Preface

On December 26th 2004 the WHO South-East Asia Region suffered one of the worst-ever earthquakes and was also battered by the destructive waves of the tsunami.

Among the Member States in the Region, Indonesia, Sri Lanka, Thailand, India and the Maldives were the worst affected. So was Myanmar, to a lesser degree.

The aftermath of the tsunami presented a great public health challenge to WHO. Thousands of injured people needed medical aid urgently. In many areas, the health infrastructure was almost completely destroyed. Thousands of people had lost their homes and were crowded in relief camps. There was a risk of communicable diseases. Clean water for drinking and for personal hygiene was essential. The nutritional needs of pregnant women and children demanded attention. Thousands of survivors, reeling from the shock of losing their near and dear ones, also needed specialized care. Their mental health was a key concern.

In response to this disaster, WHO immediately established a Tsunami Task Force and activated the Operations Room in the Regional Office for South-East Asia to function round-the-clock. The Task Force operated in close coordination and consultation with the Health Action in Crises team in WHO Headquarters.

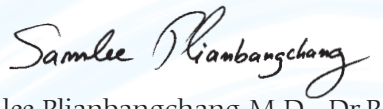
WHO urgently mobilized and deployed human resources and provided emergency medical supplies. Working closely with the health departments of the affected countries, WHO played a key role in

coordinating the work of hundreds of health agencies and nongovernmental organizations involved in tsunami relief work. Technical guidelines were compiled, updated and disseminated for use by emergency teams in the field. WHO facilitated logistics, restored medical supply chains and set up surveillance systems to monitor any possible outbreak of diseases. Water and sanitation experts from WHO monitored water quality to ensure its safety.

Considerable concern has been expressed by affected countries in the area of mental health due to psychosocial trauma created by the disaster. WHO responded quickly to the request for technical guidance to tackle this important problem.

As we move on to the rehabilitation phase, we must use the key lessons learnt to further improve health services for the people in affected areas. We must move more efficiently to respond to the urgent need for strengthening the capacity of the health sector in emergency preparedness and response.

This booklet provides some glimpses of the concerted efforts put in by all concerned in the unprecedented response to this disaster. For this, we must thank the donors, and all those who have expressed, in word and deed, their sympathy, concern and solidarity. We have greater challenges ahead, and we look forward to continued support from our partners to provide long-lasting benefits to the affected population.



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

Photograph: *Jim Holmes*

Four- year-old Pere receives a Vitamin A drop from a health worker in a camp near Banda Aceh, Indonesia, which was devastated by the tsunami. WHO has worked closely with the governments of the tsunami-affected countries to ensure that displaced children are immunized against common diseases, and their nutritional needs are met.

WHO's Response to the Tsunami: A Summary

Background

The earthquake and tsunami that devastated parts of South-East Asia occurred early on 26 December 2004, the Sunday after Christmas, during the peak holiday season. As news of the scale of the disaster poured in, the World Health Organization (WHO) prepared immediately to respond to the emergency. It soon became apparent that the combination of the 9.0 Richter scale earthquake and tsunami could lead potentially to one of the biggest public health crises in recent memory, and the Organization geared itself up to prevent such a scenario.

With six of the countries in the Region reeling from the impact, the Regional Office for South-East Asia (SEARO), located at New Delhi, was appointed the nodal point for coordinating WHO's efforts in the affected countries, and with WHO headquarters in Geneva.

By 27 December 2004, the Regional Director, Dr. Samlee Plianbangchang, nominated Dr. Poonam Khetrapal Singh, Deputy Regional Director, to oversee the coordination effort. Plans were set into motion at a meeting that morning. Senior WHO staff from across the world began to arrive in Delhi.

Dr Samlee Plianbangchang, WHO Regional Director for South-East Asia, visits healthcare workers in tsunami-affected regions of Sri Lanka.

Dr LEE Jong-wook, Director-General of WHO (right), talks to injured survivors of the earthquake and tsunami in Indonesia. Medical staff – many of them directly affected by the disaster – worked with only basic equipment and supplies. WHO deployed emergency medical supplies to affected areas immediately after the disaster.

WHO's Response

Immediately after the tsunami, WHO deployed emergency medical supplies and prepared to provide technical and logistical support.

SEARO's primary role was to coordinate the response efforts with the affected countries, and WHO headquarters, and various agencies and non-governmental organizations (NGOs) operating in the Region. An Operations Room was set up at World Health House , where an Emergency Task force constantly monitored the situation and liaised with the affected countries. Two cells were set up for information and technical tasks.

A 100-day strategic plan was developed to deal with the health challenges arising from the tsunami disaster.

As an international organization, WHO mobilized available resources immediately, from all over the world, to the affected countries. For example, an emergency health expert from the WHO Regional Office for the Western Pacific, was deployed to Indonesia. Experts also arrived from Europe and Washington. More than 60 professionals were mobilized and deployed in Indonesia, 50 in Sri Lanka, 27 in Thailand and 20 in the Republic of

Maldives. Hundreds of other experts also offered assistance, during the emergency period.

The challenges were tremendous. Health infrastructure was not spared in the calamity, so the injured had nowhere to turn to for help. The tsunami had left thousands homeless. Dazed, mentally shattered, some physically battered, survivors poured into relief camps.

The initial concern was about water and sanitation in the relief camps, and prevention of disease outbreaks. In crowded conditions like camps, even a few cases of infectious disease can spread rapidly, unless suitable preventive measures are taken, and the situation is closely monitored. WHO helped in monitoring the quality of water, and provided assistance in disease surveillance.

