On 25 April 2015 at 11:56 NST with a mighty shudder, the earth released the pent-up seismic energy trapped within in the form of an earthquake that lasted 55 seconds. That brief span of time brought to life an instant of destruction, injury, death, injury to thousands of people, loss of homes, families, livelihoods, and thousands of lives. An earthquake, damage health facilities and schools, cause power outages, and create landslides, and trigger the process of required reconstruction. A strong aftershock followed on 12 May 2015, adding to the death toll and injuring another 200. More landslides occurred in the following days and weeks, and people and infrastructure eventually collapsed. More than 8,800 people were injured, and 4.1 million people, 71% of the population, were affected, and over 6,000 were lost in earthquakes and landslides. Nepal came through unscathed as the country that had prepared for such an eventuality. It had gone through years of preparation and strengthened many of the critical health facilities so that they could withstand the earthquake. The health staff and capital prepared for the unexpected, and the government and people worked together to respond to the natural disaster. The country then worked hard to recover, and today it has gained through the experience.
An insight into risks

nepal
Earthquake 2015

A vision for resilience

September 2016
Acronyms

CBDI community-based organization
CNDRRC Central Natural Disaster Relief Committee
DNDRRC District Disaster Response Committee
DHN DH District Health Office
DPHO District Public Health Office
DSO District Support Office
DODBC Department of Urban Development and Building Construction
EDCD Epidemiology and Disease Control Division
EPF emergency preparedness and response
EWhRS early warning and response system
FCHV female community health volunteer
FMT foreign medical team
FMTCC FMT Coordination Cell
GDP gross domestic product
GIS geographical information system
HEDOC Health Emergency Operations Centre
HOPE hospital preparedness for emergencies
IDP internally displaced person
IEHM interagency emergency health kit
IHR International Health Regulations
IMCI Integrated Management of Childhood Illness
IMNCI Integrated Management of Neonatal and Childhood Illnesses
IOM International Organization for Migration
IPPF International Planned Parenthood Federation
MCK medical camp kit
MDG Millennium Development Goal
MoHA Ministry of Home Affairs
MHP Ministry of Health and Population
NDRC National Disaster Response Force
NEOC National Emergency Operations Centre
NGO nongovernmental organization
NHIEIC National Health Education Information and Coordination Centre
NHSP National Health Sector Programme
NHSS Nepal Health Sector Support Programme
NHRC Nepal Risk Reduction Consortium
OPD outpatient department
PDNA post-disaster needs assessment
PHC primary health centre
PPRCD Policy, Planning and International Coordination Division
RHO reproductive health
SDG Sustainable Development Goal
SEARHEF South-East Asia Regional Health Emergency Fund
SOP standard operating procedure
TB tuberculosis
TUTH Tribhuvan University Teaching Hospital
UN United Nations
UNICEF United Nations Children’s Fund
UNFPA United Nations Population Fund
UNOCHA United Nations Office for Coordination of Humanitarian Affairs
UNICEF United Nations Children’s Fund
UNOCHA United Nations Office for Coordination of Humanitarian Affairs
UNDAC United Nations Disaster Assessment and Coordination
UNOCHA United Nations Office for Coordination of Humanitarian Affairs
UNICEF United Nations Children’s Fund
UNOCHA United Nations Office for Coordination of Humanitarian Affairs
UNDAC United Nations Disaster Assessment and Coordination

Note: The Ministry of Health and Population (MoHP) formally became the Ministry of Health (MoH) in December 2015.
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<th>ix</th>
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**Medical camp kit Technical specifications**
I have witnessed the consequences of several major events in the Region, including the Indian Ocean tsunami of 2004; cyclone Sidr in Bangladesh in 2007; cyclone Nargis in Myanmar in 2008; several earthquakes and volcanic eruptions in Indonesia; floods in Thailand, Democratic People’s Republic of Korea, Bhutan, India and the Maldives; and armed conflicts in Timor-Leste and Sri Lanka. On every occasion, amid the devastation and trauma, the need to uphold and defend public health, and to alleviate suffering has been at the core of my personal and professional mission. The Nepal earthquake of 2015 was no different.

This book is an eyewitness account of those 55 seconds that changed Nepal on 25 April 2015. Even in this age of instant information, it can take time to establish facts and reach a full understanding of an event’s impact. In the days and weeks following the earthquake, for example, the numbers of those who perished, who were injured and who were displaced became clearer as affected groups were reached. But even when all facts are known, our focus can be askew. When making sense of past events, experts and disaster managers often overlook the “why” and “how” and instead focus on describing the response. This can leave important questions unanswered and create a deficit in our understanding. The specifics of the Nepal earthquake, documented here in detail, will provide the information necessary to understand how public health and other issues evolved. It will also inform future disaster preparedness in the country.

This publication also places a lens on the action that occurred during the response. The earthquake response can be considered one of the best in recent years, with health workers across the country fulfilling their duties admirably. As the injured flocked to hospitals at all levels, mass casualty management procedures were rolled out and referral networks activated. Of critical importance was the fact that all major Kathmandu-based hospitals withstood the earthquake due to investments in structural retrofitting and other preparedness measures.
This document provides inputs toward envisioning a more disaster-resilient Nepal. Within three months of the earthquake, I set up an advisory group to provide critical ideas on how WHO and other health sector partners can assist in the recovery process. This has helped inform and guide action to date, and will continue to do so in the months ahead. At a time when the world has adopted the Sendai Framework for Disaster Risk Reduction and there is global consensus on how the Sustainable Development Goals can help make the future safer, Nepal has an outstanding opportunity to secure a more resilient and earthquake-ready tomorrow. This opportunity must be grasped.

As you may note, the title of the book references the sense of sight through Nepal’s most iconic pair of eyes. Clear vision allows us to see disasters and emergencies in a larger time and space continuum, thereby giving us the capacity to reduce risks altogether if we have real insight and vision. This publication therefore provides an insight into risks and a vision for resilience, ably capturing the Nepal earthquake continuum. In doing so, this book makes a critical contribution to the culture of risk reduction within the WHO South-East Asia Region.

Dr Poonam Khetrapal Singh
Regional Director, WHO South-East Asia Region
The Himalayan country of Nepal lay in ruins. On 25 April 2015 at 11:56 NST, with a mighty shudder, the earth released the pent-up seismic energy trapped within in the form of an earthquake that lasted 55 seconds. That brief span of time was enough to cause thousands of deaths, injure several thousand people, bring down high-rise buildings and shanties alike, split apart roads, bring down bridges, dam rivers, cause avalanches and landslides, and ruin priceless heritage structures to the ground. At a magnitude of 7.8 on the Richter scale, it was one of the most catastrophic events to have struck Nepal in the past 80 years.

The event was the result of movement of two massive tectonic plates. The temblor was caused by a sudden thrust, or release of built-up tension, along the major fault line where the plate carrying India is slowly diving under the one carrying much of Europe and Asia, according to the United States Geological Survey (USGS). About 50 million years ago, this movement gave rise to the Himalayas. Below the earth’s surface in Nepal, the India plate is moving north-northeast towards the Eurasia plate at the rate of about 5 cm each year. Plates usually move slowly, but they get stuck at their edges due to friction, and cause pressure to build. When the rocks finally give way under the strain, the plates jerk rapidly, releasing the energy that causes the earthquake. The energy travels in waves through the earth’s crust and results in the shaking that we feel. The quake had a depth of about 12–15 km, which is considered shallow in geological terms. The shallower an earthquake, the more destructive power it carries. It caused Kathmandu, the capital city, to move 3 m to the south in a matter of just 30 seconds! Over the space of less than a minute, the rupture propagated east by about 136 km and south by about 60 km, a fault segment of about 15,900 sq. km in area. The 7.8-magnitude earthquake released energy equivalent to 7.9 million tons of TNT, and was 504.4 times the energy sent out by the Hiroshima atomic blast in 1945.
Nepal’s devastating earthquake was the disaster experts knew was coming. Just a week before the earthquake, about 50 earthquake and social scientists from around the world had come to Kathmandu, Nepal, to figure out how to get this congested, overdeveloped, shoddily built area to prepare better for the big one, a repeat of the 1934 temblor that levelled this city. They knew they were racing the clock, but they didn’t know when what they feared would strike. But they didn’t expect the massive quake that struck on Saturday to happen so soon. The magnitude 7.8 earthquake killed nearly 1400 and counting, and caused widespread destruction.

Nepal, home to the highest point on earth (Mt Everest), and eight of the world’s ten highest mountains, is one of the most seismically hazardous countries in the world. In addition, it has been identified as one of the countries most vulnerable to climate change over the next 30 years. The region has seen four quakes above magnitude 6 in the past century, and has a long history of big earthquakes, reports the USGS. A magnitude 6.8 earthquake in August 1988 killed nearly 1500 people. An 8.1 event in 1934 severely damaged Kathmandu, killing 10,600 people. The largest quake in the region measured by instruments was a magnitude 8.6 event in 1897, centred in Assam in eastern India. Sitting on two moving tectonic plates, Nepal lives with this constant risk of earthquakes.

The intensity of the tremors was labelled as “violent.” Tremors of a lesser intensity were felt in India (as far south as Karnataka), Bhutan, China, Bangladesh and Pakistan.

The earthquake triggered an avalanche on Mt Everest, which killed at least 18 persons. It was one of the deadliest days recorded in the history of the mountain. The aftershock on 26 April triggered a fresh avalanche on Mt Everest. About 200 people were stranded on the mountain. It also triggered an enormous avalanche in Langtang valley, destroying it completely. Two hundred and fifty people were reported missing.

This first massive tremor had its epicentre in Barpak, Gorkha district, about 77 km northwest of the capital, Kathmandu. It was followed by about 38 aftershocks on the same day, at intervals of 15–20 minutes. On 26 April 2015, there was a tremor with a magnitude of 6.8 on the Richter scale, while the others were around 4.5–5. In all, there were about 553 aftershocks over the first 45 days, though those were of a smaller magnitude. In all, the earthquake resulted in 4332 landslides in Gorkha!

That wasn’t all. On 12 May 2015, a major aftershock of magnitude 7.3 struck, with its epicentre in Dolakha district, about 78 km east of Kathmandu. More than 200 people were killed and more than 2500 were injured by this aftershock. Taken together, this was Nepal’s biggest natural disaster since 1934. While some felt that the 1934 earthquake had fulfilled Nepal’s quota of earthquakes, others knew that the earthquake of 25 April 2015 was an event waiting to happen. And Nepal had prepared for it. But had it prepared enough?

THE IMPACT

Nepal, well known for its rich cultural heritage and extreme tourism, is one of the low-income countries in South-East Asia. Despite significant improvement in key health indicators, Nepal’s infrastructure was critically feeble even before the disaster struck. With a per capita gross domestic product (GDP) of less than $700 a year, many Nepalese build their own houses without oversight from trained engineers. Building codes are not specific enough and, where they exist, they are not enforced. As a result, despite risk awareness, efforts to manage risk resulted in “patchy” preparedness, where only a few structures were resilient enough to withstand the shock of the earthquake. The damage done by the quake has put a strain on its citizens that will last for many years.

The earthquake affected 35 of Nepal’s 75 districts. Of these, 14 districts were severely affected (Gorkha, Dhading, Rasuwa, Sindhupalchok, Kavrepalanchok, Nuwakot, Dolakha, Kathmandu, Lalitpur, Bhaktapur, Ramechhap, Sindhuli, Okhaldhunga and Makawanpur), and the others moderately affected. Of the 2.8 million people rendered homeless by the earthquakes, 864,000 lived below the poverty line in remote, hard-to-reach areas. Sindhupalchok district reported the maximum number of deaths while Kathmandu reported the maximum number of injuries. The death toll would have been much higher had it not been a Saturday, when schools and offices are closed, and during the daytime, when people in rural areas were working in the fields. Had it happened at night, it would have caught people unawares.

Neighbouring countries too felt the impact of the earthquake. A total of 78 deaths were reported in India – 58 in Bihar, 16 in Uttar Pradesh, 3 in West Bengal and 1 in Rajasthan, and 560 injured. In China, there were 25 dead and 363 injured, mostly in the Tibet Autonomous Region; in Bangladesh 4 died and 200 were injured.
“We were in the field planting corn when it struck… when the ground trembled and ruptured we realized it was an earthquake. It felt like we were being pulled inside. When we reached the road, we saw everything topple before our eyes… I felt it was the end of the world. When I reached home, my youngest son was in the garden patch. I cuddled him in my arms but he had already passed away. We found my husband buried in the rubble after two hours of extensive search… we took them for cremation on Saturday but we did not get our turn. It was only on Sunday that we had the chance to cremate them.”

– A survivor (Nepal rises documentary)
“Like every other day, I had finished lunch and was sitting outside when the quake struck. I was with a neighbour and he managed to run before the debris buried him. I have knee problems so I could not get to a safe place. All I can remember is the houses in my neighbourhood collapsing on top of each other. A piece of debris hit my head and I was engulfed in darkness. People heard my cries for help after 3 hours and they managed to dig me out.”

– A survivor (Nepal rises documentary)

**DAMAGE TO CRITICAL INFRASTRUCTURE**

Hundreds of thousands of people were rendered homeless, and thousands lay dead, many buried under the rubble. Several thousands were injured. Across many districts in the country, entire villages had been flattened, with no remnant to indicate that they had ever existed. Not a single house remained standing in some villages. About 602,257 houses were destroyed and over 285,099 houses partially damaged.

Much of the infrastructure in the affected areas was also destroyed, such as government buildings (more than 6000), schools (9300), and health facilities, roads, and electricity and water supply systems. Most of the destruction occurred in rural areas that were difficult to reach even in the best of times and conditions. Mobile communications were also disrupted, though landlines mostly remained functional. Water systems in hillyside villages were wrecked. Terraced farms and cattle were wiped out by the quake or subsequent landslides, destroying people’s entire livelihoods.

**Roads and bridges**

Most of the roads were intact, other than a small part of the strategic roads network that was completely destroyed. The road network that connects the Kathmandu valley (home to approximately 2.5 million people) to rural Nepal was poorly maintained and unreliable even under normal circumstances. Landslides caused roadblocks and damage to several mountain roads, cutting off thousands of people in rural communities across Nepal’s vast mountainous regions and leaving them without shelter, food and clean water. The road adjacent to the China border was badly damaged, causing interruption of trade between the two countries. Extensive blockages were reported in the district road core network and village road core network. Many of the latter were in a non-motorable condition even before the earthquake. Initially, 68 bridges were estimated to have been damaged, but 10 bridges were found to not require much repair. One had to be dismantled.

“Like every other day, I had finished lunch and was sitting outside when the quake struck. I was with a neighbour and he managed to run before the debris buried him. I have knee problems so I could not get to a safe place. All I can remember is the houses in my neighbourhood collapsing on top of each other. A piece of debris hit my head and I was engulfed in darkness. People heard my cries for help after 3 hours and they managed to dig me out.”

