

The role of physical therapists in disaster management

WCPT report



**World Confederation
for Physical Therapy**

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Earthquake, Haiti - © William Daniels/Handicap International

Notes:

The terms physical therapy/therapist and physiotherapy/physiotherapist refer to the same profession and are used interchangeably in this document. In case studies and examples, the professional title relating to the country concerned is used.

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Introduction

Context

WCPT encourages its member organisations to facilitate the contribution of physical therapists to national and local disaster preparedness and management strategies and provides a range of resources on its website, including a policy statement and information to support physical therapists specialising in humanitarian responses to disaster. These are among the most accessed and downloaded resources.

Discussions between WCPT and physical therapists involved in humanitarian responses identified a need to advocate for the presence of rehabilitation professionals, including physical therapists, in all phases of disaster management. There is a need to strengthen their role in preparedness, to promote their role in emergency medical teams (EMT), and to affirm the need for the establishment or development of physical therapy services in disaster areas.

This led to the formation of a project team to develop a report on the topic. The team was supported by an advisory group with representatives from frontline service delivery in emergency situations, academic centres of excellence, physical therapist professional organisations, established international non-government organisations, the International Committee of the Red Cross (ICRC) and the World Health Organization (WHO).

This paper joins WCPT's suite of resources. As the field is changing rapidly, new resources become available regularly and will be placed on the WCPT website at www.wcpt.org/disaster-management.

About this report

This report has two main aims:

- to highlight the need for physical therapist involvement in disaster management and particularly in EMTs
- to brief physical therapists who want to work in the field, and national and international agencies who are already working in the field.

Following an introduction to the topic of disasters, the paper outlines in separate sections the three phases of disaster management most relevant to physical therapists:

- preparedness
- response
- recovery

Each section includes information on the role of physical therapists and details guidelines and resources to support practice in disaster management.

Summary

There are four phases of the “disaster continuum”: prevention, preparedness, response and recovery. The professional role of physical therapists in prevention is limited and will not be addressed in detail here.

The inclusion of vulnerable groups should be a consistent factor throughout the disaster continuum.

1. Preparedness:

Physical therapists have a significant contribution to make in disaster preparedness.

Physical therapy input must be included in disaster management planning and implementation.

There is a need to establish a global framework of, and standards for, physical therapy preparedness.

As part of planning, minimum injury and disability data sets, reporting mechanisms and rehabilitation referral pathways should be agreed and standardised and this information should be disseminated to all service providers.

Locally appropriate disaster preparedness should be included in entry-level physical therapy programmes and in post-qualifying and continuing education to ensure sound knowledge, skill and ethical frameworks for practice.

Locally appropriate preparedness should be mainstreamed into community based rehabilitation (CBR) programmes and other projects in which physical therapists work with vulnerable groups.

Physical therapists, especially those in disaster prone areas, should:

- make themselves aware of the vulnerability of their country/region to disaster
- ensure that they have a personal preparedness plan in place – ideally, integrated into a health service disaster management plan
- increase their awareness of the likely consequences of disasters – in terms of impact on services and infrastructure, injuries, disease, psychological impacts and social impacts
- lobby governments and non-governmental organisations and institutions to be prepared for disasters and to include physical therapists in their planning
- increase awareness among members and the public of physical and rehabilitation needs in emergencies
- play a lead role in advocating for and ensuring the inclusion of all vulnerable groups in emergency preparedness
- contribute to disaster risk reduction efforts and reduce the vulnerability of populations by providing effective development programmes including CBR.

Physical therapy associations, together with professional associations, health service providers and training institutions should:

- make themselves aware of the vulnerability of their country/region to disaster and increase awareness among members and the public of that risk
- map rehabilitation service provision, and consider establishing skill registers of providers that can be called upon
- take steps to develop and test integrated disaster preparedness plans that are part of a coordinated multi-disciplinary, multi-agency response, and that include agreed referral pathways for rehabilitation
- assess likely rehabilitation equipment needs following a disaster and stockpile essential equipment

- assess likely skill requirements following a disaster and plan training accordingly
- consider the development of standardised treatment protocols and patient education leaflets in advance of an emergency
- consider the registration and regulation requirements of international physical therapy respondents in emergencies.

Physical therapists interested in international humanitarian response should:

- access specific humanitarian and clinical training and pre-register with international medical teams or international non-governmental organisations (INGOs)
- consider developing a national or regional subgroup of physical therapists with interest and expertise in disaster management.

2. Response:

There is growing evidence and guidance that rehabilitation should be considered a central part of disaster response from the onset of a disaster.

The role of physical therapists is not limited to the direct provision of rehabilitation but can include assessment, coordination, psycho-social support and advocacy.

Rehabilitation in humanitarian disasters is best provided by experienced local providers, or, when required, by INGOs specialising in meeting rehabilitation needs in this context or as an integral part of specially trained emergency medical teams (EMTs).

Required skills and knowledge

- General and specialised clinical skills are required, and may need to be adapted for an austere environment.
- Commonly required skills include the rehabilitation of fracture, spinal cord injury (SCI), amputation, brain injury, burns, soft tissue injury and nerve injury, while respiratory skills are also likely to be required, particularly in responding to tsunami or floods.
- Physical therapists involved in response should be aware of humanitarian principles and global frameworks, including the FMT minimum standards.

Required actions

- Establishing early links with governmental or cluster based coordination mechanisms is critical.
- The early communication of rehabilitation capability and referral pathways are essential, and may impact upon triage and the medical or surgical management of severe trauma cases.
- The early dissemination of nationally agreed, standardised reporting datasets, multi-disciplinary team (MDT) treatment protocols and patient education materials is essential.
- Multi-disciplinary, multi-agency cooperation and collaboration, both within teams and across organisations, is vital.
- In disasters resulting in a significant number of traumatic injuries, a rehabilitation coordination group may need to be established.
- Physical therapists are often in a unique position to ensure the inclusion of vulnerable groups in emergency response, and should take steps to ensure that their responses are inclusive, and to advocate for the inclusion of vulnerable groups in responses.

Other requirements

- Rehabilitation and equipment provided should meet local and international standards and be capable of being maintained or replaced locally.
- High professional standards, in accordance with relevant WCPT policies and guidelines should be maintained at all times, including documentation and scope of practice
- Rehabilitation does not end at inpatient discharge, and failure to consider ongoing needs can be fatal. Linkage with local rehabilitation providers, CBR organisations or disabled people's organisations (DPOs) is essential to ensure continuity of care and support. Establishment of new services that provide local access to ongoing rehabilitation may be required.
- There is a significant need to conduct research to establish an evidence base for best practice in humanitarian rehabilitation response.

3. Recovery:

Disasters present a unique opportunity to “build back better”, including improving access to rehabilitation services.

Physical therapists form a key link between disaster response and recovery and should play a role in rehabilitation capacity building and planning service delivery, accessibility, and inclusion.

Planning for recovery should be initiated as early as possible, be locally led, and should include multi-disciplinary and multi-agency stakeholders.

Planning for recovery should not just focus on the needs of those with injury but should include people with pre-existing disability. CBR can form a strong focus of recovery planning.

International respondents should focus on local capacity building during the recovery phase, through training, service development, and the establishment of formal education programmes where they are absent.

Part 1: Background

Defining disasters

Between 2002 and 2011 disasters killed an annual average of 107,000 people and affected an annual average of 268 million ⁽¹⁾. Since 2000, the world has witnessed a significant number of disasters, including:

Year	Disaster	Number of deaths ⁽²⁾	Number of people injured*
2001	Gujurat Earthquake	20,005	161,812 ⁽³⁾
2003	Bam Earthquake (Iran)	26,796	30,000 ⁽⁴⁾
2004	Indian Ocean Earthquake and Tsunami	226,408	>300,000 ⁽⁵⁾
2005	Hurricane Katrina (USA)	1,833	7,543 ⁽⁶⁾
2005	Kashmir Earthquake (Pakistan)	73,338	>70,000 severely injured ⁽⁷⁾
2006	Java Earthquake (Indonesia)	5,778	38,000 ⁽⁸⁾
2008	Cyclone Nargis – Myanmar	138,366	19,359 ⁽⁹⁾
2008	Sichuan (Wenchuan) Earthquake (China)	87,476	374,643 ⁽¹⁰⁾
2010	Haiti Earthquake	222,570	300,572 ⁽¹¹⁾
2010	Pakistan Floods	1985	2966 ⁽¹²⁾
2011	Great East Japan Earthquake and Tsunami	19,846	6000 ⁽¹³⁾
2013	Typhoon Haiyan (Philippines)	7354	28,689 ⁽¹⁴⁾
2015	Nepal Earthquake	8657	22,220 ⁽¹⁵⁾

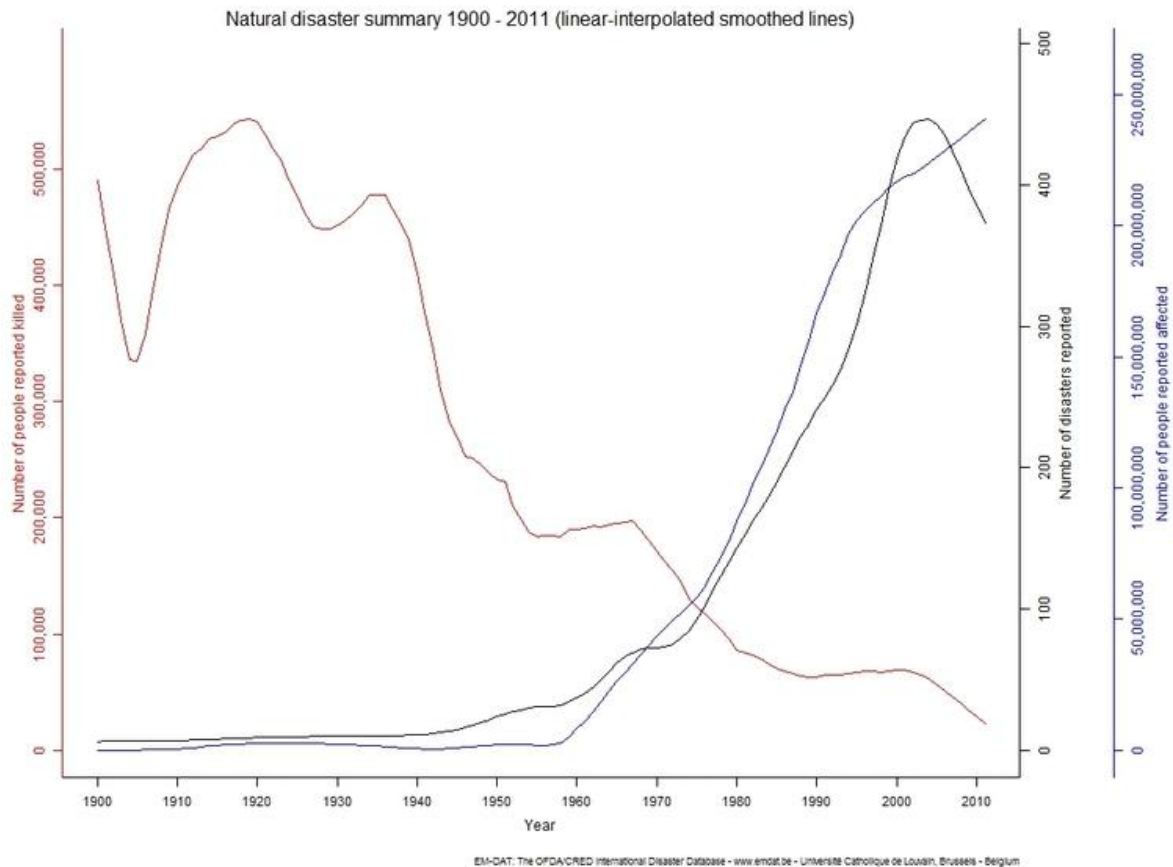
* Injury figures are not consistently reported and different measures are often used ⁽¹⁶⁾ which makes reporting and comparison of numbers almost impossible. For example, some reports track the total number injured (eg. Gujurat) whereas others report on the severely injured (eg. Kashmir). Figures used here are from a variety of government, UN, NGO or academic sources. Even for individual emergencies, numbers reported from different agencies often vary significantly.

A disaster is defined by The United Nations Office for Disaster Risk Reduction (UNISDR) as “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.” ⁽¹⁹⁾

Today we talk simply about disasters rather than “natural” disasters as it is important to recognise the role that humans play in increasing exposure and vulnerability to hazards such as earthquakes and tsunamis. Increasing population and urbanisation exposes more people to risk, while factors including economic situation, environmental degradation, infrastructure, construction quality, policy, laws and preparedness can all impact on the vulnerability of a population. It is these human factors, coupled with the magnitude of the hazard, that determine the scale of the disaster.

Some authors use the term “sudden onset disaster” (SOD), meaning “a disaster that arrives with little or no warning.”⁽²⁰⁾ While in this paper we focus on hazards that have a sudden onset rather than more chronic disasters such as droughts, the term “sudden onset” can be misleading, as there are often lead times for hazards such as major storms and earthquakes. Disasters are rooted in vulnerability, not in hazard, and so they are foreseeable⁽²¹⁾.

Figure 1 National disaster summary 1900-2011



Source: D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.

While there is debate about whether the frequency of hazards has increased in recent times, what is certain is that the number of disasters and the number of people affected is rising, while at the same time injury to mortality ratios are also increasing^(17,18). The implication of this is that disasters are likely to cause an increasing number of injuries and result in increasing numbers of people with impairment over the coming years.

Hazards

Hazards which may result in disasters include:

- earthquakes
- tsunamis
- hurricanes, typhoons, wind storms and associated storm surges
- floods
- volcanic activity
- landslides

Some definitions also include biological hazards, such as epidemics, and others expand the list to include fires and “man made” hazards such as industrial accidents. For the purposes of this paper biological and “man-made” disasters are not included. In some cases hazards may be coupled, as in the flood caused by a hurricane or the tsunami that is created by an earthquake.

The history of rehabilitation in humanitarian responses

The role of physical therapists in responding to emergencies is evolving. There is an increasing recognition both inside and outside the profession of the importance of rehabilitation in a range of humanitarian settings. At the same time, an increased focus on areas such as disaster risk reduction, disability inclusive responses and preparing local first responders for emergencies, means that physical therapists and their rehabilitation colleagues have opportunities to make significant contributions to these fields.

Disasters result in a significant number of disabling impairments^(18,22) yet the literature about physical therapists assisting in major disasters around the world is scarce⁽²³⁾. However, physical therapists and their precursors have long been involved in the rehabilitation of those injured during emergencies including both conflict and disasters.

Physical therapy first emerged as a profession during the first world war^(24,25). The International Committee of the Red Cross and Red Crescent (ICRC) was the first humanitarian organisation to focus formally on rehabilitation, establishing its Physical Rehabilitation Program in 1979, while Handicap International first sent physical therapists to work with landmine survivors in 1982. Organisations like ICRC, Handicap International and the overseas disability charity CBM now send or recruit local rehabilitation personnel to work directly in response to emergencies, while medical organisations including Médecins Sans Frontières (MSF), Emergency, International Medical Corps (IMC) and Medicine Du Monde (MdM) sometimes include rehabilitation personnel, either as part of their emergency medical teams, or as a separate component of their response. Following the 2015 Nepal earthquake, the International Organisation of Migration (IOM) employed physical therapists to provide services in rural communities through outreach programmes and step down care facilities.

Physical therapists are now considered an essential participant in international emergency medical teams (EMTs)⁽²⁰⁾ and in the United Kingdom have been integrated into the UK International Emergency Trauma register since 2013. It has also been proposed that physical therapists are included in a proposed Global Humanitarian Health Association⁽²⁶⁾.

Most importantly, it is inside their own countries that physical therapists are best involved in disaster management across an enormous variety of roles through the disaster continuum.

Disaster case study 1

Country	Nepal
Event date	2015 April Earthquake
Background circumstances	Dhulikhel Hospital provides medical services to a large rural population in central Nepal. The hospital physiotherapy department consists of 14 full-time staff. In conjunction with overseeing the clinical work at the hospital these staff also run the only Bachelor of Physiotherapy degree programme in Nepal at Kathmandu University with more than 100 students enrolled. Dhulikhel Hospital has a bed capacity of 350 but following the 2014 earthquake close to 900 in-patients were accommodated.
Role of the physical therapist	Immediately after the earthquake there was confusion as to how physiotherapists could contribute. Initially they were involved in triaging patients, dressing wounds, providing assistive devices, applying braces, plaster casts and skin traction. Physiotherapists were also involved in more conventional roles mobilising patients, prescribing exercises and preventing potential secondary complications after surgery and prolonged bed rest. The workload became far beyond the normal caseload. Physiotherapy classes at the university were postponed and volunteers enlisted from the Nepali physiotherapy students. Each physiotherapist supervised several students.
Outcomes from the event	The involvement of physiotherapy students enabled a large increase in delivery of quality physiotherapy services. Students gained valuable experience and were given the opportunity to help in practical ways. Physiotherapy staff were able to direct student learning in a very difficult situation.
Lessons learned/recommendations	Physiotherapists should not underestimate their contribution in the initial stages of a disaster response. They have valuable input to provide at all stages and levels of disaster management. Recruiting the support of physiotherapy students, with the appropriate guidance, can play a significant role in meeting the need in disaster situations.

Increasingly, global guidance on trauma recommends rehabilitation as an essential service⁽²⁷⁻²⁹⁾ and there is now a consensus that the management of rehabilitation plays a role in decreasing morbidity⁽³⁰⁾ and mortality⁽³¹⁾, reducing length of hospital stay⁽²⁰⁾ and improving function following disasters⁽²²⁾. However, until recently, the inclusion of rehabilitation personnel in EMTs was seen as a luxury, and traditional health system emergency planning and response to disasters largely neglects health-related rehabilitation as a strategic intervention^(32,33). New guidance such as the International Classification and Minimum Standards for Foreign Medical Teams in Sudden Onset Disaster⁽²⁰⁾ and its accompanying rehabilitation standards (in preparation) are beginning to change this.

On an individual, organisational and global level, physical therapists and our rehabilitation colleagues are now emerging as a core part of the humanitarian response^(20,31,34), and are involved in the entire spectrum of the disaster continuum, from disaster risk reduction, to the immediate response, and throughout the process of rehabilitation and rebuilding.

The impact of disasters on populations



Tacloban, The Philippines, November 2013. © Peter Skelton/Handicap International

People are more likely to die as a result of a disaster if they live in a low income country. These countries account for only 9% of the world's disasters, but over 48% of mortality⁽³⁵⁾. This demonstrates the fact that disasters are a development issue as well as a humanitarian one.

While disasters cause death and injuries, they also disrupt and overload existing systems. This can lead to exacerbations of pre-existing health conditions and impairments.

The tragic reality of disasters is that those with serious injuries are often also those who have lost family members, homes and livelihoods. They are likely be dealing with this at the same time as their own rehabilitation, and can face significant other challenges relating to discharge (to where? and with what support?) and longer-term recovery.

Types of injuries

The type and distribution of injuries caused by disasters varies widely according to the type of hazard and a range of other factors, but common injuries that can lead to long-lasting or permanent disability include⁽³²⁾:

- fracture
- limb amputation
- spinal cord injury
- traumatic brain injury
- peripheral nerve injury

In addition to the above, soft tissue injuries may be a significant and often underestimated cause of disability in all disasters, and often require extensive rehabilitation, while burns may occur as a direct result of fire or electrocution caused by disasters, or as an indirect consequence of displacement, for example for those cooking with flame and living in tents⁽³⁶⁾. Floods and tsunami are also associated with high rates of respiratory complications, in particular pneumonia, both as a result of aspiration of contaminated water and as a secondary effect of displacement and living in a damp unhygienic environment⁽³⁷⁾.

Significantly, injuries rarely occur in isolation. Patients frequently present with complex poly-trauma or co-morbidities, and risks of infection, and conditions such as tetanus, are generally raised.