WHO provided technical support and guidelines, adapted to the situation, to the relevant governments, very early during the emergency. A Tsunami Technical Group (TTG), headed by CDS, was established and coordinated mobilization of expertise, guidelines and tools and other required resources. The TTG anticipated implications for communicable diseases. During the first week, water contamination, injuries and resultant infections were perceived as the most urgent health threat. During the second week, included respiratory infections, measles and water-borne diseases such as diarrhoea and dysentery (including shigella and cholera) as a result of overcrowded conditions and poor sanitation were identified as health risks. Vector-borne diseases were expected afterwards due to mosquito breeding in stagnant water.

Four technical working groups were established to cover: (1) development and adaptation of guidelines and tools, (2) mobilization of technical experts for deployment to Tsunami-affected countries, (3) data management, and (4) communication and updates. These groups worked with all technical units in SEARO, WHO/HQ and WR offices in affected countries.

The TTG, in collaboration with HAC/EHA, mobilized and deployed more than 250 WHO staff and consultants in the relief work in the three most affected countries, namely Indonesia, Sri Lanka and Maldives. More than 80 technical guidelines, outlining best practices to be followed, have been produced, transmitted to the field and posted on the web. Surveillance data were compiled and analyzed on a weekly basis and used to signal any likely disease outbreak or unusual health event. Likewise, regular communication through teleconferences and electronic communication were maintained across all levels. The TTG also mobilized and stockpiled vaccines and life-saving drugs and supported laboratory strengthening through supply of reagents and technical support.

The world donated medical supplies generously. WHO coordinated supply chains so that there was no delay in medicines reaching those who needed them most.

As a result of this concerted effort, early warning systems were strengthened and enhanced in affected areas enabling early recognition and initiation of appropriate interventions. Many clusters of cases have been investigated and rumours verified. Currently, three months after the disaster, the health situation is under control, with no outbreaks identified. The rapid institution of the Early Warning and Response Network (EWARN) system, in addition to the establishment of mobile laboratories, deployment of staff and consultants for technical support in communicable diseases, psychosocial support, water and sanitation, and nutrition, contributed significantly in safeguarding public health across the Region.

In many areas, WHO staff were involved in nutrition and vaccination programmes for children, pregnant and vulnerable women.

WHO headquarters procured urgent supplies for the affected areas. As supplies poured in, WHO provided logistical support to manage these supplies efficiently.

Within a few days, mental health was recognized as a serious problem. SEARO officials, collaborating with some local hospitals, set up psychosocial training sessions for medical personnel and NGOs.

Another major concern was the disposal of bodies. SEARO offered support to countries like Thailand to aid in forensic identification, and to strengthen their forensic infrastructure.

Information flow was also organized so that donors as well as the public could be kept abreast of the health situation in all the affected countries. Health bulletins and regular press releases also helped to cater to the tremendous media interest. Accurate information helped scotch rumours and panic.

As the emergency moves from the relief to the rehabilitation phase, WHO has attempted to establish a long-term, project-based planning approach, and to identify people who are willing to stay in the affected areas for a longer period to implement these plans.

Impact

There have been no major outbreaks of communicable diseases. Mental health is being addressed as one of the priorities in all areas, and psychosocial support has been provided. Health systems are being re-established and have begun activities that were available before the tsunami. The road map for long-term rehabilitation and rebuilding is being chalked out.

Photograph: *Pallava Bagla*

Frightened and weary, 18-month-old Manni Kannan weeps inconsolably when he cannot find his house, destroyed by the tsunami, in the village of Vemba Keera Palyam in Pondicherry, India. The tsunami had destroyed not only his house, but a centuries old way of life. His father Mr. Babu is a fisherman who lost his boat and nets on that Black Sunday, rendering him and his family unemployed, homeless and mentally devastated.

India

Background

More than 2000 km of coastline along the Southern Indian states of Tamil Nadu, Andhra Pradesh, Kerala, and the Union territories of Pondicherry and the Andaman and Nicobar islands, were devastated by the earthquake and subsequent tsunami on 26 December 2004. The Andaman and Nicobar Islands were particularly badly hit, with more than 215 aftershocks reported. Waves as high as 3–10 meters swept inland, sometimes as far as 3 km. More than 3.6 million people are estimated to have been affected, and the total financial loss for the mainland states have been estimated at 1.8 billion USD (Rs 53.22 billion). The detailed damage assessment of the Andaman and Nicobar islands has not yet been completed.

The initial priority was to prevent epidemics and ensure supplies of clean drinking water. Thirty-two medical officers were sent to the Andaman and Nicobar islands immediately, and another 80 to the mainland states. Emergency medicines and sanitation items were dispatched, and the situation closely monitored.

WHO Response to the Tsunami

India did not request external assistance in dealing with the emergency. However, the WHO Representative's Office (WR India) worked closely with the government, providing technical assistance. India also helped WHO efforts in other tsunami-affected regions, by providing resources.

Coordination and Liaison: One of WR India's key tasks was coordination and liaison. Immediately after the tsunami, an Operations Cell was established in the WR India office and regular liaison was maintained with the Government of India, state governments and development partners. Four national staff and 9 consultants from polio and tuberculosis projects were immediately deployed for field operations. In late January, a WHO Coordination Cell was established in Chennai to coordinate health-related activities with the Tamil Nadu government. A WHO epidemiologist was also positioned in Trivandrum.

