For example, mental health was identified as an important issue to be tackled.

A press release highlighting the mental health situation was therefore released by WHO. This was followed by a press conference in the Regional Office. One-to-one interviews with experts were also arranged.

It was equally important that donors were kept informed of the situation. Within the Organization and among partner agencies too, it was important that key people were kept abreast of the situation.

An information system was devised so that a daily summary of the latest situation was received by all key people. This was also placed on the WHO website so that the public and the media could access it too. Media professionals from WHO offices across the world came to the Region to assist with media queries and needs. Field visits were organized for journalists, and many mediapersons accompanied the WHO Director-General, as well as the Regional Director, on their visits to the affected areas. ■



Human hands, humane deeds

At the end of the day, any system, however foolproof it may look on paper, is only as good as the people who run it. The quantum of work in post-tsunami operations could not be overstated. As the Organization realized, over 200 additional skilled professionals were needed in the field and at the regional levels. The Personnel Unit immediately got busy, trying to identify and recruit these experts. As a first step, it looked to familiar ground — WHO's own staff. A considerable number were seconded to the affected countries from Headquarters, the Regional Office, as well as from other WHO offices.

In the first week of the disaster, the biggest challenge from the human resources angle was the recruitment of suitable short-term staff as fast as possible. But almost every other Organization involved in the tsunami relief exercise — and there were hundreds of them — was also seeking precisely such professionals. It became a challenge to find the appropriate experts who could, at extremely short notice, undertake various activities in the affected countries, particular in disaster areas, in fields like emergency preparedness, mental health, communicable diseases, emergency health in action, rehabilitation, water and sanitation.

Many skilled professionals volunteered their services following the disaster.

A health worker in the field. With such a tremendous demand for specialists, finding the right person at short notice was a challenge.

Initially, WHO Headquarters worked through its Health Action in Crises (HAC) team, which later shifted its function to SEARO, as part of the Human Resources for Operations (HROPS) team, working closely to support the Operations Room. HROPS was set up on 11 January 2005 with the purpose of speedy recruitment and deployment of experts to tsunami-affected areas. A dedicated team from the Personnel Unit was identified in the first week of the crisis to concentrate on tsunami-related recruitment. At the same time, the Tsunami Technical Group was formed; among its many functions was helping to identify suitable candidates.

HROPS became the lynchpin for WHO's recruitment in all the affected areas. It assisted in meeting the human resources needs assessment made by each affected country, and went into the finer details for getting necessary approvals at short notice from the technical and other departments, as well as the country offices, for recruiting the identified candidates. The team officially worked seven days a week, 12 hours a day — in reality, the hours stretched on — to find the appropriate people, and at least one staff member was always accessible on the mobile phone, at any time of the day or night. An emergency recruitment procedure was adopted early in the process to contract and complete recruitment within hours. This included ensuring availability, obtaining medical clearances, issuing contracts, making arrangements for visas where necessary, travel authorization and itineraries, as well as liaising with WHO Country Offices with regard to security clearances. It was hard, background work, but the success of the entire operation rested on these efforts.

The efforts paid off. Between 26 December and June 2005, 160 contracts had been initiated by SEARO, of which 126 were finalized. This is three times greater than the number of contracts issued under normal circumstances.

Experts get ready to be flown by helicopter to inaccessible areas. ►





Many countries provided support, financially and materially.

The economy of compassion

As the magnitude of the disaster became apparent, so did the fact that it would need vast resources to overcome. When WHO drew up the 100-day strategy to deal with the tsunami's aftermath, initial work had already begun with internal funding and loans. It was clear that external assistance - in financial as much as in logistical terms - would be called for.

On 6 January 2005, a Flash Appeal for 977 million USD was prepared by Office for the Coordination of Humanitarian Affairs of the United Nations (OCHA), UN agencies and nongovernmental organizations, to plan and implement a strategic, effective and coordinated response to the needs of five million affected people. This Flash Appeal focused on supporting people in Indonesia, the Maldives, Sri Lanka and Myanmar in the South-East Asia Region, besides Somalia and the Seychelles, which were relatively less affected.

