

Introduction

CHAPTER 1: Introduction to Health Recovery

CHAPTER 2: Impacts of Disasters on the Health Sector

Sub-issue 1: Human Impacts

Sub-issue 2: Impacts on Health Professionals

Sub-issue 4: Impacts on Clean Drinking Water

Sub-issue 3: Impacts on Medical Facilities

Sub-issue 5: Impacts on Creating New Health Risks

CHAPTER 3: Humanitarian Assistance: Relief and Transition



CHAPTER 4: Recovery Phase

Sub-issue 1: Leadership and Governance

Sub-issue 2: Human Resources

Sub-issue 3: Financing

Sub-issue 4: Medicines and technology

Sub-issue 5: Information

Sub-issue 6: Service Delivery

CHAPTER 5: Pre-Disaster Health Sector Recovery Preparedness

Sub-issue 1: Leadership and Governance

Sub-issue 2: Human Resources



IMPACTS OF DISASTERS ON THE HEALTH SECTOR



CHAPTER 2: Impacts of Disasters on the Health Sector

Sub Issue 1: Human Impacts

- **Women and Children** (Case 1, 2, 3)
- **Nutrition** (Case 4, 5, 6)
- **Individuals with Disabilities** (Case 7, 8, 9, 10)
- **Elderly populations** (Case 11)
- **Communicable Diseases** (Case 12, 13)
- **Livelihoods and health impact** (Case 14)

Sub Issue 2: Impacts on Health Professionals

5



Case 1: Impact of Tsunami on Women and Children, Indian Ocean tsunami in 2004

- **High mortality among women** in the population may lead to more orphans
- Past studies have shown that **orphans** are highly vulnerable and exhibit higher mortality rates than their peers

Case 2: Children, women and elderly more vulnerable in disasters

- **High mortality rates among children** under 15 years old and individuals over 50 years old
- Women ages 15-50 years old are more vulnerable than men
- **Swimming ability reduces** mortality rate by 60% in flooding disasters
- Women and **girls responsible for young children** have higher mortality rates because of limited mobility
- **Children under 5 years old** are main victims of sanitation-related illnesses because of less developed immunity and greater exposure to pathogens

6



Case 4: Nutrition in Emergencies: Factors that impact nutrition in disasters and steps to reduce these impacts

- **Nutrition for infants** can be negatively impacted by interruptions in breastfeeding as well as exposure to abuse and trauma and degree of affection and physical stimulation received by the infant

Case 5: Risks of Artificial Feeding in Emergencies, Botswana 2005

Key Issue: Flooding disasters can trigger outbreak of communicable diseases

The **risks of artificial feeding** were exposed in Botswana in 2005/06 where replacement feeding with infant formula was offered to all HIV-infected mothers as part of a national programme to prevent transmission of HIV from mother to child (PMTCT). **Flooding led to contaminated water supplies**, a huge rise in diarrhea and malnutrition in young children. National under five **mortality increased by at least 18%** over 1 year. **Non-breastfed infants were 50 times more likely to need hospital treatment** than breastfed infants, and much more likely to die.

7



Case 6: Single parent households, women and men: Difficulties single parent households incur after a disaster

- **Single women parents** face a number of **physical and psychological threats** in the post-disaster environment
- **Men's roles** change post disaster and this can give rise to **substance abuse** and domestic and sexual violence
- **Supporting** and monitoring **single parent households** is recommended to ensure that proper adjustments are being made to new roles and responsibilities

Case 7: Treatment of Individuals with a Disability, Tsunami in Tamil Nadu

The post Tsunami relief and rehabilitation activities by government and other organizations missed the persons with disabilities who were among the most affected. Around 658 organizations started their operation in Nagapattinam district but shockingly none of them specifically addressed the issues of the persons with disabilities.

- People with **disabilities are often missed** or excluded from relief efforts
- **Need to involve NGOs that work with individuals with disabilities** in relief and recovery efforts

8



Case 8: Communication systems used during disasters: Access to communications technologies by disabled persons in disasters

After Hurricane Katrina, most people were found to have lost cell phone usage in the area for between several days and up to many weeks because cell towers and their on-site generators were destroyed.

