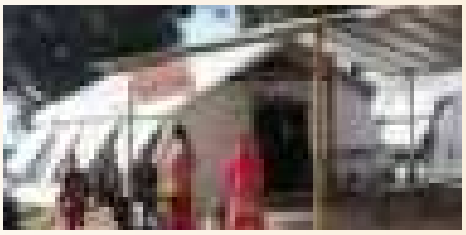
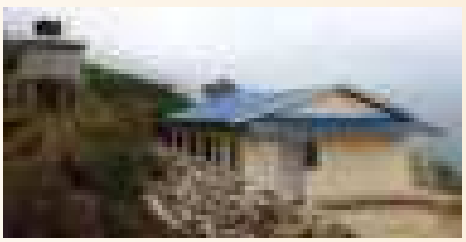
Response and Beyond: The Road to Resilience

Health Sector Interventions following the Nepal Earthquake 2015 and Lessons Learned





GOVERNMENT OF NEPAL

MINISTRY OF HEALTH

KATHMANDU

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2017

Response and Beyond: The Road to Resilience
(Health Sector Interventions following the Nepal Earthquake 2015 and Lessons Learned) was commissioned by Ministry of Health to World Health Organization on March 6, 2016.

This report is the FIRST of the FOUR components that reviews the health sector's response to Nepal Earthquake 2015. The production of this "Main Report" by WHO Country Office Nepal was agreed during the join consultative meetings with the partners on 26 January 2016 and 08 February 2016. Other three components include Case Studies by UNICEF Nepal; Photo Story Book by NHSSP/DFID Nepal and Documentary by GIZ Nepal.

To review and finalize all the four components including the "Main Report" [Titled: Response and Beyond: The Road to Resilience (Health Sector Interventions following the Nepal Earthquake 2015 and Lessons Learned)] a Technical Working Committee was formed. The details of the TWC can be found in Annex 1.

Additional information about report may be obtained from the Ministry of Health, Ramshahpath, Kathmandu.

Acknowledgements
Lead Author/Consultant: Manish Gautam
Concept and Content contribution: Dr Reuben Samuel
Text Review: Damodar Adhikari
Copy Editing: Preena Shrestha
Operational Facilitation: Health Emergency Programme Team, WHO Nepal
Designed and Processed by: Moti Prasad Marasini
Cover Photos: Unicef, IOM, Nepal Army, NHSSP
Inside Photos
WHO : Page x, xiv, 9, 10, 51, 52, 63, 85, 86, 107, 108, 109, 110, 116, 122
NHSSP: Page 28, 31, 34, 37, 39, 44, 124
Dhulikhel Hospital: Page 42, 44, 118
Illustration by Deepak Gautam (Page xiv)

Suggested citation
MoH. (2017). *Response and Beyond: The Road to Resilience (Health Sector Interventions following the Nepal Earthquake 2015 and Lessons Learned).* Kathmandu: Ministry of Health.

Disclaimer: The interviews and data collection for this report was done between 15 August 2016 to 14 November 2016. The contents, findings and reflections hence refers to this response and recovery period. The interventions that were carried out beyond this period will be dealt with in a forthcoming report.

MINISTER OF HEALTH

KATHMANDU
NEPAL

Message

A resilient health system is a prerequisite in coping with disasters. This is especially true as applies to a country like ours that is vulnerable to a range of natural hazards such as the massive earthquake of 2015.

After the quake hit, the Ministry of Health sprung swiftly into action, since hospitals within and beyond the Kathmandu Valley were already filling up with patients and there was a great deal to be done. The hub hospitals that had been selected for such a situation did a truly commendable job in not just treating the injured, but also coordinating with other hospitals to ensure people in need did not have to be turned away. Preparedness efforts had also included retrofitting of hospitals and formation of Rapid Response Teams in each district, among others, and it was heartening to see these were paying off.

Now that we have entered the reconstruction phase, the Ministry is committed to restoring healthcare services without any more delays by relying on prefabricated structures for the time being, while continuing to persevere with the process of building permanent, resilient premises.