The health sector's financial requirements were estimated at 122 million USD. WHO itself sought approximately 70 million USD and eventually received more than 50 million USD. This is being used for the core elements of the programme, such as:

- disease surveillance and response through GOARN;
- coordination of all actors in the health sector, at the local, national and international levels;
- providing guidelines and advice on all major public health issues;
- assessment of health infrastructure and the quality of healthcare;
- monitoring and streamlining medical supply chains.

The response to the Flash Appeal can only be described as phenomenal. Some countries offered assistance both in kind and in monetary terms — in a few cases, for specific countries or indicated areas. A few donors stipulated conditions for use of resources, such as grants that were not to be used for purchase or transport of food items, or to be used only with the participation of national NGOs in the field. Others provided funds for areas where the need was greatest. Yet, whatever the conditions, without such generosity, the post-tsunami health situation in the South-East Asia Region would have been much worse.




To ensure that all tsunami-affected people received appropriate healthcare, the health sector's financial requirements were estimated at over 120 million USD.

The response to the Flash Appeal can only be described as phenomenal. Some countries offered assistance both in kind and in monetary terms.

Chapter 4
The Lessons
Learnt



 There were no major outbreaks, and deaths due to communicable diseases after the tsunami were not higher than normal. This would appear to indicate that the timely preventive measures taken — chlorinating water, setting up early warning systems for disease, using anti-vector sprays, to name just a few — were successful.

A new building replaces an old one destroyed by the tsunami.



Recovery Plus

More than eight months after the tsunami, as the relief and rehabilitation efforts have moved away from the emergency phase, health sector workers can allow themselves a small sigh of relief. While over the months, there had been sporadic cases of diseases like measles, diarrhoea, hepatitis A and others, there were no major outbreaks, and deaths due to communicable diseases after the tsunami were not higher than normal. This would appear to indicate that the timely preventive measures taken — chlorinating water, setting up early warning systems for disease, using anti-vector sprays, to name just a few — were successful.

In public health, the level of sickness and death among surviving populations following a disaster is an indicator of how much basic relief is reaching people in need. There are, however, challenges to be met. Hundreds of people are still in camps, particularly in Sri Lanka and Aceh. They continue to need assistance and have yet to re-establish secure livelihoods.

As governments and people now look towards building a new life, the UN agencies are focusing on, in Secretary-General Kofi Annan's words, 'Recovery Plus'. The concept is that recovery from the tsunami offers an opportunity to look beyond, not merely rebuilding what previously existed, but to improve upon earlier systems. It is a concept that WHO complies with. As Dr Samlee Plianbangchang said, "Every disaster presents opportunities to both countries and international agencies to strengthen capabilities."

Already, systems that were developed to cope with the aftermath of the disaster are being integrated into daily routines and strengthened further. In Aceh, for example, the surveillance system has responded to over 350 cumulative cases through alert and response mechanisms. In order to strengthen the surveillance system, with support from WHO, training workshops have been conducted for all district surveillance officers from 21 districts in Lhokseumawe. Six training sessions have been planned for district and provincial surveillance officers over the next three months on a regional basis across the province. The Provincial Communicable Disease Control office has been equipped with IT capacity for effective management of disease surveillance data. Plans are in place to extend the IT capacity to all the 21 districts. Motorcycles are being provided to all the districts in order to improve mobility for effective surveillance and routine immunization outreach. This strengthening of systems is not limited to IT capacity and training. The Meulaboh District Laboratory as well as the Provincial Food and Drug Laboratory have been further equipped by WHO to ensure accurate testing even in normal times. As a Banda Aceh-based epidemiologist put it, "We are now trying to build a system which could match the best available standards to serve the people of Aceh."

This is a sentiment echoed across all tsunami-affected countries, in every sphere. In India, a well established Integrated Disease Surveillance system is going to be strengthened further, with the focus

Looking to the future: children affected by the tsunami ▶





Recovery from the tsunami offers an opportunity to look beyond, not merely rebuilding what previously existed, but to improve upon earlier systems.

on capacity building. Sri Lanka too is in the process of upgrading and streamlining its surveillance systems. Functional public health laboratories are being established in different provinces, and there are plans for an organized laboratory network to improve the quality and efficiency of diagnostic services.