Early warning systems could also rely on SMS messages, as they are the fastest way of communicating with many people. To help the **blind**, the only communication available is by using a cell phone running the **Symbian operation system**, which is expensive, or secondly purchasing a special piece of software that you must run on the cell phone and requires outside funding.

HAM radios are very useful as are satellite phones during disasters. HAM radios are financially out of reach of the average person in a developing country but can be purchased through external funding sources **for communities**. It is important that the disabled are involved at this stage so they can become part of local disaster plans. Without electricity, computers and TVs also are useless.

Lessons

- **Technologies used by disabled individuals become inaccessible** in a disaster when the electric power is interrupted
- **Wireless, SMS and Ham radios** provide some assistance but each technology **excludes some segment** of the disabled population
- Assisting the disabled should be part of any disaster preparedness, mitigation and recovery plan – buddy system.

9



Case 10 : Privacy and Security of Women with Disabilities: Protecting women with disabilities after a disaster

“**Privacy and security** are a high priority for many people when using the **toilet or bathing**, especially for women. Lack of security can lead to anxiety about latrine use. This may lead to **urine retention**, and subsequently to medical problems.” This problem becomes more difficult for **women with disabilities** as they may be using a wheel chair or not able to see.

Lessons

Women, especially disabled ones, have **increased vulnerability in evacuation centers and camps**

Case 11: Impacts of disasters on the elderly and the role elderly can play in recovery

- Elderly individuals are especially susceptible to death and injury in disasters because of a **number of factors** including **physical and cognitive disabilities**, **reliance on caregiver support** to function, **transportation needs** and increased susceptibility to diseases and infection.
- Separation during **displacement** leaves older people further disadvantaged. This often leads to a double burden on older people. They may lose the normal support structures provided by their own children while, at the same time, given the **additional burden of caring for grandchildren** when the middle generation moves to other areas to pursue income-generating opportunities.
- Elderly individuals must be **included in decisions** and governing councils established in **evacuation centers and camps** to ensure their needs are considered.

10



Case 12: Impact of communicable diseases post-disaster

Lessons

- **Increased epidemiological surveillance** is a must after disasters
- Evacuation centers and “tents cities” could be hazardous to the health of its occupants
- Drinking from unprotected wells can increase chances of a cholera outbreak
- **Crowding** of infected and susceptible hosts, a weakened public health infrastructure and **interruptions of ongoing vector control programs** are all risk factors for vector-borne disease transmission
- Reported incidence of **acute diarrheal illness and acute respiratory infection** increased significantly post event
- Increased incidence of these illnesses was **attributable to flooding, poor sanitation measures, lack of drinking water, overcrowding**, and damage to the basic infrastructure.

11



Sub Issue 2: Impacts on Health Professionals

Health professionals (i.e. **doctors, nurses, clinicians, technicians**, hospital workers, etc.) are vulnerable to death, injury and dislocation from a disaster. Many communities are underserved by experienced medical professionals in non-disaster periods. Any **losses among health care professionals** caused by a disaster can have a significant **impact on the health and well-being of community members**.

12



Case 15: Impact on Medical Facilities

The 1999 earthquake in Turkey left more than 44,000 people injured. Most were either medically **evacuated to faraway health facilities** because of damage to nearby hospitals or were **treated outdoors** on the grounds of the closest hospital or clinic.

The 2001 earthquakes in El Salvador left 1,159 dead and 8,122 injured. **Nineteen hospitals (63%) were damaged** and six were completely evacuated. **Three years after** the earthquake, patients at the hospital San Rafael in the capital were **still being admitted in temporary facilities (tents or containers)**.

Hurricane Ivan struck the small Caribbean nation of **Grenada** in the West Indies in September 2004. It was the strongest hurricane on record occurring this close to the equator. The second most important hospital in Grenada (**the country has only two**), the Princess Alice Hospital, **lost most of its roof**.