After assuming the mantle of Health Minister, my focus has largely been on policy reforms, and my major task at present is to envision a health system that would function in the federal set-up, and expert committees have already been formed for this purpose. One essential component in this context is for districts and provinces to have in place sound disaster plans to guide actions in an emergency and reduce casualties. Also important is the prepositioning of logistic stocks for use during disasters so that shortages can be avoided.

Another point that I find worth stressing on is the exigency of establishing hospital pharmacies to make available drugs at reasonable prices. This is significant because a major chunk of people's out-of-pocket expenditure is currently spent on buying medicine even in normal circumstances, and it is of special concern during disasters when options are even more restricted. I am glad to say that those hospitals that had set up pharmacies were well able to keep the supply of logistics flowing until additional support came in. Seeing this, we have already allocated seed money to different institutions to start pharmacies of their own, so that there are no shortages of essentials if a similar event comes to pass.

The compiling of this report on the health sector response in the Nepal Earthquake is consequential in that it reflects on the experiences and performance of the health sector in what was one of the most distressing periods in our country's history. Of special import are the recommendations provided, guidelines to help us achieve the goal of bringing about more resilient health systems and essentially building back better. Preparedness is key to countering adversity, and the lessons included here will be useful in readying other disaster-prone areas in the country to cope with potential hazardous events.

The MoH will soon lay out plans to implement the recommendations highlighted in the report and I assure full commitment to the endeavor from my side and that of the government.

Lastly, I would like to congratulate my team for putting together this invaluable document, and take this opportunity to dedicate this report to the health workers and Female Community Health Volunteers who lost their lives in the earthquake, as well all the other health personnel and even those beyond the field of health who still contributed to the cause, and whose unwavering commitment saved thousands of lives. They are proof of the good that humankind is capable of and encouragement for all of us to serve better.

Hon. Gagan Kumar Thapa
Minister of Health

SECRETARY

GOVERNMENT OF NEPAL
Ministry of Health
KATHMANDU

Message

Prior to the occurrence of the earthquake, Nepal had been making significant headway in key health indicators. The maternal mortality ratio had come to 190 per 100,000 live births in 2013 and infant mortality rate was 46 per 1,000 live births in 2011. Notable decline had also been marked in fertility rate, going from around five births per woman in 1990 to just 2.6 in 2011. Furthermore, immunization coverage has now extended to over 97 percent of the population. And these are just some among the many positive leaps taken by the health sector in recent years.

So when the disaster struck last year, the MoH was faced with twin challenges—providing urgent care and support to victims while at the same time ensuring that the hard-won health gains were not derailed. I have no doubt that our team worked well on both fronts, despite challenges; patients were given the best possible treatment, and strong public health mechanisms functioned to keep health gains steady.

It was the activation of the HEOC that had aided in streamlining efforts from the central level. And officials at the centre and on the ground had worked tirelessly round the clock to provide the masses with the necessary services—those who did not live up to these responsibilities and the ministry's directives were sacked. The MoH also strove to effectively mobilize required logistical supplies and human resources, including I-EMTs, across all affected districts.

Coordination among line ministries and other supporting agencies was more or less smooth. And the success we had in preventing epidemics—despite the danger being ever-present—is a lesson to countries around the world. Unlike what was seen in many other disaster-hit countries, Nepal was able to ensure that no big outbreaks of disease occurred, and minor ones were quickly caught and managed based on a treatment protocol that was handed to both national and international teams. The minimal amputations that were necessitated overall, even with the thousands of cases of injuries that were counted is a testament to that accomplishment.

Having presently shifted from immediate response and relief to the recovery and reconstruction stage, the MoH is fully committed to resuming full service delivery from prefabricated buildings by the end of this year and to implement its intermediate plans to soon replace these buildings with permanent concrete structures.

As much death and devastation as a given disaster might leave behind on its path, what such events also represent are an opportunity to learn and grow, particularly for the benefit of policymakers. It was to document that process, as a means of informing and enriching future courses of action, that we requested our partners for support in strengthening vital institutional memory. This report is a product of that very initiative.