Under challenging circumstances, health interventions may be sub-optimal or specifically adapted for an emergency environment. A second wave of admissions to hospitals is commonly seen several

weeks after a disaster, caused by complications of initial injuries, exacerbations of chronic conditions and outbreaks of communicable diseases resulting from insanitary conditions. “Clean-up” and repair work following a disaster can also result in an increase in trauma from accidental injuries, as observed in New Orleans in 2005 when it was reported to be the leading cause of injury ⁽⁶⁾.

Quantifying injuries:

Mortality and morbidity varies widely depending on a range of factors, although ratios of injury to mortality are generally increasing ⁽³²⁾. While no disaster is the same, understanding the scale and types of injury associated with certain types of disaster can assist planning and responding in a more effective manner.

Collecting accurate data on injuries sustained is often difficult during the immediate response to disasters. Reporting of injuries is frequently flawed, with broad categories such as “fracture” and “head injury” giving little helpful information about classification, morbidity and long-term functional consequences of an injury. More accurate data is sometimes drawn from hospitals or organisations, or from particular events, but it cannot be interpreted as being representative. In much of the below, general injury patterns and anecdotal evidence replace exact statistics.

Injuries associated with earthquakes



Haiti 2010 © William Daniels/ Handicap International

Earthquakes typically result in a higher ratio of morbidity to mortality when compared to other disasters, with the most commonly quoted ratio in low and middle income countries being 3:1 ⁽³⁸⁾. The number of people killed and injured depends on the:

- epicentre – urban centres can result in higher casualties whereas more rural areas may be harder for rescuers to reach
- seismic factors (depth, magnitude etc.)
- built environment (construction standards, materials, quality, height etc.)
- number of people indoors when the earthquake occurred (time of day, culture)
- rapid response and capability of rescue and acute health services
- local climatic conditions.

The majority of people will present with more than one injury⁽³⁹⁾. As observed recently in Nepal⁽⁴⁰⁾, fractures generally account for more than two thirds of injuries requiring rehabilitation, with limb injuries being generally the most commonly seen^(16,41), and the lower extremity more often affected^(38,41). As an example, Yuanfeng Li et al⁽⁴²⁾ recorded that 50% of all patients presenting to hospital in Sichuan (China) following the earthquake had extremity or pelvic trauma. Zhang et al⁽⁴³⁾ classified the injuries seen in a sample of patients in three hospitals following the Sichuan earthquake according to the body region affected: 36% of patients had injuries to the lower limb while 13% had injuries to the upper limb. Fractures are frequently open and contaminated. According to Bartels⁽⁴⁴⁾, between 11% and 54% of fractures are open.

Amputations are a likely consequence of earthquakes, and again their incidence is linked not just to the hazard but to environmental factors and the clinical management of injuries⁽⁴⁵⁾. Limited record keeping and reporting limits the accuracy of data, and initial reports on numbers of amputees have sometimes been overstated⁽⁴⁶⁾. In Haiti in 2010, the number of amputees was reported as being 4000⁽⁴⁵⁾, or 1.3% of the total number of injured and 6% of those presenting for rehabilitation⁽³⁴⁾. In Pakistan, Mallik⁽⁴⁶⁾ identified 713 cases of people with amputation or around 1% of the total number injured. Three months following the Nepal earthquake in 2015, the official figure for the number of people with limb amputations was 40⁽⁴⁷⁾, or just 0.2% of the total reported injured.

Spinal cord injury (SCI) prevalence varies dramatically and is highly dependent on the hazard, the environment and the response. Estimating the number of people with SCI is a challenge in disasters⁽⁴⁸⁾. Just 150 people with SCI were reported to have survived following the Haiti earthquake in 2010⁽⁴⁹⁾ or around 0.05% of the total number injured. Conversely, in Nepal, where the early national response has been praised, there were estimated to be around 200 people with spinal cord injuries, constituting around 1% of the total number injured⁽⁴⁷⁾, which is consistent with the percentage reported⁽⁴⁶⁾ in Pakistan in 2005.

While traumatic brain injury (TBI) is a major cause of death in earthquakes, there are limited data on impairment caused. It has been suggested that, in Haiti, cases of severe brain injury (and SCI) were not treated so that urgent medical care could focus on those with greater perceived rehabilitation potential⁽⁵⁰⁾. Bartels⁽⁴⁴⁾ proposes that people with severe injuries of the brain and spinal cord cannot be saved in a disaster setting. Incidence of TBI in the available literature varies significantly, perhaps related to the varied efficacy of rescue and pre-hospital care or the availability of specialised medical equipment including ventilators, but also due to the mixed use of "head injury" and "brain injury" categories in data collection. Scalp lacerations are likely to account for 43-65% of reported head injuries, while most earthquake-induced head injuries are mild (55%) or mild-to-moderate (85%) in severity⁽⁴⁴⁾. Skull fractures have been observed in between 8%-28% of people with head injuries, of which basal skull fractures constitute 11%⁽⁴⁴⁾. Improved rescue and medical response is likely to contribute to increased survival of more severely injured patients. Rough extrapolation of data from Handicap International from two responses has indicated that those with head injuries requiring rehabilitation made up 3-4% of the organisation's rehabilitation caseload^(51,52).

It is likely that a combination of factors may also lead to an increase in the prevalence of stroke during the response and recovery phases following a disaster⁽⁵³⁾.

Other complications commonly seen as a result of earthquakes include crush syndrome, post-operative sepsis and infected wounds. Peripheral nerve injuries and some fractures may be missed during initial life-saving procedures and identified later by rehabilitation professionals.

Injuries are not always as a result of being crushed or hit by debris but may occur while people are escaping disasters⁽⁵⁴⁾. Burns may occur due to falling electricity lines or secondary fires. Research following the Ya'an earthquake in China found that jumping from a height and falls accounted for a

significant portion of trauma ⁽⁴¹⁾. Anecdotal evidence emerging from the 2015 Nepal earthquake is supportive of falls and jumps being a cause of injury.

An early estimate from Nepal suggested 1500 people would require long term rehabilitation or nursing care beyond the first three months of the response ⁽⁴⁷⁾. This was equal to around 7.5% of the total number reported injured, and consistent with the estimate of 8-10% of those injured in the 2008 Sichuan Earthquake having lifelong complications ⁽⁵⁵⁾. Caution should be used in using an 8-10% figure to estimate ongoing rehabilitation need though, due to variability both in the impact of disasters and methods of counting injuries.

Of note, Injuries and complications seen in high income countries (HIC) may differ from those in low and middle income countries (LMIC). For example, Mulligan et al report that, in New Zealand, physical therapists described new and unusual patient presentations in addition to crush injuries, including “pothole neck” (from driving on badly damaged roads), “shovel shoulder” (from repeatedly shovelling liquefied silt from houses, driveways and roads) and stress-related muscular pain and spasms. They also described a sharp increase in patients with breathing pattern disorders, as well as patients with “broken-heart” syndrome (a stress cardiomyopathy brought on by an emotional trigger), and patients with high levels of distress and anxiety. ⁽²³⁾

Injuries associated with hurricanes and windstorms



Aerial view of Tacloban, the Philippines, 2013. © Peter Skelton/Handicap International

Death and injury do not just result from the effect of wind (such as from flying debris or from building damage), but from the associated impact of the storm, including:

- flooding
- landslides
- sea-surge (such as in Tacloban, the Philippines in 2013).

Due to their largely predictable nature, hurricanes and windstorms generally have lower rates of death and injury and a lower morbidity/mortality ratio, due to secondary hazards that are more likely to kill, such as sea surges or landslides. Common injuries include penetrating trauma and lacerations and blunt trauma from flying or falling debris. Wounds are commonly contaminated, leading to increased risk of infection and secondary damage to tissues. There may be an increased risk of electrocution.

There is a lack of epidemiological evidence relating to injuries and disability following hurricanes and windstorms in LMIC. In a HIC, research following Hurricane Katrina found a significant decline in

health for the adult population from New Orleans in the year after the hurricane, with the disability rate rising from 20.6% to 24.6% and a large rise in mental impairments ⁽⁵⁶⁾. Bloodworth et al (2007) provide a frank account of life in the Astrodome shelter following Hurricane Katrina, and as rehabilitation physicians report on treating a range of conditions including “cardiovascular, metabolic, cutaneous, orthopedic, chronic pain and musculoskeletal conditions, sub-acute stroke, and chronic spinal cord injuries” (page 771). It is clear from their account is that people with chronic health conditions and existing disability were the worst affected.

Injuries associated with tsunami



Tsunami, Indonesia - © T. Agagliate/Handicap International

Also known as seismic sea waves or (incorrectly) tidal waves, tsunamis are caused by the displacement of large volumes of water, most frequently as a result of earthquakes. Evidence from recent tsunamis in the Indian Ocean (2004) and Japan (2011) indicates that more people die than are injured, with a typical ratio of around 9:1. Where tsunamis strike in the absence of a local triggering hazard (normally a seismic event), local services beyond the reach of the wave are left intact and are normally able to respond, whereas the combination of earthquake and associated tsunami close to an urban centre can decimate any local response, and result in increased injury.

Those swept up by tsunamis may experience injuries such as fractures, lacerations, contusions and head injuries due to being hit by debris. Multiple small to medium injuries may also be common. As with flooding, return/cleanup injuries are also likely to be a significant problem. The combination of open wounds and contaminated water can result in an increased risk of infection ⁽⁵⁸⁾.

The 2004 Indian Ocean Tsunami killed over 200,000 people as it struck populated coastal areas. It resulted in a high mortality to injury ratio, with the majority of deaths occurring from drowning. Aspiration pneumonia was a significant cause of morbidity with pneumonia being a particular problem

following the aspiration of contaminated water⁽³⁷⁾. A number of factors also combine following tsunamis that mean that respiratory infections may continue to predominate for several weeks⁽³⁷⁾. Doocy, et al (2009) examined mortality and injuries in particular populations following the 2004 Indian Ocean Tsunami in Aceh, Indonesia. They found a high mortality rate of 23% of the population compared to morbidity (7-10%). Mortality was highest among the elderly and young, while women were more likely to die than men. Conversely, men were less likely to die but proportionately more likely to be injured. The most common injury type seen was laceration (74.8%) of which just under half were infected, and 14% of those injured were hospitalised. Large variations were seen depending on geographical location.

Injuries associated with floods



Floods - Orissa, India (photo from a Disaster Risk Reduction exercise) - © Benoit Marquet / Handicap International

While floods generally do not directly kill or injure large numbers of people, immediate deaths and injuries from rapid onset floods follow a similar pattern to tsunami. The leading immediate cause of death is drowning, while aspiration⁽³⁷⁾ and trauma from floating or submerged debris can contribute to morbidity. It is the secondary effects of flooding which can be the most devastating. The 2010 Pakistan floods, for example, affected over 20 million people, killing under 2000⁽²⁾. The destruction of homes, loss of food and livestock and breakdown of water and sanitation left populations at increased risk of hypothermia and disease. Those with existing health conditions and disability were particularly vulnerable.

As with all disasters, an exacerbation of mental health problems following flooding is well recognised. In their review of literature (2004-2010) Stanke et al⁽⁶⁰⁾ found that flooding has an effect across the age spectrum and that secondary stressors can prolong the psychosocial effects on people. Particular factors that impact in the long term include: a lack of close relationships with family, friends and community; belonging to a “vulnerable” group including children and the elderly; and repeated exposure to flooding events.

Part 2: The role of physical therapists in disasters

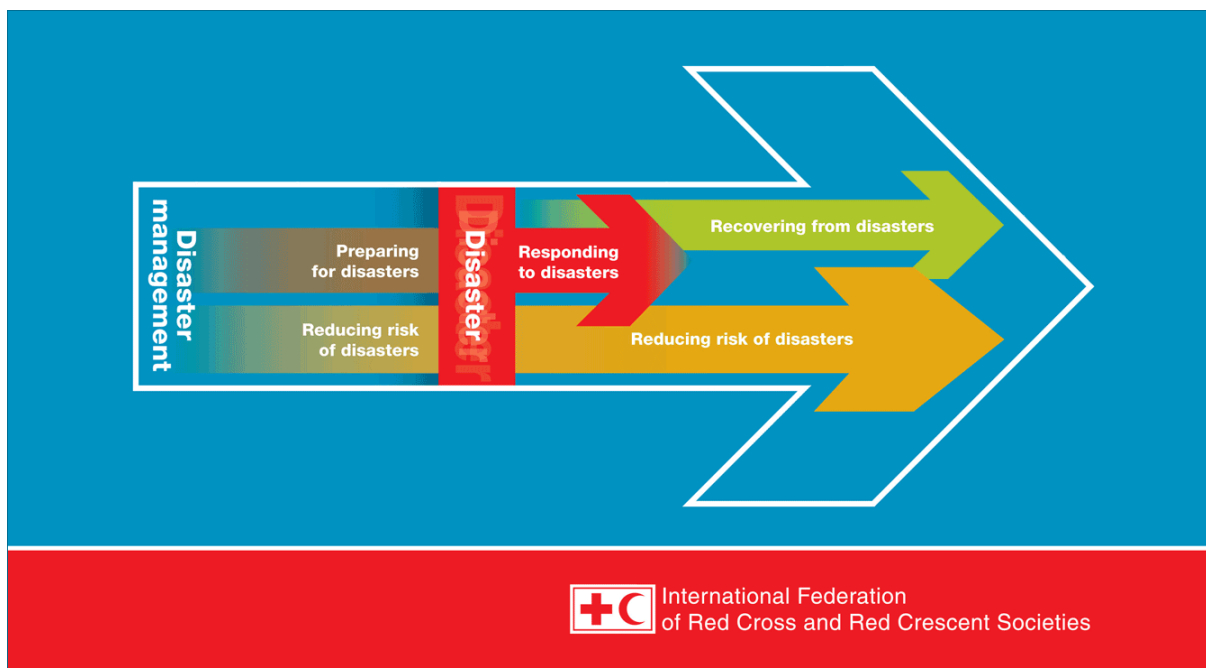
When people think of working in the field of disaster management, they commonly imagine the first days and weeks after a major disaster. While there is a clear role for physical therapists in this phase of the response, the profession's role in preparing for disasters and ongoing work afterwards should not be overlooked.

The way that professions prepare for and respond to disasters is known as the disaster continuum.

The disaster continuum

The disaster continuum has four components: prevention, preparedness, response and recovery. This paper will not cover prevention in detail. Prevention involves the outright avoidance of the adverse impacts of hazards and related disasters, so prevention activities would include the construction of dams that eliminate flood risks, the enforcement of construction codes to ensure buildings can resist earthquakes, or creating land-use regulations that prevent settlement in high risk zones. The combination of prevention and preparedness is referred to as "disaster risk reduction," and the entire continuum as "disaster management". Components overlap, for example recovery includes aspects of risk reduction. This is depicted in the chart below, reproduced with the permission of the International Federation of Red Cross and Red Crescent Societies (IFRC).

Figure 2 The disaster continuum



1. Preparedness

Preparedness aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response through to sustained recovery. It refers to the knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions ⁽¹⁹⁾.

Examples relevant to physical therapists include:

- contingency planning
- stockpiling equipment and supplies
- developing arrangements for coordination, evacuation and public information
- training and field exercises ⁽¹⁹⁾

Global preparedness frameworks

The United Nations Office for Disaster Risk Reduction (UNISDR) is the UN focal point for the coordination of disaster risk reduction. UNISDR seeks to promote a culture of prevention and risk reduction, moving away from a more traditional global emphasis on response. One of the main initiatives of UNISDR has been the Hyogo Framework for Action (HFA), the first ever plan to explain, plan and detail what different sectors and actors need to do to reduce the consequences of disasters. The Hyogo Framework was succeeded in 2015 by the Sendai Framework for Action ⁽⁶¹⁾.

The Sendai Framework for Action (SFA) aims to substantially reduce disaster risk and loss of life, livelihood, health and economic, physical, social, cultural and environmental assets.

The goal is:

“To prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience.”

The SFA is a major step forwards in inclusive disaster risk reduction. It builds on the work of the HFA and sets four priorities for action:

- Priority 1: Understanding disaster risk.
- Priority 2: Strengthening disaster risk governance to manage disaster risk.
- Priority 3: Investing in disaster risk reduction for resilience.
- Priority 4: Enhancing disaster preparedness for effective response and to “build back better” in recovery, rehabilitation and reconstruction.

The SFA also places a strong emphasis on the need for inclusive disaster risk reduction. It states that:

“Disaster risk reduction requires an all-of-society engagement and partnership. It also requires empowerment and inclusive, accessible and non-discriminatory participation, paying special attention to people disproportionately affected by disasters, especially the poorest. A gender, age, disability and cultural perspective should be integrated in all policies and practices.”

Of relevance to physical therapists, the SFA calls for:

- a mechanism of case registry [eg. for those injured] to be established
- the provision of psychosocial support and mental health services for all people in need
- national and local training of the workforce in disaster response.

The UN Convention on the Rights of Persons with Disability ⁽⁶²⁾ is also highly relevant to those developing preparedness plans, emphasising that they must be inclusive of people with disability ⁽⁶³⁾.

The role of physical therapy in disaster preparedness

Physical therapists living in disaster-prone areas are often in a unique position to contribute to preparedness planning, whether on an individual, organisational, national or international level. Their role will vary depending on their place of work, role or speciality, but there are many cross-cutting themes.

Physical therapists generally form part of a critical link between hospital and community health services, and may have strong multi-disciplinary links across social care, education and community services. Preparedness planning is therefore not limited to those with trauma skills, but embraces all physical therapists. Those working on a community level or with vulnerable groups have a particularly important role.

Before involving themselves in preparedness activities, physical therapists first need to learn about local risks and prevention strategies and to evaluate how they would react to disasters in their own homes, places of work, communities and regions. In particular, therapists working with those at increased risk during emergencies, such as children, elderly people, those with chronic health conditions or disabilities can play a role in advocating, planning and enabling their inclusion in any emergency response. Handicap International (2014) has published a report on good practice in disability inclusive disaster risk management from South and South-East Asia ⁽⁶⁵⁾.

The role of physical therapy in planning and coordination

When planning physical therapists should ask themselves:

- Am I aware of the likely hazards facing my local area and the likely consequences of a disaster?
- Is there a disaster management plan for my practice environment and region?
- Can I contribute to planning for emergencies in my place of practice?
- If there is no local plan, how can I contribute to the development of one, making sure there is adequate consideration of the needs of people with disabilities and for those who acquire disabilities as a result of the disaster? ⁽⁶⁶⁾

The inform database (www.inform-index.org/) is a global, open-source risk assessment for humanitarian crises and disasters. It can inform decisions about prevention, preparedness and response, and provides an excellent overview of the risk profiles of individual countries, based on the likelihood of hazards, vulnerability and coping capacity of the country in question. It is recommended that physical therapist visit the database to gain an understanding of the risks in their own country.

Personal and family preparedness are critical in disaster prone areas and have a direct impact on ability to respond professionally. Physical therapists living in disaster prone areas should ensure that they have a personal preparedness plan in place. Ideally, this should be an integrated part of any health service disaster management plan.

Physical therapists, particularly those working in disaster prone areas, should ensure that there are disaster management plans in place within their organisations with clear roles identified for physical therapists, particularly around the integration of early/acute rehabilitation into trauma management plans. An insufficient understanding of rehabilitation can hamper an integrated rehabilitation response and have an impact upon patient care ⁽⁴²⁾. Lack of a clear plan can leave physical therapists feeling redundant in the immediate aftermath of an event ⁽²³⁾. Even where physical therapists lack acute

trauma rehabilitation skills, they can plan with their team for involvement in response in other ways, including (but not limited to) identification of and service provision for vulnerable groups, equipment distribution, discharge planning, coordination, auxiliary health roles, acute musculoskeletal treatments for rescuers and administrative support.