Lessons

- **Failure of Hospitals** denies medical care when most needed and raises social and economic concerns
- Disaster can **severely reduce the ability to provide medical services** in the post disaster phase
- **Public confidence** in government recovery efforts can falter if the health infrastructure fails and/or is not rebuilt properly

13



Sub Issue 5: Impacts on Creating New Health Risks

Disaster can often expose individuals to new and potentially dangerous health

Case 19: Asbestos in Sichuan Earthquake in China, 2008

The May 12, 2008 earthquake in Sichuan, China, destroyed many buildings including hospitals, schools, government offices and private homes. The external walls, roofs, window awnings and bathrooms in many of these buildings had been made using asbestos cement sheets – commonly known as “fibro” or “fibro cement”.

The earthquake broke the fibro into many small pieces, releasing fine fibers of asbestos at the broken edges. During clean up operations, there is the risk of liberating substantial quantities of asbestos fibers, particularly if heavy plant and equipment are used to demolish damaged structures and load rubble into vehicles. These asbestos fibers are a significant risk to public health.

As a result of the cleanup operations there may be an accumulation of asbestos containing waste that will present a hazard to people in the local environment and those living in close proximity to the site of final disposal.

Lessons

- Disasters can expose populations to **additional health risks** such as **asbestos** release from buildings
- **Clean-up workers are especially vulnerable** to exposure to asbestos and other hazardous building materials because of a lack of protective gear

14



RECOVERY PHASE

15



Case 22: The Six Core Health System Building Blocks – Key Considerations During Recovery

Topic: Rebuild the health sector recovery with an eye on opportunities for enhancement and improvement

- Recovery from a disaster is an excellent **opportunity to enhance** and improve existing health sector capacities and capabilities
- Coordination and **leadership are critical** for gaining support and acceptance for making positive changes to the health sector during recovery
- Information and communications and **service delivery** are also key factors.
- In Haiti some NGOs conflicted with MoH by offering long term medical care without the legally required user fee.

16



Case 24: Health sector reconstruction, Pakistan

Key Issue: **Post-disaster is an opportunity** to revitalize and enhance the health sector

In Pakistan, based on the Damage and Needs Assessment (DNA), a health sector reconstruction strategy was designed with **two overlapping phases**, building upon the ongoing work and learning lessons from the relief effort.

- **Short term (3-12 months)** The short term strategy focused on ensuring revitalization and **availability of the basic health services** and core public health programs and functions.
- **Medium to long term strategy (12 months to 36 months)** included the **reconstruction of seismically safe facilities** and also outlined options for addressing key issues faced by the sector.

Lessons

- **Short-term** relief activities must focus on revitalizing essential health services, helping special needs populations and preventing disease outbreaks
- **Long-term** recovery involves **building back safer** and efficiently in order to maximize health sector capacities and capabilities

17



RECOVERY PHASE

Case 27: World Bank experience in assessments; Planning for a better health system for the next 5 to 10 years

According to the World Bank “International experience shows that in the aftermath of a natural disaster, a transitional strategy for restoring and maintaining health services should be developed while **planning for a better health system for the next 5 to 10 years**.

A rapid **assessment** should be done for changed population profile, epidemiology and burden of diseases. The health needs of the people in the affected areas should be assessed periodically, and **particular attention** needs to be given to the existing and **newly emerged vulnerable populations** in both transitional and reconstruction strategies.

The transitional phase should prioritize rapid restoration and assurance of undisrupted supply of essential health services.

Reconstruction planning begins during the damage and needs assessment phase.

18



RECOVERY PHASE

Safer Facilities in the Future

Case 30: Rebuilding safer health facilities, Gujarat Earthquake

- During the rehabilitation and reconstruction phase, several measures were taken to ensure that hospitals are safer in emergencies in the future:
- Systematic **survey of health facilities**
- **Vulnerability** and impact **analysis** of health facilities
- Rehabilitation of health facilities, including **repair, strengthening, new construction** as per new revised norms of earthquake safety, and **retrofitting**
- Guidelines developed for buildings according to earthquake seismic zones
- **Seismic zoning** of the state of Gujarat
- Training and mock drills