In chronicling the details of the disaster and supplying recommendations for creating stronger health systems that are able to withstand future shocks, the report will undoubtedly be of value in disaster planning. I am hopeful that these suggestions will soon bear fruit, enabling the health sector to improve on its performance and level of preparedness.

I offer my deepest congratulations to the team behind such a fantastic initiative.

Dr Senendra Raj Upreti
Secretary, Ministry of Health

CHIEF, CURATIVE SERVICE DIVISION

GOVERNMENT OF NEPAL
Ministry of Health
KATHMANDU

Acknowledgement

It is my great pleasure to introduce Response and Beyond: The Road to Resilience. The report is likely to prove a valuable resource for the MoH, as well for the many policymakers, bureaucrats, researchers, academics and other persons who might have an interest in learning of the nature and quality of the health sector's response in the wake of the 2015 earthquake.

The first chapter offers a general rundown of the event and the sector's immediate actions—starting with how the MoH activated the HEOC as the first step towards addressing the needs of the injured. The second chapter then delves into the specific circumstances in each of the 14 districts deemed to be the "worst-affected" in the quake, and the valiant efforts that went into ensuring treatment options were available for victims and outbreaks of disease averted. The following chapter then examines the particulars of central-level management of resources, including logistics and manpower, giving us a glimpse into the mechanisms that were in place and the challenges encountered in activating these. Chapter four deals with assessments conducted by the MoH and its supporting partners, which were crucial for the resumption and improvement of health service delivery, informing as they did the monitoring of outbreaks and the identifying of post-disaster needs. The fifth chapter delves into the recovery and reconstruction phases, summarizing the activities and the progress made therein. The sixth chapter, perhaps the most important of them all, takes us through the lessons and learnings gleaned from the experience, accompanied by recommendations that aspire to ensure we are much better prepared if another such event were to transpire in the country in the future.

All of the efforts by MoH would not have been possible without support from multilateral donors, bi-lateral donors International Emergency Medical Teams and others.

I would like to thank World Health Organisation for its unfettered support to the health sector of the country particularly during emergencies including the earthquake, and for diligently putting all its effort in producing this valuable document. The immediate support of health sector partners including Unicef and UNFPA and other UN Agencies; multilateral and bilateral donors; INGOs and NGOs; International Emergency Medical Teams and Health cluster partners is also greatly appreciated.

We are equally indebted to various other supporters who extended their generous gesture to assist the health sector in any way they could.

I trust that this report will come to comprise a handy tool for the MoH and all other stakeholders in building capacity and boosting resilience.

Dr Bhola Ram Shrestha
Chief, Curative Service Division, Ministry of Health

Remarks

In collaboration with other health sector partners, the WHO Country Office for Nepal has long been supporting the Ministry of Health (MoH) to prepare for both small and large scale public health emergencies. Such emergencies may be due to various hazards, including earthquakes. A crucial milestone in this partnership was the drafting of the "Emergency Preparedness and Disaster Response Plan"in 2003 that revamped the Disaster Health Working Group and has continued to serve as a major guiding document for the health sector.

Realizing Nepal's susceptibility to disasters, WHO extended its support in strengthening the country's health systems. The WHO facilitated the preparation of contingency plans in many health facilities and district health offices, as well as simulation exercises and drills so that health personnel could be trained to act appropriately when disaster would strike.

In 2013, WHO supported the then-Ministry of Health and Population in the establishment of the Health Emergency Operation Center (HEOC). The HEOC was housed in a disaster-resilient structure and was equipped with all the essential information and communication facilities, so that it could work as the central command and control system for the health sector during crises. And indeed, when the earthquake struck in April 2015, the HEOC, as planned, served as a safe base from which to operate—proof that expectations had been met.

In the period immediately following the quake, as mandated,WHO functioned as the co-lead of the Health Cluster. WHO immediately secured the release of USD 175,000 to the government as the first tranche of the South-East Asia Regional Health Emergency Fund (SEARHEF). As little as an hour after the event, the WHO Regional Director was already in discussion with the then-Health Minister, assuring a wide range of support in the days to come. The WHO distributed emergency kits the next day, which included medicines, non-injectable drugs, supplies and health equipment, accompanied by simple treatment guidelines.