– A survivor (Nepal rises documentary)
WITNESSING THE MINUTE

NEPAL EARTHQUAKE 2015

It was a fresh spring day in Kathmandu, and Dharmu Subedi decided it was time for a bird’s-eye view of the ancient city. The 36-year-old made his way to the landmark Dharahara tower – a soaring, nine-storey building, jutting upwards from the valley into the sky – which for the past ten years had served as a popular tourist observation point. But as Mr Subedi made his way towards the tower entrance, the earth buckled and surged beneath him. Nepal’s biggest earthquake in 80 years struck the heart of the capital, killing over 1300 people and sending buildings tumbling to the ground.


Heritage structures

Nepal has a number of UNESCO World Heritage sites, both cultural and natural, Kathmandu valley alone has a group of seven monuments. The earthquake levelled many of these priceless structures. Historic temples crumbled; some at the Kathmandu, Patan and Bhaktapur Durbar Squares were almost completely destroyed. Others included the Changu Narayan temple and the Boudhanath and Swayambhunath stupas. The Dharahara tower, built in 1832, collapsed, killing at least 180 people. The damage was both “extensive” and “irreversible.” Nepal’s natural heritage, in particular, the World Heritage site of Sagarmatha National Park, including Mount Everest, was also severely affected by the earthquake. The impact was minimal on the World Heritage site of Lumbini, the birthplace of the Lord Buddha, and Chitwan National Park.

In more than 20 districts, thousands of private residences built on traditional lines, historic public buildings, ancient and recently built temples and monasteries, were affected by the disaster; 25% were destroyed completely. In all, about 2900 structures of cultural and religious heritage value were damaged or destroyed. Those structures were Nepal’s pride, and brought flocks of tourists into the country.

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Damage to health facilities

The health-care sector was severely affected and suffered major damages; 462 health facilities were completely destroyed; these included 446 public health facilities (consisting of 5 hospitals, 12 primary health centres (PHCs), 417 health posts, and 12 other facilities) and 16 private facilities. Seven hundred and sixty-five suffered partial damage (701 public and 64 private health facilities). Of the 446 completely damaged public health facilities, 375 (around 84%) were in the 14 most severely affected districts.

The largest numbers of health facilities destroyed were in Sindhupalchok, Nuwakot and Gorkha. Moreover, some buildings of central hospitals such as the Maternity Hospital and Bir Hospital in Kathmandu were also severely damaged. In the 14 severely affected districts, of the 360 health facilities that were providing emergency obstetric maternal and neonatal care services before the earthquake, 112 were seriously damaged and 144 were partially damaged.

Eighteen health workers and volunteers lost their lives and 75 were injured.

The financial impact of damage to the infrastructure, and equipment and logistics was calculated based on an inventory of damages by the district health offices.

The total value of damages and losses was estimated to be NPR 706 billion (US$ 7 billion). Of this, 85.1% was the cost of damages and the remaining 14.9% was due to losses. Most of the damages and losses were in the public sector (81.5%), as the number of public health facilities was much higher than the private health facilities.

In the first week, it was estimated that there were about 7240 deaths and 14 122 injured. About 2.8 million people were displaced, and 4.2 million affected. Of these, many lived in remote, hard-to-reach areas, and were socioeconomically below the poverty line. The large number of internally displaced persons (IDPs) had to be moved immediately to temporary shelters and camps. The final numbers released by the Government of Nepal in June 2016 of those dead and injured were 8856 and 22 309, respectively.6

Nepal did not take time off to grieve. Instead, with amazing yet characteristic courage and resilience, it shook off the dust of the earthquake within the hour. The knowledge that it would always be at risk drove the resolute country to get to work, and ensure that, despite the uncertainty and risk that it lives with, this time it would build back and stay standing.
### Status of health facilities in affected districts

<table>
<thead>
<tr>
<th>Districts</th>
<th>Hospitals</th>
<th>Primary health centres</th>
<th>Health posts</th>
<th>Others</th>
<th>Private sector facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completely destroyed</td>
<td>Partially damaged</td>
<td>Completely destroyed</td>
<td>Partially damaged</td>
<td>Completely destroyed</td>
</tr>
<tr>
<td>Bhaktapur</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Dolakha</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Gorkha</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>35</td>
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<tr>
<td>Kathmandu</td>
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<td>0</td>
<td>1</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Kaliyatalanchok</td>
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<td>1</td>
<td>1</td>
<td>2</td>
<td>32</td>
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<tr>
<td>Lalitpur</td>
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<td>0</td>
<td>0</td>
<td>2</td>
<td>9</td>
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<tr>
<td>Makawanpur</td>
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<td>0</td>
<td>1</td>
<td>3</td>
<td>14</td>
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<tr>
<td>Namakot</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>43</td>
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<tr>
<td>Okhaashura</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>17</td>
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<tr>
<td>Ramshapur</td>
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<td>1</td>
<td>1</td>
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<tr>
<td>Rudrapur</td>
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<td>0</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Sindhuli</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>22</td>
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<td>Sindhupalanchok</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>62</td>
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<tr>
<td>Total (14 districts)</td>
<td>5</td>
<td>6</td>
<td>10</td>
<td>16</td>
<td>348</td>
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<tr>
<td>Other districts</td>
<td>0</td>
<td>13</td>
<td>2</td>
<td>22</td>
<td>69</td>
</tr>
<tr>
<td>Central-and/oral level hospital/administrative stock</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total**: 5 39 12 14 417 558 12 18 16 64


### Estimation of damages in the health-care sector (in million NPR and US$)

<table>
<thead>
<tr>
<th>Facilities completely destroyed</th>
<th>Public</th>
<th>Private</th>
<th>Total (NPR)</th>
<th>Total (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals and administrative buildings</td>
<td>2,102</td>
<td>700</td>
<td>2,802</td>
<td>28.6</td>
</tr>
<tr>
<td>Primary health centres</td>
<td>131</td>
<td>130</td>
<td>261</td>
<td>2.6</td>
</tr>
<tr>
<td>Health posts</td>
<td>1,877</td>
<td>1,877</td>
<td>3,754</td>
<td>37.54</td>
</tr>
<tr>
<td>Others</td>
<td>45</td>
<td>45</td>
<td>90</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>4,144</td>
<td>4,904</td>
<td>9,048</td>
<td>90.48</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Facilities partially destroyed</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td>Hospitals and administrative buildings</td>
<td>416</td>
<td>416</td>
<td>832</td>
</tr>
<tr>
<td>Primary health centres</td>
<td>35</td>
<td>35</td>
<td>70</td>
</tr>
<tr>
<td>Health posts</td>
<td>454</td>
<td>454</td>
<td>908</td>
</tr>
<tr>
<td>Others</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>703</td>
<td>456</td>
<td>1,159</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Equipment and logistics</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>984</td>
<td>984</td>
<td>1,968</td>
</tr>
<tr>
<td>Office equipment and furniture</td>
<td>41</td>
<td>41</td>
<td>82</td>
</tr>
<tr>
<td>Medications and supplies destroyed</td>
<td>13</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>Other medical logistics and supplies (e.g. instruments, health management information system [HMIS] forms)</td>
<td>22</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>310</td>
<td>360</td>
<td>670</td>
</tr>
</tbody>
</table>

Nepal had received a Millennium Development Goal (MDG) award for its outstanding national leadership, commitment and progress toward achievement of the improved maternity health goal under MDG-5.

PRE-EARTHQUAKE STATUS

The earthquake struck at a time when Nepal was doing well on key health indicators. The under-5 mortality rate had declined by about 73% and the infant mortality rate by 67% since 1990. The maternal mortality ratio had declined from 415 deaths per 100 000 live births in 2000 to 229 deaths per 100 000 live births in 2010, and the total fertility rate had also improved significantly. Nepal received a Millennium Development Goal (MDG) award for its outstanding national leadership, commitment and progress toward achievement of the improved maternity health goal under MDG-5. The country’s significant and hard-earned gains threatened to be negated by the earthquake.

However, all was not lost. Investment by the Ministry of Health and Population (MoHP) and World Health Organization (WHO) in health sector disaster preparedness initiatives for more than a decade paid off handsomely. In 2011, the Nepal Risk Reduction Consortium was formed, bringing together humanitarian and development actors, donors and the Government of Nepal with the aim of reducing the country’s vulnerability to natural disasters. The results were both visible and tangible; the public hospitals in Kathmandu valley remained standing and functional, and even increased their capacity manifold. These disaster preparedness initiatives included non-structural mitigation at the Tribhuvan University Teaching Hospital (TUTH), Patan Hospital, Bhaktapur Hospital, the trauma centre at Bir Hospital and Civil Hospital. However, some buildings of central hospitals such as the Maternity Hospital and Bir Hospital in Kathmandu were severely damaged.

Other initiatives included physical preparedness (electricity, water supply) and identification of hub hospitals and satellite centres for emergency management of health-care needs. Activities such as capacity building of staff in mass casualty management, triage and early deployment training for emergency management had been conducted for hospital staff in selected hospitals within and outside the Kathmandu valley. All health facilities in the country had been mapped with geographical information systems (GIS), and medical logistics (medical tents, interagency emergency health kits (IEHKs), diarrhoeal kits, surgical kits, reproductive health kits) had been pre-positioned in strategic locations. Structural and non-structural assessment of health facilities had also been initiated to minimize the risk of a potential disaster. In addition, standards for public health emergency management, such as a mass casualty management strategy, protocols, referral and early deployment guidelines, and rapid response team guidelines had already been developed.

REFERENCES

Nepal rose from the rubble. Tribhuvan University Teaching Hospital (TUTH), one of the hub hospitals, began attending to earthquake victims within 20 minutes of the disaster. On that first day, it attended to 800 patients. Triage helped to streamline operations and ensure that those who most needed care were attended to first. Medical and nursing students volunteered their services, while external volunteers were deployed outside the hospital premises and attended to patient needs for food, water and sanitation, and helped with traffic control. Routine services were shut down and the entire hospital was engaged in providing trauma and emergency services. As many inpatients as could be sent back from hospital were discharged from the intensive care unit, postoperative and surgical wards to make way for the injured needing hospital care. Three standby containers with emergency stocks were made available, and the stocks of the hospital pharmacy provided free of cost. TUTH blood bank started collecting blood on the first day, and over two days, collected 600 units of blood from eager responders.

Six operation theatres were functional immediately, and emergency life-saving surgery started within 2 hours. A total of 35 surgeries were performed on the first day, 18 of them life saving and the others for trauma care. The operation theatre remained busy round the clock. About 300 beds were vacated over the next five days to make room for the operated and injured. It was 10 days before regular services were resumed in TUTH.

Tribhuvan University Teaching Hospital’s preparations since 2006 helped it to meet this catastrophe with clockwork efficiency. Overall, 1812 earthquake victims reported to TUTH’s Emergency Room, 613 major surgeries were performed and 561 victims were treated as inpatients. There was an intense sense of national pride. No foreign medical experts were used in the operation theatre.

**DEVASTATION MEETS DETERMINATION: 25 APRIL 2015**

**TRIAGE** is the process of deciding which patients should be treated first, based on how sick or seriously injured they are. This type of categorization of the sick or wounded is especially important when there are insufficient resources for medical care of everyone at once, or when there are huge influxes of patients, as in the case of disasters.
The Government of Nepal swung into action with amazing speed and efficiency. The planned responses in the event of a disaster were activated right away. A series of actions led the way for coordinated and effective action. The Government of Nepal declared a state of emergency in the affected areas. Immediately after the earthquake, the Central Natural Disaster Relief Committee (CNDRC) held an emergency committee meeting chaired by the then Minister of Home Affairs, Mr. Bamdev Gautam. The National Emergency Operations Centre (NEOC), located at the Ministry of Home Affairs (MoHA), was responsible for coordinating the overall response, including search and rescue. A command post was set up under the leadership of the Home Secretary with secretaries from other ministries. The needed financial resources from the Prime Minister’s Disaster Relief Fund were immediately approved. The Government activated its cluster mechanism (11 clusters: emergency telecommunications; camp management; health; education; food security; protection; shelter; water/sanitation; and early recovery), and made an official request for international assistance, including military support from India and China.

The security forces (Nepal Army, Nepal Police and the Armed Police Force) were immediately deployed for search and rescue operations. Within an hour of the earthquake, the MoHP held its first emergency committee meeting chaired by the Minister at that time, Mr. Khagaraj Adhikari, and activated the incident command system. The urgent priority was to save lives by providing treatment to the injured and restore the disrupted services to meet the increased flow of patients. The MoHP led the health response from the Health Emergency Operations Centre (HEOC), established within the premises of the MoHP in 2013. It was built for portable use in anticipation of an earthquake. It was activated within 3 hours and...
At 4 pm, the United Nations (UN) country team held a meeting. External development partners also held an emergency coordination meeting to address immediate needs and plan for the next steps.

With large numbers of the population made homeless and left without shelter, the government set up 16 camps in the open areas around Kathmandu. Initially, about 70,000 people took shelter here. With the continuing aftershocks, many were afraid to go back to their homes, even if these were not damaged. They preferred to sleep in the open, in case they were caught unawares at night by another earthquake. The fear and trauma went deep.

As darkness fell on 25 April, the Government of Nepal and partners set aside their heartaches and came to terms with the enormous challenges that loomed before them in the days and months to come. It was a time for action; there was no time for grief.

Rasmila had gone to a nearby shop before noon, leaving her two children, 10-year-old Sonia and four-month-old Sonit, at home. Suddenly the home started swaying violently and cracks started to appear on the walls. Sonia ran outside, but realized that her brother was still inside. She returned, picked up her brother and started running outside. But she could not move her trapped feet, and held her brother tightly against her chest. A wooden cupboard fell over Sonia and she lost hold of her brother. Rasmila rushed back to see her house coming down; her feet trembled and she wanted to cry out but no sound came.

Rasmila’s neighbours stared digging through the debris to rescue the children. Half an hour later, they found a little leg covered with dust. As they dug deeper, they found Sonia who was alive but unconscious. Sonit was still missing, and although the neighbours dug feverishly they couldn’t find him, and assumed the worst. Rasmila stood frozen. It was 9 pm, and the survivors were preparing to sleep out in the open. Just then, they heard a baby crying from under the ruins of the house. Rasmila knew that it was her baby. Nepal Army personnel arrived and started digging. Rasmila’s newfound hope slowly ebbed as the soldiers couldn’t find her baby.

Before dawn the next morning, neighbours started digging again and the soldiers returned. They could now hear the baby’s cry. It was 10 am when Dipak Rai of the Nepal Army pulled Sonit out of the rubble. He was covered with dirt and was not able to open his eyes, but he was alive and surprisingly unhurt.
A central information management unit was activated on 28 April 2015 in the HEOC. All agencies and partners were asked to coordinate with the HEOC.

WHO operationalized the Health Cluster mechanism for the earthquake response on 26 April.

UN OCHA established operations in Kathmandu and three field coordination hubs.

Eleven districts were identified for priority health interventions. Later, three more were added.

Pre-positioned logistics meant for health emergencies were accessed.

An epidemiologist arrived from the Regional Office to help set up an emergency surveillance system.