Lessons

- When rebuilding and rehabilitating medical facilities in the recovery phase it is important to incorporate disaster resilient measures into the **siting, construction and repair** of these facilities so that they can survive the next disaster
- Officials in charge of recovery projects should consider **location, design, structural safety, and nonstructural concerns in the design**, repair and reconstruction of damaged health facilities
- Preparedness measures should be included in the recovery and reconstruction activities including **conducting preparedness exercises** in health facilities, linking with other sectors and engaging the community

19



RECOVERY PHASE

Patient treatment

Case 31: Treating individuals with chronic diseases, Great Hanshin-Awaji Earthquake, 1995

Assistance for those suffering from intractable diseases who are highly reliant on medical care:

The **regional disaster emergency medicine manual** has been created, and the production of a manual of health care guidance for patients with intractable diseases has also helped in the preparation of lists of patients requiring priority assistance during emergencies by the prefectural health and welfare office.

Lessons

- Provisions should be made in advance of a disaster to **care for patients with chronic diseases**
- These provisions include the **development of a treatment manual**, a **network of health professionals** focused on patients with chronic diseases

20



RECOVERY PHASE

Case 33: Support for communication with the hearing impaired and others, Great Hanshin-

To ensure the **availability of and dispatch sign-language interpreters**, the **Hyogo Sign-Language Interpretation Center** was established as a means of developing a support system for communication with people who are hearing impaired. It also trains emergency disaster-relief specialist volunteers (sign-language interpreters). **Information Center for the Hearing Impaired** is opened to assume the function of a base for relief activities during disasters.

RECOVERY PHASE

Lessons

- Establish disability support **institutions and capabilities pre-disaster**
- **Interpreters are critical** to recovery for hearing impaired people

21



Case 34: Public health considerations, Indian Ocean tsunami in 2004 in Tamil Nadu

A survey did reveal that while many injuries were treated in government hospitals, the largest proportion (60.2%) received medical attention from private institutions such as private hospitals and NGOs. This suggests that there was a heavy **reliance on the non-public health sector** following the tsunami in Tamil Nadu.

Such patterns of post-disaster health care emphasize the importance of **including private health providers in emergency response planning and disaster training**.

RECOVERY PHASE

Lessons

- Many persons injured in disaster are treated in private and NGO hospitals
- Important to include private health providers in emergency response planning and disaster training

22



Case 36: Policy initiative to change how to deal safely with healthcare waste, Hurricane Ike struck the Turks and Caicos Islands (TCI), 2008

The Environmental Health Department mobilizes a contractor every time there is a risk for a hurricane hitting the island. The **contractor** then **relocates** appropriate equipment to a site where it is more **readily accessible for clean up**.

The first clean-up phase after the storms was completed fairly quickly. However, during the September/October mission there were still piles of debris and other waste material to be found in the streets. By mid-December, the waste on the island had been cleaned up, with a few exceptions. People continued to dispose of secondary disaster waste in the streets, although this was far less common.

The debris that spread into the salinas (salt lakes) has been cleaned up, with a few exceptions such as the pond to the west on the nether side of the new hospital.

At the hospital, proper waste disposal of common waste as well as infectious waste is reestablished, with a functioning incinerator and proper storage facility. The temporary wooden construction for the oil tank has been replaced with a steel construction.

RECOVERY PHASE

Lessons

- Disposal of health related waste identified as environmental problem and policy initiative put forth to fix the problem
- Old dump sites should be maintained as a preparedness measure in case of future unexpected rapid increase of waste
- Old construction and storage measures should be replaced by new technologies

23



Sub Issue 3: Financing

The WHO guide entitled, "The Six Core Health System Building Blocks – Key Considerations During Recovery,"

"**Realistic estimates** are required for both the costs of recovery activities and the levels of funding likely to be available from the government budget, continuing (but diminishing) humanitarian funding, new development schemes, bilateral funding, various global funds, and loans from international financial institutions.

Elaborating strategies and **formulating plans without linking them to the resources realistically** going to be available, is a **fruitful** exercise. The issue of **user fees** – whether they should be introduced, maintained or abolished – is likely to be contentious.