Reporting on the role of physical therapists in responding to the Canterbury earthquake, Mulligan et al⁽²³⁾ made a series of critical recommendations regarding local preparedness, including:

- physical therapy departments and business owners should develop their own specific disaster management plan
- through these plans, physical therapy departments should contribute towards a central disaster management document which clearly outlines the skills that will enable physical therapists to provide an important contribution in the event of a natural or manmade disaster.

On a regional or national level, physical therapists, together with their professional association, should ensure they are integrated into any emergency plans. At present, most local and national disaster management plans do not include rehabilitation^(22,23) despite the fact that providing coordinated ongoing care and rehabilitation for those affected by disasters is one of the greatest challenges faced in many responses.

Disaster case study 2

The 2011 Great East Japan Earthquake was probably the first example of a coordinated, collaborative locally-led rehabilitation response to a disaster⁽³³⁾. It led to the development of a Japanese *Rehabilitation manual for large scale disaster (2012)* – a response to problems such as poor disaster preparedness, inadequate advocating and a lack of objective data collection⁽³³⁾.

Country	Japan
Event date	2011- present
Background circumstances	Based on the experience of the large-scale disaster in 2011, it was thought necessary to prepare the organisational structure and guidance in order to work together with rehabilitation-related professions.
Role of the physical therapist	<ol style="list-style-type: none"> 1. For a future wider response, the Japanese Physical Therapy Association (JPTA) established the Japanese Rehabilitation Assistance Team (JRAT) to link with rehabilitation-related professional organisations. Under this initiative, JPTA called for representatives of disaster sections from each local physical therapy association, and encouraged them to develop the organisational structure. 2. To inform guidance for supporting victims, JPTA started to develop a disaster response manual with JRAT member organisations.
Outcomes from the event	<ol style="list-style-type: none"> 1. At the local level, physical therapy associations started collaboration with other rehabilitation-related organisations. They hosted training programmes with the related organisations. Some physical therapy associations started communicating with local officers in disaster management sections. 2. The response manual for large-scale disaster was published. It included physical therapist involvement in the prevention of disuse syndrome.
Lessons learned/ recommendations	As part of preparedness work, physical therapists need to develop organisational structure, and review response manuals.

Not involving rehabilitation personnel in national disaster plans has been shown to be detrimental⁽³³⁾. Disaster management plans on a local, regional and national level should outline the skills that physical therapists have and the contributions that they can make during emergencies. National

plans, normally developed by the Ministry of Health, are critical to ensuring physical therapists can be mobilised appropriately.

National physical therapy associations should support the development of central disaster management plans, outlining the roles and skills of physical therapists and formalising their involvement. They should also play a role in communicating these plans to other agencies ⁽²³⁾.

National associations have a role to play in sensitising and educating physical therapists about the roles physical therapists can take in disaster preparedness. They should facilitate discussion, share resources and guide individual members. The following specific actions have been identified ⁽⁶⁶⁾:

- be aware of the vulnerability of the country/region to disaster and increase awareness among members and the public of that risk
- be aware of the likely consequences of disasters in terms of diseases, injuries, psychological impacts and social impacts
- increase awareness among members and the public of physical and rehabilitation needs
- lobby governments and non-governmental organisations to be prepared for disasters and to include physical therapy in planning
- participate in disaster management planning and implementation, ensuring physical therapist input
- train physical therapists to be effective in crisis/emergency situations, incorporating disaster preparedness awareness in entry-level physical therapy programmes and in post-qualifying and continuing education
- liaise with other professions and governmental/non-governmental agencies at local, regional, national and international levels
- consider developing a subgroup of physical therapists with interest and expertise in disaster management.

In addition, mapping of human and institutional rehabilitation resources in disaster prone areas is critical, and national associations can play a key role in the coordination of this. Not only does this allow for improved response, but it can also reveal critical gaps in service provision, or areas that will be easily overwhelmed. It is essential to be able to rapidly provide accurate information to national and international agencies following a disaster. It has been reported that medical teams may make triage decisions based on patients' perceived rehabilitation potential ^(44,68) and so communicating rehabilitation capacity to medical teams responding in the early stages of a response is critical.

Disaster management rehabilitation response plans

In the development of a national or regional disaster management rehabilitation response plan physical therapists and their associations should consider the following questions:

Systems

- Is there a risk assessment of the impact of possible disasters and their implications for rehabilitation providers?
- Are there established generic and condition-specific rehabilitation referral pathways that hospitals are aware of for particular types of trauma in the event of an emergency? Is there a centralised system that can coordinate rehabilitation referrals in the event of an emergency?
- How will injuries be classified, how are injury and disability data collected and reported and how will rehabilitation services contribute to this?
- Are there systems in place for the identification and follow-up of vulnerable groups, including people with a disability?
- Are plans in place to ensure the continued access to health services for people with essential needs, including those with chronic health conditions and disabilities?
- Once established, how will a disaster preparedness plan be updated and maintained?

People

- Are there identified national and regional rehabilitation leads for disaster response? Do they have experience in disaster management, and is there an established management system in place?
- Is there a register of physical therapists with the skills and experience to respond to a regional disaster? How can they be contacted and coordinated?
- What are the required skill sets for physical therapists to respond to disaster? Is a system of training required for the workforce?
- How will you register and regulate any international volunteers or teams (and local volunteers such as students or recently retired physical therapists) that arrive to provide rehabilitation services? Do you have any minimum standards (length of stay, years of experience, qualifications etc.) that they will need to adhere to? Are there any national protocols, minimum standards or reporting guidelines that national or international rehabilitation or medical teams will need to adhere to? How will these be shared and if necessary enforced?
- Do management or coordination systems take into account service providers from across government, private, charity, voluntary, NGO and INGO sectors?
- Are Disabled Peoples Organisations (DPOs) included in disaster planning? How can physical therapists support their integration?

Facilities

- Where are rehabilitation services located, what is their capacity, and how can they be contacted in the event of an emergency? Given their location and construction, are they likely to survive a major disaster?
- Where are the specialist rehabilitation units (including spinal injury, brain injury and burns units) located, what are their admission criteria and what is their capacity?
- Where are the prosthetics centres located, what is their maximum normal output and what technology do they use? How might capacity be increased in an emergency?
- Which hospitals have been identified to receive trauma cases in an emergency? Are rehabilitation professionals a core part of their disaster planning? What additional rehabilitation resources might they then require? Where will these come from? How might capacity be increased in an emergency?
- Are there designated locations or facilities that can operate as “step down” facilities – hosting medically stable patients with ongoing rehabilitation or nursing needs to relieve the pressure on acute hospitals? If not, can these be identified? How will they be staffed?
- How will disruption to infrastructure such as roads and travel affect access to rehabilitation? Are there contingency plans for patient transport or community based or community outreach teams?

Resources

- Are there agreed patient education materials about common traumatic injuries in the local language? How will these be distributed in the event of a disaster?
- Are there contingency stocks of equipment in place? If not, can these be established? How will they be accessed and released and appropriately distributed? What additional equipment is expected to be required?
- Do equipment stocks take into account possible new equipment needs to protect people with disability as well as those with new injuries?

Knowledge about specialist rehabilitation facilities (eg for SCI or brain injury care) and locally appropriate prosthetic provision and the ability to share information rapidly amongst first responders is important for optimal use of these resources. An awareness of rehabilitation capabilities may affect surgical and medical decisions taken by local and international providers in the immediate aftermath

of a disaster ^(44, 69), and can easily be shared via the health cluster or Ministry of Health. See the response section for more information.

Maintaining registers of rehabilitation staff, their locations and areas of expertise allows for rapid resource re-allocation during an emergency. For example, physical therapists in private practice may be re-assigned to a tertiary trauma centre, or physical therapy students can be mobilised to act as assistants and work under the supervision of more experienced staff.

Physical therapy professional associations and/or regulatory bodies in disaster-prone countries should also develop guidance on whether and how international rehabilitation personnel can be welcomed during an emergency, considering not just how they may be integrated but also how they may be regulated and what standards they should adhere to. In Nepal, for example, national emergency trauma guidelines including rehabilitation were developed prior to the earthquake, and were then distributed to arriving medical and rehabilitation teams. As part of FMT coordination, a system was established by the Ministry of Health and Population whereby international teams were asked to pre-register before travelling to Nepal. Through this system, specific skills can be requested or assistance declined by the coordinating body, depending on whether the teams meet required standards and whether their capabilities are required.

Finally, there is a need to establish common rehabilitation specific minimum datasets ⁽⁴²⁾ and outcome measures that are appropriate or adapted for emergencies. The lack of agreed data sets on issues such as type and location of injury, and lack of data disaggregated by disability (pre- and post-disaster), as well as a lack of published information on long-term functional recovery of those injured during disasters, hinders those planning responses and advocating for improved rehabilitation response and inclusion of people with disability in responses. Such a data set might be as basic as a list of “notifiable injuries” such as spinal cord injuries, amputations, brain injuries and fractures requiring fixation, which can enable a coordinating group to quickly assess likely rehabilitation needs in a particular area. In the absence of internationally agreed datasets, integrating disability and rehabilitation orientated datasets into nationally emergency coordination plans is a significant need.

Advocacy

The role of physical therapy in emergencies is emerging, and there is currently a lack of physical therapy involvement in disaster management plans. This means that advocacy and lobbying around the role of rehabilitation in emergencies is vitally important. To strengthen their ability to advocate, physical therapists should consider developing a national special interest group of physical therapists or rehabilitation professionals with interest and expertise in disaster management.

Examples of advocacy include:

- advocating for the inclusion of physical therapists in local and national disaster management plans
- advocating for the inclusion vulnerable groups, such as the elderly or persons with disabilities, raising awareness of their needs at times of disaster
- advocating for the role of rehabilitation in emergency medical teams, with the support of guidance such as the Sphere Guidance (2011) and FMT Minimum Standards (2013)
- advocating for the provision of local and national level training for physical therapists to help them prepare for disaster response.

As a vehicle for advocacy, member organisations may also wish to commemorate the annual International Day for Disaster Reduction, held each year on 13th October. Visit www.unisdr.org/we/campaign/iddr for more information.

A collaborative project, “Inclusive Community Resilience for Sustainable Disaster Risk Management” provides a toolkit for inclusive disaster risk reduction. It is available via their website: www.incrisd.org/

Stockpiling equipment and supplies



Delivery of emergency wheelchair stock, Nepal 2015 © B. Blondel/Handicap International

There may be a case for stockpiling essential rehabilitation equipment in disaster-prone areas, as disasters can increase demand and severely disrupt supply lines. Stockpiling for relief activities is recommended in the Sendai Framework for Action ⁽⁶¹⁾. Assistive devices such as wheelchairs, crutches, splints and orthotics – and sometimes mattresses – are often in short supply during the immediate response. Their absence can create bottlenecks in acute centres or result in people being limited to staying in bed or home on discharge, or patients with external fixators or neurological injuries sleeping on the bare ground.

The need for equipment goes beyond those with new injuries – many patients with existing conditions may have lost their assistive devices during the emergency or, finding themselves in emergency shelters or tents, may have additional needs. Physical therapists should make sure disaster plans include ways of identifying the most vulnerable and providing them with the equipment they need to safeguard their wellbeing. Following a disaster, there are often logistical challenges that make it difficult to bring large quantities of equipment to disaster areas, and while national governments and international NGOs may have their own preparedness plans to bring in essential rehabilitation equipment, this might take weeks to arrive. Coordination across agencies to ensure equipment distribution is timely and effective is essential.

The type and amount of equipment to be stockpiled will vary from location to location. Risk assessment and mapping of resources should indicate the amounts of equipment that may be required, while a preparedness plan will include information on where additional equipment may be

sourced in a disaster, how it will be transported, prescribed, distributed and tracked, and how the equipment needs of individuals or organisations can be communicated.

It is rarely appropriate merely to distribute equipment – plans should be made to ensure equipment prescription is safe and appropriate.

Training

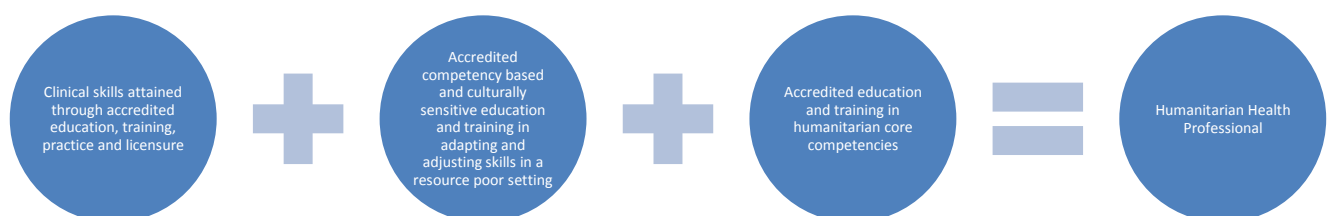
Whether living in a disaster-prone country or considering involvement in international response, physical therapists should enhance their effectiveness by preparing for a disaster before it occurs and thinking critically about their ability to respond ⁽⁷⁰⁾. It is essential that individuals, employers, and education institutions consider the training needs of physical therapists. Disaster specific training needs will vary widely, and should be evaluated on a national, regional, service, and individual level. The training needs of those interested in international response are likely to differ from those involved in a local response.

Training is critical to ensure that rehabilitation professionals in disaster prone areas have the core clinical skills to be able to manage a wide range of presentations in a challenging environment, possibly faced with overwhelming numbers of patients and with limited access to electricity and equipment. Multi-disciplinary training ensures that professionals understand each other's roles and raises awareness of the importance of early rehabilitation and coordinated care among other professional groups.

Strengthening the technical capabilities of the workforce is a key part of the Sendai Framework for Action ⁽⁶¹⁾. Making recommendations based on experience in the Sichuan Earthquake, YuangFeng Li et al ⁽⁴²⁾ recommend enhanced training for rehabilitation providers, in addition to the development of specific rehabilitation standards. Employers, training institutions and physical therapists in disaster prone areas should identify core areas of practice in which physical therapists require further training, with a particular focus on acute trauma rehabilitation skills in low resource environments. Training institutions in disaster prone areas should take into consideration the need for basic clinical training in major trauma, including the management of spinal cord injury and amputees ⁽⁴⁰⁾, fractures, nerve injuries, burns and plastics, brain injury and psychological first aid. Training needs to be refreshed and kept up to date.

Physical therapists interested in taking part in humanitarian response as part of international teams should also examine their own clinical and non-clinical skills and competencies, and build their transferable skills. Burkle ⁽⁶⁹⁾ suggests the following steps towards the certification of the humanitarian health professional:

Figure 3 Steps towards the certification of the humanitarian health professional



Adapted for physical therapists with kind permission of F Burkle.

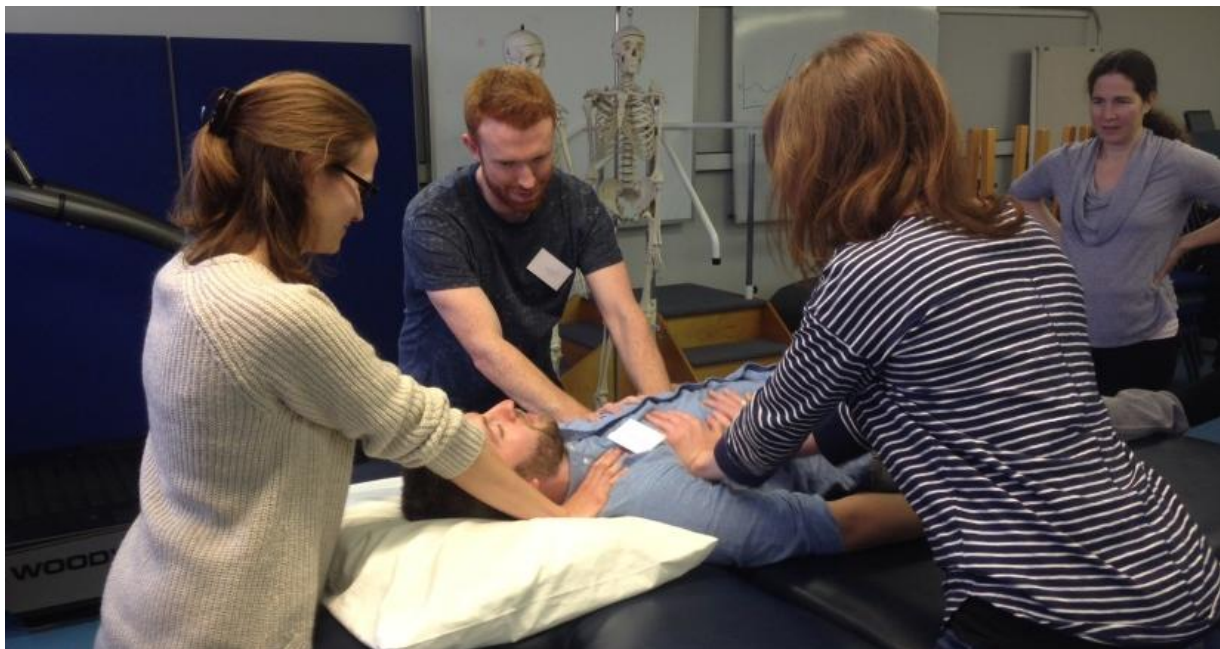
It is recommended that anyone interested in preparing for deployment as part of an international, multi-disciplinary EMT should access clinical and humanitarian training. Clinical training needs

depend on existing experience, scope of practice and the anticipated role in the response, but should be specifically adapted for work in an austere humanitarian environment. As an example, for those working as part of the UK's Emergency Medical Team, acute management of the following areas of expertise have been identified:

- spinal cord injury
- brain injury
- fracture (in particular external fixation and traction)
- peripheral nerve injury
- burns, grafts and flaps
- amputation

Skills in the following area are also required:

- respiratory physical therapy
- splinting
- wheelchair prescription
- psychological first aid
- disability inclusion



Acute SCI training, UK - © P Skelton/Handicap International

Previous experience of working internationally in a non-disaster setting is considered to be advantageous, as it contributes to an increased understanding of cross-cultural working and development and sustainability issues that are common themes in disaster response and recovery.

The case study below is an example of the integration and training of rehabilitation professionals as part of an international response team.

Case study 3

Country	United Kingdom
Event date	2013 onwards
Background circumstances	Integration of rehabilitation professionals into the UK Emergency Medical Team (UKEMT)
Role of the physical therapist	<p>Physical therapists working in the UK were recruited to a multi-disciplinary response register. Those with the appropriate experience then undergo pre-deployment training to becoming deployment-ready including safety and security and humanitarian principles, as well as specialised, competency based clinical rehabilitation trauma training that has been developed to UK best practice standards and adapted for austere environments. The training also includes sessions on psychological first aid (manual available at www.who.int/mental_health/publications/guide_field_workers/en/) and establishing an emergency wheelchair service, as well as clinical practical days to learn new skills that are specific to work in an austere environment.</p> <p>Those likely to deploy then undergo additional MDT training in a field hospital environment, and there are opportunities for more advanced training and overseas travel.</p>
Outcomes from the event	For the first time, physical therapists have been fully integrated into an EMT, having received both clinical and humanitarian training. Physical therapists from the register have since deployed in response to emergencies in the Philippines, Gaza and Nepal.
Lessons learned/recommendations	When fully integrated into response planning, physical therapists can play a key role in EMT deployments, particularly when rapidly deployed as part of an initial team.

Physical therapists can also play a role in training other professionals, communities or individuals in advance of disasters. This could involve work with communities or organisations to better include people with disabilities in their response, or providing people with disabilities with new skills to support themselves during a disaster. The training of other professionals will be dependent on the health system in which you work. For example, in some contexts physical therapists trained and experienced in managing acute SCI can work with their colleagues to directly influence the planned early management of patients with SCI in disasters, including in the education of first responders. Similarly, physical therapists with experience of prosthetic provision can work with surgeons to explain the impacts of different emergency surgical approaches to amputation on long term function.