The mental health of the affected population has always been a key concern. In every affected country, WHO, along with the concerned governments, has provided training for psychosocial support. This emphasis on mental health in the tsunami-affected communities has set in motion some far-reaching changes. Realising the benefits of community mental health systems compared to delivery of mental



Hospitals have been rebuilt and many are fully functional again.

health care in tertiary care psychiatric hospitals, the government of Sri Lanka also decided to review its mental health policy and mental health legislation to make it more community service oriented. This review was long overdue and the tsunami worked as a 'wake-up call'.

In Indonesia too, an offshoot of the tsunami is that Aceh will become the first province in the country to have community mental health services. A WHO-funded survey conducted by the University of Indonesia showed that there is a need for community mental health

services. The University did a study on children in five districts in Aceh, Nias and Jakarta. The results showed that although most children managed to cope with the disaster, a fourth of them had significant emotional and behavioural problems that needed skilled professional attention.

With technical assistance from WHO, the Ministry of Health has developed a mental health plan for Aceh. Endorsed by the Provincial Health Authority, the idea now is to work with District Health Authorities, NGOs and donor agencies to develop a needs assessment plan for each district. District health authorities will need to put those plans into action.



This is also the first time that modern technology for forensic identification of bodies has been used on such a large scale following a natural disaster. In Thailand, the Ministry of Public Health is being assisted by WHO in over 30 projects, including forensic science, the architectural engineering aspects of building hospitals and other public health infrastructure in disaster-prone areas, mental health (particularly in the long-term psychological effects of disasters on children), and capacity building in disease surveillance as well as

Four mournful tsunami-affected women. Community support is now part of long-term mental health strategies in the affected areas.



development of mobile emergency response units.

Indeed, infrastructure has been a major area of focus in the reconstruction phase. In most disasters, hospitals are places of refuge, where survivors can be sure they will be taken care of. Hospital staff are trained to tend to an influx of serious patients after a disaster. The damage to health facilities added a further burden after the tsunami. In the post-disaster reconstruction scenario, therefore, governments — with support from the World Bank, international donors and the private sector — are rebuilding or improving structures for health care so that they can withstand possible future tsunamis and earthquakes. Sri Lanka, for example, is focusing on the 'build back better' strategy. The issue of infrastructure development has been successfully addressed through coordination initiated by WHO with the Ministry of Health, and with other UN agencies, international NGOs and donors. An MoU has been signed by each of the donors with the Ministry of Health for restoration, reconstruction and/or rehabilitation of almost all the identified damaged or destroyed institutions.

In the Maldives, too, infrastructure has been strengthened, keeping long-term benefits in mind. Three thousand drums have been procured for collecting hazardous waste from tsunami-affected islands, and 13 health professionals have undergone training to develop and implement a national strategy for management of healthcare waste. With a view to long-term, sustainable use of water resources, 'template' water safety plans are being developed, and the needs for water quality surveillance assessed.

In the Maldives the capacity building support provided following the tsunami through training and the updating and development of food safety guidelines, culminated in the preparation of a national food safety strategy. It is based on a risk analysis approach in combination with self regulation by industry, consumer participation and selective enforcement. Twenty five food inspectors have been trained.

◀ Children play in front of a rebuilt house



Two tsunami-affected nurses get on with their jobs. Training human resources for long-term benefit is a key goal.

Sri Lanka Reviews Mental Health Policies

Mental health has been a key concern across all tsunami-affected countries. In Sri Lanka, the plan has now taken on a much wider coverage. WHO is working with the Ministry of Health, the College of Psychiatrists, and numerous other health partners to devise and implement a long-term strategy and plan that will benefit not only the population affected by the tsunami, but also patients of mental illness.