Case: Assessment of health sector damages and financing of needs, Earthquake in El Salvador

On January 14, the day after the earthquake, PAHO/WHO issued an appeal for **US\$770,000**, based on a **very preliminary assessment** of health sector damages and needs, conducted just hours after the earthquake.

Four days later, a more accurate picture is emerging in the health sector. Most notably are the importance of maintaining and strengthening immunization and the restoration of the cold chain, and an assessment of necessary emergency rehabilitation measures in health facilities.

The following consolidated and revised appeal reflects these emergency needs for PAHO technical support now estimated at **US\$1,750,000**.

RECOVERY PHASE

24



Case 39: Medical Fee Exemption System for Earthquake-Affected People, Great Hanshin Earthquake 1995

A system to exempt earthquake-affected people from payment of medical fees was set up. Under this system, 1) those whose home collapsed, even partially or 2) chief earner of the household was killed, seriously injured, or ill, were **given exemption from medical expenses while in hospital**. In case of those covered by national insurance, those whose business was lost or who had lost their job and had no income, were added to the target group.

The exemption system was **discontinued after four months**. The victims had just moved into temporary housing without much hope for the recovery, the number of disaster-related deaths were increasing and people's health conditions were deteriorated. Many of the disaster-hit people with health problems were **forced to stop receiving medical treatment due to the termination of the system**.

Lessons

- Providing financial support to people impacted by disasters **helps them to recover**
- **Discontinuing the financial support** can result in stopping medical assistance to some people

25



RECOVERY PHASE

Sub Issue 4: Medicines and technology

Case 40: Short- and Long-term policy strategies for getting medicines for HIV/AIDS-affected populations in the aftermath of Wenchuan Earthquake, China 2008

Short-term policy response (end 2008)

- A supply chain management assessment (procurement, delivery, storage, distribution and monitoring) should be done in conjunction with any health systems assessment.
- Provincial centers for disease control and health bureaus must determine where service delivery breaks have occurred and ensure access to antiretrovirals for all people living with HIV/AIDS.

Long-term policy response (2009-2010)

- A re-evaluation of the supply chain systems should be completed, and priority should be given to ensuring timely procurement and delivery to people with AIDS.
- Financing for the **establishment of a supply chain system to rural areas** should be done.
- Development of an "Emergency Preparedness Drug Supply Chain Systems Strategy".

Lessons

- Short-term strategies meet the immediate medicine needs of patients
- Long-term strategies are designed to **improve and enhance procurement and delivery of medicines** and financing of the supply chain based on an evaluation of the existing practices

26



RECOVERY PHASE

Sub Issue 5: Information

Monitoring & Evaluation (M&E)

Case 41: The Tsunami Recovery Impact Assessment and Monitoring System (TRIAMS)

The Tsunami Recovery Impact Assessment and Monitoring System (TRIAMS) is a sub-regional initiative that defined, promoted and supported a **common system to monitor recovery activities** and assess their overall impact in the four countries affected by the 2004 Indian Ocean tsunami – Indonesia, the Maldives, Sri Lanka and Thailand. The purpose of the TRIAMS initiative is to **assist governments**, aid agencies and affected populations in **assessing and monitoring the rate and direction of tsunami recovery**.

The **methodologies** promoted in TRIAMS include:

- Collection and compilation of **indicator data**, metadata and analysis in a database
- Use of thematic **mapping** to show geographic distribution and equity dimension of recovery assistance
- Use of existing routine and survey sources of quantitative data
- Use of **beneficiary perspectives** to triangulate and better understand how affected people view the **quality** and relevance of the recovery assistance.
- **Incorporation of disaster risk reduction elements into the indicators**
- Measuring progress towards recovery goals is a critical element in measuring the success or failure of recovery programs and projects

27



RECOVERY PHASE

Community-based outreach

Case 46: Community-based health and first aid (CBHFA), Cyclone Nargis, Myanmar

Community-based health and first aid (CBHFA) activities have progressed well despite the heavy rains and difficulties in **accessing communities in remote areas**.