Guidelines on physical therapy in disaster preparedness

Local health service providers, national professional associations and/or governments may already have in place local or national guidance on the role of physical therapists during an emergency. It is important to be aware of these.

Although, to date, there are no global guidelines regarding the specific training or preparedness of physical therapists for emergency response, several guidelines do exist that are relevant.

Burkle ⁽⁷¹⁾ suggests that the following 10 elements should be considered “essential” components in any disaster education or training programme for health professionals:

1. Personal and family preparedness is crucial to ensure health professionals will report to work when needed in a disaster. This is most effective when all employees understand their roles and responsibilities and how they fit into a larger framework.
2. Health professions training should utilise an all-hazards approach, which is systems-oriented and sustainable.
3. In response to all hazards, affected populations are best-served by a multidisciplinary approach to policy, planning, and practice. All stakeholders should be represented in formulating policy and planning and be trained to function as integrated teams.
4. All-hazards response requires integration and cooperation across all sectors including public health agencies, academic/health professions institutions, emergency management services, community health and service organisations, practitioners, and volunteers.
5. For training programmes to assure that health professionals can perform effectively in a disaster or public health emergency, curricula need to be standardised and based upon a consensus set of core competencies with learning objectives related to those competencies.
6. All-hazards training for health professionals must anticipate the particular needs of underserved and other vulnerable populations in disasters with locally relevant and socially and culturally sensitive planning and practices.
7. To engage health professionals in all-hazards training, the training must be accessible, acceptable, adaptable, time-efficient, cost-effective, evidence-based, and customised to the needs of learners and the communities they serve.
8. Education and training in disaster preparedness should be flexible and convenient, which requires a variety of learning modalities (eg. classroom, web-based, exercises, drills).
9. To encourage participation of health professionals in all-hazards training programmes, incentives such as continuing education credits or professional certifications are desirable.
10. Systematic evaluation of programme effectiveness is needed on a regular basis, with modification of training approaches as needed to achieve successful process measures and outcomes.

Guidelines on including people with disability in both preparedness and response are referred to in the section on vulnerable groups.

The evidence on physical therapy in disaster preparedness

“Planning and training are critical to optimal emergency response” ⁽⁷⁰⁾

The importance of preparedness is undisputed, and is central to the majority of emergency response guidelines. According to Demey et al ⁽⁵⁵⁾ *“Working ahead of a disaster remains the best way of being quickly effective, efficient and sustainable on the long-run. Standardisation and preparedness allows us to not only focus on the urgent needs but to also spare time to start answering long-term needs and sustainability.”*

Currently, most national disaster plans do not include physical therapists, and there remain significant gaps in planning to safeguard vulnerable groups during emergencies. There is a lack of research in general on the preparedness phase of the continuum, and in particular on the role of rehabilitation in this phase. According to the 2013 evidence review of health interventions in humanitarian crisis: *“More studies are needed that evaluate interventions in the preparedness phase, and the subsequent impact they have on health outcomes”* ⁽⁷²⁾.

There is, however, growing evidence that this lack of preparedness is detrimental. According to Mallick et al ⁽⁴⁶⁾, following the 2005 Pakistan earthquake, “many preventable amputations and incomplete spinal cord injuries would not have resulted in permanent damage had there generally

been a high level of emergency preparedness and appropriate steps taken for disaster reduction, mitigation and preparedness, particularly in the context of disabilities.”

A lack of local planning as to how national and international volunteers can be integrated into a response has been shown to cause challenges ⁽²³⁾ as has the lack of a clearly defined role for physical therapists during a response ^(23,73).

Reflecting on the role of physiotherapists in responding to the Christchurch earthquake in New Zealand, Mulligan et al ⁽²³⁾ recommended:

“Individuals, physical therapy, departments and business owners develop their own specific disaster management plan and, through these plans, contribute towards a central disaster management document which clearly outlines the skills that will enable physiotherapists to provide an important contribution in the event of a natural or manmade disaster.... physical therapy professional bodies [should] communicate this contribution to both health and rescue organisations.”

Case study 4

Country	Nepal
Event date	2011 onwards
Background circumstances	The Ministry of Health and Population (MOHP), together with Handicap International, WHO, Oxfam and Save the Children implemented an Earthquake Preparedness Programme (2011-2014) with a focus on mass casualty management, in case of a major disaster in the Kathmandu Valley.
Role of the physical therapist	Protocols and trainings on trauma management were developed, as well as patient education materials. Topics included complex fractures, spinal cord injury, burns and head trauma. The uniqueness of the training was the involvement of health professionals from different disciplines (doctors, nurses and physical therapists) for the first time working together on an integrated approach. The management included primary/emergency interventions as well as acute and long term rehabilitation.
Outcomes from the event	The project resulted in an increase in the trauma management skills and awareness of the effectiveness of multi-disciplinary care among health teams. The early involvement of the MOHP has provided positive signs for sustainability and the possibility of scaling up training to reach many more health and rehabilitation staff outside the Kathmandu Valley. This is particularly important because physical therapy services in Nepal are not yet fully integrated into the health system and many health needs of the population are not addressed by the profession.
Lessons learned/ recommendations	An integrated, multi-disciplinary approach to preparedness planning is essential, and physical therapists can play a key role in this. The involvement of multiple stakeholders, including the ministry of health, is critical. The system was in place and contributed to a highly effective national response to the Nepal Earthquake of April 2015.

2. Response



Baktapur, Nepal 2015 - © P Skelton/Handicap International

“The first people to respond to disasters and conflict are the ones affected by them. Friends and neighbours search through the rubble for loved ones after earthquakes; local hospitals work through the night to care for the injured.”⁽⁷⁴⁾

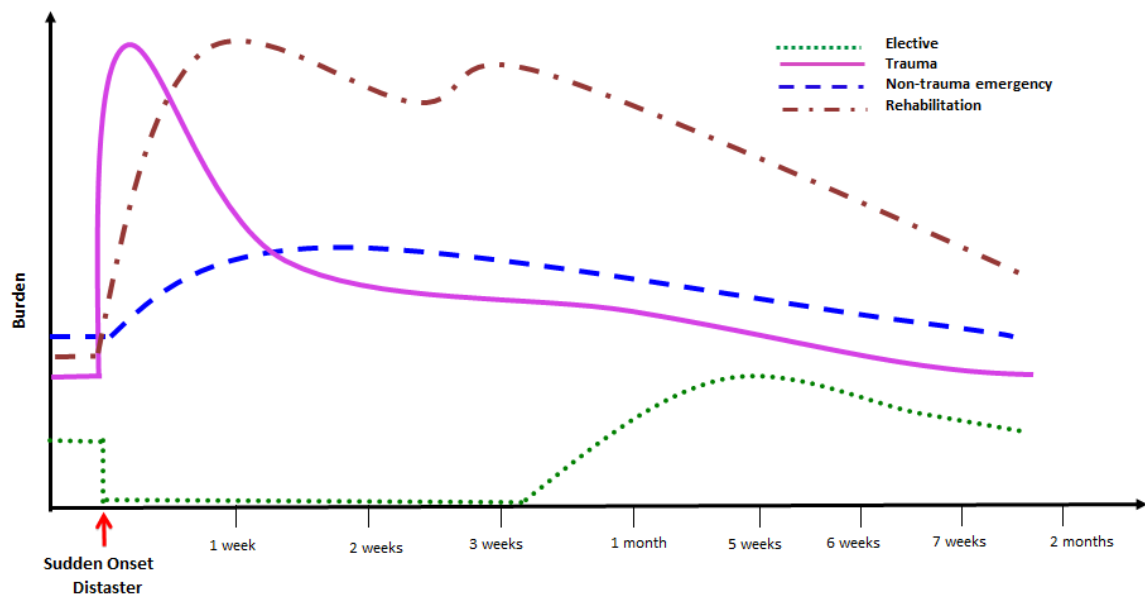
The response stage can last from a few days to months. Search and rescue of survivors and quickly providing first aid, food, water and shelter can reduce morbidity and mortality. The immediate response to large disasters can be chaotic, particularly where strong disaster management plans are not in place or when local infrastructure and institutions have been damaged or destroyed. For large scale emergencies in most LMICs, the response is led by local or national authorities (where capable) with the support of the UN. Responsibilities are divided into “clusters.” The cluster system is designed to improve the coordination of the response, and each cluster is led by a coordinating ministry, in collaboration with a UN agency. Clusters include:

- health
- shelter
- water, sanitation and hygiene (WASH)
- protection
- communications
- education
- logistics

Response time is critical, with the greatest demand for lifesaving interventions occurring during the first 24 hours after a disaster. This emergency medical care is usually provided by the affected population. Those with acute injuries will often continue to present for at least 3-5 days following the event⁽⁴⁴⁾. International medical and search and rescue teams often arrive too late to provide immediate lifesaving care, but can play a vital role in supporting devastated services and increasing local capacity.

Though saving lives is the highest initial priority, the focus of the local and international health response effort quickly shifts to the management of severe, traumatic injuries and related health problems⁽³²⁾. Although primary care complaints do increase in frequency beyond the first week, the health care of acutely injured victims might continue to predominate for several weeks⁽⁴⁴⁾ or longer. A second surgical wave of procedures and revisions often follows several weeks after the emergency, addressing secondary complications, delayed definitive treatment or inadequate initial treatment. There may be a need for specialist surgical input such as plastic reconstructive and neurosurgery. There may also be a rise in communicable disease, in addition to trauma, followed by an increased need for non-trauma emergency care and elective surgery associated with the disruption of local health services (see figure 4).

Figure 4 Model of surgical and rehabilitation needs over time following a sudden onset disaster.



Modified with permission from Von Schreeb J, Riddez L, Samnegård H, Rosling H et al. Foreign field hospitals in the recent sudden-onset disasters in Iran, Haiti, Indonesia, and Pakistan. *Prehosp Disaster Med.* 2008;23(2):144–51 ⁽⁷⁵⁾

In the past, international responders to emergencies have travelled to disaster zones independently, as part of smaller charities, or as part of international governmental or non-governmental teams. The challenges of travelling as an individual or a team without disaster experience are summarised by Cranmer and Biddinger ⁽⁷⁶⁾:

“Despite noble intentions, poorly prepared and poorly equipped responders have sometimes ended up depleting needed resources rather than providing solutions. In previous responses, some health care workers have worked outside their scope of practice and licensure. Many have been deployed without food, water, medical-supply chains, or even transportation. Their failure to secure basic logistic arrangements taxes already stressed and fragmented local systems that are attempting to deliver basic necessities to the locally affected population. Failure to coordinate with local response authorities or with international relief agencies results in either duplication of existing capacity or missed opportunities to fill gaps in delivery.”

It is in response to many of these issues that global frameworks regarding disaster responses, and in particular emergency medical team responses, have been developed.

Global response frameworks

The humanitarian space is constantly evolving. Historically, coordination following disasters has been a major challenge. Significant steps have been taken to improve the coordination of humanitarian response, such as the first use by the UN in 2005 of the cluster approach to deliver humanitarian assistance. At the same time, there are increasing moves towards establishing minimum standards and professionalising the response. The 2011 Sphere Standards establish a broad range of minimum standards, while the 2013 WHO publication “Classification and Minimum Standards for Foreign Medical Teams” sets out specific technical and operational standards for medical teams, and includes guidance on the importance of rehabilitation.

The dates below set out some key moments in humanitarian history, with a particular emphasis on medical and rehabilitation response:

1863	Formation of the International Committee of the Red Cross (ICRC) following the 1859 Battle of Solferino
1918	End of the First World War and foundation of several NGOs, including Save the Children (1919)
1945	End of the Second World War, formation of the United Nations
1971	Formation of Médecins Sans Frontières (MSF) following the end of the Biafran War in 1970
1979	Establishment of the ICRC Physical Rehabilitation Program
1982	Formation of Handicap International to respond to the unmet needs of Cambodian amputees
1991	UN Resolution 46/182 passed affirming the humanitarian principles, and establishing the UN Office for the Coordination of Humanitarian Affairs (OCHA)
1997	Launch of Sphere Standards Project
2005	First cluster response in Pakistan earthquake
2010	Haiti earthquake and establishment of first “injury, rehabilitation and disability working group” within the health cluster response
2013	Publication of WHO FMT minimum standards, including specific reference to rehabilitation
2013	First full integration of rehabilitation into an emergency medical team – the UKEMT
2015	Nepal earthquake and establishment of “injury and rehabilitation sub cluster” under the Ministry of Health and Population/WHO and EMT Coordination Cell
2015	WHO minimum rehabilitation standards for EMTs created with input from ICRC, MSF, HI and CBM.

It is critical that all those interested in working in humanitarian response are aware of current guidance and principles. An e-learning package is available providing an introduction to humanitarian action and principles, www.buildingabetterresponse.org/ and www.disasterready.org hosts e-learning training on both disaster risk reduction and humanitarianism.

Humanitarian principles

In 1991, UN resolution 46/182 ⁽⁷⁷⁾ established that humanitarian assistance must be provided in accordance with the following principles:

- **Humanity:** suffering must be addressed wherever it is found, with particular attention to the most vulnerable in the population, such as children, women and the elderly. The dignity and rights of all victims must be respected and protected.
- **Neutrality:** humanitarian assistance must be provided without engaging in hostilities or taking sides in controversies of a political, religious or ideological nature.
- **Impartiality:** humanitarian assistance must be provided without discriminating as to ethnic origin, gender, nationality, political opinions, race or religion. Relief of the suffering must be guided solely by needs, and priority must be given to the most urgent cases of distress.

These principles are expanded in the code of conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organisations in Disaster Relief ⁽⁷⁸⁾. The code establishes that it is the obligation of the international community to provide humanitarian assistance wherever it is needed.

The UN Office for the Coordination of Humanitarian Affairs (OCHA) was established in 1991. OCHA is the part of the United Nations Secretariat responsible for bringing together humanitarian actors to ensure a coherent response to emergencies. This includes assessing situations and needs; agreeing common priorities; developing common strategies to address issues such as negotiating access, mobilising funding and other resources; clarifying consistent public messaging; and monitoring progress. This includes supporting the cluster system.

The cluster system

Clusters are groups of humanitarian organisations, both UN and non-UN, governmental and non-governmental in each of the main sectors of humanitarian action, eg. water, health and logistics. They have clear responsibilities for the coordination of the humanitarian response, with leadership from national ministries.

Figure 5 The cluster system



Source: www.unocha.org/what-we-do/coordination-tools/cluster-Coordination

The World Health Organization (WHO) is the lead UN agency in the health cluster and its emergency response framework ⁽⁷⁹⁾ sets out those actions that WHO is committed to delivering in emergencies with public health consequences, with the aim of minimising mortality and life-threatening morbidity and leading a coordinated and effective health sector response.

Under the framework, WHO will:

- develop an evidence-based health sector response strategy, plan and appeal
- ensure that adapted disease surveillance, early warning and response systems are in place
- provide up-to-date information on the health situation and health sector performance
- promote and monitor the application of standards and best practices
- provide relevant technical expertise to affected member states and all relevant stakeholders.

Coordination of rehabilitation activities can be complicated, since responsibility for rehabilitation can fall across different ministries (eg. health and social care). Coordination of the immediate rehabilitation response will normally fall under the Ministry of Health and health cluster, or for complex emergencies where there are specific needs, may require the formation of a specific rehabilitation working group.

In Nepal, for example, the injury rehabilitation sub cluster coordinated mapping, data collection, referral networks, the tasking of international teams, and the collaboration between responding organisations to ensure that people with injuries were able to access ongoing rehabilitation.

Coordination with other clusters, in particular the shelter and protection clusters, is also critical. The protection cluster in particular is likely to lead on mental health and psychosocial coordination, as well as being the focal point for coordinating the protection of vulnerable groups. The position of disability within the cluster system is complex, as it is a cross-cutting issue that is relevant to all clusters.

Although it formally falls under the protection cluster, in some responses such as Gaza (2008) and Haiti (2010) a disability sub-cluster has formed under the health cluster and has at the same time engaged with other cluster leads to mainstream disability ⁽⁸⁰⁾.

The Sphere Handbook

The Sphere Handbook ⁽³¹⁾ contains the Humanitarian Charter as well as core standards and minimum standards for people-centred humanitarian response. The handbook is designed for planning, implementation, monitoring and evaluation during humanitarian response.

The Humanitarian Charter is based on the humanitarian imperative that action should be taken to prevent or alleviate human suffering arising out of disaster or conflict, and that nothing should override this principle. It affirms:

- the right to life with dignity
- the right to receive humanitarian assistance
- the right to protection and security.

The Sphere Handbook also establishes minimum standards in four key areas of action: WASH, food security and nutrition, shelter and health. The components of the health section will be covered in more detail in the guidance section.

WHO classification and minimum standards for foreign medical teams

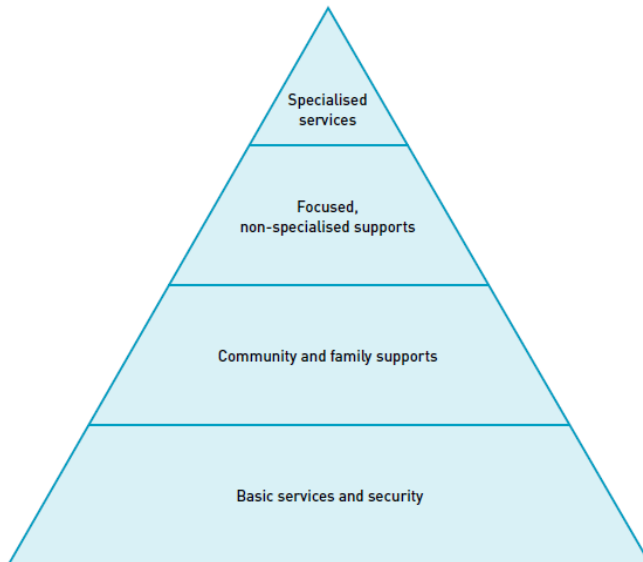
The Foreign Medical Teams (FMT) Working Group (now EMT Working Group), with the support of the Global Health Cluster and the WHO have developed a classification system and minimum standards for how EMTs provide trauma and surgical care in the first month following a sudden onset disaster ⁽²⁰⁾. The document is a significant step forward in the professionalisation of humanitarian response, and builds on lessons learned from past disasters. The objective of the EMT working group is to reduce the mortality, injury complications and disabilities caused by disasters through improving the effectiveness and quality of care by emergency teams. Rehabilitation is a significant component of the guidance, and has also been expanded in the minimum standard on rehabilitation provision in EMTs (in press). Both documents will be discussed in more details in the rehabilitation guidance section.

Inter Agency Standards Committee guidelines

The Inter Agency Standards Committee (IASC) Guidelines of Mental Health and Psychosocial Support (MHPSS) in Emergency Settings ⁽⁸¹⁾ offer essential advice on how to facilitate an integrated approach to the most urgent mental health and psychosocial issues in emergency situations. The guidelines set out core principles, detail the matrix of possible interventions and establish action sheets for a minimum response. As many people with injuries will have increased MHPSS needs in an emergency, physical therapists should be familiar with the guidance. Importantly, IASC propose an intervention pyramid (see figure 6) which clearly sets out that the majority of people will require non-

specialised support, and so is highly relevant to physical therapists. Focused, non-specialist support, represented in tier 3, can be delivered by many health workers including physical therapists, and includes psychosocial support (including peer support) and psychological first aid.

Figure 6 Intervention pyramid for mental health and psychosocial support in emergencies.



Source: IASC (2008) pg 12.

The role of physical therapy in disaster response



Nepal Earthquake © Brice Blondel / Handicap International

The role of physical therapists in responding to disasters depends on many factors, including:

- the nature of the disaster

- whether the physical therapist was in country at the time of the disaster or not
- the time that has passed after the disaster
- the competency of the physical therapist
- the identified needs of the affected population.