It has been estimated that 384000 Sri Lankans suffer from serious debilitating mental illnesses, such as bipolar illness, major depression and schizophrenia, whilst about 10% of the population is thought to suffer from less acute mental disorders in the form of phobias, obsessional, somatoform, mood and delusional disorders. Following the tsunami, a further 30000 survivors are expected to develop mental illness, most notably depression and medically unexplained symptoms. WHO's criteria is that there should be one psychiatrist for every 100000 people. By this measure, Sri Lanka needs 300 psychiatrists. Currently, it has only 28. Hence, the necessity for far-reaching and effective modification, particularly in a country that has one of the highest suicide rates in the world.



A man being counseled in a camp.

In order to achieve maximum impact and coverage the revision and amendment of the existing mental health legislation in Sri Lanka is therefore crucial. Originated in 1873 and last amended in 1956, the legislation is of an era when people with mental disorders were incarcerated in large institutions which promoted stigmatization, discrimination, isolation and ostracism.

While there are many areas in this sector where immense progress is being shown in Sri Lanka, the need to develop and tailor the legislation to the essential components of today's mental health requirements remains vital. As such, a draft

policy has been created, which has been approved by all relevant parties within the health sector and the Ministry of Health. It is currently receiving public inputs before being presented to Parliament where the objective is to have the amended legislation passed and implemented.

A key component of the strategy will be to develop a planned and comprehensive community-based health service. This translates into the training and development of community health workers in the recognition and support of mental illness and disorders within their community. After a disaster such as the tsunami, for instance, each and every person in the population is psychologically affected to a certain extent. Community level workers, providing key emotional first aid at this point, could help prevent many of these cases from developing to full-blown mental disorders after some months.



The haunted stares of tsunami-affected children.

Also, while discouraging long-stay institutions, smaller, less restricted community-based care systems will be developed.

These are just two of the long-term and nationwide activities that are in process. Meanwhile, psychosocial support of the tsunami-affected population is ongoing with a strong training and recruitment drive in skilled workers to widen the coverage of these primary health care services immediately. ■



Challenges remain. Some people are still in camps. (Photo on pages 128-129)

As part of the 'Recovery Plus' process, messages to promote health awareness are being integrated in school curricula in some tsunami-affected countries.



Lessons Learnt: WHO's Experience

For the Organization, the post-tsunami relief operations highlighted some important issues.

Capacity Building

First and foremost, the clear message that came forth is that to respond effectively to any disaster, preparedness is essential. It was clear that countries that had a better health infrastructure were able to respond better. The massive mobilization of resources and international support required an enormous amount of coordination, communication and logistical support in order to ensure that all worked together in an effective manner. Now the key challenge in many areas is the rehabilitation and re-establishment of the health system at all levels. WHO's strategy focuses on building public

health capacity, establishing surveillance and laboratory back-up, strengthening logistic management and communication, and refining the monitoring and evaluation systems.

Improving Systems and Guidelines

Among the systems to be refined are guidelines. While WHO guidelines were appreciated, general guidelines are too bulky to be useful for field-level quick-reference purposes. Guidelines were therefore quickly summarized into succinct versions following the tsunami. Simpler, thinner guidelines, kept ready now, may serve better in any future emergency.

Attention to needs of vulnerable women and children

There was a recognition that disasters enhance the vulnerability of women, children and adolescent girls, but limited attention is paid to their needs in the early relief and restoration work. Special efforts need to be made to provide adequate supplies for reproductive health, emergency obstetrics care, newborn and child health services.

Working with local communities

The disaster also emphasised the importance of working with the local people, using local expertise to find suitable local solutions. It is the local experts that have an in-depth knowledge and experience of how systems are organized in their region. They also understand the language and culture, and can therefore work effectively with the community. If local experts are trained to international standards, they will form a valuable resource for their region well after the disaster is over, providing long-term support.

Effective Communication

With information pouring in from all quarters, the importance of the effective management of communication was also underscored. The media played a key role. WHO recognized this and staff were available

A mother holds her six-month old baby, who was born only half an hour before the tsunami struck the hospital she had delivered in.



The clear message that came forth is that to respond effectively to any disaster, preparedness is essential. Countries that had a better health infrastructure were able to respond better.

round the clock to take media interviews from around the world. Indeed, it is through the media that the public are kept abreast, and form their opinion of progress, following a disaster. Investing in public information professionals at the country and Regional levels, continuously building good relations with mediapersons and establishing good communications systems are therefore important.