Community activities and beneficiaries reached

56,573 beneficiaries were reached through community-oriented and community initiated activities such as hygiene promotions in schools and communities, as well as health education for communities. Hygiene promotions have included hand-washing exercises and clean-up campaigns, while health education has covered discussions on disease awareness and prevention, immunizations and malaria-prevention activities.

Community mobilization by CBHFA-trained volunteers

The total number of community volunteers who have received CBHFA training is 2,730.

Collaboration with the water, sanitation and hygiene promotion programme

The CBHFA programme has collaborated with the water, sanitation and hygiene promotion programme, in hygiene promotion activities during latrine constructions.

Lessons

- Community-based health and first aid (CBHFA) programs are an **effective method for reaching targeted populations** in the recovery phase
- Programs **promote good health activities and disease prevention**
- **Trained volunteers** critical to reaching all targeted populations

28



RECOVERY PHASE

Case 50: Pre-Tsunami medical system could not meet the public needs, Tsunami 2004

Reconstruction **cannot simply aim to replace what existed**. Low levels of public investment, poor maintenance and inefficient use of resources meant that **pre-tsunami health services did not fully meet** the needs of the population and the quality of such services was generally poor. The coverage of key public health programs such as child immunization was low. Rural populations had inferior access to maternal health services.

Islamic Relief has developed satellite clinics and several NGOs also provide mobile clinics to IDP locations.

RECOVERY PHASE

Lessons

- **Opportunity** in recovery phase **to improve** and strengthen health systems to meet **both disaster and non-disaster needs**
- Disaster offer an **opportunity to strengthen health systems** in a long-term sustainable manner
- Recovery phase is opportunity to **not only rebuild hospitals** and other medical facilities but also to **upgrade and better equip** these facilities
- Opportunity to **revise existing programs** and promote new programs that **increase the capacity of the health systems**

29



Case 51: Building a safer hospital, Hurricane Georges 1998

Citizens of St. Kitts and Nevis in the Eastern Caribbean had a sense of déjà vu as they awoke on 21 September 1998 to survey damage caused overnight by Hurricane Georges. Roofs were lost and other buildings seriously affected at Joseph N. France Hospital. The laboratory roof was gone and support services such as storage facilities, laundry and the central sterile supplies department all had sustained damage. An estimated 90 per cent of the hospital could not function. With its 174 beds, Joseph N. France Hospital is the **only referral hospital** on the island. Three years earlier, almost to the day, Hurricane Luis had ripped through the island, damaging the same hospital severely. In fact, JN France Hospital has suffered moderate to severe damage from hurricanes on **no less than 10 separate occasions** since it opened in 1966.

RECOVERY PHASE

Lessons

- Important to **understand the potential risk** to health facilities posed by disasters and to **incorporate measures to mitigate** these risks in recovery plans
- Creating a **master plan** complete with **risk management measures prior** to a disaster will facilitate the design of safer health facilities in the recovery phase
- Use an **independent engineer** to review designs and **audit implementation** of mitigation and risk reduction measures in reconstruction of medical facilities

30



Supporting private health care facilities

Case 52: Support for medical patients and public and for private medical facilities, Great Hanshin Earthquake 1995

In the areas impacted by the Great Hanshin Earthquake, private medical facilities were also severely affected. Doctors, dentists, their families, staff, hospitalized patients, and their homes suffered great damage by the earthquake and fires.

Finding out how serious the damage wrought by the earthquake was, the **national government decided to assist the reconstruction of private medical facilities**.

The direct public aid helped the reconstruction of damaged hospitals and clinics a great deal.

RECOVERY PHASE

Lessons

- Government **funding may be needed to rehabilitate private sector** medical facilities during disaster recovery
- **Opportunity for government to demand that private sector medical facilities incorporate mitigation measures** in their rebuilds in order to build safer facilities

31



Case 54: Delivering new medical services based on survey of earthquake victims living in emergency temporary housing, general housing and reconstruction public housing projects, the Great Hanshin-Awaji Earthquake, 1995, Japan

Hyogo prefectural government carried out a four-year **health survey of earthquake victims** living in emergency temporary housing, general housing and reconstruction public housing projects from 1995 through 1998, linking this with the development of health promotion measures in disaster-stricken areas. One issue for the future is the need for a system for keeping track of people's destinations when they move from temporary housing to permanent housing, in order to maintain continuity of contact.