WHO experts assisted the World Bank and the Asian Development Bank team in the assessment of the health sector in the tsunami-affected states.

Technical Guidelines: Twenty-eight WHO technical guidelines were provided to the Government of India, relevant state governments, and other partners, on subjects ranging from *Tsunami: Anticipated Health*

Problems and Interventions and *Communicable Diseases Early Warning System* to *Mortuary Service and Handling of dead persons*.

Disease Surveillance: WHO provided technical assistance to strengthen disease surveillance systems in all affected Indian states. Four Disease Surveillance Units were equipped in Tamil Nadu (Districts: Nagapattinam, Kanyakumari, Cuddalore and Kancheepuram), with supportive supervision and training provided by a team from WHO and the National Institute of Communicable Diseases (NICD). Medical officers and paramedical workers in Kanyakumari, Cuddalore and Chingleput districts of Tamil Nadu were sensitized to the importance of accurate and timely surveillance reporting.

Psycho-social Support: A WHO India expert was part of a UN Disaster Management Team to Chennai to advise on the importance of psycho-social support to tsunami survivors. WHO, along with UNICEF and UNDP, has developed a framework for providing psycho-social support to the affected population. Under WHO guidance, NGOs will be trained in psycho-social support. Three WHO collaborating centres are engaged in providing training and services for mental health, disaster management in children and adolescents, and disease surveillance. A proposal has been prepared with the Alcohol and Drug Information Centre, Trivandrum,

Village health nurse Ms. R. Rani (in white) visiting shelters to give psycho-social counselling to women who have been affected by the tsunami in Akirapettai shelter, Nagapattinam. Here, she tries to console Mrs. Govindamma who lost her 16-year-old son in the tsunami. WHO has provided guidelines and training for psycho-social support.

Kerala, to develop manuals and educational material in the areas of alcohol and substance-use prevention.

Water Quality & Environmental Sanitation: The quality of drinking water has been a concern, and WHO has provided technical assistance for monitoring microbial contamination of water and laboratory surveillance of Shigella and cholera. WHO has also supplied 1000 chloroscopes to monitor the quality of drinking water in the affected areas. In collaboration with the Gandhigram Rural Institute, WHO also provided technical assistance to district authorities for strengthening the monitoring of drinking-water quality, hygiene education, and waste management in Nagapattinam, Kanyakumari and Karaikal. Another proposal is being developed with the Tamil Nadu Water and Drainage Board to assess the changes of drinking-water quality in the coast after the tsunami.

To prevent malaria, insecticide-treated bed nets have been provided to affected districts in Tamil Nadu. In Nagapattinam, for example, 2500 insecticide-treated bed nets have been distributed. WHO also provided technical support for spraying and fogging to prevent vector-borne diseases.

Maternal and Child Health: With thousands of pregnant women and children reported in camps, this is a crucial area where WHO is working closely with the state and central governments. WHO provided surgical and emergency health kits to Kerala, Andhra Pradesh and Tamil Nadu, and a WHO official visited Tamil Nadu to meet with collaborating UN agencies and state government representatives to speed up implementation of proposed activities. There are proposals to strengthen maternal and child healthcare services, in collaboration with professional organizations like the Federation of Obstetrics and Gynaecological Societies of India (FOGSI) and the Indian Academy of Paediatrics (IAP). A plan is also being developed, with the Indian Nursing Council and Tamil Nadu Nursing Council, to strengthen nursing services, provide training in psychosocial support and develop a curriculum in disaster management for nurses.

Immunization: WHO has provided technical assistance in Tamil Nadu, Kerala, Andhra Pradesh, Pondicherry and the Andaman & Nicobar islands for measles vaccination, vitamin A supplementation for children aged 6-59 months and oral polio vaccine for children under 60 months. To date, 71 338 children have been vaccinated by the governments.

Health Systems: WHO is providing technical assistance to state governments in the assessment and strengthening of the health systems in affected areas.

The Eternal Bond

Christmas Day, 2004, seemed picture-postcard perfect in the seaside town of Nagapattinam in Tamil Nadu, India. The azure sky was reflected in the wide blue expanse of the Indian Ocean. The gentle sea breeze tempered the tropical heat. As Mr. Packriswamy, a resident of Nagapattinam and his wife Aryamalai, went about their daily chores, they could hear the screams of laughter of their four children as they played with their friends, not far from the sea. Aryamalai smiled a contented smile as she watched her children's delight on being sprayed by the shower of the ocean waves hitting the shore. Little did she realize that this day was the very last time she would watch her children play.

Photograph: *Pallava Bagla*

The very next day, the ocean, their lifeline and friend, turned traitor. Like mythical monsters, giant green waves launched a furious onslaught on the unsuspecting residents of this peaceful town. Water swirled everywhere, in the streets, in their homes, mercilessly engulfing everything in its path. When it was all over, Aryamalai's children had gone too. Crying out loud, calling out their names, she looked everywhere. But they did not appear. Even their photographs, barring one, were swept away by the waves. All that was left of this happy family were the memories that the parents harboured. Everything else had gone with the sea.