Physical therapists may find themselves working in their own facility, being re-directed to a local trauma facility, or providing services in camps or the community. They may work as part of emergency medical teams (EMT), with a local or international rehabilitation or disability organisation, and, if in the country at the time of the disaster, as part of the wider emergency response. Local physical therapists may also take on training or coordination roles. Rehabilitation needs and the roles of responding therapists in high income countries (HICs) are likely to differ significantly from those in low and middle income countries (LMICs). It is worth noting that in many disasters, local physical therapists and other health professionals continue to work despite their own families and lives being directly affected by the disaster.

Much of the current literature is based on the experiences of physical therapists in HICs. Waldrop⁽⁸²⁾ describes the varied roles that physical therapists have played in responding to disasters in the USA. These have ranged from triage and wound care to patient transport and even bomb-sweeping. Research in the USA in 2007⁽⁷³⁾ and New Zealand⁽²³⁾ indicates that the role of local physical therapists was poorly defined in the disasters affecting these two countries. Harrison's small study of responders in the USA describes how "the types of patients treated fell into two main groups: rescue workers, who sustained a variety of minor musculoskeletal injuries and respiratory problems, and those injured in the disaster". In disasters with relatively low levels of traumatic injury but high numbers of people affected, such as Hurricane Katrina⁽⁵⁷⁾ and The Great East Japan Earthquake⁽³³⁾ rehabilitation staff providing services in shelters for displaced people, with a particular focus on vulnerable groups such as those with existing disability, chronic health conditions and older people. This is an important role, and should not be neglected.

Any role in disasters in LMIC is likely to be different, with a need to prioritise caseloads based on clinical need, and little if any time for the treatment of minor injuries in the early stages of the response. Nixon et al describe how, in Haiti, physical therapists faced the ethical challenge of trying to balance the limited rehabilitation workforce capacity with increasing rehabilitation need.⁽⁸³⁾

The Nepal Physical Therapy Association (NEPTA) describes the association's initial experiences in the aftermath of the 2015 Nepal Earthquake⁽⁴⁰⁾ and how physical therapists were involved:

"...physical therapists across Nepal worked alongside orthopaedic and emergency doctors, nurses, and other health providers, assisting in the screening and transfer of patients as well as providing acute-injury management. This included applying braces, plaster casts, temporary plaster backslabs, and skin traction for fractured femurs and dislocated hips; helping in the dressing of wounds; and providing assistive devices. Physical therapists were also involved in their more traditional roles in these early days: mobilising patients, prescribing exercises, and positioning patients to prevent potential secondary complications after surgery and after prolonged bed rest".

Following the disaster, physical therapists in Nepal also played significant roles in coordinating the rehabilitation response, expanding the reach of rehabilitation services and developing a long-term recovery strategy that was inclusive of rehabilitation and people with disabilities⁽⁴⁰⁾.

Case study 5

Country

Nepal

Event date

2015 - April earthquake

Background circumstances

In Nepal, most therapists are located in the larger cities with limited numbers in CBR programs and in smaller district regions. Physical therapy posts exist in larger government hospitals but apart from this most physical therapists are employed by non-government organisations. NEPTA utilises social media (Facebook) as their main communication channel with more than 1000 users.

Role of the professional body

Post-earthquake, NEPTA was represented (along with government health facilities, non-governmental organisations, and emergency medical teams) in the injury and rehabilitation sub-cluster. This operated under the Ministry of Health and was established to map injuries and rehabilitation needs and to facilitate service delivery. NEPTA assisted in the advertisement and timely recruitment of local physiotherapists to the areas of identified need through its well established social media network. The government was also lobbied to establish physiotherapy posts in smaller district hospitals as part of the immediate emergency response and ongoing provision of physiotherapy services. NEPTA representatives, as part of a multidisciplinary health team, assisted in developing protocols and providing training for disaster management.

Facebook was used to disseminate disaster related material and update members about the the recovery response.

Outcomes from the event

Many suitably qualified local physiotherapists (both volunteers and salaried) were recruited through NEPTA's social media network and directed to the areas of greatest need. NEPTA's knowledge and database of local physiotherapy resources allowed the mobilisation of local personnel, before requesting international expertise in areas identified as gaps in service provision. The skills and valuable input of local physiotherapists was widely recognised at various levels.

Lessons learned/ recommendations

Professional associations should work with governments at a management level in disaster response. They should also take a lead in preparedness and training for a disaster. Disasters may provide an opportunity for professional associations to promote the need for expanding physiotherapy services, in the short- and long- term.

Local physiotherapy resources should be utilised first before "outside" help is requested. Social media is a valuable resource in disseminating information to local physiotherapists and mobilising these resources. Up-to-date databases are essential.

Mallick et al ⁽⁴⁶⁾ describe an effective rehabilitation response combining institutional and CBR following a major earthquake in Pakistan, with the establishment of specialist spinal injury centres and satellite prosthetics centres in affected districts linked to a regional centre. Mallick describes the challenge of providing sustainable support to people with injuries and disabilities in their home districts. Importantly, a holistic response was developed, with a focus not just on rehabilitation but also inclusive education and livelihoods. This was complemented by increased recruitment of rehabilitation professionals and the establishment of additional facilities.

Raissi⁽⁸⁴⁾ highlights what happens when community follow up and referral systems are ineffective, describing a range of difficulties following up SCI patients after the 2003 earthquake in Iran. His description of patients with nerve or plexus injuries being mis-diagnosed as SCI is consistent with experiences in other disasters where health systems have been devastated or health personnel lack the specialist training to manage complex trauma. Raissi also emphasises the importance of locally-led, culturally appropriate rehabilitation that includes strong psychosocial support and community re-integration.

Based on the available literature, and their own scope of practice and experience, the role of appropriately trained physical therapists in the immediate response to disasters can include:

- assessing the general need for rehabilitation in the disaster situation
- mapping available rehabilitation and other specialist services for those with injuries and/or disabilities
- providing acute rehabilitation, including orthopaedic, neurological, respiratory and burns rehabilitation, in local hospitals, the community or as part of an NGO or emergency medical team
- providing holistic education of patients, carers and other health personnel
- triage, managing and/or referring survivors
- coordinating discharge, referral and follow up
- providing psychosocial support or referral to appropriate services
- assessing, prescribing, fitting and providing assistive devices and providing training in use and maintenance
- assessing environments (such as camps) and environmental adaptation needed to ensure accessibility for those with injuries and disabilities
- identifying and assessing people at increased risk, such as elderly people or those with disability
- providing preventative care or rehabilitation for elderly people, people with chronic health conditions and those with a disability who have been affected by the disaster
- providing musculoskeletal rehabilitation or manual handling training and support to other professionals involved in the response
- training rehabilitation colleagues in more specialised trauma care such as spinal cord injury or amputee rehabilitation
- training community workers or other professionals to identify people with a disability and others in need of rehabilitation.

In all these activities, physical therapists work with other health professionals so that the right profession takes responsibility for tasks where there is overlap in scopes of practice. For example, where there is an orthotist/prosthetist, the assessment and fitting of prosthetics will be the responsibility of that professional.

There are subjective accounts of physical therapists being diverted from their usual roles to take on paramedical or auxiliary roles in health facilities during the immediate aftermath of disasters. These roles range from transporting patients to dressing wounds and sterilising surgical equipment. Physical therapists should be prepared to be flexible and work in support of the multidisciplinary team, though this should not undermine the critical rehabilitation role that physical therapists can play as part of an emergency response. They must also practise ethically within their competence and scope of practice.

A holistic approach to care and training is important in areas where resources are stretched or access to care is limited. Therapists may find themselves needing broad trauma skills, but also need to be aware of wider issues patients may face. There may be a tendency towards short-termism, with emergency medical teams failing to take into account the needs of the patient beyond their immediate

intervention. Patient education in particular may be lacking. For example, Raissi⁽⁸⁴⁾, visiting patients with spinal cord injury three months after an earthquake in Iran, found only three had received education regarding bladder care and only one had received education regarding bowel care. Many patients had pain syndromes, but there was little attention to pain management. All team members should be aware of patients' longer term needs being managed, and physical therapists are well qualified to ensure these needs are met.

The need for psychosocial support is cross-cutting following disasters, with support needed for those who have been injured as well as colleagues and family members who have lost loved ones, livelihoods or homes. The IASC guidelines⁽⁸¹⁾ and WHO *Psychological First Aid Handbook*⁽⁸⁵⁾ are excellent resources. The role of physical therapists in providing psychosocial support post disaster is increasingly recognised. Physical therapists are one of the health professionals who spend the most time working directly with patients and caregivers, and as such, are perhaps most frequently involved in listening to the patient's narrative of the event.

Mulligan et al⁽²³⁾ document the role of physical therapists in providing psychosocial support following the Canterbury earthquake in New Zealand. The provision of psychosocial support is integrated into the rehabilitation activities of many international organisations, such as Handicap International. Physical therapists on the UK International Emergency Trauma Register receive a mandatory training in psychological first aid, the WHO's frontline method for providing humane, supportive and practical help to fellow human beings suffering serious crisis events.

While some EMTs may adopt an "in-out" approach, the longer-term need for rehabilitation renders this approach ineffective as a rehabilitation response⁽⁵⁵⁾ and highlights the need for either strong links with local providers, or longer-term collaborative interventions. The involvement of local health personnel is essential. Coordination is key to any effective response, whether working as an individual via existing local systems or for an international organisation in the cluster system. The increased role that physical therapists can play in follow up and discharge planning was highlighted in the recent publication by Sheppard and Landry⁽¹⁷⁾.

Following major disasters, well intended international volunteers, including physical therapists, often travel to areas affected to offer assistance. Spontaneous health volunteerism can overwhelm a response system and, unless coordinated, can make things worse instead of better^(34,70,84). In their review of the Haiti response, Blanchet and Tataryn⁽³⁴⁾ recommend that "rehabilitation professionals should be trained in emergency response (or have experience in the affected country) before intervening post-disaster."

It cannot be emphasised enough that international volunteers should not travel independently to disaster zones without the support of a local or international organisation.

Individuals or teams should only travel at the request of a locally based organisation. Those travelling to work in an emergency are likely to fall under the classification "Emergency Medical Team" and should meet the rehabilitation standards. A group of rehabilitation providers would be classified as a rehabilitation specialist cell, and must register in advance with the WHO EMT Secretariat and register on arrival with the Ministry of Health or coordinating body. Length of stay is critical. Other than an ego boost, there is little value in a rehabilitation professional spending a few days in a country providing clinical care. This is well captured in the review of the Haiti response by Blanchet and Tataryn⁽³⁴⁾:

"Where expatriate staff worked alongside local personnel, it was reported that short-term volunteers did not help improve the training, knowledge or clinical practice of local staff. Due to the high turnover rate of volunteers and lack of continuity of practices between the different organisations, there was little uptake of new skills or techniques. Consequently, local staff resorted to what they already knew to avoid confusion between the disparate approaches of transient volunteer teams."

Before travelling to assist in a disaster, it is vital to know that your skills are needed, that you have been invited, and that you are appropriately prepared. Those interested in responding internationally should access specific training in humanitarian response prior to an emergency, and should examine their own skills and capacity to respond.

Critical questions to ask before any considering deployment include:

- Has my help been asked for by the host country/team?
- Is there an identified role for me?
- Do I have the appropriate level of clinical and personal skills for this role?
- Am I prepared to work long hours and to live and work for an extended period of time in a potentially unstable challenging environment?
- Do I have the right equipment, training and funding, and personal and professional insurance to support myself? If using your own insurance, is it still valid in this context?
- Do I understand the local context and culture sufficiently?
- Is there a local or regional person who could respond more quickly, appropriately or most cost effectively?
- Does the international organisation I'm working for have sufficient experience in delivering this kind of response?

Physical therapists should register their interest in advance with either their national EMT or international non-governmental organisations (INGOs) that send physical therapists to work in emergencies^(66,83). These include:

- [CBM](#)
- [Handicap International \(HI\)](#)
- [International Committee of the Red Cross and Red Crescent \(ICRC\)](#)
- [International Federation of the Red Cross and Red Crescent \(IFRC\)](#)
- [International Medical Corps \(IMC\)](#)
- [Malteser International](#)
- [Medecins Sans Frontieres \(doctors without borders\) \(MSF\)](#)
- [Medecins Du Monde \(doctors of the world\) \(MDM\)](#)
- [Motivation](#)
- [Rehabilitation International \(RI\)](#)

Any disaster response should support, not neglect or disempower, local responders. They have borne the brunt of the initial response and will continue to provide ongoing input long after emergency response teams have left. Collaboration with (and capacity building of) local responders should be taken into account from the very beginning of any post-disaster response that aims at provision of rehabilitation services⁽⁵⁵⁾.

Case study 6

Country

Philippines

Event date

Typhoon Sendong, 2011

Background circumstances

In response to the devastation of Typhoon Sendong in Northern Mindanao, two rehabilitation schools in Cebu (Cebu Doctors' University and Velez College of Physical and Occupational Therapy) organised a response activity focused on surviving persons with disability.

Role of the physical therapist

The therapists coordinated with the leaders of the Federation of Persons with Disabilities in the area to gather all survivors with disabilities. They provided psychosocial support and training on disaster risk reduction.

Outcomes from the event

- More than 50 adult and children with disabilities benefitted from the activity.
- A referral network for services was established.
- Links were established to facilitate a similar response in future emergencies.

Lessons learned/recommendations

- Working with local federations and local therapists has the benefit of allowing access to existing networks with people who understand local culture and challenges. This means that activities can be implemented more quickly.
- Follow-up after any intervention is critical.

Management of injuries in austere environments



Haiti 2010 © Michiel Steenbeek/CBM

The consequences of disasters in low and middle income countries (LMICs) are often far worse than in wealthier nations. Acute care and rehabilitation resources in such settings are often limited even prior to disasters. International support is often required, but the majority of international teams will not

be operational until several days after the disaster. Therefore local responders bear the brunt of the initial response.

Those involved in the initial response to large scale disasters often find themselves working with limited access to electricity and equipment, in potentially unsterile surroundings, yet facing high caseloads of critically injured patients. As a result, the management of injuries is often adapted to meet the necessities of austere environments. There are several quality guides to the management of trauma in emergencies which cover rehabilitation. These include those developed by WHO⁽²⁹⁾, ICRC⁽²⁷⁾ and HI⁽⁸⁹⁾ and a forthcoming publication and resource pack on rehabilitation in disasters from Handicap International⁽⁹⁰⁾.

Key differences in the management of common injuries in austere emergency environments are highlighted below. This list is intended as an illustrative introduction not a clinical guide.

Fractures

Extremity fractures are likely to account for over half of all significant injuries, with the lower limbs more commonly affected, creating an increased need for assistive devices such as wheelchairs and crutches. Fractures are more likely to be managed conservatively or fixed with external fixators. Physical therapists should be aware of potential complications caused by inappropriate pin-siting, as well as increased risk of infection, non- or mal-union, and contracture. Weight-bearing and functional status is determined in collaboration with the surgeon, where possible. Traction may be more commonly used in austere environments than in HIC settings. Follow-up of people with fractures needs to be carefully co-ordinated with local providers since facilities provided by EMTs may no longer be available when a review or fixation removal is needed.

Amputations

Where possible, a rehabilitation professional with experience of working with people with amputations should be involved as early as possible, ideally pre-amputation. Decisions about amputation and selection of amputation level may be influenced by local availability of prosthetics. Stump closure is often delayed to rule out infection. Some techniques such as myoplasty may be preferable in order to lessen time in theatre and free up operating rooms. Rehabilitation is frequently complicated by polytrauma. Guillotine amputation is always contraindicated (unless for extraction) and compromises the rehabilitation process. However, it is still seen at times. Guidance is available from Knowlton et al⁽⁹¹⁾. To ensure sustainability, prosthetic needs are best met in the country and by local providers. Early psychosocial support including peer support is recommended. Interestingly, a two-year follow up of patients who underwent limb preservation or amputation in Haiti revealed that only half in both groups were satisfied with their functional outcome⁽⁹²⁾ and while more of those with amputations considered themselves “cured” there was a clear preference in both groups for limb preservation over amputation.

Spinal cord injury

The initial triage of people with SCI may depend on perceptions of local rehabilitation⁽⁴⁴⁾ so it is essential to rapidly communicate information on SCI rehabilitation centres. Rapid identification and specialist referral or follow up of patients with SCI should be a priority⁽⁴⁸⁾. There have been cases where patients with unstable spinal fractures and neurological symptoms have been discharged home without intervention or advice and no follow up plan. SCI are more likely to be managed conservatively after disasters in LMICs, unless specialist spinal surgeons and hardware are available. Even then, surgical management may be delayed due to high demand. Conservative management presents its own challenges, requiring extended immobilisation for up to three months in bed and effective spinal precautions. Survival rates of patients with high spinal cord injuries are likely to be low in LMICs, while poor pre-hospital and hospital care may result in a higher incidence of complete injuries. Poor hospital and ongoing care can also result in an increased incidence of complications

such as pressure sores and urinary tract infections. Rathore et al⁽⁹³⁾ report not seeing a single complete tetraplegic case following the 2005 earthquake in Pakistan, while only one of a sample of 18 SCI patients involved in a pilot study in Haiti had tetraplegia⁽⁹⁴⁾. Lumbar injuries are generally the most common, followed by thoracic injuries^(46,68,84). A higher rate of complete injuries may also be seen, possibly related to difficulties with extraction and pre-hospital care^(46,95). This is not always the case: in a sample of 26 patients following the Sichuan earthquake, only six were ASIA A (complete)⁽⁹⁶⁾. Occasionally, spinal fractures may be missed⁽³⁾. There is emerging evidence indicating that SCI patients should be grouped to receive specialist care following disasters^(49,93,97). Recommendations are available from Burns et al⁽⁴⁹⁾, while a comprehensive chapter on SCI management in emergencies is included in *International Perspectives on Spinal Cord Injury*⁽⁴⁸⁾.

Brain injury

The incidence of brain injury varies, and there is little data on the long-term outcome for patients with brain injury after disasters. Unless working in a tertiary referral centre, the majority of injuries seen are likely to be mild to moderate. Bhatti⁽⁹⁸⁾ writes about the experience of a military trauma referral centre with ventilator capacity following the Pakistan earthquake. Despite delays in evacuation, over 10% of head injury patients had severe brain injury, but in many settings severely injured patients are unlikely to survive due to limited access to equipment and specialist neuro-surgery. Patients with mild to moderate injury are unlikely to remain in hospital for long, so holistic patient and family education and advice prior to discharge is critical. Subjective accounts suggest that mild to moderate brain injuries may be missed among more severe poly trauma and so physical therapists should remain alert to histories of head trauma, and the risk of rapid acute deterioration or subtle cognitive or behavioural changes in people with such a history. Physical therapists should also be aware that stroke may be a later and secondary consequence of events which disrupt routine management of chronic health conditions⁽⁵³⁾.

Crush injuries

Acute complications include rhabdomyolysis and compartment syndrome. Rehabilitation professionals should be particularly aware of the possibility of missed fractures (such as pelvic or spinal fractures), peripheral nerve or other injuries in the weeks following a disaster.

Burns and soft tissue injuries

Burns and open soft tissue injuries carry a particularly high risk of infection, often exacerbated by growing levels of diabetes in LMICs. Burns can be seen as a direct result of a disaster, or as a result of people living in temporary shelters and relying on open flame cooking. Recurrent debridement with delayed closure is common for severe soft tissue injuries in order to rule out infection and preserve as much tissue as possible. More complex injuries may require grafting or flaps to achieve coverage. Pathways for referral to specialists for these procedures should be identified as early as possible. Long-term follow up and psychosocial support for those with severe burns is essential.

Peripheral nerve injuries

Nerve injuries are a neglected aspect of major trauma care, often missed during initial life-saving procedures. It is important to ascertain if there are local options for repair within the first two weeks: otherwise grafting may occur at a later stage. However, care needs to be taken to avoid secondary complications such as contracture or burns. Following earthquakes, compressive neuropraxic injury can be seen as a result of being trapped for long periods under rubble or in sustained postures^(99,100).