Nursing volunteers launched "**Mobile Health Care Rooms**" as a space where elderly people can talk at length about their worries concerning moving to a new place as a result of the earthquake, or health concerns arising from their solitary lifestyles and ask advice.

RECOVERY PHASE

Lessons

- Bring health services to individuals **wherever they reside**
- **Track individuals movements** from temporary to permanent housing in order to maintain effective delivery of health services

32



Case 56: Management of healthcare waste in Port-au-Prince, Haiti earthquake

Among the concerns for environmental experts was the lack of adequate facilities for the management of healthcare waste in Haiti.

This matter was discussed between UNEP, the World Health Organization (WHO), and the Haitian Government, and it was agreed that a **temporary facility** to dispose of medical wastes would be created **within the municipal landfill** in Titanye. A design for the same was provided and the facility was promptly constructed. Additional steps to **train staff**, equip them with the required personal protective equipment (PPE), and to provide **suitable containers** for the collection of healthcare waste were also agreed.

RECOVERY PHASE

Lessons

- Collection and **disposal of medical waste** is an often overlooked but critical function
- **Multiple partners** may be needed to design and implement an efficient and effective medical waste disposal capability
- Major elements of a medical waste disposal operation include **assessment, equipment and training**



Providing long-term rehabilitation services

Case 57: Providing long term rehabilitation services to disaster victims, Gujarat EQ 2001

It was realized that Gujarat Government need to provide long term intervention in terms of fitting of assistive devices, artificial limbs, psychological reinforcement, counseling, vocational orientation, vocational training and rehabilitation. They were also required to provide follow up services to all the persons who have been provided artificial limbs and other assistive devices by other organizations as well.

Generally earthquake-affected people needed support, services and intervention in the following areas:

1. Fitting of prosthetic devices and rehabilitation aids:
2. Physiotherapy Services: They started physiotherapy Centers at appropriate locations with the involvement and participation of local NGOs.

RECOVERY PHASE

Lessons

- Post-disaster there will be a **need for long-term rehabilitation** for those individuals suffering crippling injuries
- Often short-term medical services outstrip immediate health needs but **long-term medical needs often outstrip available medical services**



Summary

- In summary, the most important lesson is that the recovery phase offers extraordinary opportunities to enhance and improve health sector capacities and capabilities:
- Take advantage of the recovery to **develop new plans for training and deployment** of medical workers that better meet the needs of the population
- **Restock and resupply medicines and technology** based on identified needs
- Collect and disseminate information on medical needs and **create a baseline** for from which you can build back better and safer
- **Explore new service delivery methods** and mechanisms
- Conduct ongoing assessments and **Monitoring and evaluation (M&E)** programs through the recovery to identify needs, allocate resources and ensure progress

RECOVERY PHASE



PRE-DISASTER HEALTH SECTOR RECOVERY PREPAREDNESS



Sub Issue 1: Mitigation actions

Case 58: Vulnerability reduction in the design of new health facilities; Building safer health facilities

The earthquake provides an **opportunity for health sector reform**.

First, it is better that the **reconstruction addresses key issues currently faced by the health sector** such as health financing to reduce out-of-pocket expenditure by the earthquake-affected population and provide better health service insurance coverage, benefits, and accessibility to the poor and other vulnerable population sub-groups.

Second, the **future health system** should be designed to be prepared for and **responsive to all major hazards** in the future. Hospitals need to be **constructed to higher standards** to ensure their integrity and functionality when another earthquake hits.

Third, the **existing health system** in the affected areas may **need to be rationalized and streamlined** to meet the changed needs because of different population profiles and epidemiology.