Eyes hollow with grief, her voice in whispers, Aryamalai, now in the Kechukuppam shelter, explains how she cannot have the comfort of having more children, as she had undergone a sterilization operation three years ago. Today, clinging to the smallest flicker of hope, she wonders if technology can help her reverse that decision. Twenty-eight-year-old Aryamalai is among the first persons affected by the tsunami to have opted for a recanalization operation in India. She is not alone. One hundred and thirty other couples in Nagapattinam district have also indicated that they wish to have a similar operation. They are being supported by the Indian government and WHO, with a grant of Rs. 25000 each. Success rates of recanalization are low – but for the parents, it is a sliver of hope.

HIV/AIDS: WHO is supporting the government in reviewing activities targeting vulnerable populations.

e-Health: Consultations have been held with WHO e-health experts about continuing health telematics initiatives in the affected regions and with resource groups.

Impact

There have been no outbreaks in India. Health services and surveillance systems are being strengthened across all the affected areas.

Future Actions

WHO through its country office will continue to work closely to provide technical assistance and support to the Indian government and affected state governments.

Photograph: Dori Indrasanto

Mute with grief, unable to believe the scale of the catastrophe, an Indonesian tsunami survivor clings on to her child.

Indonesia

Background

With more than 126 800 people dead and buried, another 93 458 missing, and 514 150 people displaced in 18 districts, Indonesia has borne the brunt of the 9.0 Richter scale earthquake and the subsequent tsunami on 26 December 2004. The province of Aceh was particularly affected. Many towns and cities along the coast were totally devastated.

Communicable diseases can spread rapidly in crowded camps. Monitoring disease outbreaks and establishing a rapid disease surveillance system were WHO's priorities.

The initial priority was to provide relief, food, shelter and clean water to all tsunami survivors. It was also crucial to provide basic health services, and establish rapid disease surveillance systems to contain any possible disease outbreak. Once a functioning, albeit rudimentary, health system had been established, the focus was on rebuilding and rehabilitation.

The challenge was tremendous in Aceh because the entire health system had been badly damaged by the earthquake and tsunami. More than 50% of health facilities had been damaged, and 600 of the 9800 health workers in the district were killed or were missing.

WHO's Response

Soon after the disaster, WHO worked closely with the Ministry of Health, supporting the authorities in responding to the tragedy.

Coordination and Liaison: As the scale of the devastation in Aceh became apparent, over 250 NGOs and health agencies began functioning to provide relief in the worst affected areas of the province. It was important to ensure that there was no duplication of effort, and that resources were utilized efficiently, to provide the health needs of the displaced people. As the lead health organization, WHO had the crucial task of ensuring coordination among all the agencies, the Ministry of Health and the provincial and district health authorities.

Technical Guidelines: WHO technical guidelines and manuals, on subjects ranging from communicable disease surveillance systems to mental health, were disseminated.

Water and Sanitation: WHO worked closely with the provincial health authorities, providing technical advice and support in assessing water quality in the affected regions. In collaboration with UNICEF and Australian emergency health experts, an assessment of the water, sanitation and health situation in camps for internally displaced persons (IDPs) was conducted in Banda Aceh. Similar surveys were also conducted in Meulaboh, and supplies provided in some camps to ensure personal hygiene standards among camp residents.

Health Systems and Supplies: In most places in Aceh, hospitals and health centres were damaged, and many medical personnel had been

Photograph: *Jim Holmes*

WHO staff work with Indonesian military doctors on an analysis of a possible cholera case, in Banda Aceh Military Hospital.

affected. At the peak of the relief phase, 20 metric tons of medical goods were delivered daily. A drug supply chain was established for donated drugs, and it was ensured that the drugs were from WHO pre-qualified suppliers, were appropriately labeled and within the expiry period. An inventory was conducted to sort out medical supplies and equipment. Initially, support was provided to provincial health offices in Banda Aceh, Aceh Besar, Aceh Jaya and Aceh Barat with 50 000 USD each to meet the operating costs to get primary health care facilities functioning again. The Organization also provided 30 basic health kits, each of which can serve 10 000 people for 3 months, to various mobile clinics in Aceh. Fixed drug combinations to treat tuberculosis were also distributed in Banda Aceh and Meulaboh. While a consultant set up cold chain systems for vaccines and drugs in Aceh, epidemiologists completed data entry for, and analysis of, medical reports from various functioning hospitals, health centres and mobile clinics.

Disease Surveillance: Technical assistance and guidelines were provided to the Ministry of Health. The Organization helped set up rapid health assessment and surveillance systems in the districts, and supported hospital laboratories. Support was provided to investigate suspected cases of various diseases.

Human Resources: A range of WHO experts – public health experts, logisticians, medical coordinators - have been closely associated with the relief and rehabilitation efforts, and in training local personnel. For example, epidemiologists trained provincial health office staff on how to enter and manage data for disease surveillance. Two WHO SUMA (Humanitarian Supply Management System) experts were in Banda Aceh to assist in training and setting up systems. WHO personnel set up offices in affected districts, and worked with local health personnel, many of whom were personally affected by the tragedy, to re-establish regular health services.

Nutrition and Food Safety: WHO has worked closely with the Ministry of Health in developing plans to manage cases of severe malnutrition through therapeutic feeding schemes. The Organization continues to work closely with other NGOs and provincial health authorities, often providing training as well, to ensure that malnourished patients have access to proper treatment. Experts were provided to ensure that food safety standards were maintained, by visiting and examining various places.

Mental Health: With thousands of tsunami survivors traumatized by their experience, mental health has been a major area of concern. WHO has prepared a set of recommendations, based on which the Ministry of

Amidst the chaos of a camp for internally displaced people, a health care worker examines a pregnant survivor. Providing care to pregnant women and children has been a top priority for WHO.