Finding Suitable Resources

It is also important to find the right people with the right skills for the job immediately after a disaster - the faster the response, the better the outcome. As most international agencies discovered, identifying and mobilizing hundreds of experts in a matter of hours was not easy. It is therefore important to have a ready database of experts who could be mobilized in times of emergency.

Ensuring International Standards of Performance

In an emergency situation, one of WHO's roles is to ensure that the highest possible standards of work are maintained by all involved in the health situation. One way to achieve this would be to identify and



An injured tsunami survivor has now put the past behind him and is back in business.



possibly keep a registry of key health organizations, their skills and strengths, and work with them to provide training and create awareness, in non-emergency periods. In this way, when an emergency occurs, there is likely to be greater preparedness, greater awareness of what is expected, and better coordination among health agencies in the field, leading to a more effective response. Monitoring of performance during an emergency should be incorporated into the system.

Pre-disasters supply arrangements

It is important to have agreements with identified industries, well before the emergency, about supplies. The agreements should be such that material resources can then be ordered immediately following an emergency, without precious time being wasted on negotiations.

IT and Telecommunications

Another important area that was highlighted in this disaster is that timely and adequate IT and Telecommunication resources are critical for disaster mitigation and relief efforts. IT and Telecommunication systems should be a strategic element in the development of comprehensive preparedness plans (including Early Warning systems

Hospitals are being rebuilt according to modern specifications to better withstand disasters like earthquakes and tsunamis.

Fishing once more amidst the waves. Slowly people are rebuilding their lives in spite of their trauma.

and alert mechanisms.) Inventory of essential IT and Telecom equipment as well as human skills and expertise should be maintained. ICT applications, deployment strategies, and operational procedures should be developed as part of preparedness planning. Agreements between relief organizations, governments and private sector should already be in place BEFORE a disaster strikes in order to allow quick deployment and ensure inter-operability and integration with existing networks/services. IT managers in various organizations should be involved from day ONE of the Disaster Response phase to ensure timely mobilization of required ICT resources.

The fundamental lesson from the tsunami is one that has long inspired boy scouts all over the world: be prepared.



Moving Beyond the Tsunami

It was recognized, at various country level meetings and at an international meeting to discuss the health aspects of the tsunami in Phuket, Thailand, that the lessons from the tsunami, and their implementation, could lead to significant changes in emergency response systems in the future. Several key areas were identified for improvement in health sector response to disasters. The first was to have prompt assessment of people's health situation and their needs when a disaster strikes. National governments expressed the desire to strengthen their capacity to address health issues in disaster risk management and vulnerability reduction. Increased funding is also needed to support the health elements of disaster preparedness and vulnerability reduction. Application of standardized methods was another important area. The need for having a single integrated response system, and the importance of coordination, was also emphasized. Updated and evidence-based guidance, and well-functioning professional networks, to help improve responses to specific problems faced by crisis-affected populations, was also considered important.

All the meetings and discussions highlighted the fact that addressing risks appropriately is the basis of disaster management and strengthening capacities for this was essential.

Political and administrative strength is vital for an effective response. In Tamil Nadu, for example, political will to immediately mitigate effects and provide relief found expression in prompt provision of funds and posting of officials on special duty to affected areas, action to ensure continuous flow of information, frequent situation updates and response to new needs as they were identified. Teamwork, and autonomy in the field, were also seen as essential for a quick, comprehensive response at the ground level. The district authorities were granted powers to act autonomously, backed by substantial cash grants. This was particularly useful in the purchase of material (such as bleaching powder during the first two or three days) and in meeting



Health infrastructure and capacity, including information technology for health, is being strengthened and modernised.

Safe Water for All

In the Maldives, where fresh water resources are limited, the reconstruction phase after the tsunami is being used as an opportunity to develop water resources for long-term, sustainable use.

WHO is supporting the development of template water safety plans. These include ways to assess and identify hazards, monitor quality, chart out management procedures and verify the quality of water produced by using desalination, ground-water and rainwater.