WHO experts in sanitation, communications, public health and logistics arrived.

WHO disbursed four interagency emergency health kits (IEHKs) followed by four more.

The Health Minister held a meeting with hospital directors in Kathmandu valley to identify needs.

WHO supported the MoHP in conducting a rapid hospital assessment.

Rapid assessments were also conducted of the 16 official campsites.

COMING TO GRIPS: A backbreaking week

Stewardship by the Government of Nepal steered the country steadily forward. With partners working shoulder to shoulder with the Government, relief activities were undertaken in a large number of areas.

The MoHP reviewed response coordination through regular meetings with the CNDRC. Regular cluster meetings were held at the MoHA, chaired by the Joint Secretaries.

WHO, as the Inter-Agency Standing Committee Global Health Cluster lead, operationalized the Health Cluster mechanism for the earthquake response on 26 April. The Health Cluster was led and coordinated by the MoHP, and comprised a group of agencies and partners working in areas affected by the earthquake to address the health needs of the affected population. Health Cluster partners were requested to provide surge capacity on the ground. The Health Cluster also participated in the inter-cluster meetings of the UN. It provided services through four broad groups of activities in the priority districts: (i) provision of clinical services; (ii) health logistics and coordination support; (iii) rebuilding of the public health system; and (iv) provision of public health services.

The MoHP coordinated the health response through the HEOC. A central information management unit was activated on 28 April 2015 in the HEOC, which was responsible for compilation of all information related to the daily situation update, disease surveillance, facility damage status, and requirements for human resources, medicines, logistics and supplies. All agencies and partners were asked to coordinate with the HEOC and contact the relevant focal persons in order to avoid duplication of effort and confusion. WHO supported the MoHP daily with cluster coordination.
The Government of Nepal decided to bear the cost of treatment for all those injured due to the earthquake. All hospitals were instructed to provide free treatment, including outpatient and surgical services to the injured. Medical services were provided through a "hub and spoke" approach. A triage system was established in all hub hospitals and their satellites in the Kathmandu valley.

Medical teams from various countries contacted the MoHP to help with the response.

The Norwegian Red Cross established a field hospital as the district hospital had been completely destroyed.

Sindhupalchok district experienced the most damage due to the earthquake. The district reported 3570 deaths, and 97–99% of the 70,766 houses had been damaged or completely destroyed. Ninety-four per cent of the health facilities in the district were completely destroyed or damaged. Eight health workers had died while 15 had injuries due to the quake.

The loss of infrastructure and human resources in the health care sector did not stop the health-care response. Immediately after the earthquake, health-care services, including deliveries and surgery, were provided in the open fields and hospital premises. By the end of the day on 25 April, about 500 patients had been treated. The second day, tarpaulins were set up in the open fields and patient triaging began. Local resources such as twigs were used to temporarily splint broken bones before referring patients to higher-level health facilities. Drugs and medical supplies were delivered by motorcycle to different health facilities in the district from the third day onwards. The seriously injured were airlifted by the security forces to Kathmandu. The fourth day onwards, routine health services were provided in medical tents. Immunization services resumed after a week of the earthquake. The Norwegian Red Cross established a field hospital as the district hospital had been completely destroyed.

The United Nations Office for Coordination of Humanitarian Affairs (UN OCHA), from their regional office in Bangkok, established operations in Kathmandu and three field coordination hubs in Gorkha, Sindhupalchok and Dolakha districts. OCHA coordinated the humanitarian activities of the UN agencies and international nongovernmental organizations (NGOs) in consultation with the Government of Nepal. External development partners also held a meeting to address immediate needs and coordinate bilateral support.

Eleven districts were identified for priority health interventions (Gorkha, Dhading, Rasuwa, Sindhupalchok, Kabhrepalanchok, Nuwakot, Dolakha, Kathmandu, Lalitpur, Bhaktapur and Namchebaj). The MoHP nominated senior directors and focal points to coordinate operations in these 11 most affected districts within the first two days. By the end of the first week, it became clear that 14 districts (in addition, Okhaldhunga, Sindhuli and Makawanpur) were also a priority for interventions. Directors of different divisions and centres of the MoHP were deployed as coordinators to the 14 most affected districts to support and supervise the response.
To identify requirements for the provision of health care, the Health Minister held a meeting with hospital directors in Kathmandu valley. The needs identified were tents (50-bed capacity): 20 for five major hospitals, or 100 in all; various essential medicines (such as antibiotics, pain-killers); oxygen; and logistics support. Hospital directors informed the Minister that they did not need outside help in terms of human resources to support them in the response in their hospitals. Other immediate needs identified were about 50 surgical kits, 20 IEHKs, and about 1000 body bags to dispose of dead bodies. The Government’s dead body management guidelines were used for disposal.

On 28 April 2015, WHO supported the MoHP in conducting a rapid hospital assessment in 12 affected districts. Nine teams were deployed and a risk assessment tool used. Seven of the 11 public hospitals assessed in Kathmandu valley and 16 private hospitals assessed were found to be functional. Three of the public hospitals had increased their bed capacity by 50–70% above pre-earthquake levels. TUTH and Dhulikhel Hospitals managed large surges in inpatients. Rapid assessments were also conducted of the 16 official campsites. These estimated that over 24 000 people were still living in the camps. Initially, military medical teams from Nepal and Bangladesh provided health-care services, and established basic water and sanitation facilities in the camps. Health desks were established in 13 camps in the Kathmandu valley. However, water and sanitation were a major cause for concern.

The Government of Nepal decided to bear the cost of treatment for all those injured due to the earthquake. All hospitals were instructed to provide free treatment, including outpatient and surgical services to the injured. The Government would reimburse private hospitals for the number and type of surgical cases. For ICU care, the Government provided NPR 3000/day, for a major surgery NPR 25 000, and for spinal surgery or neurosurgery or more than one major operation NPR 50 000.

A Casualty Triage Desk was set up at the Tribhuvan International Airport for basic initial symptomatic management and referral of airlifted patients to hospitals in the Kathmandu valley.

The UN launched a Flash Appeal for Nepal for an amount of USD 422 million.

The MoHP mobilized approximately USD $330 000.

The MoHP instituted public health measures and WHO carried out a needs assessment for water, sanitation, and hygiene (WASH) in all affected districts with the help of partners.

The International Committee of the Red Cross provided support for the management of dead bodies, and helped the Nepal Red Cross Society trace and reunite missing relatives.

Sub-clusters for mental health and reproductive health were formed.

By 1 May, a total of 24 999 patients had been treated in different hospitals in and outside the Kathmandu valley, and 3249 admitted for hospital services.
Private hospitals were asked to provide free treatment for smaller injuries and OPD services to the victims as part of corporate social responsibility. The Government would provide public hospitals with a lump sum for the management of earthquake victims.

Humanitarian support poured in from all corners of the world. Several partners provided medical, surgical, search and rescue teams, while others provided funds, tents, water filters and other material support such as shelter materials, food, body bags and medical equipment. Several provided support for water, sanitation and hygiene (WASH), commodities that were in very short supply.

Medical services were provided through a “hub and spoke” approach. Six pre-identified emergency hubs within the Kathmandu valley (Shree Birendra Hospital, Bhaktapur Hospital, Bir Hospital, Civil Service Hospital, Patan Hospital and TUTH) were activated to provide medical services to the injured, including those referred from other districts. Three hub hospitals were also established in Dhulikhel, Pokhara and Bharatpur.

A triage system was established in all hub hospitals and their satellites in the Kathmandu valley. Colour-coded bands were applied on patients after they were brought in to separate them according to the urgency of health care they needed.

Medical teams from various countries contacted the MoHP to help with the response. The continuing aftershocks delayed the arrival of many foreign medical teams (FMTs), as the runway had to be checked after each of the aftershocks to assess damage. The MoHP and WHO worked together with the Nepal Army to coordinate the deployment of FMTs to the severely affected districts. By the second day, four medical teams were sent to Gorkha and one to Bhading, districts that were the worst hit.

Twelve FMTs were already in the country by the third day. An FMT Coordination Committee was formed to register them and coordinate deployment. It was led by the MoHP focal point for international teams (the Executive Director of the Nepal Health Research Council), and the WHO coordinator for FMTs. Within the week, the FMT Coordination Cell (FMTCC), supported by OCHA/United Nations Disaster Assessment and Coordination (UNDAC) team members, was established for information management of FMTs and facilitation of registration. Registration of FMTs took place at the MoHP’s HEOC and Tribhuvan International Airport.

Triage: prioritizing the seriously injured
April 2015, Dhading

When the earthquake struck on 25 April, Dr Basila Amatya, a medical superintendent from Dhading district, rushed to her post. As a flood of patients began pouring in, many with multiple fractures, spinal cord and head injuries, Dr Amatya was able to provide the leadership necessary to coordinate triage efforts. “I knew that in a disaster situation, unless a coordinated triage effort is maintained, the seriously sick can easily be overlooked and neglected. Triage allows patients to be segregated according to the seriousness and urgency of their injuries. As I had been given triage management training some months ago, organized by WHO and Ministry of Health and Population of Nepal, thankfully I could oversee the efforts of the health teams to ensure that the seriously injured received priority attention.” Preparedness pays rich dividends!
NEPAL EARTHQUAKE 2015: HEALTH FACILITIES DAMAGED AND FMT DEPLOYMENT

Note: Location of FMTs are randomly assigned in a VDC. Mobile FMT is assigned to a single VDC. FMT with unknown location is assigned to a district headquarters.

FMT data as of: 25 May 2015 (13:00 hrs)
Map produced: 25 May 2015
Registration was also possible through the WHO website. A reporting form for FMTs was developed by the MoHP with WHO’s help. The FMTCC provided daily information on FMTs and where they were deployed to the HEOC and other partners. Regular FMT coordination meetings were also held to interact with and get updates from FMTs in the field.

FMTs were classified as Type 1 (outpatient initial emergency care of injuries and other significant health-care needs); Type 2 (inpatient acute care, general and obstetric surgery for trauma and other major conditions); and Type 3 (inpatient referral surgical care, including intensive care capacity). Four district hospitals that had been destroyed were replaced by mobile field hospitals managed by FMTs. A “hub and spoke” approach was used to deploy different types of FMTs based on their capacity, expertise and local needs. FMTs were provided with standard guidelines and asked to use national protocols while managing cases (e.g. emergency trauma protocol on open fracture, spinal cord injuries, etc.) to ensure uniformity in treatment and referral mechanisms. They were also required to maintain detailed records of patients who needed major interventions such as amputations and those who needed follow up and rehabilitation. Additionally, they were required to send daily reports of patients attended to using a template issued by the MoHP. There were a total of 137 registered FMTs that provided medical services during the earthquake response. In all, they provided over 100,000 consultations. They were of three classes: military 12% (16), government–civil 18% (25), and nongovernment and nonmilitary 70% (96).

On 29 April 2015, the UN launched a Flash Appeal for Nepal for an amount of US$ 422 million. This was required to meet the critical humanitarian needs of the affected population for five months, taking into account the effect of the monsoon season on emergency operations.
COORDINATION STRUCTURE OF HEALTH CLUSTER PARTNERS

**PRODUCTS**
- Situation reports from districts
- Health Cluster bulletin
- Situation reports
- Assessment reports
- Technical guidelines
- Mapping of facilities, services
- Surveillance reports
- Health information/communication materials

**A LENS ON THE ACTION**

<table>
<thead>
<tr>
<th>Coverage of FMTs by type</th>
<th>FMT type</th>
<th>Number of FMTs</th>
<th>% of FMTs</th>
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<td>Type 1 – mobile</td>
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<td>Type 2</td>
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Source: FMT Coordination Cell

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<th>FMTs operating temporary field hospitals</th>
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<td>District</td>
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<td>Bajura</td>
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<td>Dolakha</td>
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Source: FMT Coordination Cell

End of operations if NGO was not originally based there
For NGOs with regular presence prior to emergencies – phase out emergency work and continue development work

NOTE: some organizations directly deployed teams to districts/affected areas

NGOs

Private structure

Offer assistance to

To Ministry of Health and Population (MoHP)

Health Cluster Coordination
(co-lead: WHO and MoHP)

Organizations are directed to
Health Cluster coordination system

Participate in joint planning, matching to areas – geographical and technical; join specific working groups/sub-clusters; provide regular reporting

Cluster partners implement their contribution to the joint cluster plan and work closely with local health authorities in districts

NOTE: some organizations directly deployed teams to districts/affected areas

To WHO

Volunteers

Researchers

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For NGOs with regular presence prior to emergencies – phase out emergency work and continue development work

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NOTE: some organizations directly deployed teams to districts/affected areas

To WHO

Volunteers

Researchers
By 1 May 2015, the MoHP had mobilized approximately US$ 330 000 (US$ 130 000 from the Government’s regular budget and US$ 200 000 from the Prime Minister Disaster Relief Fund) for the procurement of medical supplies, and prevention and control of disease outbreaks.

Along with provision of treatment, the MoHP instituted public health measures. It disseminated messages through radio and television, and printed information to raise awareness of disease outbreaks in all affected districts. WHO carried out a needs assessment for water, sanitation and hygiene (WASH) in all affected districts with the help of partners. By the end of the first week, several camps in Lalitpur district had been provided with safe water, mobile toilets and pit latrines. WASH assessment in three major hospitals, one primary health centre (PHC), and a temporary clinic showed that there were no issues of water and toilets in the hospitals, while the clinic had no water and the water quality at the PHC was not good. WHO provided a water tanker and storage tank for the clinic.

The International Organization for Migration (IOM) conducted public health assessments in IDP camps, and assessed the needs of patients discharged from hospitals for transport, shelter and other assistance. The International Committee of the Red Cross provided support for the management of dead bodies, and helped the Nepal Red Cross Society trace and reunite missing relatives.

Mental health services were initiated within the first week. The population was severely traumatized and many were unable to come to terms with their grief and loss. WHO had been piloting a mental health programme in PHCs in Nepal for the past 3 years. With IOM and MoHP as partners, it was decided to focus initially on three of the hardest-hit districts – Nuwakot, Sindhupalchok and Dhading.

At the end of the first week, more than 78 FMTs were in the country and 48 were tasked with delivering care in the severely affected districts, where they were beginning to reach with the help of OCHA. The initial need was for the provision of psychosocial services as well as services for special populations such as pregnant health workers, police, and others. The Nepalese Army and Police were also provided with psychosocial support.

WASH activities

Joint lab was set up with capacity to perform 53 different tests, 200 samples/day.

Chlorination of water was carried out.

Life straw™ community filters were distributed to community-level health facilities.

2000 L water tanks were provided to health facilities with no water facilities.

Hand washing points were installed in health-care facilities where required.

Medical waste management was set up in 15 health facilities in the Kathmandu valley.

Autoclaves were supplied where needed.

More than 200 water storage tanks were provided in 14 camps in the Kathmandu valley.

Hygiene education and information materials were provided to 77 160 people in 7 severely affected districts (Gorkha, Dhading, Dhalke, Sindhupalchok, Kathmandu, Lalitpur and Nepal).