Health has drawn up an Action Plan. WHO experts have subsequently provided training for psychosocial support to primary care doctors, nurses and community workers in the affected areas.

Maternal and Child Health: In Aceh, WHO is assisting the Provincial Health Office to re-establish midwifery services in an integrated manner with other primary health care services in the affected areas. In each of the 49 points of resettlement in Aceh, there will be a satellite health post providing 24-hour basic health services through health providers, including a doctor, a midwife and two nurses. WHO has also provided USD 762 000 to re-established a functional provincial and district health office to provide reproductive health services. A sum of USD 1.2 million has also been provided for the re-establishment of a midwifery clinic in Aceh.

Immunization: WHO has been involved in a major measles vaccination campaign in IDP camps and among the community in Aceh. In Aceh Besar, for example, the target is to cover 68 000 children between the ages of 6 months and 18 years, in 30 IDP camps.

Impact

As the lead health agency, WHO has worked closely with the health authorities as well as various other governments and organizations to

When the Sea Turned Treacherous

Forty-two-year-old Faridah mimics the sound of the giant tsunami. It is similar to that of a jetliner passing overhead. Indeed, the mammoth waves really did speed across the ocean at the speed of a jetliner. She had thought, initially, that an airplane carrying Hajj pilgrims had crashed.

Faridah lived in Lamkruet in Aceh Besar with her 46-year-old husband, Khairuddin, her children and relatives – a big family of some eleven members.

For her, 26th December 2004 began like any other day except that there was a gathering in the nearby mosque and all the children and relatives went there. "Just after they left the house, the water came", recalls Faridah. The wave was preceded with a sound like that of an airplane. Before her husband could figure out what that was, suddenly the big wave, almost 15 metres high, appeared behind them.

Terror-stricken, they started screaming and running crazily towards the wide open rice field which too had got flooded with nearly a metre of muddy water. Suddenly, she grabbed a big tree and climbed. That impulsive action may well have saved her life. She survived and managed to reach a house nearby. "The water receded briefly after 5 minutes and I started to look for all of my children and relatives", says Faridah.

Many people were simply crushed under the debris or died when the giant waves hurled them against solid structures.

"Tsunami waves were jet black in colour", recalls Sofyan, 46, from the same village of Lamkruet. He used to live in the same area, 2 kms from the seashore. "It tasted saltish, it tasted bitter", he added. Tsunami water was cold like ice, he says. "Those who swallowed the water mostly died within 2-3 days. They developed fever, shortness of breath, vomited and became

Large parts of Aceh were completely flattened by the earthquake and subsequent tsunami on 26 December 2004.

Injured survivors of the tsunami await medical attention in Aceh.

pale before they died, he added. He was extremely lucky – all his six family members survived but he lost his house and all his belongings.

The enormous energy of the tsunami made mincemeat of vehicles. It lifted giant boulders, demolished houses and turned lush green fields into grisly swamps. The badly mangled remains of cars, buses, trucks and even cranes are chilling reminders of sheer fury of the sea.

Muddy water remained for a few days in Lamkruet and Faridah struggled to find her family members but found none. On the third day, she found her seven-year-old son, Wahyu Putra. He was saved by people who grabbed him and helped him climb the roof of one of the houses where he had been swept to. When his sisters went to the mosque he followed them but suddenly the waves came and just tore them apart.

The next day, Faridah and her family members evacuated to a higher ground at Mata Ie, six kilometres from the village. One month later, she came back to live in the camp at Lamkruet.

Fifty days after the tsunami, people discovered the body of one of her daughters, 14-year-old Laila Fitria, underneath the ruins, still with her clothes and many injuries. One hundred days later, they found the decomposed body of one of her relatives, an 18-year-old male. Of the 11 family members, only three survived. The bodies of the remaining ones were never found.

"I cannot believe all this happened to me", mumbles Faridah, her eyes dried up. She now runs a small provision store at the camp.

The sea is again calm and serene with a dark, beautiful hue in Aceh. With moist eyes, Farida gazes at the sea, almost uncomprehendingly. Then mutters slowly, "That day was like Doom's Day".

ensure that tsunami survivors receive basic health services. There have been no major outbreaks, apart from 91 tetanus cases in one camp, and a suspected outbreak of food poisoning. The process of normalizing health services and infrastructure is progressing.

Future Directions

The large number of mobile, displaced people makes it difficult to ensure that everyone has been covered by public health measures. With the capacity of the current health system being severely tested, there are concerns about sustaining the service once international agencies hand over their activities to local ones. The threat of outbreaks in camps remains. However, in spite of the challenges, the process of rehabilitation is proceeding steadily.

Photograph: Randy Grodman

Smiling through their tears: In spite of the catastrophic events they have witnessed, two young tsunami survivors smile for the camera, displaying the inherent Maldivian spirit of optimism.

Maldives

Background

The tsunami that left a trail of destruction across much of South-east Asia devastated the Maldives. Although the number of casualties was low compared with the rest of the affected countries, the impact was tremendous as one third of the population was affected. Several sources of water were contaminated with salt water and sewage. With 2214 people confirmed injured it was imperative that they had prompt access to adequate health facilities and treatment. Providing relief was logistically difficult considering that the country's 200 inhabited islands stretch almost 900 kms across the ocean.