An assessment is being carried out to identify training and equipment needs for water quality surveillance. ■

Water storage tanks in the Maldives.



expenses for the housing, feeding and care of displaced persons in temporary camps. There was close planning and coordination between revenue, health and social welfare departments, municipal administrations, and a number of other services like transport, power, police and fire, telephones, Public Works Department and highways. Particularly at district level, this speeded up the process of restoration of services, evacuation of affected populations, transport for the injured, retrieval of bodies and mass burial and clearing of debris. The speedy restoration to functional level of the badly damaged Nagapattinam General Hospital provides an example of how service departments and municipal authorities worked together.

The various discussions and meetings also raised the various needs, gaps and issues in preparedness and response:

- Development or updating comprehensive national disaster management plans
- Developing resilient health systems which include: well trained health staff and professionals; health facilities which are protected to various hazards and risks; mechanisms and arrangements for deployment of staff management of supplies; well-established surveillance and reporting system; and outbreak response mechanisms is the cornerstone of preparedness and efficient and effective response.
- Coordinated work with NGOs and other partners is essential and mechanisms must be set for this
- Awareness and addressing wider issues such as the protection of the environment is key in mitigating the impact of natural hazards.
- Efficient management of supplies and assistance received. A joint inter-country system to manage supplies and logistics may be a feasible solution to this issue.

As the fear of the tsunami slowly recedes, children play once more near the sea. ►



A resolution of the fifty-eighth World Health Assembly highlighted the need to build local capacity to assess risks, provide continuous public education, dispel myths about health consequences of disasters, and reduce the risk of disaster damage in critical health facilities.

Dr David Nabarro (right), Representative of the WHO Director-General for Health Action in Crises, surveys the progress in the rehabilitation process.

WHO's primary role was in supporting, and providing technical guidance and advice to the countries in the Region. It was recommended that WHO should assist in strengthening national emergency health preparedness and response capacities through:

- conducting needs and risk assessments;
- facilitating inter-country collaboration, exchange and mechanisms;
- active collaboration with other agencies in the health sector in emergency preparedness and response initiatives;



- ensuring wide dissemination of accurate technical information and implementation of guidelines, and

The countries, it was felt, would benefit if they institutionalize their Emergency Health Preparedness and Response programmes in ministries of health at the highest possible level with sufficient human and financial resources. It was also suggested that they engage communities and other sectors directly in the implementation of health programmes in emergency preparedness and response.

The fifty-eighth World Health Assembly emphasized these issues too, in a resolution on 20 May 2005. It recalled that more than 30 countries worldwide are currently facing major, often long-standing crises, and as many as 500 million people are at risk of avoidable threats to their survival and well-being. The lessons from the tsunami, if implemented well, could potentially transform the lives of all these people. "Recognizing that improvement of social and economic circumstances of the most disadvantaged countries is a preventive action that reduces the risk of crises and disasters and their consequences", it highlighted the need to build local capacity to assess risks. According to the resolution, preparing for future catastrophes involves providing continuous public education. It also involves dispelling myths about health consequences of disasters, and reducing the risk of disaster damage in critical health facilities. This would be possible only with strong long-term support of all nations to the tsunami-affected countries in all areas of health, and the Assembly called upon the international community to continue their support.

Thousands of people lost their lives in the tsunami. Learning from this terrible tragedy, and integrating those lessons to improve the response to all emergencies in the future is the best way one can pay tributes to all those who died.

The resilient human spirit: tsunami-affected children at play. ▶



A Success Story in Aceh



Children playing at a camp in Aceh

An early warning system for targeted epidemic-prone diseases was established jointly by WHO's Epidemic Alert and Response team and the Provincial Ministry of Health (MOH) in Aceh by the first week of January 2005. WHO established excellent collaboration and coordination with all operational agencies providing healthcare to the affected populations. This resulted in weekly reporting on syndromes and immediate alerting of suspected cases for a rapid response to epidemic-prone diseases, including field case investigations and institution of appropriate interventions. The fact that so far no epidemics have occurred in Aceh, in spite of approximately 400 000 internally displaced persons living in temporary housing, is a testament to this remarkable accomplishment. ■

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