After the Health Cluster mechanism was activated, WHO was fully engaged in assisting the MoH to effective play its stewardship role in coordinating and facilitating humanitarian agencies to perform their respective roles. The WHO provided critical assistance to the National Health Research Council to establish a coordination unit for the mobilization of the International Medical Teams. WHO also readily acquiesced to the MoH's request to deploy its Nepali staff members from all over the world to work in the affected areas. It established operational hubs at Gorkha and Sindhupalchowk to assist the respective District Health Officers to coordinate the sub-national level health clusters. Both at the national level and the sub-national levels, WHO was able to effectively discharge its mandate thanks to the excellent cooperation of sister UN agencies working in the health sector such as UNFPA and UNICEF and many international and national NGOs. The successful deployment of about 50 Medical Camp Kits in the most needy areas to ensure continued delivery of health services is ample testimony to this partnership.

After the acute phase, aware of the many vulnerabilities of the country and the potential repercussions of these in accentuating the health impact of the earthquake, crucial efforts were made to step up preparedness and the resilience of the health system. These included the deployment with USAID/OFDA support of "WHO Emergency District Support" (WEDS) Officers, posted in the earthquake-affected areas.

Together with other partners active in the health sector, we have assessed which factors might undermine the ability of health facilities to recover and respond to future crises. We have also committed our full support to the establishment of sub-national HEOCs that can function from the ground-up in case of disasters occurring outside the Kathmandu Valley, and have prepositioned emergency medical stocks in fail-safe warehouses at hub-hospitals that can serve as nuclei for similar or different stockpiles by other health sector partners – such as the reproductive health kits by UNFPA.

It is praiseworthy that the MoH has taken the crucial step of recording the lessons learned from the earthquake, thus ensuring a level of institutional memory. We have keenly accepted the Ministry's request to support the production of this report in addition to facilitating the completion of a joint lessons learning conference. Now that the report is completed, we are proud to have contributed to a document that will serve as a vital reference for health sector emergency risk management.

In line with the designation of Nepal as a high priority country for support by the WHO Health Emergencies Programme, WHO would like to reaffirm its commitment to the MoH and to the people of Nepal to work towards an equitable, effective and sustainable health sector, that is also disaster resilient.

Acronyms & Abbreviations

CCUs	Critical Care Units
CHD	Child Health Division
CNDRC	Central Natural Disaster Relief Committee
CRRTs	Community Rapid Response Team
CSH	Civil Service Hospital
DAO	District Administration Office
DDA	Department of Drug Administration
DDRC	District Disaster Relief Committee
DHO	District Health Office
DHWG	Disaster Health Working Group
DIPECHO	Disaster Preparedness European Commission's Humanitarian Aid and Civil Protection
DoHS	Department of Health Services
DPHO	District Public Health Office
DRRP	Disaster Risk Reduction Portal
DUDBC	Department of Urban Development and Building Construction
EDCD	Epidemiology and Disease Control Division
EMTCC	Emergency Medical Team Coordination Cell
ERH	Emergency Reproductive Health
EWARS	Early Warning and Reporting System
FCHVs	Female Community Health Volunteers
I-EMTs	International Emergency Medical Teams
GIS	Geographic Information System
HEOC	Health Emergency Operation Centre
HFs	Health Facilities
HMIS	Health Management Information System
HOPE	Hospital Preparedness for Emergencies
HP	Health Posts
ICUs	Intensive Care Units
ILI	Influenza-Like Illness
LMD	Logistics Management Division
MAM	Moderate Acute Malnutrition
MCK	Medical Camp Kits
MCM	Mass Casualty Management
MNMCC	Multi-National Military Coordination Center
MNP	Multi-Nutrient Powder
MoGA	Ministry of General Administration