In the author's personal experience pain management (both acute and chronic) is frequently neglected in disaster response situations. Particular attention should be paid to the management of neuropathic pain, especially in patients with amputation, SCI or nerve injury. Chronic pain appears to be a significant problem for patients with a range of injuries post disaster^(92,101). A multi-disciplinary,

collaborative, culturally appropriate approach is essential, and the complex interplay between physical and psychological factors such as grief, fear and distress need to be considered.

There is limited information on respiratory physical therapy in a humanitarian setting. Chest trauma is likely to be a major cause of death, and its incidence and severity in survivors appears to vary. Rib fractures may be a relatively frequent occurrence in earthquakes ⁽⁴⁴⁾ while pneumo or haemothorax may also be encountered. In austere environments, a lack of ventilators and intensive care beds is likely to limit the number of patients with severe respiratory complications encountered, but may increase the importance of preventative care. The ability to provide extended care may also dictate decisions to initiate critical care for patients with other severe trauma. According to the 2014 Chest Consensus Statement ⁽⁶⁹⁾.

“We suggest host nation rehabilitation and prolonged care capabilities that are likely to exist following the disaster be considered when determining the appropriateness of initiating critical intensive care”.

Additionally, many surgical procedures are likely to be carried out using austere anaesthetic techniques such as regional blocks or ketamine, avoiding intubation. However, respiratory skills are likely to be required due to complications from neurological injury, prolonged bed rest, pneumonias or tetanus, and are certain to be needed in rapid onset floods or tsunamis ⁽¹⁰²⁾.

Early psychosocial interventions such as counselling or peer support can be extremely important for people who have experienced life-changing injuries such as amputation ⁽⁹¹⁾ and SCI ⁽⁴⁸⁾. Ideally this should be provided by local specialists ⁽⁹¹⁾.

While injuries can be categorised for simplicity and to allow for data collection, many injuries are complex and around half of all patients are likely to present with multiple injuries ⁽¹⁶⁾. It is important not to focus attention on any one injury or impairment. For example, while amputations frequently receive a huge amount of attention, they make up a relatively small proportion of those requiring rehabilitation. Amputee rehabilitation received a large amount of publicity and was a significant focus of short term service provision and research, potentially to the detriment of other less visible or less easily categorised injuries such as nerve injuries, fractures and soft tissue injuries which also cause impairment and require significant ongoing rehabilitation ⁽³⁴⁾.

Coordination of the rehabilitation response

As stressed in the preparedness section, coordination of rehabilitation and follow-up is very important, and has been one of the major challenges of recent disasters. In Haiti, at the peak of the response, there were over 124 different agencies involved in rehabilitation provision ⁽³⁴⁾. In Nepal, where the need was significantly lower and there was a strong local response, there were still 35 different organisations participating in the coordinated rehabilitation response three months after the earthquake ⁽⁴⁷⁾. Evaluating the Haiti response, Blanchet and Tataryn ⁽³⁴⁾ praised the formation of the injury, rehabilitation and disability group within the Health Cluster, and found that the rehabilitation sector was quick to bring Haitian stakeholders on board and enable them to take the lead. They make the following recommendations regarding coordination.

- Meetings should focus more on the future and what every actor should do to build the rehabilitation sector.
- Meetings should be held in an accessible location, in the country's official language/s (and/or with translators).
- NGOs and INGOs should ensure that their staff are aware of international standards concerning rehabilitation response.
- To ensure the necessary follow up and continuity of care, rehabilitation personnel must prepare for the future from the early stages of the emergency response.

- Governmental and civil society stakeholders should be involved and, as duty bearers, take over responsibilities as early as possible in the development of rehabilitation services.



Humanitarian log-base, Haiti 2010 © Michiel Steenbeek/CBM

The formation of the EMT Coordination Cell was a major step forward in coordination, and the establishment of formal rehabilitation coordination, as seen in Haiti and Nepal, has further strengthened responses. It is critical that any rehabilitation personnel, whether national or international, engage with established coordination mechanisms, when activated, and international responders should do so prior to deploying to any disaster.

There are several web portals that support the coordination of efforts in disasters. Information on the EMT Initiative is available here: extranet.who.int/fmt/page/home

ReliefWeb (reliefweb.int/) is a web based service offered by OCHA. It provides reliable disaster and crisis updates and analysis to humanitarians, so they can make informed decisions and plan effective assistance.

GDACS (www.gdacs.org/monitor.aspx) is the Global Disaster Alert and Coordination System. It hosts information on recent disasters, and is the host platform for OCHA's Virtual Onsite Operations Coordination Centre (Virtual OSOCC).

Clinical practice in the response phase

Working in a humanitarian context is not an excuse for disregarding national and international standards, including the [WCPT guideline for standards of physical therapy practice](#) ⁽¹⁰³⁾. These standards are in place to ensure clinical practice is safe and effective for the public. Particular attention should be paid to the following areas:

Documentation

Effective documentation is essential where patients may encounter multiple professionals or medical teams during the course of their treatment who may lack a thorough understanding of medical care to date. A lack of systematic record-keeping is detrimental to any coordinated response ^(30,45). Documentation is frequently neglected during disasters, resulting in treatment duplication or error.

Physical therapists must continue to adhere to guidance set out by WCPT ⁽¹⁰⁴⁾. All interventions should be documented. Notes should be legible, avoiding the use of acronyms and abbreviations.

Record management

Record management in disasters can be challenging. It may be appropriate where patients are highly mobile for the patient to take their notes with them. It is vitally important to maintain a central patient database, which should be coordinated or at least consistent ⁽³⁴⁾ across agencies. The database should include: a means of patient identification and contact; diagnosis; functional status; rehabilitation or equipment needs. This will enable follow-up and management of resources. As patients are easily lost to follow-up, recording a mobile phone number (with consent) of the patient or family member can help the continuation of services. Any data should be stored securely, ensuring confidentiality.

Data and research

There is a lack of research on impairment following disasters and medium- to long-term functional outcomes ⁽⁹²⁾. This is a major cross-cutting issue. The absence of established best practice and generally accepted measures hinders efforts.

Disaggregation of data by age, gender, and disability is also important for monitoring equity and access to services. Whatever the circumstances, ethical principles of data collection, storage, analysis and reporting still apply. Ethical approval and consent from individuals and organisations to collect or utilise data for research is essential. Where possible, local organisations should be supported in their own research aspirations, rather than finding themselves “being researched” by international teams while under pressure to respond to disasters.

There is a need to establish standard, disaster sensitive data sets and outcome measures. No single measure is perfect for the humanitarian setting, but generic measures that have been used to date in research include:

- [WHO Disability Assessment Schedule](#) (WHO-DAS 2)
- [Barthel Index](#) (105)
- [Functional Independence Measure](#) (FIM™) ©
- [European quality of life index](#) (EQ5D)
- [Short Form](#) (SF36) ©

Informed consent and confidentiality

Principles of informed consent are vitally important during emergencies. Please see the WCPT policy statement ⁽¹⁰⁶⁾ for more information on informed consent.

Scope of practice

Facing unique challenges in an emergency situation and working with teams from different nationalities, it is not unusual to feel pressured to work beyond competency. The humanitarian environment is definitely not an opportunity for physical therapists to work in areas they are not qualified and competent to practise in. However, rapid skill development for national staff may be required. It is important to remember that there is normally support from a range of professionals, either locally or in other teams. Establishing support and links to other networks as early as possible is advantageous. Above all, physical therapists should abide by the principal of “do no harm”.

Regulation and insurance

If outside their usual country of work, physical therapists should seek information on professional standards in the affected country and should always register with the national regulatory authority, if one exists. Information about the state of regulation in many WCPT member organisations is

available on the WCPT website under the country profiles (www.wcpt.org/members). Physical therapists on short-term visits are generally liable for regulation by both their own regulatory body and that of their host country, and should abide by whichever has the tighter regulation.

Physical therapists should ensure that they have valid professional liability/indemnity insurance for the work they are undertaking.

Hand hygiene and infection control

In accordance with the WCPT policy on infection prevention and control, physical therapists “[must] implement best practice in infection prevention and control when working in any practice setting.”⁽¹⁰⁷⁾ The need for infection control in disasters is a key issue, particularly as there are likely to be a high number of patients with open and/or infected wounds, and working conditions may be unsanitary. Basic practices such as hand hygiene should not be neglected, both for the safety of the patient and the physical therapist. This is underlined by the fact that diarrhoea is the leading cause of illness in ICRC humanitarian workers, affecting over 44% of staff⁽¹⁰⁸⁾.

Communication

For many recruiting organisations, local language skills are essential or desirable for deployment in an emergency. However, this is not always possible. The population affected may speak a variety of languages, have varying degrees of literacy or have additional communication needs associated with speech, hearing and/or visual impairment. Working through interpreters then becomes a necessary skill. In some contexts, patients may not have heard of physical therapy or the cultural models of health and health care may be very different. Clear concise communications are important, particularly when follow-up is not possible. Understanding needs to be verified by asking the person to demonstrate what has been explained. Where people are literate, clear written instructions for translation can be used. Where literacy is low, locally appropriate forms of communication, such as pictures or diagrams, can be used – but again it is important to check understanding. Having pre-prepared patient and health worker education materials may be advantageous in some situations. These should be simple, in the local language and with culturally appropriate images⁽⁴⁸⁾.

Referral

Physical therapists should play a role in ensuring patients requiring rehabilitation are identified and that referral mechanisms and protocols are established, linking emergency response services with appropriate hospital and CBR services (and vice-versa). Appropriate follow-up is key to a positive outcome for patients. To avoid duplication, coordination should be done through existing mechanisms. Reporting of injuries such as SCI and amputations to a central coordination body is likely to be required under the WHO Emergency Medical Teams Minimum Standards for Rehabilitation^(In press). Organisations should maintain a database of all patients requiring follow up.

Discharge planning from acute care in an austere emergency environment

The coordination of follow-on care has historically been one of the greatest challenges in a disaster setting, particularly where patients have been transported from remote areas, and/or their homes have been destroyed. Particularly in acute emergencies, hospitals may be overwhelmed – requiring patients to be moved from acute care as early as possible. Here are some factors to consider:

1. Know patients' discharge destination

Think through where the patients will be discharged to eg. home/tent/shared house. If it is possible and safe, then take any opportunity to go into the community to see what the likely discharge environments are like. This will improve the ability to problem-solve and set up functional treatment plans with patients and to provide appropriate equipment before they are discharged to ensure their safety and maximise their independence and function. Examples of

barriers to early discharge include sleeping on hard floors, absence of carers, inaccessible toilet facilities, and distance, cost or availability of transport. Significant barriers to access should also be reported at cluster level, advocating to all stakeholders to coordinate and facilitate access.

2. Early discharges vs longer term stay patients

A need for bed space may lead to early discharge. For example, amputees may be discharged after just three to four days. Therefore physical therapists must ensure they are aware of discharge plans for each person and plan accordingly, making referrals for prosthetics and ensuring a way of following up. In a hospital setting, involvement in ward rounds will ensure that the multi-disciplinary team (MDT) is aware of prospective discharges. Even for long-stay patients, those with ongoing wound management and/or polytrauma, discharge plans should be made early, since disaster situations are unpredictable. In the first few days of an emergency where coordinated discharge plans may not yet be in place, keep a clear record of all patients requiring follow-up, including how to contact them. Remember that patients may be being discharged into an uncertain environment with many challenges in addition to their injury. This can be distressing. Psychosocial support and clear planning and communication around discharge is critical. Establishing discharge and rehabilitation referral criteria in advance of a disaster should assist with planning and ensuring patients are not unsafely discharged.

3. Think through levels of family/community support

Be aware that benefits or carer systems are unlikely to exist or may be disrupted. Those affected by disasters may also have lost their caregiver, family, home, and livelihood. Cultural awareness is key. In some cultures, patients may take a passive role, with all their needs provided by carers. This may not help their long-term recovery. Communities may play a big role in how people integrate back into society. This can work positively and negatively: for example, in some cultures people with disabilities are stigmatised and may not have very much support at all; others will ensure that it is the responsibility of the whole community to care for the patient. It is not our role to challenge cultural norms in an emergency, but we should be aware of them and provide patient and family education that is appropriate and understood.

4. Educate family members

Educating family and carers about providing care or supporting independence is critical. Aim to promote functional independence where possible, remembering discharge conditions are not likely to be optimal and follow-up sometimes challenging.

5. Adapt

Limited access to equipment means physical therapists have to be resourceful and think through meaningful function for the patient, always considering what will promote maximum independence. Wheelchairs may or may not come with leg extenders, in which case stump boards may need to be found for trans-tibial amputee wheelchair users, and modifications may be required for patients requiring knee extension in sitting. Logisticians will normally be deployed with EMTs and local craftsmen may be available to manufacture or modify equipment or procure locally available alternatives. Ensure patients understand the role of their equipment, how to maintain it, and when and how its use needs to be reviewed.

Equipment

With disasters comes an increasing need for mobility devices, including wheelchairs, walking frames and crutches, both for those with new impairments and those with existing needs who have either lost their device or are experiencing increased difficulty as a result of the disaster⁽⁵⁷⁾. It is important that devices provided, including prosthetics and orthotics, are appropriate for the individual and the environment, and that they can be maintained or replaced in the country. Guidance on equipment

donation is available from WHO ⁽⁸⁶⁾ and the Tropical Health & Education Trust (THET) ⁽⁸⁷⁾ while specific guidance on wheelchairs is available from the WHO ⁽⁸⁸⁾.



Destroyed hospital wheelchair, Tacloban, The Philippines - © P Skelton/Handicap International

Case study 7

Country

Philippines

Event date

2013 - Typhoon Haiyan

Background circumstances

In response to the emergency, an international organisation planned to distribute wheelchairs. A group of local PTs lobbied for appropriate provision following the WHO guidelines. It resulted in the organisation “outsourcing” the provision of wheelchairs to a group of local therapists trained in wheelchair provision. Appropriate wheelchairs were then purchased from a local manufacturer only after the assessments were completed.

Role of the physical therapist

1. Advocates for provision of wheelchairs with an accompanying service as outlined by the WHO guidelines
2. Assessment of each client, prescribing the right wheelchair, checking that it fits, training users in how to use it in different terrains and how to maintain and repair it. After six months users were followed up.

Outcomes from the event

More than 50 individuals were provided with a wheelchair that met their needs. Through follow up, physical therapists gained valuable insights from the perspective of the wheelchairs users.

Lessons learned/recommendations

- Assistive devices services can be provided even in emergencies.
- International organisations should explore partnerships with local physical therapists (if available) in providing services.

Guidelines on rehabilitation in disaster response

The Sphere Guidance ⁽³¹⁾ sets out minimum standards across the entire humanitarian response. The recommendations regarding physical rehabilitation are:

- Surgery provided without any immediate rehabilitation can result in a complete failure to restore a patient’s functional capacities.
- Early rehabilitation can greatly increase survival and enhance the quality of life for injured survivors.

- Patients requiring assistive devices (such as prostheses and mobility devices) will also need physical rehabilitation.
- Post-trauma and post-surgical rehabilitation should be established only by agencies with appropriate expertise and resources.
- Where available, partnership with CBR programmes can optimise the post-operative care and rehabilitation for injured survivors.

For more information please refer to the [WHO Community-based rehabilitation guidelines](#) ⁽¹⁰⁹⁾ or the [WCPT Policy statement: Community based rehabilitation](#) ⁽¹¹⁰⁾

The *Minimum Standards for Foreign Medical Teams* ⁽²⁰⁾ guidance states:

- “Rehabilitation is one of the core functions of trauma care systems in regular healthcare, and FMTs should have specific plans for the provision of rehabilitation services to their patients post sudden onset disaster (SOD).
- Rehabilitation is included as a core component (either integral or via referral) of any inpatient surgical team, while specialist rehabilitation teams may be deployed to provide support to FMTs and hospitals unable to provide rehabilitation services.
- In the case of amputations, rehabilitation services and psychological support ideally should be involved prior to, or at the same time as, the surgery.
- In SOD, beds become rapidly filled and it is difficult to discharge people due to loss of home and long-distance referrals. Rehabilitation specialist support embedded within the team can offer triage and peri-operative advice as well as rehabilitation post-surgery. It has also been shown to reduce length of stay.
- FMTs should be aware that cross-cutting issues of disability and vulnerable population care are an important part of ethical SOD response, and teams should plan to specifically assist or refer those with disability that present for treatment. Studies quote increased odds ratios for death in those with pre-existing disability of up to 2.0.
- Low and middle income countries generally have poorly resourced rehabilitation services, which are quickly overwhelmed by survivors of a disaster. Early rehabilitation can reduce the complication rate, length of inpatient stay and long-term health burden as well as improve the overall outcomes of trauma victims post SOD.
- FMT rehabilitation experts should provide rapid training to local staff and their teams to maximise the impact of consistent and continuous rehabilitation care.”

Case study 8

Country	Philippines (with UK and Australian teams)
Event date	Typhoon Haiyan, November 2013
Background circumstances	Following the devastating typhoon and storm surge, emergency medical teams (EMTs) were deployed to Tacloban to provide emergency medical care for those affected.
Role of the physical therapist	A physiotherapist deployed within an integrated surgical team from the UK Emergency Medical Team (UKEMT) worked alongside Australian colleagues in a tented surgical hospital facility. They provided pre- and post-operative rehabilitation to people with fractures, lacerations and amputations. By keeping a database of those that needed follow up and their contact details, the team were able to refer all patients in need of ongoing rehabilitation to Handicap International for longer term care. The rehabilitation equipment needs of the hospital, including commodes, crutches and wheelchairs, were identified and met. Because the team was rapidly deployed, the physiotherapist could also assess other facilities and report to other providers on the rehabilitation needs in the region, and coordinate work closely with them. In the evenings, as the hospital continued to function, the physiotherapist was trained to take on an auxiliary role, helping to move patients and sterilise surgical equipment.
Outcomes from the event	Patients received early rehabilitation. Maintaining a database and establishing links to a long term service provider ensured follow-up. The field hospital was accessible.
Lessons learned/recommendations	There is a critical role of rehabilitation and rehabilitation equipment as an integrated part of any Emergency Medical Team response. The physiotherapist needs to be flexible in their role (within their scope of practice).

The 2011 Humanitarian Action Summit resulted in recommendations for best practice in surgical response in humanitarian emergencies⁽¹¹¹⁾. There were two statements particularly relevant to physical therapy.

- Surgery and anaesthesia are essential services in the crisis response, and along with rehabilitation, are part of the spectrum of care of the injured patient.
- Follow-up of the surgical patient should occur within an appropriate time frame, with the view towards long-term rehabilitation, prevention of disability, quality of life and community reintegration.

The recommendations also said that:

- an assessment of the team infrastructure and capacity must include the resources for anaesthesia and pain management, surgical capabilities, and the ability to provide peri-operative care, rehabilitation and psychosocial services
- teams that provide post-operative physical rehabilitation should coordinate with physical rehabilitation service providers for provision of required assistive devices (eg., prostheses) and mobility aids (eg., wheelchairs and crutches) as necessary.

There are also a number of guides that focus on trauma care in emergencies or austere environments, not exclusively in disasters. For example, ICRC ⁽²⁷⁾ has published guidance on war surgery in austere environments. ICRC advocates for early physical therapy as a core step in the management of war wounds. It also specifies that:

- the outcome of surgery is determined by the quality of hospital treatment (resuscitation, surgery, post-operative care, physical therapy and rehabilitation)
- specialised centres offering definitive surgical treatment including reconstructive procedures should include physical therapy and rehabilitation, both physical and psychological
- high-quality physical therapy is required to ensure early mobilisation after surgery and a good functional result
- the functional result of wound healing depends to a great extent on proper physical therapy to retain muscle mass and joint mobility, and should be instituted early as part of the healing process
- good post-traumatic or post-operative pain relief not only helps to alleviate suffering, but also allows for rapid mobilisation and early physical therapy which help attain as good a functional result as possible
- chest physical therapy is required in patients with established tetanus to prevent respiratory complications
- in the treatment of burns, physical therapy and mobilisation should begin as soon as the grafts are solid and a hand should never be immobilised longer than ten days.