Pit latrines were built in temporary shelter sites.

By 22 May 2015, about 900 000 people had received emergency water interventions, 287 982 were provided with sanitation facilities and 287 982 were provided with hygiene kits.
women, neonates and lactating mothers. Sub-clusters for mental health and reproductive health (RH) were therefore formed.

More than 30 Health Cluster members and external development partners provided support and assessed the health-care needs of the affected population in remote areas. They also established temporary sanitation facilities and helped with the management of dead bodies.

Several partners provided material support. The United Nations Children’s Fund (UNICEF) supplied 70 health kits, 3810 blankets, 90 survival kits, three tents and intravenous fluids, which were sent to some of the priority districts. A fresh order for more supplies was placed on 1 May 2015. WHO provided tetanus toxoid vaccine for use from the Regional Office, as well as 100 bottles of water filters (Life straw”). Direct Relief sent five mechanical ventilators and five portable X-ray machines. UNICEF sent essential maternal and neonatal health-care drugs, supplies and tents to Dhading, Gokha, Nawaleg, Ramchhap and Sindhupalchok districts. Two tents, 15 emergency health kit medicines, five surgical instruments, abdominal sets, 10 surgical instruments, and basic surgery sets were transported to Dolakha district on 2 May 2015.

Six hospitals were identified for providing referral care for emergency reproductive health (RH) and obstetric services. The United Nations Population Fund (UNFPA) with the MoHP developed a format for assessing RH services in the affected districts, and finalized the guidelines for post-maternity care. Along with partners, it also initiated the RH response in Kabhrepalanchok and Dhading districts.

As of 1 May 2015, a total of 24,999 patients had been treated in different hospitals in and outside the Kathmandu valley, and 3249 admitted for hospital services. At that point in time, it was estimated that 2,240 people had died, and 14,122 had been injured.
From 1 May 2015, the HEOC started producing a daily situation update report. The daily situation updates were linked with the other emergency operations, mainly with FMTs and human resource deployment, logistics supply and resource mobilization. The capacities and areas of expertise of about 60 FMTs were mapped and matched against needs. A 24-hour toll-free number was also set up at the HEOC to help people access general information regarding treatment services and address grievances.

A Medicine and Equipment Customs Release Desk was established on 1 May 2015 at Tribhuwan International Airport to support speedy release of drugs and medical equipment at the customs office, and channel other health-related international support measures such as food and drinking water. Items received at the airport were cleared after recording all the levied taxes, duties and fees in an account of the local offices of concerned agencies in Nepal. An official from the Policy, Planning and International Coordination Division (PPICD) of the MoHP was present at the airport to expedite the customs clearance of medical goods and teams. At other customs offices, a Relief Materials Recommendation Committee was responsible for clearing all the materials imported for the purpose of rescue and relief, recording all the levied taxes, duties and fees. Chief District Officers were directed to send details of such imported goods to the CNDRC.

With medicines and other essential items in short supply, it was hard to provide treatment. The Logistics Management Division repackaged medicines and sent these to various districts as per need. WHO provided a mobile storage unit on the premises to ensure additional storage space for medicines and supplies. However, transportation of medical supplies remained a key challenge, as air transportation to areas not accessible by road was limited, in part because of bad weather.

The first month

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The number of OPD and trauma cases has been decreasing by the end of the first month in Kathmandu valley hospitals, but the situation outside the valley was still fluid.

The Injury Rehabilitation Sub-cluster formed on 19 May with 35 organizations. Later, it identified a number of large step-down facilities for trauma care and established hotlines.

On 12 May, a quake measuring 7.3 on the Richter scale shook the already shaken people.

WHO provided 4000 hygiene kits to the Water Supply and Sanitation Offices for distribution to people in the affected districts.

WHO deployed surveillance medical officers (district support officers (DSOs)) to the 14 highly affected districts.

WHO provided logistical support to the National Tuberculosis Centre to trace TB patients, including patients with multidrug-resistant (MDR)-TB.
totally damaged, and there were no water or sanitation facilities, though limited outpatient departments were functioning. These would require long-term support for 2–6 months from FMTs. Partners were identified for all four field hospitals with provision of surgical, obstetrics, outpatient and inpatient care. Nineteen field hospitals were set up in total. Setting up these facilities began in the first week of May.

Continuous rain hampered relief efforts and raised concerns over potential outbreaks of diarrhoea and waterborne diseases, especially in the camps. WHO set up a surveillance system for outbreak-prone diseases, helped the MoHP strengthen disease surveillance and respond to communicable disease alerts, and collected information on bed occupancy rates and health-care services being provided by Health Cluster partners, and health-care needs and gaps in underserved areas. A report of a diarrhoeal disease outbreak affecting about 100 people in an IDP camp was jointly investigated by WHO and the MoHP, and samples were sent for testing. No outbreaks of waterborne diseases were reported.

On 2 May 2015, the Chinese Medical Team and the National Public Health Laboratory set up a joint laboratory with the capacity to conduct 53 different kinds of tests (including for common infectious diseases, water quality, etc.) on 100 samples per day. By 14 May 2015, 282 samples had been collected (180 water samples, 46 stool samples, 56 throat swab samples) from seven districts and 238 of these samples had been tested.

The Chinese Medical Team also trained up two rapid action special teams to conduct communicable disease prevention and control at focal areas. Between 30 April and 14 May 2015, the MoHP and Chinese Medical Team provided training to 948 health personnel on laboratory tests, specimen collection, field disinfection, surveillance and similar subjects.

Due to the heightened risk of communicable diseases, including waterborne diseases and acute respiratory tract infections, the MoHP, HEOC and WHO introduced the epidemic-prone disease control measures and established health camps in the affected districts. By 26 May, 130 Health Cluster partners were working in the 14 most affected districts. Most FMTs had ended operations, and 42 teams remained. By the end of the first month, a total of 88,482 people remained displaced in 373 sites in 12 of the 14 severely affected districts.
number of OPD and trauma cases had begun decreasing in Kathmandu valley hospitals, but the situation outside the valley was still fluid. There were no gaps reported in surgical or trauma care. However, one of the biggest needs was follow up for earthquake-injured patients, and support for transportation, shelter and rehabilitation. The Injury Rehabilitation Sub-cluster formed on 09 May had 35 organizations. It reported that about 1000 patients needed ongoing care, of whom about 700–800 needed orthopaedic care.

early warning and response system (EWARS). It had two components – a health facility-based surveillance system from surveillance sites in the 14 affected districts, and event-based surveillance. The former included 46 hospitals and temporary camps in Kathmandu valley and 21 hospitals outside it. Since 2 May, the facilities provided daily reporting on four syndromes (respiratory infections, acute watery diarrhoea, bloody diarrhoea and fever of unknown origin) from 60 surveillance sites. From 28 May, 38 hospital sites in the 14 most affected districts sent regular reports. The second type of surveillance was prospective or event-based surveillance and rumour verification to detect outbreaks of epidemic-prone diseases in hospital outpatient departments. Rapid response teams were mobilized to verify rumours, and prevent and respond to potential disease outbreaks in all affected districts. Some cases of chickenpox were verified by these teams in village development committees (VDCs) in Gorkha and Dhading districts. The teams also investigated reports of diarrhoea and influenza. Vigilance and preparedness to manage such outbreaks were stepped up in all facilities, both central and peripheral, and health workers were alerted. On 16 May, the MoHP and Chinese team organized a three-day training course for health workers on communicable disease surveillance in a post-disaster situation.

Simultaneously, other public health measures were also conducted. WHO assessed medical waste management in several mobile clinics and found that the waste was not being disposed of correctly. Together with local NGOs, it addressed this issue by putting in place proper management systems, segregation of waste and waste treatment technology. WHO also partnered with the Department of Water Supply and Sewerage to monitor water quality in all the camps using the mobile laboratory that had been set up. The National Public Health Laboratory tested water samples from Gorkha, Kathmandu and Lalitpur. As a precautionary measure, bleaching powder was distributed to the affected districts.

FMTs worked closely with district health officers, supported by WHO district-level focal points. Although the MoHP had stated that more FMTs were not needed, specialized physical rehabilitation teams consisting of physiotherapists, occupational therapists and rehabilitation physicians were welcome, as there was a huge shortfall in these areas. By that time, the
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The MoHP and MoHA coordinated with each other for the management of dead bodies. As of 15 May, a total of 8187 out of 8233 dead bodies were handed over to relatives, including 79 from the 12 May earthquake. The remaining bodies were kept at TUTH awaiting identification.

WHO together with UNICEF provided support to the National Health Education Information and Coordination Centre (NHEICC) to expedite preparation of a post-earthquake communications plan. The purpose of the plan was to communicate health risks directly with the affected communities through frontline health workers and civil society organizations, and aid interpersonal communication, especially among people in the 14 worst affected districts. It outlined the needs, stakeholders/audiences and strategic approaches. It also proposed activities to be implemented in the next 6 months, and mechanisms for carrying out monitoring and evaluation. WHO provided health-related information to the package developed by UNICEF for the purpose. The post-earthquake communications plan was endorsed by the MoHP on 15 May 2015. Following endorsement, it was sent to the District Planning Oversight Committee and training and orientation conducted for frontline health communicators.

DOWNED AGAIN BUT NOT OUT!

Before Nepal had a chance to pick itself up, a fresh tremor flattened the country yet again on 12 May. An aftershock measuring 7.3 on the Richter scale shook the already shaken people. Landslides were also reported from a number of places in Dolakha, Gorkha, Rasuwa and Sindhupalchok. In response to a request by the MoHP, WHO provided medical tents for five hospitals to expand the capacity, as the flow of injured patients suddenly increased after the second earthquake.

On 13 May, to manage the rush of fresh injuries, the MoHP deployed a type 2 field hospital jointly managed by teams from Nepal and India in Charkot, Dolakha, one of the most affected districts, as surge to support existing teams. Temporary field hospitals were established in Bhitapur, Chhauni, Laganikhel, Sirumangal and Singhadurbar area in the Kathmandu valley, and in Sindhupalchok, Kathmandu valley, and Rasuwa districts outside the valley with the help of different medical teams and support received from Bhutan, Canada, China, Czech Republic, France (MSF), Germany, India, Israel, Japan, Norway, Pakistan, Qatar, Red Cross, and Thailand. A total of 72 FMTs officially deployed through the Nepal Government were working in earthquake-affected districts at the time. The MoHP requested all FMTs to remain in the country.

Nepal's first responders continue to be critical part of quake response

Nepal’s first responders are a critical part of the MoHP and WHO-coordinated health-care response, and are frontline defenders of the health of their communities. Following the two earthquakes of 25 April and 12 May, health-care workers were placed under severe strain. They had to deal with personal losses, but their professional and volunteer obligations meant that they had little time to pause.

Nirmala Acharya, a female community health volunteer in Kabhrepalanchok District, just east of the Kathmandu valley, is a case in point. Despite the destruction of her house and the economic burden on her family, Acharya insisted on performing her duties in the immediate aftermath of the quake.

“I have gone to every village and all the households within the ward and talked to the mothers in the community regarding hygiene and sanitation, and have been explaining the importance of using boiled water,” she says.

Even after the emergency phase is over, Acharya will go on disseminating MoHP and WHO-approved messages within her community during the rainy season, when the risks of communicable disease outbreaks are most pronounced.

“I want to do social work and assist my community,” Acharya asserts.
WHR deployed surveillance medical officers (district support officers [DSOs]) to the 14 highly affected districts as WHD Emergency District Support (WEDS) to aid district health authorities in sector coordination, assessment, surveillance and logistics in the districts. These officers supported the district health offices (DHOs) in coordinating the response and strengthening disease surveillance. WHD started a weekly planning meeting between the central-level operation team and the DHOs to better streamline needs, priorities and response. The first such meeting was held on 17 May 2015. This highlighted that the 12 May earthquake had caused additional damages to health facilities in several districts, especially Dolakha, Gorkha, Kâhârvâlpâchok and Sindhulpâchok districts, which needed to be prioritised for action. Electricity, telephone, transportation, accommodation and Internet facilities in all 14 districts were severely affected and most DSOs were operating from tents. Operational Health Cluster meetings were held in the above-districts, and others that were severely affected.

The WHD WASH Team together with the Kathmandu District Public Health Office (KDPHO) carried out an assessment of WASH facilities in various health facilities in and on the outskirts of Kathmandu Valley. WHD provided 4000 hygiene kits to the Water Supply and Sanitation Division Offices of Dhading, Dolakha, Kâhârvâlpâchok, Lalitpur, Nuwakot and Sindhulpâchok districts for distribution to the affected people.

Reproductive health (RH) services, especially emergency services (emergency obstetrics and newborn care) in the most affected districts remained disrupted. With about 10 000 deliveries each month, 1500 of which were likely to be complicated, provision of services was an urgent need. The MoHP identified focal agencies to coordinate RH services at the district level for all 14 affected districts. The RH Sub-cluster was formed in Gorkha on 14 May, followed by one in Sindhulpâchok. WHD, in consult with the MoHP’s Child Health Division, prepared and printed national RH treatment protocols on the Integrated Management of Childhood Illness (IMCI) as posters for distribution to health facilities, partners and PMTs. UNFPA and International Planned Parenthood Federation (IPPF) provided RH services to some of the most affected districts. UNICEF, with Nepal Public Health Association and Centre for Public Health Development, established 22 shelter homes for women needing care postpartum, and for neonates and children.

The Child Health Division of the MoHP, jointly with WHD, UNICEF, Save the Children and Population Services International commenced an Integrated Management of Neonatal and Childhood Illnesses (IMNCI) readiness assessment in Nuwakot and Rasuwa on 19 May. This involved interaction with the DHO and health facility, and training for female community health volunteers (FCHVs).

The Mental Health Sub-cluster had been mapping partners providing mental health and psychosocial services to ensure better coordination. The mapping helped to link all those providing such services. The need for psychosocial support increased as people began to come to terms with the situation. By 22 May, 26 160 people had received psychosocial counselling. The Sub-cluster also developed criteria and a simple tool for referral from community-based care to clinical care, available in both English and Nepali. The MoHP deployed surveillance medical officers (district support officers [DSOs]) to the 14 highly affected districts as WHD Emergency District Support (WEDS) to aid district health authorities in sector coordination, assessment, surveillance and logistics in the districts. These officers supported the district health offices (DHOs) in coordinating the response and strengthening disease surveillance. WHD started a weekly planning meeting between the central-level operation team and the DHOs to better streamline needs, priorities and response. The first such meeting was held on 17 May 2015. This highlighted that the 12 May earthquake had caused additional damages to health facilities in several districts, especially Dolakha, Gorkha, Kâhârvâlpâchok and Sindhulpâchok districts, which needed to be prioritised for action. Electricity, telephone, transportation, accommodation and Internet facilities in all 14 districts were severely affected and most DSOs were operating from tents. Operational Health Cluster meetings were held in the above-districts, and others that were severely affected.