In the early stages of the response, it was observed that the tsunami disaster had inflicted psychological trauma. Initial concerns centered on the lack of access to adequate water, sanitation, food and loss of livelihood. Moreover, the contamination of water and lack of adequate sanitation facilities posed a threat of diseases such as diarrhoea, typhoid, hepatitis, viral fever and dysentery. There was also the risk of vector-borne diseases, making effective disease surveillance vital. The tsunami proved to be a huge blow to the country's public health infrastructure, damaging one regional hospital, two atoll hospitals, 14 health centres and 20 health posts.

WHO's Response

WHO responded promptly by working in conjunction with the Ministry of Health, other UN agencies and NGOs. WHO placed due emphasis on supporting the Ministry of Health, to establish disease surveillance measures, and ensure an adequate and immediate response to an outbreak. WHO appealed for USD 6 085 000, through the UN Flash Appeal, to meet the urgent health needs. Already, WHO Maldives has put together USD 250 000 to fulfill the immediate requirements of affected groups. In terms of supplies, WHO has provided 11 Emergency health kits, each kit catering to the needs of 10 000 people for 3 months. It has also provided 10 surgical kits, 100 000 packs of Oral Rehydration Salts, and 6.5 million tonnes of Chlorine. As for manpower, technical support was provdied in the areas of budget and administration, water, sanitation and environmental health, media operations, food safety, logistics, epidemiology, disease surveillance, and emergency preparedness and response.

Photograph: *Randy Grodman*

A boat carrying relief supplies to the worst-affected islands leaves the harbour. WHO responded promptly to the emergency with medical assistance.

Impact

Much has been done to restore normalcy. Although the consequences of the tsunami are enormous and far-reaching, the relief efforts have made sufficient public health services available.

From the very outset, essential medicines were procured to cover immediate needs. As such, provisions lost to the disaster are being gradually replaced, if not improved upon. Much emphasis has been placed on disease surveillance, as can be seen in the containment and monitoring of diseases. In this regard the capacity of laboratories has been strengthened by the provision of diagnostic kits, especially for epidemic-prone diseases.

Furthermore, in a country like Maldives, where potable water has always been regarded as a scarce resource, it is important to note that clean water was produced by desalination, and use of water purification tablets and chlorine. One of the most pressing problems caused by the disaster was the lack of hygiene and inadequate sanitation facilities. The threat of water-borne and vector-borne diseases grew. While the whole population is at risk, vulnerable groups such as pregnant women, children and the elderly are even more so. Water and sanitation issues have seen significant improvements, albeit by temporary measures, such as the provision of sustainable water supplies to the islands, while long-term solutions are being sought. The timely availability of technical experts in affected areas helped greatly in planning the recovery efforts.

The Courage to Move On

The island of Muli is a far cry from the complexities of urban life. Situated in Meemu atoll, it boasts a simple, close-knit and peace-loving community. The tsunami of 26th December 2004 brought about a deep-seated sense of fear, for their livelihood came from the surrounding seas. The Regional Hospital for the atoll was also located in Muli, and was completely destroyed by the calamitous waves.

That Sunday morning fisherman Adnan and his two children were seated on a traditional Maldivian reclining chair, or 'joali', when, without warning, a wave of immense proportions appeared on the horizon. Fascinated by the sheer size of the approaching wave, he was barely able to motion his children to run for shelter when the wave smashed on to the beach flattening everything in its path. Before he had a chance to act, an eight-foot wall of water swept him away. As he fought against the strong currents, he managed to grab hold of his youngest child. The currents dragged them all the way through the island, until Adnan caught hold of a tree, and he clung there until the water levels receded. By then, he had lost all hope of his elder daughter being alive. Walking through debris and murky waters, calling out her name, he reached his house, to find in its place a heap of rubble. The gravity of the situation struck him at that moment and he sank to his feet and wept. Hours seemed to have passed, when suddenly someone said 'Adnan, your child is safe'. Apparently his daughter was sucked out to sea, and a boat moored in deeper waters pulled her to safety as she drifted by. Relief flooded him, and it was at that precise moment that he had a heart attack. He lost consciousness and only came to, a week after the disaster. Adnan's first reaction was to mutter a prayer of thanks. His family was safe, and that was all that mattered.

Months after the tragedy, Adnan's courage is remarkable. Although he has lost his property and his entire life's savings, he is optimistic about getting on with life. Understandably, he is a bit apprehensive at the prospect of going out to sea. However, his faith in God overrides any lingering doubts. The path looks set for recovery, as Adnan, like many Maldivians, assumes the formidable task of rebuilding the fragments that remain of his life.

Volunteers help clear up the damage and destruction caused by the tsunami in the Maldives.

Battling the Demons of the Mind

Naaz is another survivor. Her voice is barely audible and her eyes speak of an untold sadness. The tsunami swept away everything that belonged to her family. Their house, their possessions and, most importantly, their peace of mind. Life, as she once knew it was but a fleeting memory. Once a nonchalant girl without a care in the world, she had seen and experienced too much.

Survivors of the tsunami in the Maldives try to rebuild their lives

That fateful day felt just like any another as she got ready for work. Naaz was all alone in the house, when the tsunami struck. She was taking a leisurely shower, when she heard a muffled roar. She ventured outside to find water gushing into the room. Within minutes the water level rose at an alarming rate. Naaz kicked and struggled to stay afloat as the room filled up with water. The door gave way and Naaz was dragged down the road by a tempestuous surge of water. Just when it looked as though she would be swept out to sea, she reached out and grabbed the nearest solid structure she could lay her hands on. Her struggle for survival against the relentless onslaught of water was over for the time being, but it was an image that would play over and over again in her mind for a long time.