In 2005, WHO published a briefing paper, *Disasters, Disability and Rehabilitation* ⁽¹¹²⁾ outlining the following priorities in a disaster:

- identifying people with existing disabilities in temporary shelters and camps
- responding to the health care needs of persons with existing disabilities, such as insulin for diabetics, soft mattresses for people with spinal cord injuries, and spectacles for people with low vision
- identifying people with injuries and providing appropriate trauma care to save lives and minimise future functional impairment and disability
- implementing other curative and therapeutic interventions that can prevent disability and possible deformities
- transferring people with severe injuries and/or newly acquired disabilities to referral centres for “medical” rehabilitation, or, in settings where such centres do not exist, ensuring that people are treated by specialists in existing facilities
- establishing a multi-disciplinary task force to prepare a long term rehabilitation programme, taking into consideration the resources available and socio-economic conditions of the country.

The 2015 [Post Disaster Emergency Rehabilitation Service Manual](#), created by the Hong Kong Red Cross and Hong Kong Polytechnic University, outlines the response to three earthquakes in China in 2008, and uses experiences to detail how external and local providers can collaborate to provide rehabilitation services in the first 18 months following a disaster ⁽¹¹³⁾.

There are also guidance documents that set out or include rehabilitation protocols. These include:

- WHO, (2004) [Guidelines for Essential Trauma Care](#) ⁽²⁸⁾
- WHO, (2007) [Best Practice Guidelines on emergency surgical care in disaster situations](#) ⁽²⁹⁾
- WHO, (2013) [Guidance note on disability and emergency risk management for health](#) ⁽¹¹⁴⁾
- Handicap International, (2011) [Trauma Protocols/Guidelines on Medical, Surgical and Rehabilitation Management of Expected Injuries during an Earthquake Scenario](#) ⁽⁸⁹⁾

- Knowlton et al, (2011) *Consensus statements regarding the multidisciplinary care of limb amputation patients in disasters or humanitarian emergencies* ⁽⁹¹⁾
- Handicap International (pending publication) *Rehabilitation in Sudden Onset Disasters* ⁽⁹⁰⁾

Two significant gaps at the time of writing are guidance or standards on injury classification and reporting, and on disability disaggregated data. Standardised reporting of injuries would allow for significant improvements in rehabilitation response planning and monitoring and improvements of interventions, while disability data disaggregation is increasingly recognised by agencies and donors ⁽¹¹⁵⁾.

The evidence on rehabilitation in disaster response

There is evidence of the benefits of rehabilitation provided following disasters, including:

- decreased mortality ⁽³¹⁾
- decreased morbidity ⁽³⁰⁾
- reduced length of stay in hospital ^(20,50)
- improved quality of life ⁽³¹⁾
- improved functional outcome ⁽¹⁰¹⁾

However, there remains a lack of research directly relating to the role or effectiveness of rehabilitation in humanitarian emergencies ^(32,116).

A systematic review of injury and rehabilitation research in humanitarian health interventions included 76 studies which met the inclusion criteria of which only two were of a high quality ⁽⁷²⁾. The following highlights the research needs identified from the systematic review and expert interviews.

- Greater quantity and quality of evidence is required on the effectiveness and cost-effectiveness of rehabilitative interventions, particularly over the longer-term – including measuring long-term health outcomes, functionality, and quality of life.
- More research is needed to better understand the mechanisms that enable a continuum of care as programmes move from the crisis to the development phase.
- Research is needed to develop appropriate quality standards and measurements of service performance.
- More evidence must be collected following sudden onset disasters, as illustrated by the response to the 2010 Haitian earthquake.
- More evidence should be collected related to rehabilitation interventions in camp contexts.

Other ways physical therapists can be involved in disaster response

There is no need to travel to a disaster zone to assist those affected by disasters, and there are different ways physical therapists can support disaster relief efforts.

Donating money or supplies

Donating money to established non-governmental agencies is the most efficient and effective way of responding to disasters. Financial contributions allow professional relief organisations to purchase exactly what is most urgently needed and pay for the transportation necessary to distribute these supplies. Supplies can often be purchased locally, reducing transport and storage costs, stimulating local economies, providing employment and ensuring that supplies arrive as quickly as possible. Newly established groups often raise money for disaster relief. Many are reputable, but some may not be. Whenever making a donation it is prudent to take steps to ensure the money given will be used for the intended purpose.

Donating equipment and supplies can be more complicated. Before organising collections of physical therapy equipment and assistive devices, it is important to confirm with local organisations or relief agencies that there is a need for the items, that they are locally appropriate (and can be maintained or repaired locally) and that those who will use them know how to. It is also important to obtain an accurate analysis of need in the disaster-stricken area and, where possible, ensure that the same equipment cannot be purchased locally. Transport of equipment can add enormous costs, and can often be delayed or stuck at customs or in airport backlogs. General guidance on donating equipment is available from [Tropical Health & Education Trust](#) (THET)⁽⁸⁷⁾.

Historically, charities have sent equipment such as generic wheelchairs to support emergency responses, but these are rarely suitable for the post disaster environment. Specialist organisations such as [Motivation](#) have developed special emergency wheelchairs. [Guidelines and training packages on the provision of wheelchairs](#) are available from the WHO⁽⁸⁸⁾.

Supporting disaster relief organisations

Volunteering at a local office of international relief organisations may provide much-needed support with campaigning or awareness-raising and disaster preparedness activities. It is worth noting that organisations may not want new volunteers at the time of a disaster when all their energies are on the relief effort, so engaging or volunteering with an organisation ahead of a disaster is important. There are also likely to be opportunities with INGOs to build the capacity of local services across a range of clinical specialities in the recovery phase following a disaster. This will be dealt with in the recovery section.

3. Recovery

The recovery phase involves the restoration and improvement of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors ⁽¹¹⁷⁾.

According to WHO: “There will be parallel needs to ensure the humanitarian imperative, that is, to plan and carry out activities aimed at protecting lives and reducing disease, malnutrition and disabilities among the vulnerable populations in the affected areas, and to set the foundations for the developmental imperative. The latter should strengthen the institutional capacity to pursue longer term health development goals, to discharge the essential public health functions and development of the health care delivery system within an environment of good governance to ensure human security and extend social protection in health.” ⁽¹¹⁸⁾

Recovery, sometimes called “recovery and reconstruction” is the stage of the disaster continuum where the country or community attempts to restore normality, to a point where the way of life is either equal to that before the disaster, or has achieved a better state of functioning.

In practical terms, it is not a matter of the response ending and recovery beginning – recovery activities should be integrated from the outset of a response, and a failure to take into account longer-term strategic recovery goals during a response can be damaging ⁽³¹⁾. The time scale for recovery is difficult to estimate as countries have different coping capacities, but can last for several years. The coping capacity will depend on a number of factors, including political commitment and will, financial and technical capacity, the type of hazard the country is recovering from, and what further hazards are experienced during this phase ⁽¹¹⁴⁾. There is no clear distinction as to when recovery ends, and “development” starts, but the focus here is on issues relating directly to recovering from a disaster.

Disasters “create a new generation of people who experience disability due to injuries, poor basic surgical and medical care, emergency-induced mental health and psychological problems, abandonment, and breakdown in support structures and preventive health care” ⁽¹¹⁴⁾ and so the inclusion of people with disabilities in the recovery phase is vital.

Long-term development plans aim for a more resilient and capable community and linking humanitarian relief with development is seen as an opportunity to “build back better (BBB).” BBB is a concept in post-disaster reconstruction and recovery where the disaster is seen as a chance to improve the community’s resilience (physical, social and economic) in conjunction with reconstruction and recovery efforts that empower survivors ⁽¹¹⁹⁾. The term came to prominence after the Asian tsunami and is now adopted widely.

BBB anticipates a better future where better protection against impending disasters can be provided. For example, new buildings, roads and structures should be rebuilt so that they are accessible to all as well as able to withstand the impact of another disaster. Involving the affected community (including people with disability) in decisions around rebuilding their livelihoods and homes is essential to a successful recovery ⁽¹²⁰⁾. There are few studies into the impact and effectiveness of BBB ⁽¹²⁰⁾.

Rehabilitation services are often underdeveloped in low and middle income countries, and disasters may provide an opportunity for (and necessitate) their strengthening ⁽¹²¹⁾. Certainly this was the case in Nepal, where planning during the response stage and early engagement with the government’s recovery plan ^(40,47) has ensured rehabilitation services will be greatly expanded, giving improved access to all people, not just those with earthquake-related injuries.

Global recovery frameworks

There is a dearth of other global frameworks for guidance on the recovery phase of the disaster continuum. There is a lack of consensus among recovery policy makers and practitioners on what “build back better” should or should not include. A 2006 UN publication ⁽¹²²⁾ established the following 10 key propositions for BBB.

1. Governments, donors, and aid agencies must recognise that families and communities drive their own recovery.
2. Recovery must promote fairness and equity.
3. Governments must enhance preparedness for future disasters.
4. Local governments must be empowered to manage recovery efforts, and donors must devote greater resources to strengthening government recovery institutions, especially at the local level.
5. Good recovery planning and effective coordination depend on good information.
6. The UN, World Bank and other multilateral agencies must clarify their roles and relationships, especially in addressing the early stage of a recovery process.
7. The expanding role of NGOs and the Red Cross/ Red Crescent Movement carries greater responsibilities for quality in recovery efforts.
8. From the start of recovery operations, governments and aid agencies must create the conditions for entrepreneurs to flourish.
9. Beneficiaries deserve the kind of agency partnerships that move beyond rivalry and unhealthy competition.
10. Good recovery must leave communities safer by reducing risks and building resilience.

As introduced in the section on preparedness, the fourth priority for the Sendai Framework for Disaster Risk Reduction ⁽⁶¹⁾ focuses on recovery. It recommends inclusion of vulnerable groups as central to enhancing disaster preparedness for effective response and to “build back better” and that empowering women and persons with disabilities to publicly lead and promote gender equitable and universally accessible response, recovery, rehabilitation and reconstruction approaches is key.

The framework also stresses that disaster risk reduction is a key part of “build back better” – thus bringing the disaster continuum full circle.

UNISDR has published guidance notes on recovery including issues like school reconstruction, health, livelihoods, psychosocial and gender via their website (www.unisdr.org). They establish six core issues for health and health related systems such as rehabilitation during the recovery phase:

- leadership and governance
- human resources
- financing
- medicines and technology
- information
- service delivery ⁽¹¹⁷⁾

UNDP and the World Bank ⁽¹²³⁾ have published a guide to aid policy makers in decision-making during the recovery process. The guide lays out processes and good practices for developing disaster recovery frameworks to assist governments in detailed recovery planning at the inter-sectoral and programmatic levels. It is available at: www.gfdr.org/sites/gfdr/files/publication/DRF-Guide.pdf

The role of physical therapy in disaster recovery

Physical therapists can play important roles in disaster recovery: linking the acute response to ongoing rehabilitation and support; advocating for and advising around inclusive reconstruction;

building the capacity of local services to respond both to current increased need and future disasters. Physical therapists should be part of a multi-disciplinary task force that prepares a long-term programme for rehabilitation services⁽¹²⁴⁾.

Decisions taken early in the response phase can have a significant impact on recovery planning⁽³⁴⁾, so it is important that those involved in planning the response think strategically⁽³¹⁾. For example, decisions on where to accommodate medically stable people with ongoing rehabilitation needs can have a long-term impact on where and how rehabilitation services are built or re-built, and a lack of focus on the needs of people with disabilities in the early stage of a response can leave them marginalised from services that focus only on the short-term needs of people with injuries.

In many low and middle income countries (LMIC), trauma care is often not a priority among other pressing health needs⁽¹²⁵⁾ and so rehabilitation personnel may lack experience in dealing with complex injuries – or there may be a complete lack of specialist services, such as SCI rehabilitation or prosthetics provision. For example, WHO estimate that only 5-15% of people in LMICs who require access to assistive technologies have them⁽⁸⁸⁾. Local rehabilitation staff may therefore require specialist training to effectively manage the long-term needs of people presenting with complex acute trauma – many of whom may only have survived due to the intervention of emergency medical teams.

Building clinical skills should not be limited to major trauma; often chronic illness, non-communicable diseases and childhood disabilities are neglected by health services in LMICs. Scaling up rehabilitation services post-disaster presents an opportunity to develop rehabilitation services for all, from tertiary hospitals through to CBR. Physical therapists involved in the recovery phase may therefore be involved in improving services for those patient groups who are likely to have been disproportionately affected by the disaster, and who are a priority group for building resilience to future disasters.

Some of the key issues in the recovery phase are outlined below:

Continuity of care

As initial response changes to recovery, the supply of rehabilitation services is central to restoring functional capacity and maximising quality of life for people with disability and those directly or indirectly injured during disasters⁽⁵⁰⁾. This is particularly crucial in countries where health services have been devastated, or were inadequate prior to the disaster. Responding rehabilitation professionals commonly recount stories of patients being lost to rehabilitation follow-up, or of a lack of adequate rehabilitation having a significant detrimental impact on the recovery of those affected. SCI is a classic example, where despite initial life saving interventions, a lack of planning for continued care places patients at increased risk of complications.

Ongoing rehabilitation through CBR, inpatient, outpatient or institution-based rehabilitation, is required for those with injuries that may result in impaired function. Delayed presentation of injuries, revision surgeries and prolonged healing of complex injuries mean that physical therapy services will be required long after the initial relief response has ended. In many cases, need for services will be lifelong. This creates challenges, because the rehabilitation requirement extends beyond the stay of emergency teams and funding cycles.

Prosthetic and orthotic support, assistive devices, referrals, and specialist care for injuries such as SCI, nerve injury and amputation are essential if the maximal functional capacity of the affected population is to be restored and maintained long-term.

There is also need for rehabilitation services for people with disabilities or whose chronic health problems have been affected by the interruption to healthcare provision and who may not have been prioritised during an emergency response: for example, those who have suffered cerebrovascular accidents (stroke) and diabetic complications.

It should be a priority to start capacity building as soon as possible once these needs have been identified and it is clear that the local rehabilitation services are unable to meet such a need⁽¹¹⁷⁾. Generally, unless there is a plan for local capacity building, the short-term provision of rehabilitation services by international providers (such as short-stay prosthetics workshops) or the transfer of patients internationally for short- or medium-term rehabilitation care is discouraged. Funding and efforts are better invested in building local capacity.

Building capacity of rehabilitation services

While physical therapists tend to have a direct clinical role in the immediate disaster response phase, this often combines with, or transitions to, a capacity-building role during the recovery and reconstruction phases of the disaster continuum.

Such a role may manifest itself in the form of establishing new services (as in Haiti or in some districts in Nepal), in direct “on-the-job” training, mentoring or peer-support in clinical settings, or more formal training for health personnel. It is imperative that activities are in response to a local request, are sustainable and are collaborative and nationally coordinated. There are many examples of international teams arriving and assuming they have “quick fix” solutions to problems they don’t fully understand, and attempting to apply training or systems from their own countries in a disaster setting.

Physical therapists may be involved in training local staff, or those newly recruited to respond to the disaster. Such training may not be limited to clinical skills, but can incorporate professional, administrative and clinical reasoning skills among others. Short-term training by international visitors, delivered in isolation during emergencies, has been found at times to lack impact or create confusion⁽³⁴⁾. The overall aim of capacity-building is to enable local service providers to provide sustainable and appropriate rehabilitation services to the affected population, and those at risk from future hazards.

Case study 9

Country	Haiti
Event date	2011- physical therapy in post-earthquake recovery and reconstruction.
Background circumstances	<p>In March 2011, over a year after the earthquake struck, killing over 200,000 and injuring many more, the charity CBM transitioned from emergency relief to recovery and reconstruction in its physical rehabilitation programme. Rehabilitation was poorly developed and under-resourced prior to the disaster ⁽¹¹⁴⁾, and the impairments that followed the disaster combined with the significant level of pre-existing chronic health conditions and disabilities in the country. A lengthy recovery phase was inevitable.</p>
Role of the physical therapist	<p>The CBM programme was supported by a much smaller team of expatriate physical therapists and occupational therapists than in the initial response phase. The bulk of the clinical load was by carried out by Haitian staff with the supervision and support of expatriates.</p> <p>A major focus was on developing a sustainable in-patient and out-patient rehabilitation services in Carrefour, a poor suburb of Port au Prince. The rehabilitation project centre, called Chanje Lavi, was attached to the main orthopaedic hospital, and has a varied adult and child patient population attending for rehabilitation.</p>
Outcomes from the event	<p>CBM worked with several partner organisations over the next two years to develop Chanje Lavi into a fully functioning high quality rehabilitation centre staffed by national physical therapists, rehabilitation assistants, community and social workers. It was at the centre of a local referral network and attached to a local CBR centre also run by CBM.</p>
Lessons learned/ recommendations	<p>The recovery phase of the rehabilitation project ultimately led to a locally operated, improved and equitable rehabilitation service for a community originally devastated by the disaster. This progress has occurred in parallel with a number of other organisations – both national and international – who grasped the “opportunity” from the 2010 disaster to raise the access and quality of Haitian rehabilitation services far beyond where they were prior to 2010.</p>

Haiti presents an extreme example, where services were limited prior to the earthquake, and damage from the earthquake was severe. In this instance there was a need for significant international assistance to establish services, including a specialist SCI centre.

This can be contrasted with the 2015 earthquake in Nepal, with an established rehabilitation sector in Kathmandu, specialised services including SCI and prosthetic centres, and skilled rehabilitation professionals. Here the transition to recovery, from a rehabilitation perspective, blended with response and was largely locally led. There was a focus on increasing access to services outside urban centres. Training needs were limited to increasing the number of staff working in specialised areas such as SCI and amputee rehabilitation, were largely led by national staff or organisations with a long-standing presence in country, and were supported by contributions on request from a small number of international specialists.

Depending on the extent of the disaster and the geographical spread, as well as the mandate of the responding international organisation, capacity-building can occur at a local direct provision level (disabled people’s organisations, non-governmental organisations, private or government health

facilities) or at an educational level. In many countries there are simply not enough skilled professionals to provide this care. Thus in certain circumstances, physical therapists will be involved at a national or regional level providing physical therapy professional entry level education – or, as in the case of Haiti, physical therapy diploma courses were developed in response to the identified need for greater access to rehabilitation services. It is vital that this work is coordinated on a local and national level, and that it is in keeping with international standards such as those set by WCPT⁽¹²⁶⁾, which are available at www.wcpt.org/guidelines/entry-level-education.

Supporting those with existing and new disabilities

Physical therapists will be involved in supporting the re-integration of people with new and pre-existing disabilities into societies, through functional and vocational rehabilitation and environment modification. This will ultimately contribute to another wider aspect of physical therapy practice, which is facilitating the access of people with disabilities to education, community activities and livelihoods.

Engagement with disabled people's organisations, where they exist, is essential to ensure the involvement of people with disabilities in decision making. A review of the Haiti earthquake response found that people with disabilities had greater access to services after the emergency response than they did before it⁽³⁴⁾. This in turn reduces their vulnerability to further hazards by enabling more equitable access to community-based risk-reduction activities, to early warning systems and evacuation mechanisms. Physical therapists can support this process by including people with disabilities in recovery decision-making, and by ensuring recovery planning does not just focus on those injured during the disaster.