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A LENS ON THE ACTION

District Health Officer Suraj Rajibhandari says that since the first quake hit, all efforts have been made to ensure that women in outlying areas unable to access facilities were assisted to maternity clinics at a Norwegian Red Cross field hospital in Chautara and a Japanese Red Cross Society primary health-care facility in Melamchi.

“We have airlifted so many women who have gone into labour. On the day before yesterday, a woman was brought in from Tamangchhe, a town near the China border, and she delivered a baby here. Yesterday we airlifted a woman who had gone into pre-term labour, and then referred her on to Kathmandu. Today, we are going to airlift one more woman who is having a premature delivery,” he said. “We are focusing on providing access to maternal and child health-care services with the help of UNFPA and UNICEF,” he said. According to Rajibhandari, approximately 100 babies had been delivered by health workers in the district since the first quake, including two within the district since the first quake hit, all efforts have been made to ensure that women in outlying areas unable to access facilities were assisted to maternity clinics at a Norwegian Red Cross field hospital in Chautara and a Japanese Red Cross Society primary health-care facility in Melamchi.

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What is a step-down facility?

A step-down facility provides an intermediate level of care for patients with requirements for care that can be given outside of a hospital. It is for patients who are stable enough to be discharged from hospital, but not yet able to care for themselves, as may be the case after surgery, amputation, or other severe illness. The level of care is between a hospital and the home, and is given to people who need little or no monitoring. In the case of Nepal, people without any caregivers were also kept in step-down facilities till they were able to take care of themselves.
A LENS ON THE ACTION

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Photo by Omar Havana
As the Health Cluster lead, WHO continued to coordinate medical relief through Health Cluster coordination at the central level and operational cluster meetings in the highly affected districts, with priority given to the severely affected areas. Gradually, the Health Cluster response operation was decentralized with a focus on district response and planning. Efforts to reach remote areas were prioritized. With the monsoons just around the corner, the Health Cluster and the WASH Cluster jointly developed a contingency plan for floods and landslides.

By 2 June 2015, 16 temporary field hospitals run by FMTs, several national medical teams and more than 130 FMTs had been deployed for health-care service delivery in the affected districts. Many of them also went to hard-to-reach areas with the necessary logistics via helicopters, and those who needed referral were airlifted to Kathmandu. The difficult terrain and bad weather conditions made it very difficult to reach remote areas for health service delivery. On 2 June, four medical aid workers were killed in a helicopter crash in Sindhupalchok district.

In collaboration with the World Food Programme (WFP), UNICEF, UNFPA, IOM and International Medical Corps, WHO started modelling the medical camp kit (MCK) from Bharatpur hub to assemble the camp as a temporary facility in priority VDCs in the affected districts. The MCK is a complete package of temporary tents with essential equipment and supplies to begin primary health-care services in areas where health facilities have been completely destroyed. It was planned that in the first phase, 10 of 50 MCKs would be set up by the first week of June 2015. This was done to restore continuity of services during the rainy season, as it was not possible to construct permanent structures. The MCKs had male and female wards, a delivery room, a consultation room and staff rooms. They were solar powered, and had water and sanitation kits, as well as facilities for the provision of RH. At the end of two months, about 17 of these had been assembled.

By 6 June, the MoHP deployed 58 doctors who had studied under government scholarship to the earthquake-affected districts as part of their mandatory service to the Government of Nepal. The MoHP confirmed that free follow-up services would be provided for a period of one year in public hospitals in Kathmandu and the district hospitals in the 14 most affected districts.

The need for medicines, supplies and other logistics continued unabated. By 10 July, over 214.8 metric tons of health logistics including 23 MCKs, 355 tents, 335 IEHKs and 191 surgical kits were provided to affected districts and medical camps. Over 48 tons of supplies and medicines were provided to more than 4 million people in the 14 most affected districts.

To ensure that a similar disaster would find Nepal fully prepared to meet every eventuality, the MoHP developed standard guidelines for post-disaster reconstruction of health facilities to provide guidance for reconstruction work. The guidelines provided technical specifications and other specific requirements that had to be considered before construction.

Reproductive health needs were considered by UNFPA, which provided 6.4 million women of reproductive age, including about 13,000 pregnant women, needed RH services in the districts.

Mental health services were also a significant need at the community, primary and secondary levels of care and were stepped up.
Health-care service delivery by types of hospitals until 8 June 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Outpatients</th>
<th>Inpatients</th>
<th>Major surgeries</th>
<th>Minor surgeries</th>
<th>Trauma cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public</td>
<td>Private</td>
<td>Community/HMO</td>
<td>Ministry</td>
<td>Total</td>
</tr>
<tr>
<td>Outpatients</td>
<td>97,792</td>
<td>10,086</td>
<td>12,288</td>
<td>5,339</td>
<td>12,419</td>
</tr>
<tr>
<td>Inpatients</td>
<td>22,052</td>
<td>11,058</td>
<td>6,775</td>
<td>808</td>
<td>13,193</td>
</tr>
<tr>
<td>Major surgeries</td>
<td>1,793</td>
<td>515</td>
<td>485</td>
<td>81</td>
<td>2,335</td>
</tr>
<tr>
<td>Minor surgeries</td>
<td>9,539</td>
<td>102</td>
<td>361</td>
<td>352</td>
<td>4,058</td>
</tr>
<tr>
<td>Trauma cases</td>
<td>9,330</td>
<td>3,420</td>
<td>2,349</td>
<td>1,746</td>
<td>15,644</td>
</tr>
</tbody>
</table>

Summary of effects of the disaster on the health sector

<table>
<thead>
<tr>
<th>Disaster effect (NPR million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health sector</td>
</tr>
<tr>
<td>Damage</td>
</tr>
<tr>
<td>5,422</td>
</tr>
</tbody>
</table>


Summary of total needs

<table>
<thead>
<tr>
<th>Health sector</th>
<th>Amount in million NPR</th>
<th>Amount in million USD</th>
<th>Percentage of total needs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14,690</td>
<td>147,200</td>
<td>2.2%</td>
</tr>
</tbody>
</table>


Trauma cases reported in the 14 most affected districts

<table>
<thead>
<tr>
<th>District</th>
<th>Total trauma cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHAKTAPUR</td>
<td>342</td>
</tr>
<tr>
<td>DHAKING</td>
<td>673</td>
</tr>
<tr>
<td>DOLAKHA</td>
<td>624</td>
</tr>
<tr>
<td>GORKHA</td>
<td>384</td>
</tr>
<tr>
<td>KATHMANDU</td>
<td>729</td>
</tr>
<tr>
<td>KABHRE</td>
<td>647</td>
</tr>
<tr>
<td>LALITPUR</td>
<td>423</td>
</tr>
<tr>
<td>MAKARANPUR</td>
<td>325</td>
</tr>
<tr>
<td>NARANSOT</td>
<td>329</td>
</tr>
<tr>
<td>NAWALPARASI</td>
<td>313</td>
</tr>
<tr>
<td>RAMEHPUR</td>
<td>111</td>
</tr>
<tr>
<td>BASAIKA</td>
<td>47</td>
</tr>
<tr>
<td>SINDULI</td>
<td>576</td>
</tr>
<tr>
<td>SINDUPALCHOK</td>
<td>627</td>
</tr>
<tr>
<td>Grand total</td>
<td>15,673</td>
</tr>
</tbody>
</table>

Source: Epidemiology and Disease Control Division (EDCD), 2016 (data until 19 June 2015)

148 spinal injury cases
(Source: Spinal Injury Rehabilitation Centre, April 2016)

41 amputations
(Source: Nepal Disability Fund, Ministry of Women, Children and Social Welfare, April 2016)

Final toll:
8856 deaths, 22,309 injured
(Source: Nepal EQ 2015 DRR portal, accessed 2 June 2016)
Together with the National Planning Commission, WHO supported the government to conduct a post-disaster needs assessment (PDNA) in all 14 affected districts in the areas of health, nutrition and WASH. The findings of this assessment formed the basis for the International Conference on Nepal’s Reconstruction, organized by the Nepal Government on 25 June 2015. Nepal’s donor partners and neighbours pledged a total of US$ 4.1 billion, against a PDNA of US$ 7 billion. The amount estimated for district-level reconstruction needs was NPR 8407 million, and that for central-level reconstruction needs was NPR 6283 million. However, these figures did not take into account some intangible costs, such as years of life lost due to premature death, socioeconomic impact of disability, loss of health workers, and other longer-term impacts on society. In addition, these estimates did not account for inflation and were taken at current prices.

According to the PDNA, rebuilding the health sector would require 2.2% of the total need for reconstruction. However, again, some intangible costs were not accounted for, such as the loss of lives of health workers, delay in services due to damages, shortage of supplies and lack of infrastructure.

During this phase, public health priorities included standardizing assessments, ensuring coverage of all areas, preparing for the monsoons, restoring primary health services and providing rehabilitation support to patients discharged from hospitals.

The hospital-based surveillance reporting form was revised to include eight syndromes – influenza-like illness, severe acute respiratory infection, acute watery diarrhoea, acute bloody diarrhoea, suspected cholera, fever with rash, fever with jaundice, and fever without rash and jaundice. A slight increase in cases of bloody diarrhoea was observed, but there was no clustering. There was a stable trend in all eight syndromes.

Reports on more than two dozen events of diarrhoea, dysentery, fever, influenza, rash with fever and conjunctivitis reported from different sources in the affected districts were investigated and verified by rapid response teams from the respective district health offices and the Epidemiology and Disease Control Division (EDCD). Timely response played a crucial role in averting further transmission of an outbreak of viral hepatitis in Barpak, Gorkha and a reported outbreak of dysentery in Sindupalchok. An outbreak of acute gastroenteritis was reported from Kathmandu three months after the earthquake. About 1000 cases of acute gastroenteritis were identified, out of which around 100 cases were laboratory confirmed as being cholera positive. The outbreak was adequately managed with no deaths. All outbreaks were promptly responded to and controlled. The emergency surveillance system was later integrated with the normative routine surveillance system.

The EDCD carried out daily event monitoring. All highly affected districts enhanced surveillance and asked all peripheral health facilities and health workers to be on high alert. To prepare hospitals for a possible increase in emerging infectious diseases such as dengue, the EDCD conducted training for a group of physicians from major hospitals in Kathmandu valley.

The Japanese Red Cross conducted a two-day workshop on preparedness for diarrhoeal diseases for health post staff.

Investigating rumours of disease outbreaks: rapid response teams

In post-quake Nepal, investigating and verifying rumours of disease outbreaks is the mainstay of Usha Kiran’s work. The Surveillance Medical Officer is stationed in Gorkha District, the epicentre of the 25 April quake and one of the 14 most affected districts in Nepal. Kiran says the possibility of a disease outbreak among its 271,000 residents remains a core concern.

“Since the initial days following the quake, disease outbreaks have been something we have all been cognizant of and alert to, especially the public. The prospect that endemic diseases could gain greater traction than usual as a result of the quake’s impact on water and sanitation has been of concern.”

On 7 July, rumour spread in Gorkha Bazaar, the headquarters of the western region district, that deaths had occurred as a result of an outbreak of diarrhoeal disease in Kerauja, a village development committee in the district’s north-east. Contingency plans were executed immediately, says Kiran. “The District Public Health Office (DPHO) dispatched a health worker within hours to investigate and report back to the DPHO where its rapid response team was waiting.”

After speaking with officials at the local health post as well as villagers in the area, Bijay Kumar Shrestha, the health worker conducting the investigation, concluded that no outbreak had occurred. Rather, he found that the deaths were caused by a landslide. The news came as a relief. However, procedures are in place to act swiftly in the event of a confirmed outbreak. Preparedness is key to achieving public health outcomes.
Mental health services were also a significant need at the community, primary and secondary levels of care. These were stepped up. Hotline numbers were set up for mental health services. Save the Children provided mental health and psychosocial services in Dolakha district. A Mental Health GAP Humanitarian Intervention Guide (mhGAP HIG) training was conducted for doctors working in 11 severely affected districts to increase their competency to diagnose and manage common mental disorders at PHCs and district hospitals. An mhGAP training of trainers was also conducted.

Reproductive health needs were estimated by UNFPA; about 1.4 million women of reproductive age, including about 93,000 pregnant women, needed RH services in the districts. The priority of the Health Cluster partners was to support the MoHP in ensuring uninterrupted access to essential and life-saving health care for all pregnant women, mothers, newborns and children through the provision of essential drugs, medical equipment, tents, vaccines and midwifery kits, because pregnant women, women in the postnatal period and newborn children are more vulnerable. The Child Health Division held a Sub-National Immunization Day in 22 districts with WHO and UNICEF. UNICEF deployed skilled birth attendants to 20 birthing centres. It supported the establishment of 15 shelter homes for women and children, including the homeless.
The final plan of Nepal’s rehabilitation strategy was drafted with the help of several partners and presented to the NHEICC for endorsement. This plan aimed to cover six months (May–October 2015). The MoHP adopted the post-disaster recovery plan with immediate, intermediate, and medium-term priorities. Immediate priorities were to furnish districts with necessary logistics and human resources by mid-July. Intermediate priorities were to replace temporary arrangements with short-term measures to ensure continuity of services and provide uninterrupted routine health-care services. This included demolition of damaged buildings and setting up prefabricated structures to serve as health facilities. The medium-term priorities included reconstruction of the health sector from a longer-term perspective to build back better. Health Cluster and external development partners expressed commitment to support these recovery efforts, and contributed to the recovery and reconstruction needs of the health sector. Services provided by FMTs were gradually taken over by regular health services provided in tents and other temporary structures. The District Public Health Officer, along with Cluster partners, conducted a series of mobile camps focusing on a set of priority lifesaving services, in addition to routine health services in various districts.

Nearly two months after the first earthquake, the response transitioned towards two aspects: (i) operations in districts and VDCs, and (ii) early recovery and reconstruction. Cluster partners strengthened their response in four districts—Sindhupalchok, Gorkha, Nuwakot, and Rasuwa. The MoHP and partners worked on a planning process at district level towards transition of services to revitalization of PHC services, and early recovery and rehabilitation. The priorities hereafter included restoration of disrupted PHC services, including rebuilding of damaged health facilities within the framework of disaster reduction strategies; continuing to provide rehabilitation services and follow-up treatment support to patients discharged from hospital; continuing provision of life-saving maternal and child health services; strengthening surveillance systems for waterborne and vector-borne diseases; and pre-positioning medical supplies in hard-to-reach areas in case of obstructions/landslides during the monsoons. Community-level follow up was needed to prevent long-term disabilities and complications. There was also a need for ongoing mental health care for people who were incapacitated by their distress and those vulnerable due to pre-existing severe mental disorders.

As the health sector response gradually transitioned towards the recovery phase, the MoHP established an early recovery working group led by the Chief of the PPICD to coordinate with partners who were supporting the MoHP in the reconstruction of damaged health facilities. The priorities hereafter included restoration of disrupted primary health-care services. These included rebuilding of damaged health facilities within the framework of disaster reduction strategies.