Today, Naaz is battling an intense fear stemming from her horrible experience with the tsunami. It was a long time before she could muster up enough courage to even set foot on Muli. Like many survivors she has recurring nightmares and deals with occasional bouts of anxiety. However, she too acknowledges that the worst is over, and is grateful that her family escaped unscathed. Despite the scale of the disaster, the determination of affected people to move on is inspiring. In addition to the remarkable will to persevere, the rapid recovery of survivors can be partly attributed to the provision of psychosocial support by local health authorities. The tsunami caused incalculable damage to the Maldives, claiming many lives. The stories of people like Adnan and Naaz are inspirational, and reflect the widespread sentiments of tsunami survivors.

Future Directions

While rehabilitation efforts are already underway, the next phase is likely to focus on reconstruction. One of the most remarkable traits that Maldivians possess is an inherent sense of optimism. Hence, despite the sheer magnitude of the tragedy, it is heartening to note that many affected persons are determined not only to get their lives back on track, but to make the best of the situation. In fact, the general attitude is to improve on their lifestyle, rather than just rebuild and replace their losses. The reconstruction phase will also include rebuilding the damaged public health infrastructure. Priority will be given to coordinate recovery actions, address imminent public health issues, enable access to basic health services including mental health, and ensure the efficient supply and distribution of medications.

An old house damaged by the tsunami in Ayawady division, Labutta township, in Myanmar.

Myanmar

Background

Compared to other affected countries in the Region, the tsunami that devastated South-East Asia on 26 December 2004 had a relatively mild impact on Myanmar. Approximately 5 000 people were estimated to have been affected along the southern coasts of the country. It was reported that 61 people were killed and 43 injured. Damage to the health infrastructure was minimal, although small scale damage was observed in a number of costal areas involving 12 townships.

While the initial emergency needs in Myanmar were largely met, a primary concern was the availability of safe drinking water. The focus was on meeting those early needs and rebuilding affected facilities, the latter requiring mid- to long-term support.

WHO Response

WHO's response has been closely coordinated with the UN disaster preparedness and management group, and with the international NGOs,

The WHO Representative, Dr Agostino Borra, symbolically hands over WHO's donation to Prof Dr Kyaw Myint, Myanmar's Minister of Health. WHO focused its support on reducing the risk of disease outbreaks and morbidity by supporting disease surveillance and providing emergency medical supplies as requested.

through the Red Cross–led *Tsunami Liaison Group*. WHO's primary role is to provide technical support to the Ministry of Health. WHO technical guidelines for emergencies have been disseminated. Regular updates to the diplomatic and international community were organized through distribution of situation reports and WHO press releases.

WHO has been focusing on reducing the risk of disease outbreaks and morbidity by supporting disease surveillance and providing emergency medical supplies, as requested by the Ministry of Health. Furthermore, a comprehensive proposal was developed by the Ministry of Health with WHO support, to mitigate the impact of the tsunami and to improve disaster preparedness and response.

Impact

No outbreaks or major health emergencies have been observed in Myanmar as a result of the tsunami. WHO supplied five new health emergency kits, designed to provide basic medical relief to 50 000 people for a period of three months. It also facilitated a donation of 22 000 treatment courses for malaria.

Future Role

WHO continues to provide technical support to the Ministry of Health in the implementation of rehabilitation measures and to strengthen disaster preparedness, within available resources.

Photograph: Akinori Kama

A child survivor amidst the damage caused by the Tsunami in Galle, Sri lanka.

Sri Lanka

Background

Sri Lanka was among the worst-affected countries in the disaster caused in South Asia by the tsunami of 26 December 2004.

The need for immediate public health action for the affected population was critical. The most vulnerable were the displaced children, women, and the elderly. There was a constant threat of potential disease outbreaks, including cholera, typhoid, shigellosis and hepatitis, as well as vector-borne diseases such as malaria and dengue, as a result of damaged water and sanitation systems. The poor health conditions of displaced people exposed them to increased risk of measles, respiratory infections, meningitis, and tuberculosis. Health systems had broken down and essential infrastructure had disappeared.

A patient and survivor of the tsunami receives medical treatment at a makeshift clinic in Galle town in Sri Lanka.

WHO Response

Within the UN family in Sri Lanka, WHO was designated as the health sector coordinator. Taking advantage of WHO's long established knowledge of prevalent conditions and partnerships with national and local authorities in the country, and the results of initial assessments, WHO Sri Lanka's action strategy targeted approximately 1 million affected people in 13 districts in the south, east and north of the country.

A WHO sanitation expert tests the quality of water at a makeshift camp in the Point Pedro area, after the tsunami in Sri Lanka.

Emergency support was provided to national and local health authorities to protect the health of survivors and other vulnerable groups affected by the disaster. WHO's primary role was effective national and local health coordination to ensure efficient use of incoming assistance. The Organization played a key role in monitoring public health to provide early warning of emerging health threats and enable a speedy response. Technical expertise was provided to replace lost assets, infrastructure, and supplies, and reactivate previously available health services, to facilitate early recovery and rehabilitation.