MoH	Ministry of Health
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MR	Measles Rubella
NA	Nepal Army
NAMS	National Academy of Medical Sciences
NEOC	National Emergency Operation Center
NHRC	Nepal Health Research Council
NMC	Nepal Medical Council
NPHL	National Public Health Laboratory
NRRT	National Rescue and Response Team
NTC	National Tuberculosis Center
OPD	Out-Patient Department
ORS	Oral Rehydration Solution
OTs	Operation Theaters
PAHS	Patan Academy of Health Sciences
PDNA	Post-Disaster Needs Assessment
PDRF	Post-Disaster Recovery Framework
PHCCs	Primary Health Care Centre
RRTs	Rapid Response Teams
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SAR	Search and Rescue
SARI	Severe Acute Respiratory Infection
SATC	South Asia Transfusion Committee
TIA	Tribhuvan International Airport
TTI	Transfusion-Transmissible Infections
TUTH	Tribhuvan University Teaching Hospital
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
VDCs	Village Development Committees
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

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Executive summary

The impact of the Nepal Earthquake 2015 and the hundreds of aftershocks that were to follow in subsequent months, had tested the resilience of the health sector—and indeed the country at large—like never before. According to the Ministry of Home Affairs (MoHA), there were over 8,856 reported deaths, while more than 22,309 people had suffered some form of injury or the other. A variety of infrastructure, including private homes, government buildings and historical structures, were affected. Data from the Disaster Risk Reduction Portal (drrportal.gov.np), accessed on the third week of August 2016, showed that while 602,257 private homes had sustained severe damages, 285,099 were partially damaged. The portal also reveals that 503 health facilities had been rendered completely unserviceable, and another 406 were partly impaired.

The readiness mechanisms that had been in place in some health facilities and at the Ministry of Health (MoH), these were nowhere near enough to deal with this disaster. Even under circumstances fraught with seemingly insurmountable odds, however, the country's health system had pushed itself to the limit tackling the crisis head on, bringing various stakeholders on board and seeking support on those counts where the health system steward lacked expertise. While there was much room for improvement in the extent and quality of services provided, the sector was largely successful in its effort to treat those who had been injured and prevent a rise in casualties.

When the earth shook: Activation of the HEOC

The Health Emergency Operation Center (HEOC), designed to function as the MoH's central command and control unit, had been activated immediately after the earthquake had struck. The HEOC is a sectoral unit of the National Emergency Operation Center (NEOC), itself an overarching framework for disaster response that had been established in December 2010 under the MoHA with the purpose of enabling coordination between different government agencies during disasters such as the one that occurred in 2015. Realizing the need for coordinated efforts between actors in the health sector and ways to ensure consistent delivery of health services in times of need, a secretary-level decision had been made on January 12, 2012 to seek the support of the World Health Organization (WHO) in erecting the HEOC to act as a central command and control facility for effective administration of health emergency preparedness and disaster management.

Leading the charge: Hub hospitals

In 2013, it was agreed that six hospitals—namely, Bir Hospital, Tribhuvan University Teaching Hospital, Civil Hospital, Patan Hospital, Bhaktapur Hospital and Nepal Army Hospital—in coordination with other health institutions, would serve as hub hospitals within the Kathmandu Valley during emergencies. Others outside the Valley, such as the Kathmandu University Dhulikhel Hospital and the Gandaki Zonal Hospital, were also activated for this purpose. In the aftermath of the quake, the hub hospitals promptly began functioning as per prior planning. However, despite their efforts, they still required assistance in connecting with the Ministry for logistical support, for which high-level officials had to be deployed.

Although some readiness mechanisms had been in place in health facilities and at the Ministry of Health these were nowhere near enough to deal with a disaster of this magnitude. Yet, even under circumstances fraught with seemingly insurmountable odds, the country's health systems pushed themselves to the limit tackling the crisis

It takes a village: Mobilization of International Emergency Medical Teams (I-EMT)

As our closest neighbor, India was the first to deploy its Search and Rescue (SAR) team to Nepal, flying into the Tribhuvan International Airport (TIA) with relief goods—including medical supplies—just a few hours after the first quake. While the initial days primarily witnessed military medical teams coming in from India, China, Israel and Pakistan, among others, with the Nepal Army (NA) serving as liaison, a variety of I-EMTs from the world over soon began arriving in legions. According to the Nepal Health Research Council (NHRC), there were altogether 143 such teams. The NHRC with WHO support was given the charge to coordinate and deploy the teams in necessary areas.