The MoHP established an early recovery working group to coordinate with partners who were supporting the MoHP in the reconstruction of damaged health facilities.
By August 2015, 227 Health Cluster partners had assisted the MoHP in the response and rebuilding of health-care services. Health Cluster priority activities over the next four months were as follows:

- Consolidation and standardization of assessments, ensuring the coverage of areas beyond district headquarters in consultation/coordination with the MoHP and external development partners;
- Support to health service delivery with a focus on restoration of primary health-care services, through the provision of medical supplies, tents and rehabilitation support;
- Provision of essential drugs and supplies, ensuring distribution of medicines/supplies from the DHO to peripheral units;
- Ensuring that priorities such as RH, mental health, and child health were coordinated and addressed;
- Strengthening communicable disease control and surveillance;
- Continuation of health services through regular health facilities following the winding down of FMTs from the country. (For a list of FMTs and the districts in which they were deployed, please see Annex 1. Annex 2 provides a list of where and when MOIs were put up.)

The earthquake turned back Nepal’s development clock by several decades. Resolutely, the country turned towards the task of rebuilding its lost heritage, hearts, homes and health. But before going ahead, it paused to reflect. Despite all that had been done, had it been enough? Could the country have done better? Did all the disaster preparedness initiatives work and were they adequate to meet any and all challenges? How prepared was Nepal? And how prepared was prepared? The time had come for introspection to gain insight.

SOURCES

The material for this chapter was taken from various sources and reports. Not all of these were published, but all are accessible with the WHO Regional Office for South-East Asia and Ministry of Health, Nepal to those who may wish to read them. Where relevant, sources are given within the text.

2. Situation updates maintained by WHO on a daily basis since the earthquake.
INTROSPECTION AND INSIGHT

Background

Every disaster leaves destruction in its wake. But each also provides an opportunity for learning, for being better prepared, for mitigating the extent of devastation and the effects on health during the next disaster. This needs enquiry and analysis into the response, and introspection on the findings of the analysis. Some hard questions need to be asked and answered. The outcome of such an exercise is insight; insight into what went wrong and what could have been done better.

Perhaps the most important and long-lasting insight into disaster preparedness was provided by the tsunami on 26 December 2004. It was a turning point in the history of disaster preparedness in the WHO South-East Asia Region. All the countries that bore the onslaught of the tsunami were caught completely unawares, and both health and non-health sectors had to deal with a near-complete collapse of services. Introspection by countries, both individually and collectively, helped to identify the main bottlenecks to the response, and what could have been done to be better prepared. The lessons learnt from the tsunami have changed the way countries look at and prepare for disasters.

Nearly a year after the tsunami, in November 2005, the WHO Regional Office for South-East Asia convened a conference in Bangkok on the health aspects of disaster preparedness and response. The goal was to produce a plan of action that would meet the specific needs of Member countries, and ensure that they would be better prepared and equipped to cope with future disasters. All Member countries and stakeholders participated. The outcome of the conference was the development of 12 benchmarks, which, if fully met, would ensure high levels of disaster preparedness in Member countries. Simultaneously, countries analysed their current state of preparedness, and identified strategies to meet the benchmarks. These benchmarks are the standard against which all countries in the Region assess their disaster preparedness. Country analysis against the benchmarks is done periodically.
THE 12 BENCHMARKS

1. Legal framework and functioning coordination mechanisms and an organizational structure in place for health emergency preparedness and response (EPR) at all levels involving all stakeholders
2. Regularly updated disaster preparedness and emergency management plan for health sector and standard operating procedures (SOPs) (emergency directory, national coordination focal point) in place
3. Emergency financial (including national budget), physical and regular human resource allocation and accountability procedures established
4. Rules of engagement (including conduct) for external humanitarian agencies based on needs established
5. Community plan for mitigation, preparedness and response developed, based on risk identification and participatory vulnerability assessment and backed by a higher level of capacity
6. Community-based response and preparedness capacity developed, and supported with training and regular simulation/mock drills
7. Local capacity for emergency provision of essential services and supplies (shelters, safe drinking water, food, communication) developed
8. Advocacy and awareness developed through education, information management and communication, including media relations (pre-, during and post-event)
9. Capacity to identify risks and assess vulnerability at all levels established
10. Human resource capabilities continuously updated and maintained
11. Health facilities built/modified to withstand expected risks
12. Early warning and surveillance systems for identifying health concerns established
Nepal knew it was seismically prone and had been preparing for such a disaster for nearly two decades. And much of its preparedness paid off during the earthquake. It was, however, important to know what could have been done better and identify gaps in preparedness in order to respond more efficiently and effectively in future. An exercise in introspection was needed. This was done with the help of the benchmarks.

The first step in this exercise was to assess Nepal’s state of preparedness at the time of the earthquake. Nepal had assessed its state of disaster preparedness against the benchmarks in January 2011. To look into how prepared Nepal had been at the time of the earthquake, initially a multi-stakeholder preparatory workshop was organized in March 2016 to update the status of the benchmarks from January 2011 till April 2015, the status prevailing in Nepal just before the earthquake of 25 April 2015.

**BENCHMARK 1.** Legal framework and functioning coordination mechanisms and an organizational structure in place for health emergency preparedness and response (EPR) at all levels involving all stakeholders.

A number of policies and plans for emergency preparedness and response were in place; these included the National Health Policy (with an EPR component); Nepal Long-term Health Plan (1997–2017); National Health Sector Programme (NHSP)-II (2010–2015) and Nepal Health Sector Support Programme (NHSS) 2015–2020; Dead body management guidelines at the national level (2012); HEOC at the national level (2014); National Health Sector EPR plan (2014); Disaster Preparedness and Response Plan (DPRP) committee (2011) at the district level; National Disaster Response Force (NDRF) (2013); Search and Rescue Strategic Action Plan (2014); and Emergency Trauma Guidelines (2015).

Disaster health working groups and multisectoral coordination mechanisms were in place at all levels. Roles, responsibilities and lines of authority for emergency preparedness in health were defined with the needed administrative structures in place. Regular health coordination meetings were held and a network of hub hospitals was created. These preparations helped in declaring an emergency in the country and operationalizing the HEOC immediately.

**BENCHMARK 2.** Regularly updated disaster preparedness and emergency management plan for health sector and SOPs (emergency directory, national coordination focal points) in place.

A National Health Sector Emergency Preparedness and Disaster Response plan was developed and adopted in 2003. District-level health contingency plans were in place in 59 districts based on risk, hazard and vulnerability. Drills and exercises based on contingency plans were held in a few hospitals and districts so people knew what to do after the earthquake struck. Logistics had been prepositioned in strategic locations that health facilities were able to access on time. GIS mapping of health facilities was completed in 2015, which made it easier to map the damage during the post-disaster needs assessment.
BENCHMARK 3. Emergency financial (including national budget), physical and regular human resource allocation and accountability procedures established

Annual budgets had been provided to support activities. In addition, to support the country financially during an emergency, there is provision of SEARHEF and the Prime Minister’s Disaster Relief Fund. The EDCD also has provision for funds to mobilize rapid response teams in case of an emergency. In the area of human resources, the MoHP had established EPR focal points and units at the district and regional levels. The funds required by MoHP were immediately released and free treatment was offered to all those who had been injured in the earthquake.

BENCHMARK 4. Rules of engagement (including conduct) for external humanitarian agencies based on needs established

A code of conduct for international agencies during emergencies was included in national policies. The national EPR plans relating to collaboration reflected the contributions expected from each partner. In addition, arrangements and agreements were in place with international humanitarian organizations responsible for health care. The Health Cluster approach was well understood and used, and replicated at the district level. Public-private partnerships in the health system as well as with academia were strong.

BENCHMARK 5. Community plan for mitigation, preparedness and response developed, based on risk identification and participatory vulnerability assessment and backed by a higher level of capacity

At the community level, a mechanism was in place to request for assistance by the community from national authorities in health and other sectors, and funds were allocated for emergency preparedness activities, though these were limited. The District Disaster Response Committee was functional, and there was a mechanism for some coordination at the community level. Emergency risk analysis tools had been adapted and used. The grass-roots level of the community was reached through the FCHVs.

BENCHMARK 6. Community-based response and preparedness capacity developed, and supported with training and regular simulation/mock drills

Many community-based organizations (CBOs) had the capacity to respond during an emergency. Community health workers and FCHVs had received some training in first aid and emergency response, and were able to provide an immediate response and first aid.

BENCHMARK 7. Local capacity for emergency provision of essential services and supplies (shelters, safe drinking water, food, communication) developed

Essential medical supplies had been prepositioned at health facilities. The prescribed household-level food storage practices and community water storage practices were followed in some places. This allowed health facilities and communities to cope with the existing stocks until assistance was received.

BENCHMARK 8. Advocacy and awareness developed through education, information management and communication, including media relations (pre-, during and post-event)

Disaster information was disseminated through some media channels and EPR had been partially integrated in the education curriculum. Risk communication guidelines were in place and training conducted. Risk-related information was developed and disseminated regularly through the media. A budget was allocated by the Government for this. Technical guidance for prevention and control of diseases was also available. As a result, some areas had the essential knowledge and skills to manage the local response.

BENCHMARK 9. Capacity to identify risks and assess vulnerability at all levels established

The Disaster Preparedness and Response Plan (DPRP) Guideline (2011) addresses methods to assess risks and vulnerabilities. The Health Sector Contingency Plan (HSCP) to address local risks and vulnerabilities had been developed in 59 districts out of 75. Risk and vulnerability assessments had been conducted in a few settings. Following the earthquake, rapid health assessments could be conducted.

BENCHMARK 10. Human resource capabilities continuously updated and maintained

Rapid response teams were functional at national, regional and district levels. Guidelines were available on hospital preparedness for emergencies (HOPE), and hospital personnel had been trained in triage and mass casualty management. Guidelines and SOPs for health workers on emergency response were in place. Therefore, health workers at major hospitals were aware of their roles and responsibilities after the disaster. The triage system was followed for mass casualty management and hub hospitals were able to manage the surge without external support in the form of human resources. Rapid response teams were able to identify and contain outbreaks.
BENCHMARK 11.
Health facilities built/modified to withstand expected risks

Building codes had been endorsed before 2011, and the new health facilities built by the MoHP through the Department of Urban Development and Building Construction (DUDBC) followed the building codes. A vulnerability assessment of 59 health facilities had been conducted in 2012, and seismic-resilient hospital design and guidelines developed in 2013. Non-structural mitigation of health facilities had been initiated, and retrofitting of major hospitals was ongoing. Functional preparedness and networking plans had been developed and tested at major hospitals. Hence, all hub hospitals were functional and able to undertake emergency responses, and seven of 11 district hospitals outside Kathmandu valley remained functional.

BENCHMARK 12.
Early warning and surveillance systems for identifying health concerns established

EWARS, syndromic, event-based and vaccine-preventable disease surveillance was in place. Ad-hoc EWARS was introduced at the district level by some DHOs (e.g. Dhading) using SMS. In Dhading, the DHO asked community rapid response teams to cover outbreaks in the whole district. Some DHOs also initiated rapid needs assessment in the community. The focal point for the International Health Regulations (IHR) was functional, and core capacities for IHR were being strengthened. There was a mechanism for regular reporting, feedback and dissemination, and funds and human resources were in place at the national, regional and district levels. Rapid response teams were also available at the national, regional and district levels, and were able to detect and contain disease outbreaks in the early stages. An early warning system for floods was working.
## Evaluation against the benchmarks: summary of what worked

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Progress</th>
<th>What worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Legal framework and coordination</td>
<td>• Relevant policies, acts, plans, guidelines endorsed (National Health Policy – with EPR component, Nepal Long-term Health Plan (1997–2017), NHSP-II (2010–2013) and MHSS 2013–2020, and Dead body management guidelines at national level (2012); MEDC at national level (2014); National Health Sector Emergency Preparedness &amp; Response plan (2014); DPPR committee (2011)) at district level, NDRF (2013); Search &amp; rescue strategic action plan (2014); and Emergency Trauma Guidelines (2015)</td>
<td>• Emergency declared immediately • HEDC operationalized within 1 hour of earthquake • Incident command system established • Dead body management implemented</td>
</tr>
<tr>
<td>2. Disaster risk reduction (DRR) plan and SOPs</td>
<td>• District-level health contingency plans exist in 59 out of 75 districts based on risk, hazard and vulnerability • Health sector interventions were largely based on plans at national and subnational levels • Logistics were distributed according to the emergency logistics plan • Existing GIS data of health facilities was used for completing the post-disaster needs assessment rapidly</td>
<td>• Funds were received immediately • Free treatment was offered to all the injured</td>
</tr>
<tr>
<td>3. Finance and human resources for emergency preparedness and response (EPR)</td>
<td>• The MoHP established EPR focal points and units at district and regional levels • Annual budgets were provided to support activities • SEAREF and Prime Minister’s Disaster Relief Fund were established</td>
<td>• The health cluster was activated and replicated at district level</td>
</tr>
<tr>
<td>4. Rules of engagement and conduct</td>
<td>• Health cluster approach was established • Health cluster coordination mechanism was used for response</td>
<td>• DDRC coordination mechanism was used for response</td>
</tr>
<tr>
<td>5. Community-based DRR plans</td>
<td>• District Disaster Response Committees (DDRC) were functional • Funds were allocated for emergency preparedness activities • Mechanism to request for assistance from national authorities was established</td>
<td>• DDRC coordination mechanism was used for response</td>
</tr>
<tr>
<td>6. Community EPR capacities</td>
<td>• CBOs had the capacity to respond • Community health workers and FCHVs were trained on first aid and emergency response was carried out in a limited manner</td>
<td>• Some CBOs were able to respond • Some community health workers and FCHVs were able to provide first aid</td>
</tr>
<tr>
<td>7. Local emergency provisions</td>
<td>• Essential medical supplies prepositioned at health facilities</td>
<td>• Some communities were able to cope with the stocks until external assistance reached them</td>
</tr>
<tr>
<td>8. Advocacy and awareness</td>
<td>• Disaster information was disseminated through social media • EPR is partially integrated in the education curriculum</td>
<td>• Some areas had essential information, knowledge and skills to manage the response locally • Technical guidance for disease prevention, control containment and risk communication were provided • Post-earthquake communications plan was implemented</td>
</tr>
<tr>
<td>9. Risk and vulnerability assessment</td>
<td>• DPRP Guideline (2011) that addresses methods to assess risks and vulnerabilities was developed • Health Sector Contingency Plan that addresses local risks and vulnerabilities was developed in 59 districts</td>
<td>• Rapid health assessment was conducted by rapid response teams</td>
</tr>
<tr>
<td>10. Human resource capabilities</td>
<td>• Guidelines have been developed on emergency response for health workers and hospital preparedness for emergencies (HOPE)</td>
<td>• Trauma system was followed in all hub and most district hospitals • Rapid response teams identified and controlled outbreaks • Tertiary hospitals managed surge</td>
</tr>
<tr>
<td>11. Health facilities built/modified to withstand expected hazards</td>
<td>• Seismic-resilient hospital design and guidelines developed in 2013 • Non-structural mitigation of health facilities initiated • Retrofitting of major hospitals was ongoing • Functional preparedness and networking plans were developed and tested at major hospitals</td>
<td>• All hub hospitals at Kathmandu remained functional under the emergency response • Seven of 11 district hospitals outside the valley remained functional</td>
</tr>
<tr>
<td>12. Early warning and surveillance systems for identifying health concerns established</td>
<td>• EWARS, syndromic, event-based and vaccine-preventable disease surveillance were in place</td>
<td>• Surveillance systems could pick up some outbreaks in early stages, for example, cholera</td>
</tr>
</tbody>
</table>
METHODOLOGY

After the status of Nepal’s preparedness had been evaluated against the benchmarks, a “lessons learnt” conference was held on 21–22 April 2016, at which the inputs from the preparedness status as documented by the updated benchmarks assessment were used to develop recommendations in the areas of stewardship, medical interventions and public health. These recommendations would feed into a roadmap for implementation.