The priority areas and activities are as follows:

- **Surveillance and Response**: Strengthening active disease surveillance and early warning system
- **Joint action:** Assisting government capacity at national and local level to coordinate health assistance
- **Public health:** Improving district capacity to manage health aspects of IDP camps; Facilitating vector control, water and sanitation, waste disposal
- **Access to essential healthcare:** Re-establishment of health systems, focusing on key hospitals and health centres
- **Health supplies:** Provision of basic drugs and health supplies, including associated logistic support; support to recover cold chain

- **Psycho-social and Mental Health**: Devise training programmes with the Ministry of Health for healthcare workers, recruitment of Community Level Workers and training.

Emergency Task Force

The WHO Country Office established an Emergency Task Force (ETF) to handle the crisis. This is chaired by the WR and, until recently, met daily. It now meets twice a week. The role of the task force is to provide policy direction on the overall approach adopted by the Country Office towards the crisis; address key managerial and organizational issues within the Office that impact on the effectiveness and efficiency of the WHO response; tackle advocacy, liaison and representation matters within WHO in relation to SEARO and HQ, and in relation to UN agencies and donor partners in the country.

The WR is supported by an Operational Support Group (OSG) headed by the EHA focal point who will act as Emergency Manager for this crisis. There are plans to open three operational units, located at Galle, Ampara, and Jaffna, respectively.

Impact

So far there has been no disease outbreak. Camp management has evolved to include a Public Health Inspector in each camp. This contributed significantly to the timely reporting and treatment of suspected diseases and in disease surveillance.

Strong facilitation of and coordination with authorities, both at district and Central levels, has supported the efficient and timely deployment of foreign medical teams.

WHO has also played a key role in ensuring that the imported medical supply chain system runs smoothly and effectively. With WHO assistance, there has been significant improvement of laboratory technical services for diagnosis, ensuring swift and accurate diagnosis, allowing timely and correct treatment.

Future Directions

The activities outlined above are comprehensive programmes being implemented in the post-tsunami period. Hence, activities are fully underway and are evolving in accordance with ongoing assessments and requirements.

Photograph: *Aphaluck Bhatiasevi*

Portraits of Hope: Anguished survivors search for their loved ones among the pictures of missing persons that are posted at the Government's relief centre in the Provincial hall in Phuket.

Thailand

Background

Unlike other countries affected by the tsunami disaster, Thailand was able to mobilize rehabilitation and reconstruction efforts quickly. The immediate response in emergency rescue and deployment of health workers, doctors, nurses and volunteers was observed within six hours following the tsunami.

Clearing up of rubble and construction of temporary shelters for affected people began the week following the disaster. Within one month, new houses had been built for some of the affected persons. This rapid response helped significantly in the population returning to a sense of normalcy.

The immediate health challenges were well taken care of and management of patients led to very low mortality. Patients were rapidly transferred to other hospitals in neighbouring provinces to help reduce the overcrowding in hospitals nearest to the areas affected by the tsunami.

Active health surveillance was concentrated in the six affected provinces (Phuket, Phang Nga, Krabi, Ranong, Trang, Satun), where no unusual disease outbreaks were reported. The Ministry of Public Health, Bureau of Epidemiology, conducted surveillance covering 77 health centres, 22 state-run hospitals, four private hospitals, 14 temporary shelters for people affected by the tsunami, and two body identification centres. Between 26 December 2004 and 31 January 2005, a total of 4468 patients were registered, of which five died. The maximum cases reported were of diarrhoea – 456 cases (there were no outbreaks), followed by unidentified cause of fever – 44, pneumonia – 33 and dengue fever 27. There was no significant outbreak of gastro-intestinal or respiratory infections such as cholera, measles, influenza and encephalitis.

In the area of mental health, over 10 000 people were interviewed in the first two weeks of the disaster, with special focus on those who had earlier received treatment. No major disease was identified, though, in the initial phase, many patients were treated for trauma, stress and depression.

The challenges that remain are, however, in areas of identification of bodies, psycho-social support, restoration of sanitary conditions and vulnerability of the migrants.

Mental health teams visit schools in Jum Island in Krabi Province in Thailand to provide psycho-social support to students directly and indirectly affected by the tsunami. WHO is working closely with the government on mental health initiatives.

WHO Response and Impact

WHO's biggest contribution in dealing with this public health emergency can be attributed to the Organization's past collaborations in training and strengthening the public health infrastructure of the country. The training of field epidemiologists and capacity building in the area of disaster preparedness, supported by WHO through the years, resulted in public health sector capable of responding quickly and appropriately to the tsunami disaster.

During the emergency, WHO opened an operations centre in the Country Office and began participating in the daily meetings held by the government. Throughout this period, technical assistance continued to be provided to the government, NGOs and others by responding to queries and through the distribution of disaster response materials on the management of bodies, rapid assessments and other technical issues. WHO participated in four interagency assessment missions on the impact of the disaster, on mental health and on the vulnerable migrant population. WHO coordinated with other international organizations, attending interagency meetings, and ensuring that health issues were addressed effectively.

A Thai health worker spraying in a tsunami-affected area to prevent the spread of vector-borne diseases like malaria and dengue.

Future Actions

Based on assessments in collaboration with the government, WHO has proposed project proposals seeking funding to assist the Ministry of Public Health. WHO will continue to support the implementation of projects with the Ministry of Public Health as required, and work with partners to assist with the long-term strengthening of the public health infrastructure in various areas. This includes manpower training, technical assistance in areas of forensic medicine, psycho-social care, and disaster preparedness and response.