Accessibility and universal design

Physical therapists can play an important role in advising or advocating for the “design for all” or “universal design” concept during rebuilding, ensuring that rebuilding efforts are designed to include all people, including people with disabilities^(17,124). Through assessments of camps and resettlement programmes, and the provision of technical advice, physical therapists can make a significant contribution to the principle of “build back better” by advising that temporary and new facilities are accessible to people with disabilities. Such efforts should be mainstreamed, and may begin early with key participants engaging different actors through the cluster system. However, physical therapists should pay particular attention to the accessibility of their own services. Of particular relevance, ICRC have published a [guide on the construction of rehabilitation facilities](#)⁽¹²⁷⁾.

Advocacy

Disasters result in an increase in disability but also raise awareness about the challenges that people with disabilities face. They present a unique opportunity to advocate for the inclusion of people with disabilities in all aspects of society. As one of the professional groups most likely to be aware of the challenges that people with disabilities face, physical therapists working alongside people with disabilities can play a role in advocating for inclusion in planning all aspects of the disaster continuum. Physical therapists should be aware of the affected country's national disability action plan, the United Nations Convention on the Rights of Persons with Disabilities and the WHO Global Disability Action Plan⁽¹²⁸⁾.

Disasters also highlight the need for increased or enhanced rehabilitation services, and physical therapists should play a lead role in engaging with both the governmental and non-governmental agencies to ensure that needs are met.

Guidelines on rehabilitation in disaster recovery

Despite a general lack of rehabilitation-specific research or guidelines on disaster recovery, there is a short WHO briefing paper ⁽¹¹²⁾ setting out the following priorities for the recovery phase:

- developing the infrastructure necessary to provide medical rehabilitation services, especially therapy and assistive devices
- initiating CBR programmes, ensuring that people with disabilities have equal access to services and are treated as equal members of society
- following the “design for all” concept during rebuilding of infrastructure: efforts are needed to ensure that physical spaces are designed and built to be accessible and safe for all, especially people with disabilities.

According to the WHO document, an appropriate long-term rehabilitation service following a disaster should include a combination of “medical” rehabilitation (essentially an institutional rehabilitation service prior to the person’s return to their community) and CBR. It states that the two approaches are complementary, and in the absence of one, the other often becomes inadequate. Certainly, an over-emphasis on institution-based rehabilitation or a focus on urban centres can limit the effectiveness of any rehabilitation response, and strong early involvement of CBR programmes is vital in any response ⁽³⁴⁾.

Both WHO ⁽¹²⁹⁾ and WCPT ⁽¹¹⁰⁾ have published guidelines and a briefing paper on CBR. Effective CBR requires advocacy and community mobilisation, and so it is vital that physical therapists working within the disaster continuum are aware of its principles and practise – which can often be very different to the health and rehabilitation service interplay within their own country. The WHO (2010) guideline is available at www.who.int/disabilities/cbr/guidelines/en/ and its supplementary booklet contains a chapter on CBR and humanitarian crisis.

The evidence on rehabilitation in disaster recovery

There is limited but emerging evidence that disasters have provided an opportunity for the improvement of services for people with injury and those with pre-existing disabilities, and that this is most effective when implemented early in the response phase, and as part of a holistic approach including not just rehabilitation, but other aspects of CBR such as improved accessibility, livelihoods, inclusion and education. Access to rehabilitation and other services for people with disability improved as a result of the 2010



Graduation of 72 student technicians in Haiti – © Handicap International

Haiti earthquake ⁽³⁴⁾ while Mallick ⁽⁴⁶⁾ provides examples of how early planning and upscaling of rehabilitation services had a positive effect following the Pakistan earthquake, with the earthquake giving rise to a national CBR programme. Also of interest in Mallick’s paper is the early production and integration of a manual on accessible design into the government’s reconstruction plans.

Case study 10

Country	Pakistan (International Committee of the Red Cross)
Event date	Earthquake, 08.10.2005
Background circumstances	Extensive damage resulted in the Muzaffarabad area of Kashmir, with at least 86,000 people killed and more than 69,000 injured. Three million people lost their homes. Pakistani and international teams helped rescue efforts, but the rehabilitation process lasts over decades.
Role of the physical therapist	600 people were affected by spinal cord injury. The government answered promptly by appointing 100 physical therapists and establishing seven rehabilitation centres in areas where physical rehabilitation was not well developed. ICRC was involved in relief activities while ICRC physical therapy/ortho-prosthetic team supported a centre in Rawalpindi and conducted mobile clinics to answer the needs of the victims.
Outcomes from the event	Visibility and interest in physical therapy rose and training institutions increased from five (2006) to 60 (2015). Physical therapists work in hospitals and rehabilitation centres. The professional association is active. The ICRC established a rehabilitation centre in Muzaffarabad and increased its support to the Prosthetic and Orthotic School and the paraplegic centre in Peshawar.
Lessons learned/recommendations	Physical therapy is an essential part of emergency response. Advanced training and establishment of rehabilitation services in disaster prone areas would improve response.

Early indications from Nepal are that the integration of a rehabilitation strategy into planning during the response stage, and early engagement with the government's recovery plan ^(15,40) has ensured rehabilitation services will be expanded and that CBR will be better integrated into the health system, giving improved access to services all people, not just those with injuries.

The review of the Haiti response by Blanchet and Tatar ⁽³⁴⁾ made some key recommendations relating to the recovery phase, including:

- rehabilitation actors must start building towards the future of the sector from the early stages of the emergency phase, to ensure necessary follow-up and continuity of care
- rehabilitation actors should seize opportunities to increase the positive profile of people with disabilities and strengthen disability rights in the country through holistic rehabilitation services
- government and civil society stakeholders should be involved and – as duty bearers – take over responsibilities as early as possible in the development of rehabilitation services.

Vulnerable groups

Children, women, the elderly and persons with disability may all face disproportionate risk during disasters. While some contributing factors to this vulnerability may be intrinsic, most commonly they are due to environmental or societal factors. These groups are not homogenous, and the risks they face vary from individual to individual, depending on the interaction of both the personal and environmental factors. This does not preclude immense capacity and resilience within these groups or individuals. However, taken as a whole, they need special attention during emergencies. Physical therapists are more likely to come into contact with vulnerable people as part of their role and more likely to understand the challenges these groups face. The profession is in a key position to respond to and advocate for their needs.

Children

It is estimated that children constitute half or more of the population affected by disasters ⁽¹³⁰⁾. They face many risks that might have a devastating impact on their physical and mental health. Davis ⁽¹³¹⁾ indicates that, in normal conditions, the mortality rates among young children are higher than the crude mortality rate (CMR) among the whole population. However these rates increase in emergencies. During disasters, and as a result of the breakdown of the infrastructure, disruption of community ties and separation from families, children may become exposed to neglect, abuse and exploitation. Yet, child protection in a disaster setting often does not get adequate attention despite the high level of vulnerability ⁽¹³²⁾.

The UN Convention on the Rights of the Child (UNCRC), which is ratified by all countries apart from the USA, offers a comprehensive code of rights that offers the highest standards of protection and assistance for children. The UNCRC legally binds countries, and is applicable to all children within the jurisdiction of each state, regardless of whether they are a national or not.

Organisations working in humanitarian response should have child safeguarding policies in place, and it is important to be familiar with and adhere to these.

Women and girls

While gender norms vary from country to country, women and girls may be more vulnerable to disasters due to their socially constructed roles. They are generally more likely than men to suffer injuries or be killed during disasters. The main reason for vulnerability is likely to be their status within a community before a disaster strikes. Women and girls often have: less access to resources, less control over assets, the double burden of productive and reproductive labour, lower social visibility, and less freedom and mobility. Violence against women and girls may be exacerbated during emergencies ⁽¹³³⁾.

The 1979 Convention on the Elimination of All Forms of Discrimination Against Women and the 1999 Optional Protocol to the Convention on the Elimination of All Forms of Discrimination Against Women protect the rights of women during disasters.

Guidance on the protection of women and girls in emergencies includes:

- UNHCR, (2008) Handbook for the Protection of Women and Girls ⁽¹³⁴⁾
- Inter Agency Standards Committee, (2006) Gender Handbook for Humanitarian Action ⁽¹³⁵⁾
- The Gender and Disaster Network: www.gdnonline.org/

Older people

It is estimated that by 2050, 22% of the world's population will be over 60 ⁽¹³⁶⁾. Research indicates that older individuals are more likely to be injured or killed during disasters ^(137,138). They are more also more likely to be socially isolated, and more difficult for helpers to identify during a disaster. Despite their potential increased vulnerability, they may not be prioritised for services.

Older individuals are more likely to be in a vulnerable state of health before disasters and less able to seek assistance afterward. Mobility, sensory or communication problems or social isolation can mean difficulties in accessing health services, leading to a lack of treatment. Disrupted access to services or normal support systems can also contribute to deteriorating health during disasters. Liu et al ⁽³³⁾ provide examples of how rehabilitation professionals specifically



Nepal Earthquake © Wesley Pryor/
Handicap International

targeted elderly populations in shelters following the 2011 Great East Japan earthquake and tsunami to prevent the development of secondary complications.

Case study 11

Country	Japan
Event date	2011 – present
Background circumstances	The role of the physical therapists in disasters was not acknowledged in public when the Great East Japan earthquake occurred in 2011. While the aging rate in Japan was over 20% in 2011, it was less than 5% when the Disaster Relief Act was enacted in Japan in 1947. Japanese physical therapists were required to keep in mind the situation of the population over the age of 80 in disaster responses.
Role of the physical therapist	Life is significantly changed after a disaster, particularly if a tsunami occurs with earthquake. Disaster survivors, especially elderly people, living in shelters/temporary housing, are at risk of disuse syndrome and subsequent death. It was recognised that a major role for physical therapists was prevention: <ol style="list-style-type: none"> 1. advocacy about the importance of preventing disuse syndrome 2. supplying materials for transferring/moving. 3. altering the living environment of shelters/temporary housing.
Outcomes from the event	Consequently the Japanese Physical Therapy Association and related-organisations established three stations providing home visits from physical therapists and other professions. Physical therapists developed communication at local level, for supporting elderly people and their continuing independent life.
Lessons learned/recommendations	Tsunami and earthquake change people’s lives. In order to prevent disuse syndrome, physical therapists need to be involved from the emergency phase, on a long-term basis.

Although all people are covered by the UN Universal Declaration of Human Rights there is currently no UN convention on the rights of older people. The 1991 UN Principles for Older Persons ⁽¹³⁹⁾ establishes an authoritative framework for the rights of older people that can be applied during emergencies. The Madrid Plan of Action on Ageing ⁽¹³⁶⁾ prioritises humanitarian disasters as one of eight key areas for action, with a focus on equal access and inclusion.

Guidance on the inclusion of elderly people in emergency response includes:

- ADCAP [*Minimum Standards for Age and Disability Inclusion in Humanitarian Response*](#) ⁽¹⁴⁰⁾
- [*Ageing and Disability in Humanitarian Response*](#) ⁽¹⁴¹⁾
- [*Protection Interventions for Older People in Emergencies*](#) ⁽¹⁴²⁾

People with disabilities

People with disabilities make up 15% of the world’s population ⁽¹⁴³⁾ but still are largely neglected in the disaster continuum, despite the fact that disasters disproportionately affect them. Challenges with data disaggregation and a lack of prioritisation means there is limited available data on disability and emergencies, but what limited evidence there is is staggering. For example, even in Japan, a country with established preparedness plans, disabled people were more than twice as likely to die as those without a disability ⁽³³⁾. Despite this increased risk, research by Handicap International and HelpAge International ⁽¹⁴⁴⁾ reveals that between 2010-2011, only 1% of projects funded through the

UN consolidated appeals process included at least one activity targeting older people or persons with disabilities.

People with disabilities may not be included in planning, or may be less able to access preparedness information or be unaware of warnings. As with elderly people, people with disabilities may also be socially isolated or discriminated against. As a result, they may be less visible to first responders and helpers. They may have limited mobility that is exacerbated by the chaos of a disaster, they may lose their assistive devices, or their main carer may have been killed or injured. They are often disadvantaged when attempting to reach basic amenities – food, water, shelter and sanitation. A lack of access to basic services can aggravate existing impairments or health conditions. Children with disabilities may be particularly vulnerable during emergencies ⁽¹⁴⁵⁾.

The human rights of people with disabilities are enshrined in the United Nations Convention on the Rights of Persons with Disabilities ⁽⁶²⁾. Article 11, on “Situations of risk and humanitarian emergencies” pays particular attention to the obligation of states to undertake “all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including situations of armed conflict, humanitarian emergencies and the occurrence of natural disasters”.

Article 32 recognises the importance of international cooperation to address the limited capacities of some states to respond to situations of risk and humanitarian crises ⁽⁶²⁾. It means that emergency and humanitarian operations must be inclusive of people with disabilities. The humanitarian needs and requirements of people with disabilities, paying regard to the diversity of disabilities, must be included across all stages of emergency and humanitarian assistance operation – from disaster preparedness to transition and hand-over, and from relief operations to development phases of the operation ⁽⁶³⁾.

The Sendai Framework for Action makes specific reference to the inclusion of people with disabilities in the disaster continuum: “Persons with disabilities and their organisations are critical in the assessment of disaster risk and in designing and implementing plans tailored to specific requirements, taking into consideration, inter alia, the principles of universal design.” ⁽⁶¹⁾

As one of the main professional groups to work alongside people with disabilities, physical therapists should be aware of existing guidance, and should take a leading role in advocating for and ensuring the inclusion of people with disabilities in the emergency response.



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Case study 12

Country	Philippines
Event date	Typhoon Bopha – 2012-2013
Background circumstances	Typhoon Bopha affected six million people. Targeting the most vulnerable, a project was launched to meet their basic needs, such as shelter, in addition to their specific needs, such as assistive devices and rehabilitation. The project lasted for 10 months.
Role of the physical therapist	A physical therapist provided leadership as Project Manager, maximising impact with limited resources and incorporating a participatory approach involving people with disabilities. The physical therapist: provided training on the provision of assistive mobility devices, to ensure devices were appropriate to users' needs; advised stakeholders on the inclusion of the vulnerable population in their emergency response; developed a training module on disability inclusive disaster risk reduction management (DRRM), using people with disabilities as trainers.
Outcomes from the event	<p>2500 of the most vulnerable families were provided with basic and specific needs, such as shelter and rehabilitation.</p> <p>The capacity of communities to cope with the crises, and to be inclusive of their most vulnerable, was increased.</p> <p>Awareness of other humanitarian actors and stakeholders about the specific needs of vulnerable people in emergency response was raised.</p>
Lessons learned/ recommendations	<ul style="list-style-type: none">• Physical therapists can be advocates and leaders of a disability-inclusive response.• Empowered people with disabilities are very effective agents of change, and physical therapists can support this process.

There are a number of resources available to support inclusive preparedness and response, including:

- ADCAP *Minimum Standards for Age and Disability Inclusion in Humanitarian Response* ⁽¹⁴⁰⁾ www.helpage.org/download/56421daeb4eff
- Handicap International *Inclusion Checklist for Emergency Response* ⁽¹⁴⁶⁾ www.handicap-international.de/fileadmin/redaktion/pdf/disability_checklist_booklet_01.pdf
- WHO *Guidance Note on Disability and Emergency Risk Management for Health* ⁽¹¹⁴⁾ www.who.int/hac/techguidance/preparedness/disability/en/
- *European and Mediterranean Major Hazards Agreement Major Hazards and People with Disabilities* ⁽¹⁴⁷⁾ www.coe.int/t/dg4/majorhazards/ressources/pub/MajorHazards_Disability_2014_en.pdf
- Vocational Rehabilitation, Florida, hurricane preparedness guide www.rehabworks.org/docs/HurricaneGuide.pdf

Reference

Selected definitions

These definitions are taken from the United Nations Office for Disaster Risk Reduction (UNISDR) unless stated.

Advocacy — Public support for or recommendation of a particular cause or policy⁽¹⁴⁸⁾.

All-hazards risk assessment — aims to include all types of threat, irrespective of its origin, and generate a balanced overview⁽¹⁴⁷⁾.

Capacity — the combination of all the strengths, attributes and resources available within a community, society or organisation that can be used to achieve agreed goals.

Climate change — the Inter-governmental Panel on Climate Change (IPCC) defines climate change as “a change in the state of the climate that can be identified (eg. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use”.

Contingency planning — a management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations.

Coping capacity — the ability of people, organisations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.

Disability advocacy — ‘ensures the human and legal rights of people with disabilities are promoted and protected so that people with disabilities can fully participate in the community.

An advocate in the disability sector works to ensure the rights of people with disabilities are upheld and supports people with disabilities to make decisions affecting their lives⁽¹⁴⁹⁾.

Disaster — a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Disaster impacts — include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.

Disaster preparedness — pre-disaster activities that are undertaken within the context of disaster risk management and are based on sound risk analysis. This includes the development/enhancement of an overall preparedness strategy, policy, institutional structure, warning and forecasting capabilities, and plans that define measures geared to helping at-risk communities safeguard their lives and assets by being alert to hazards and taking appropriate action in the face of an imminent threat or an actual disaster.

Disaster prevention — ‘is the outright avoidance of adverse impacts of hazards and related disasters. Prevention expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance. Examples include dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high risk zones, and seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake. Very often the complete avoidance of losses is not feasible and the task transforms to that of mitigation. Partly for this reason, the terms prevention and mitigation are sometimes used interchangeably in casual use.’

Disaster recovery — 'is a focus on how best to restore the capacity of the government and communities to rebuild and recover from crisis and to prevent relapses into conflict. In so doing, recovery seeks not only to catalyse sustainable development activities but also to build upon earlier humanitarian programmes to ensure that their inputs become assets for development.' ⁽¹⁵⁰⁾

Disaster risk — the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.

Disaster risk management — the systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.

Disaster risk reduction — the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Emergency management — the organisation and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps.

Emergency Medical Team — expansion of the term Foreign Medical Team (below).

Foreign Medical Team — groups of health professionals and supporting staff outside their country of origin, aiming to provide health care specifically to disaster affected populations. They include governmental (both civilian and military) and non-governmental teams ⁽²⁰⁾.

Hazard — a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

National Platform for Disaster Risk Reduction — a generic term for national mechanisms for coordination and policy guidance on disaster risk reduction that are multi-sectorial and interdisciplinary in nature, with public, private and civil society participation involving all concerned entities within a country.

Resilience — the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Risk — the combination of the probability of an event and its negative consequences.

Risk assessment — a methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.

Risk management — the systematic approach and practice of managing uncertainty to minimise potential harm and loss.

Structural measures — any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard-resistance and resilience in structures or systems.

Non-structural measures — any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular through policies and laws, public awareness raising, training and education.

Universal design — is the design of products, environments, programmes and services to be useable by all people, to the greatest extent possible, without the need for adaptation or specialised design ⁽¹³⁵⁾

Vulnerability — the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Vulnerable groups — include indigenous peoples, ethnic minorities, refugees, migrant workers, women, children, people with HIV/AIDS, persons with disabilities and older persons. People belonging to these groups have certain common characteristics or are in a situation that have been shown to make these people more vulnerable to discrimination. They are especially "vulnerable", because these grounds for discrimination have been overlooked or insufficiently addressed ⁽¹⁵¹⁾.

Selected abbreviations

BBB: Build back better

CBM: International non-governmental organisation, formerly Christian Blind Mission

CBR: community based rehabilitation

DPO: disabled people's organisation

EMT: emergency medical team

HI: Handicap International

HIC: high income countries

IASC: Inter Agency Standards Committee

ICRC: International Committee of the Red Cross

INGO: international non-governmental organisation

LMIC: low and middle income countries

OCHA: Office for the Coordination of Humanitarian Affairs

MDT: multi-disciplinary team

MHPSS: Mental Health and Psychosocial Support

NEPTA: Nepal Physiotherapy Association

NGO: non governmental organisation

SCI: spinal cord injury

SOD: Sudden onset disaster

UKEMT: United Kingdom Emergency Medical Team

UNISDR: United Nations Office for Disaster Risk Reduction

UN: United Nations

WASH: Water, sanitation and hygiene

WHO: World Health Organization

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