WHAT COULD HAVE BEEN DONE BETTER?

Stewardship

The HEOC could be expanded to cover the regional and state levels, and its response capacity strengthened during emergencies. The personnel to be deployed at the HEOC in times of emergency should be identified earlier and provided with clear terms of reference. Essential information technology and communications infrastructure should be put in place at the HEOC.

Policies and guidelines need to be developed in the area of donation of medicines and supplies. Lack of these led to unnecessary medicines coming into the country, while aggravating the paucity of medicines and supplies in needed areas. Policies, protocols and guidelines were also lacking on health-care waste management during emergencies. Guidelines thus need to be developed in these areas and disseminated widely. In the case of the earthquake, the Government bore the cost of treatment for all victims of injuries, but financial policies need to be in place for the treatment and management of injuries or other clinical management during large-scale emergencies.

Health information exchange platforms, with standard codes to facilitate this, at the health facility, village and municipality levels, are required for prompt analysis of data from different systems, and exchange of data in areas such as disease surveillance, logistics, and so on. Multiple assessments were conducted using different assessment tools, so that the results were not comparable. The MoHP and partners need to decide which assessments should be conducted and with which tools, so that they are standardized and comparable across sectors, agencies and regions. Comprehensive guidelines and clear formats need to be developed for conducting post-disaster needs assessment, and adequate training held to enhance competency. To standardize the assessment process, data collection templates need to be developed.
Response capacities varied in the affected districts. These could be strengthened and made uniform, and mock drills conducted once a year at all levels. The capacity of rapid response teams, DHOs and DPHOs could be built so that their response is even better. The logistics management system should be assessed and strengthened to face large-scale emergencies, and a national plan made for this.

Medical interventions
An inventory should be made of the tools and guidelines developed or translated during the emergency. These should be regularly reviewed, endorsed by the MoHP and disseminated. These could include, for example, the HOPE and trauma guidelines, among others.

Some staff in hub hospitals were not aware of EPR, and only a few hospitals had a disaster management plan. Disaster management training must be provided to all staff in hub and satellite hospitals, and all hospitals with more than 50 beds should develop a disaster management plan. In addition, all hospitals should conduct regular drills and exercises to prepare for emergencies.

Coordination of the HEOC can be further improved. The HEOC could be strengthened to function as a disaster cell in the MoHP. All medical data should be centralized to the HEOC, and the health information system updated to include trauma and injuries.

Hubs hospitals were found to function well during the emergency; the concept of hub hospitals could thus be expanded. Retrofitted hospitals were able to provide immediate care to the injured. All hospitals should be retrofitted, including non-structural retrofitting to be able to function smoothly during emergencies when they are needed most. Specialized hospitals should be prepared to provide the necessary general services during disaster situations.

 Provision of medical care was delayed in remote areas for several reasons, among them, inaccessibility. To avoid this situation, early medical care teams that can be quickly deployed need to be constituted. There was overcrowding in hospitals because of the absence of pre-hospital care mechanisms in the community. Similarly, a need was felt for transition homes for pregnant women, as well as therapeutic feeding centres. Another felt need was for step-down care facilities and active rehabilitation units for post-surgery and disabled patients who needed care but did not need to be hospitalized. Physical rehabilitation services also need to be regulated to provide acute and post-hospital care.

Casa detection and referral systems need to be streamlined and relevant policies put in place. Comprehensive patient management protocols need to be developed, as well as essential lists of medicines.

Gaps were identified in the provision of mental health care. Although a mental health policy is in place since 1997, it has not been implemented properly.

TB infection control was found to be lacking in IDP camps. This could lead to the spread of TB, especially in the overcrowded situations prevailing at these camps.

Public health
There was a lack of guidelines in some domains, such as information management, EWARS, rapid assessment and needs assessment at the national and district levels. Different surveillance instruments and formats were used for surveillance of infectious diseases because of lack of coordination, and because pre-established guidelines were not followed.

There was limited coordination between water quality surveillance and disease surveillance. Coordination and information sharing between the WASH and Health Clusters was also poor. It was also found that the contents of the WASH kits were not constituted according to the needs in remote rural areas.

During the response phase, a lack was felt of national guidelines specific for immunization in a post-disaster situation. Several other guidelines that have been developed were not used, or partially used, as in the case of the cold chain, procurement and management guidelines.

Some hospitals and clinics were not able to manage health-care waste, and there were no uniform guidelines.

In the IDP camps, women did not have privacy and some were unable to protect themselves from violence. Structural segregation should be thought of in IDP camps.

Communication systems were severely damaged in remote areas, which limited information flow to and from these areas to the Centre in the initial phase.
KEY RECOMMENDATIONS

Conference participants discussed the findings and arrived at a consensus on the recommendations from the group work. They selected the most important recommendations in the areas of stewardship, medical interventions and public health, and prioritized these for implementation.

Stewardship
1. A national framework and protocols need to be developed in the following areas: FMTs, financing and donations of medicines and supplies, public–private partnerships, information management, human resources in emergencies, waste management, among others. For these, reporting forms and formats need to be developed.
2. The medical team mobilization guidelines in case of large-scale emergencies should be adapted. This would involve consideration of registration, accreditation, placement approach, composition of teams, various requirements such as logistics and equipment, reporting mechanism, monitoring and follow up, supervision, roles and responsibilities, etc. It would also include guidelines for volunteer mobilization, and constitution of a national team in each hospital, which would be ready for deployment in emergencies.
3. Institutional architecture should be in place at the ministry for emergency response management. This would include a disaster risk reduction framework for health and community engagement.
4. Management and use of information should be strengthened for all sectors and integrated. This would mean strengthening coordination between sectors, developing standard guidelines, uniform forms and formats, clearly defining roles and responsibilities, and having communication mechanisms for different scenarios.
5. Hub hospitals should be institutionalized and strengthened.
6. Monitoring and evaluation of the impact and response mechanism should be strengthened.

Medical interventions
1. An inventory should be made of the tools and guidelines developed or translated during the emergency. These should be reviewed, endorsed by the MoHP and widely disseminated (e.g. HOPE and trauma guidelines).
2. All medical data should be centralized to the HEOC.
3. The Mental Health Policy, developed in 1997, should be implemented.
4. Step-down facilities and active rehabilitation units (community based) should be developed.
5. The health-care waste management guidelines should be disseminated and operationalized.
6. The infection control guidelines need to be strengthened, especially for temporary settlements.
7. Medical teams should be deployed early in the course of a disaster to minimize adverse effects on health.
8. Discharge and referral systems need to be streamlined.
9. A community pre-hospital care system should be developed to reduce the burden on hospitals.
10. Disaster management training should be provided to all staff in hub and satellite hospitals.
11. All hospitals with more than 50 beds should have a disaster management plan.
12. Non-structural retrofitting should be undertaken in every hospital.

Public health interventions
1. Guidelines and tools should be developed on information management, EWARS and emergency operations centres, and for needs assessment at the national and district levels.
2. Preparedness and contingency plans should be updated.
3. The Emergency Unit should be strengthened so that it can coordinate and maintain preparedness and response capacity.
4. Specific designated staff should be placed at the national level to handle sanitation and hygiene issues.
5. Joint surveillance for disease and WASH could be considered.
6. Multisectoral coordination mechanisms should be developed at all levels.
7. The contents of various kits should be revised according to the settings in which they will be used, e.g. rural, urban.
8. Special care should be provided for women in post-disaster situations, especially IDP camps, to maintain privacy and protect them from violence.
9. A state of readiness should be maintained at all times. The functionality of structures and surge capacity should be regularly tested through training and drills at all levels, and a roster maintained of skilled professionals so that they can be called upon in case of an emergency.
10. Alternative modalities of communication should be explored in case of breakdown of communication, such as radio and satellite communication.
CONCLUSION

While the introspection provided several insights into what was well done and what could have been done better, the exercise was far from over. Just knowledge is not enough; it needs to be followed by single-minded and concerted action, by implementation. The vision that would fuel this action would be that of a risk-resilient Nepal, a Nepal that stood strong, proud and upright in the face of any eventuality.

Were there any global frameworks that would help Nepal frame its future? What could these guiding forces be and how could they help? Could they be leveraged to Nepal’s advantage? Would the country be able to envision a time when its resilience could overcome every challenge, no matter how severe? Answers to these would determine Nepal’s future path.

SOURCES

Material for this chapter was taken from discussions and presentations of the Lessons Learnt Conference: Health Sector Response to Nepal Earthquake 2015. Kathmandu, 21–22 April 2016, jointly organized by WHO and MoH, Nepal.
A VISION FOR THE FUTURE
RETHINK BEFORE REBUILDING

Planning for and developing the framework for recovery in any emergency should begin within the response phase. The evidence around this idea has been translated and accepted as good practice, such that in recent major emergencies, early recovery work began even during the height of delivery of much-needed services.

Within three months of the earthquake, the Regional Director of the WHO Regional Office for South-East Asia set up an advisory group to provide a more multidimensional input to the recovery process that had already begun in the health sector. The group was composed of academicians, practitioners of public health and disaster management, prominent clinicians, and a representative of the group of health development partners in Nepal.

In a series of meetings over a period of a year, key recommendations were put together, reviewed and revised so that they were consistent with the changing context of the situation. Following the policy of rethinking before rebuilding, the recommendations of the advisory group are summarized in the table below.

The Advisory Group also noted that implementing global health priorities (e.g. Global Action Plan on antimicrobial resistance, Sustainable Development Goals) needs to be aligned to the context of Nepal’s post-disaster situation. These should be implemented without overshadowing the delivery of services needed by the affected, which is the main priority.
Recommendations and priority actions from the Regional Director’s Advisory Group on Nepal Earthquake Recovery

<table>
<thead>
<tr>
<th>Summary of key recommendations</th>
<th>Priority actions</th>
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<tr>
<td>Review the recovery plan, looking at reallocation of health services with a more resilient health system.</td>
<td>Make prefabricated health facilities (currently existing and those to be built) fully functional.</td>
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<td>Set up mechanisms for a health system that supports the delivery of health services and is designed to address various shocks (from all hazards) by reviewing: • leadership • policies • financial management systems • human resource development / management • systems for the supply and distribution of medicines.</td>
<td>Scale up preparedness by • conducting vulnerability analysis at the district level; • prioritizing the further construction of health facilities (prefabricated or permanent, based on the analysis); • conducting contingency planning with DPHOs; • implementing regional HEOCs and hub hospital systems; • pre-positioning emergency equipment and supplies for an immediate response; • developing policies and mechanisms for access to financial resources for use in emergencies, and establishment of an emergency revolving fund.</td>
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<td>Ensure that community-based approaches are applied to public health programmes – a uniform approach in all districts, integrating best practices. This should be considered for the following areas: • maternal, neonatal and child health (MNCH) • immunization • TB and HIV • prevention and continuation of treatment for noncommunicable diseases • rehabilitation of the disabled, and mental health and care for the elderly (the new areas of focus post-earthquake).</td>
<td>Integrate in current health services delivery programming: • ensure the use of common national guidelines and protocols, and disseminate these to partners (as was done during the response).</td>
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<td>Improve investments in disaster risk reduction, prevention and preparedness in the health sector, linking with other sectors, using lessons from the earthquake. These will primarily be implemented in districts.</td>
<td>Set up safer and functional health facilities that are networked and support each other in a systematic way. • build the capacity of human resources for health in this area through innovative training methods (in-service), and integrate disaster risk reduction in the pre-service curriculum. • improve the capacity for risk assessments and surveillance in the districts.</td>
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<td>Advise the MoHP to advocate with other sectors to improve linkages that support health systems functioning in the recovery phase and in the longer term.</td>
<td>Establish a disaster management cell in the MoHP. • advocate for the creation of a cross-sectoral disaster risk management body in the government.</td>
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<tr>
<td>Develop and implement a communication strategy to inform the public of the recovery plan and progress on health sector interventions using the best channels (e.g. community radio, information and communication technology, social media).</td>
<td>Note: This will be implemented through the MoHP and key partners.</td>
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NGOs partner with the government to rebuild health facilities

The earthquakes of April–May 2015 had rendered the district hospital in Chautara and the primary health-care centre in Charikot, Dolakha uninhabitable. In a unique example of public–private partnership, the group Possible Health turned the disaster into an opportunity to build a better health-care system. The Charikot health post was repaired, and the group signed a memorandum of understanding with the Government to upgrade it to a district hospital and run it for ten years. The hospital has already added an orthopaedics department, a 24-hour emergency service, surgical equipment for caesarean sections, and an inpatient department. The number of patients in Charikot has grown fivefold.

Similarly, Ramche Health Post in Rasuwa was rebuilt by the Karuna Foundation and handed over to the Government in February 2016. The new facility is equipped with a ramp for easy access and serves 600 households. Indrawati Jana Sewa Samiti Health Post in Sindhupalchok is one of the first health posts to be reconstructed following the earthquake by a collaborative effort of the community and Global Shapers Kathmandu.

Source: http://nepaltimes.com/article/Nepali-Times-Buzz/building-back-better-health-facilities,2980
http://www.nepaltimes.com/blogs/thebrief/2016/03/01/birthing-the-future/
EXPAND TO THE DISTRICTS AND CONNECT

To ensure that the recommendations were implemented well, one very important principle advocated by the Advisory Group was to build on existing efforts. The country had indeed invested in disaster risk reduction before the earthquake. Some of these are as follows:

- District contingency plans – 50 districts out of 75 had completed these.
- Safer hospitals – six hospitals in the Kathmandu valley had been structurally and non-structurally retrofitted. This was one of the flagships prioritized by the Nepal Risk Reduction Consortium (NRRRC).
- A model for the structure and function of the HEOC was established in Kathmandu.
- A proposal was made for the integration of disaster risk management in the curriculum of health professionals.

Work has been directed at building on these existing efforts and expanding these to the districts. Moreover, there is a need to link each of the efforts, especially priority actions, to each other. This way, there would be a synergistic build-up to the districts. Moreover, there is a need to link each of the efforts, especially priority actions, to each other. This way, there would be a synergistic build-up to the districts.