Recovery is preparation for the next disaster

37



Case 61: Hospital retrofit in Costa Rica, 1990 and El Salvador, 2001

Case: Hospital retrofit helps keep hospital open and functioning post-disaster, **Costa Rica, 1990**.

An ambitious **program to retrofit** five major hospitals was **underway** in Costa Rica when a 6.8 magnitude earthquake struck in 1990. The partial retrofitting of one hospital is credited with **saving the facility and its occupants**. In other hospitals, those parts of the facility that had already been retrofitted came through the quake in excellent condition, while other parts which had not yet been reinforced showed evidence of structural failure.

Case: Hospital retrofit works to keep hospital open and functioning after a disaster, **El Salvador, 2001**

The 286-bed Benjamin Bloom Children's Hospital in El Salvador's capital, San Salvador, was seriously damaged in a 1986 earthquake and was **repaired adhering to anti-seismic norms**. Fifteen years later when major quakes once again struck in 2001, this hospital suffered mostly cosmetic damage.

Lessons

- You can retrofit a facility to reduce the impacts of a disaster
- Retrofits can save money and lives by ensuring the hospital will remain functioning after a disaster
- Guides easily available - PAHO

38



Case 63: Program to reduce impact of future events on medical infrastructure, Nepal

Recognizing the gap between current hospital capacity and predicted medical needs in a post earthquake scenario, a **seismic assessment** of 14 hospitals was conducted in 2001 in Kathmandu Valley, including Patan Hospital. Subsequently, Patan was one of four priority hospitals to undergo a more rigorous study. Unlike most other hospitals in Nepal, Patan Hospital's earthquake resilience was considered relatively good. Nonetheless, it was almost a foregone conclusion that a major earthquake would leave the hospital unable to function due to structural and non-structural damage. To find out, an earthquake **mass casualty scenario** was used for Kathmandu Valley to estimate the number of people that would require hospital services, based on: (1) **expected damage** to buildings; (2) a one-to-five ratio of deaths to injuries; and (3) the Kathmandu Valley's population of 1.5 million (in 2002).

Lessons

• **Understanding the hazard risk** to a hospital can help you plan for whether that hospital will survive a disaster and identify those preparedness measures that you must put in place to deal with the damage to the hospital and retain some functionality post-disaster

39



Case 64: Preparedness training for hospital workers, 2004 Tsunami in Sri Lanka

Ampara General Hospital was the tertiary care institution in Sri Lanka that managed the highest number of tsunami victims. Fortunately, training in disaster preparedness and response had just been completed.

Preparedness

For over five years now, the annual "Public Health and Emergency Management in Asia and Pacific" (PHEMAP) course has been introducing participants to the concepts of health action in times of disaster.

As a result of the preparedness measures, when the tsunami on 26 December, 2004, the Ampara General Hospital **staff were well aware of what their duties were**. A total of 1015 patients were admitted the hospital immediately after the tsunami. More than 4000 patients received treatment from the outpatient department.

Lessons

- Preparedness **training** for health workers and first responders enhances capacity health sector in disasters
- Pre-disaster **drills** introduce health workers and first responders to mass casualty management system
- **Mass casualty management training** and drills strengthen communication, coordination and collaboration among key stakeholders

40



Summary

There are measures that can be taken by officials to reduce the impacts of future disasters on the health sector and to better prepare the population and health workers to deal with future disasters including:

- Rebuilding old facilities and future facilities to **higher standards** that ensure that the facilities will remain functional after a disaster
- **Retrofit** old facilities to life safety and higher standards
- Provide **training** to medical workers on disaster procedures and medical practices

41



ANNEXES

- Annex 1: Hospital Safety Index
- Annex 2: Tool for Analyzing Disrupted Health Sectors: A Modular Manual
- Annex 3: Tool for Understanding Children in the Evacuation Site
- Annex 4: Check List for Health Care of Elderly
- Annex 5: Check List for Pregnant and Nursing Mothers
- Annex 6: Check List for Nutrition
- Annex 7: The Safe Drinking Water Response to the Indian Ocean Tsunami
- Annex 8: Sanitation and Waste Disposal in Hospitals

42