To ensure that the recommendations were implemented well, one very important principle advocated by the Advisory Group was to build on existing efforts. The country had indeed invested in disaster risk reduction before the earthquake. Some of these are as follows:

- Use the current momentum to build priority health services that will rebuild with the family.
- A model for the structure and function of the HEOC was established in Kathmandu.
- A proposal was made for the integration of disaster risk management in the curriculum of health professionals.

Nepali community radio continues to play central role in earthquake recovery efforts

...Instructively, I turned the radio on and caught a newsflash on Uyala FM, a local station. It said that the 446th quake above magnitude 4 we’ve had since the Gorkha earthquake of last year was one of the tremors seemed to have headed elsewhere – to Myanmar, Japan and then Ecuador. I asked Gopal Garjain, Executive Chairman, Uyala FM, why the station was counting the quakes. “We want people to remember how vulnerable we are to make sure we are better prepared for the next one,” he added. “We’ve reported on recovery and reconstruction efforts for one full year and we now know better about the sufferings in remote villages. We don’t want that to happen again.”

...These reports from the villages were made possible by a locally conceived radio programme designed to make sure there was accountability in the efforts of both government and international agencies helping people to rebuild from the rubble.

DERAILLED! EXTENDING THE RESPONSE PHASE

With a clear view on how to address recovery, the PDNA costed for a total of US$ 7 billion. The international community stepped in and pledged US$ 4.1 billion on 25 June 2015. With 60% of the funding secured, development partners together with the Government fast-tracked implementation of the comprehensive earthquake recovery plan.

It seemed all was well under way. However, together with Nepal’s fragile fault line is a sociopolitical environment that also constantly shifts and shakes. While efforts were on to fast-track the writing of a new Constitution and bring stability to the country, there were instances of civil strife which, in turn, led to disruption of essential supplies such as petrol and other goods, including basic medicines.

The momentum for rebuilding the country was lost and came to an almost complete halt. Emergency procurement of these items were a priority during the five months of the blockade.

WHO, together with the MoHP and partners, shifted towards scaling up response services once again. The WHO Emergency District Support teams (WEDS) were revitalized and deployed in 14 districts. They were responsible for regularly aiding in surveillance, coordinating with partners in the districts and supporting any public health campaign or intervention required. The WEDS regularly reported and provided information on ongoing initiatives and work in their respective districts.

The logistics team of WHO also proceeded with “winterization” of MICS. This consisted of insulating the interior of MCK tents with heavy-duty foam. In addition, warm blankets and hot water bags, which are primarily provided to the maternity wards to protect the newborn babies and mothers from the cold, were also provided to the other wards. In areas where direct electricity was available, halogen heaters were also provided. It was no mean feat to deliver these additional features at a time when access was difficult and prompt delivery was a challenge.
VIEWING THE LARGER PICTURE

As recovery efforts continue, it is important to seize the opportunity and use the situation as a turning point to improve systems for disaster risk reduction. This has been done in many countries that have experienced disasters. There are many noteworthy examples from the six tsunami-affected countries of the South-East Asia Region\(^1\)\(^2\) and the turnaround that they have achieved in the past decade for better systems in disaster prevention, preparedness, response and recovery. Nepal can take a cue from this.

It is clear that the development agenda of Nepal needs to be seen through a disaster risk reduction lens. In 2011, this had already begun with the formation of the NRRC.\(^3\) It is described as a “unique arrangement that unites humanitarian and development partners with financial institutions in partnership with the Government of Nepal in order to reduce Nepal’s vulnerability to natural disasters.”\(^4\) With flagship priorities identified in key areas, the NRRC also focuses on safe schools and hospitals. WHO is leading the safer health facilities component and Asian Development Bank is coordinating safer schools. The NRRC is a good vehicle to coordinate efforts in disaster risk reduction in health, as it revitalizes efforts around this, taking into consideration the needs of earthquake recovery in the districts.

The Nepal earthquake is a reminder to its people and the world that disasters push development back by decades, derail delivery of health services to the population, and disrupt systems that took years to set up. With the implementation phase of the Sendai Framework,\(^4\) Sustainable Development Goals (SDGs)\(^5\) and the Climate Change Treaty (Paris Agreement 2015)\(^6\) all coming together, an opportunity presents itself to align all disaster risk reduction efforts across all hazards with sustainable investments and development. The major difference between the Sendai Framework and its predecessor, the Hyogo Framework, is the strong integration of the health sector. The Sendai Framework can then serve as a linchpin, intended to integrate disaster risk reduction within the health sector and across all sectors, by aligning the implementation of disaster risk reduction interventions with other relevant health frameworks.\(^7\) The timing presents a unique opportunity. Within the Sendai Framework are clear targets for:

- resilient health systems – by integrating disaster risk management and IHR capacities into primary, secondary and tertiary health care, especially at the local level;
- resilient critical infrastructure – new and old, across all sectors – schools, road networks, telecommunications, water systems, hospitals, and other health facilities to ensure that they remain safe, effective and operational during and after disasters in order to provide live-saving and essential services;

SURMOUNTING THE OBSTACLES

Despite the barriers and delays, recovery proceeded, albeit slowly, with the help of partners, national organizations and community-based efforts. Some achievements are truly commendable. Primarily, the completion of standards, designs and policies for prefabricated and new earthquake-resilient health facilities early on during the response resulted in 52 completed prefabricated health facilities in the 14 affected districts, and six semi-permanent district health structures and health facilities constructed in Dolakha, Gorkha, Nuwakot and Ramechap.

Resources were also provided for the “hub” hospital set-up and preparedness, including logistics arrangements required for these to be functional. In this plan, a specific health facility is networked with other health facilities around it, and becomes the hub for support and surge for response. An HEOC is also linked to this network. This hub system for district health preparedness was supported by the following initiatives:

- establishing an incident command system at the MoHP;
- strengthening the HEOC in the capital and setting up regional HEOCs;
- strengthening community rapid response teams in rural areas and community health disaster response teams in urban areas.

These initiatives will continue, as preparedness and response capacity need to be tested regularly and improved.

Much of the work in recovery was also in the area of developing new health policies. A new health policy geared towards a resilient health system was incorporated in the Nepal Health Sector Strategy 2015–2020 (NHSS). Specific outputs were formulated such as those related to the construction of seismic-resistant health facilities. The MoHP was also active in contributing to the sectoral (other than health) components of the national reconstruction policies and implementation plans.

Emergency procurement of essential medicines was a priority during those months of the blockade. WHO was requested to assist in augmenting the gaps in essential medicines, to which it promptly responded. Throughout the changes in the situation and circumstances, the focus was and always would be the needs of the affected people.

\(^1\) Tsunami-affected countries of the South-East Asia Region:
\(^2\) The six tsunami-affected countries of the South-East Asia Region are the Philippines, Indonesia, Thailand, Sri Lanka, India and Malaysia.
\(^3\) Nepal Risk Reduction Council (NRRC)
\(^4\) Sendai Framework for Action
\(^5\) Sustainable Development Goals (SDGs)
\(^6\) Paris Agreement 2015
\(^7\) Sendai Framework for Action
ELECTRIFICATION IN BARPAK

Barpak village in Gorkha district, Barpak Village Development Committee (VDC), the epicentre of the 25 April earthquake, was a self-reliant village with 24-hour electricity and thriving local businesses. The earthquake completely destroyed over 95% of the houses in the village, including schools, health posts and local businesses. Barpak’s micro-hydropower plant was also damaged by the earthquake. While the overall reconstruction and recovery following the earthquake has been slow, Barpak Rural Electrification with grant support from National Geographic’s Great Energy Challenge has succeeded in repairing and upgrading the micro-hydropower plant and reinstating 24-hour power supply in the village on the first anniversary of the earthquake. Resumption of power supply will improve the economy and facilitate rebuilding and other services.

"Barpak Rural Electrification in consortium of Barpak Rural Electrification Ltd., Hydro Energy Concern Ltd., and Gorkhaly Foundation) received grant support from National Geographic’s Great Energy Challenge (http://environment.nationalgeographic.com/environment/energy/great-energy-challenge/grantees/barpakrural electrification/).

http://www.gorkhaly.org/other-projects/ rebuild-barpak/

Photo by Nabin Baral / StoryCycle
If there is anything that the Sendai Framework, the SDGs and Climate Change Treaty emphasize, it is bringing capacities to the subnational level and tapping people themselves as the sources and drivers of solutions. As with any emergency, when the response has settled, and teams and aid workers have left, the rubble swept aside and reconstruction begun, it is the affected people who take on the challenge of rebuilding their lives. Nepal faced a similar situation. Work during this recovery period was a joint effort of the community, government and partners that have always been located there. In the larger scheme of things, a huge amount of local effort has resulted in addressing the basic needs of the people. Some examples include an electrification project in Barpak, the use and operations of the community radio that continues to inform people of health and disaster risks, and NGOs partnering with the Government to rebuild health facilities.

As documented in this publication, and every event that has happened in the world, disasters are ultimately about people. They are the fulcrum of all our efforts. Government, UN agencies, donors and partner organizations can be the catalysts that provide support but tapping social capital is the key to sustainability. People and the networks they have and form create an enabling environment for resilient communities through several means:

- filling in knowledge gaps on disaster risks
- allowing local and indigenous knowledge to be tapped
- ensuring that information and knowledge on disaster risk reduction is shared
- building the capacity of local players to sustain action on disaster risk reduction.

Nepal’s wealth is in its people. Their resilience to disasters was evident even eight decades ago in the aftermath of the 1934 earthquake. A study on survivors of the 1934 earthquake found that social capital in the form of close ties or bonding were important for immediate support. It was also documented that bridging and linking social capital offered pathways to longer-term survival and wider neighborhood and community revitalization during recovery. Arguably, resilience builds within a culture, and is passed on as part of the culture to the next generations.

As the recovery phase continues hand in hand with the development of the country, people should be the only focus. Tapping social capital and linking and bridging them will take the affected people through difficult times in the decades ahead. People are not just passive recipients of aid and services but active participants in their own resilient future, as some of the examples have shown. Linked together, they are the planners for their villages and districts, leaders in disaster risk reduction activities, decision-makers in their health system and guardians of a more resilient Nepal.
REFERENCES

1. These countries are India, Indonesia, Maldives, Myanmar, Sri Lanka and Thailand.
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### ANNEX 2. SITES WHERE WHO MEDICAL CAMP KITS WERE SET UP

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MEDICAL CAMP KIT

CONSULTATION ROOM
Size of tent: 6 x 7 m² or 6 x 4 m² with two doors
Can accommodate: 8 people (5 patients, 2 medical personnel, 5 visitors)
Contains:
- 1 working table
- 3 chairs
- 1 consultation bed
- 1 consultation table
- 2 patient beds
- 10 health promotion posters
- Stationary kit
- Basic medical equipment: stethoscope, blood pressure apparatus, thermometer
- Solar fan (DC converter)
- Metallic trunk: size 2 x 1.5 x 2 m²
- 2 solar lights
- Outside consultation room:
  - 2 stretchers (to transfer patients)
  - Community Life Straw™ – filter for safe drinking water

MALE WARD
Size of tent: 6 x 4 m² with two doors
Can accommodate: 4 patients and 2 medical personnel
Contains:
- Number of beds: 4 foldable and portable plastic beds
  - 1 chair
  - 2 solar lights
  - Solar fan (DC converter)
  - 1 intravenous infusion (IV) stand
  - 2 solar lights

FEMALE WARD
Size of tent: 6 x 4 m² with two doors
Can accommodate: 4 patients and 2 medical personnel
Contains:
- Number of beds: 4 foldable and portable plastic beds
  - 1 chair
  - Solar fan (DC converter)
  - 1 intravenous infusion (IV) stand
  - 2 solar lights

DELIVERY ROOM
Size of tent: 6 x 4 m² with two doors
Contains:
- 1 delivery bed
- Examination light
- 1 intravenous infusion (IV) stand
- Instrument trolley
- Solar fan (DC converter)
- Revolving stool
- 2 solar lights

TWO FAMILY TENTS
Male and female: 6 x 4 m² each
Used to accommodate staff
Extra tarpaulins
Storage of hygiene kits and interagency emergency health kit (IEHKs)
- 8 foam mattresses (4 in each tent)

TOILETS
- 1 male and 1 female toilet
  - Toilet base, toilet pan, frame (size 3’x6’), pan cover
  - Bucket, jug, soapcase & soap
  - Iron pole and flex cover with door

ANCILLARY MATERIALS
Essential medical supplies
- Hygiene kits for mothers and neonates
- IEHK (10 basic units and 1 set supplementary unit)
- Safe delivery kit

- Solar panels
- Solar battery (200 mh), converter, solar panel (600 watt)
- Cable (200 m), solar frames

- Water container
- 500 L plastic container with lid
- Three sets of water distribution taps

- Water drainage system

TECHNICAL SPECIFICATIONS

CONSUL TATION ROOM
Size of tent: 6 x 7 m² or 6 x 4 m² with two doors
Can accommodate: 8 people (5 patients, 2 medical personnel, 5 visitors)
Contains:
- 1 working table
- 3 chairs
- 1 consultation bed
- 1 consultation table
- 2 patient beds
- 10 health promotion posters
- Stationary kit
- Basic medical equipment: stethoscope, blood pressure apparatus, thermometer
- Solar fan (DC converter)
- Metallic trunk: size 2 x 1.5 x 2 m²
- 2 solar lights
- Outside consultation room:
  - 2 stretchers (to transfer patients)
  - Community Life Straw™ – filter for safe drinking water

MALE WARD
Size of tent: 6 x 4 m² with two doors
Can accommodate: 4 patients and 2 medical personnel
Contains:
- Number of beds: 4 foldable and portable plastic beds
  - 1 chair
  - 2 solar lights
  - Solar fan (DC converter)
  - 1 intravenous infusion (IV) stand
  - 2 solar lights

FEMALE WARD
Size of tent: 6 x 4 m² with two doors
Can accommodate: 4 patients and 2 medical personnel
Contains:
- Number of beds: 4 foldable and portable plastic beds
  - 1 chair
  - Solar fan (DC converter)
  - 1 intravenous infusion (IV) stand
  - 2 solar lights

DELIVERY ROOM
Size of tent: 6 x 4 m² with two doors
Contains:
- 1 delivery bed
- Examination light
- 1 intravenous infusion (IV) stand
- Instrument trolley
- Solar fan (DC converter)
- Revolving stool
- 2 solar lights

TWO FAMILY TENTS
Male and female: 6 x 4 m² each
Used to accommodate staff
Extra tarpaulins
Storage of hygiene kits and interagency emergency health kit (IEHKs)
- 8 foam mattresses (4 in each tent)

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- 1 male and 1 female toilet
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- Solar panels
- Solar battery (200 mh), converter, solar panel (600 watt)
- Cable (200 m), solar frames

- Water container
- 500 L plastic container with lid
- Three sets of water distribution taps

- Water drainage system

Total area of the MCK: 200 m²
Locally available resources (gravel, stones, bricks, etc.) used for compact flooring
Floor of tents at least one foot higher than ground level