On ground zero: The worst-affected districts

Soon after the disaster hit, the government had classified 14 districts—Kathmandu, Bhaktapur, Lalitpur, Nuwakot, Rasuwa, Dhading, Gorkha, Makwanpur, Kavrepalanchok, Sindhupalchowk, Dolakha, Ramechhap, Sindhuli and Okhaldhunga—as the 'worst-affected' in the event, and others as 'moderately-affected'. There were, expectedly, variations on how well each district was able to cope with and mitigate the effects of the earthquakes, depending on their contextual challenges, and the level of impact they had suffered.

Steering from the center: Disaster preparedness and management

The MoH had adopted a number of readiness measures prior to the disaster—in terms of the management of information, logistics, human resources, disease surveillance and blood supply, just to name a few. Where some of these mechanisms, together with post-quake efforts, proved prudent in averting more losses and damages than were predicted, and helped to bring a potentially chaotic situation to heel, it was acknowledged that there was room for more effective management and delivery of services, but that this would have warranted a much higher level of preparation at the central and district level.

Where some of these mechanisms, together with post-quake efforts, proved prudent in averting more losses and damages than were predicted, it was acknowledged that there was room for more effective management and delivery of services, but that this would have warranted a much higher level of preparation at the central level

An eye on impact: Post-disaster assessments

It is crucial that detailed assessments be carried out in times of crises, not only to guide immediate humanitarian response, but additionally, to identify essential areas of intervention and to engender a more resilient system—and there were several such efforts undertaken in Nepal following the earthquake. For instance, the MoH, with technical support from the WHO, had carried out an immediate Rapid Hospital Needs Assessment to examine the conditions at health institutions and determine their current requirements. The National Public Health Laboratory (NPHL) had also conducted an assessment of the post-disaster outbreak situation in order to locate the potential sources of diseases that had the ability to affect large groups of people and undertake appropriate measures to nip these in the bud. And there was the Post-Disaster Needs Assessment (PDNA) which looked at four basic dimensions—infrastructure, service delivery, governance and risks—and tried to examine how these areas have been affected and how other vulnerabilities and risks can be assessed so that the country can put in place stronger mechanisms in the future.

Build on history: Lessons learned

The experience of responding to the earthquake, while certainly daunting, also offered up, at the end of the day, a wealth of lessons for the health sector and stakeholders therein. Based on this learning, we advance the following key recommendations:

Reinforcing readiness: Tools and mechanisms

- Mapping resources: In order to understand the availability and capabilities of different actors, we could employ the 4Ws—who, what, where and when—in the mapping of resources and capacities for emergency risk management.
- Standard Operating Protocol: The importance of having a Standard Operating Protocol (SOP) in place to guide the functioning of the MoH during a disaster cannot be overemphasized. SOP should be part of a national-level arrangement and should address a wide range of issues, including the easing of the finance and procurement processes, among others.
- More medical tents: The availability of medical tents at decentralised levels would help provide continuity to basic healthcare delivery and treatment of the injured until the reconstruction process can reach a conclusion.
- Resilient buildings: Coping with disaster will prove impossible without raising the resilience of the actual physical structures themselves. In the health facility setting this includes the resilience of non-structural elements to ensure the ability of the facility to function effectively in the aftermath of the disaster.
- A strong referral mechanism: It is imperative that the MoH invest in developing a more strengthened referral system that both eases the burden on health facilities by redistributing patients and keeps necessary track of their movements.
- Functional safety of health facilities: Disaster preparedness and response plans with clear identification of the roles and responsibilities of the staff in the implementation of plans together with the necessary sensitization.
- Drills, drills and more drills: Regular drills and simulation exercises are among some of the most vital components of disaster preparedness. But it would be ideal if these exercises had the participation of not just health professionals but also non-health staff and members of the community, so that when adversity strikes, everyone is better able to contribute to relief efforts.

Information management: The primacy of data

- A standard data-collection format should be immediately developed, based on the reflections of those professionals and experts who were involved in gathering data during the latest disaster.
- Districts and their subordinate units should then review the format developed at the centre and localize it according to various contextual factors.
- Concerned authorities must also remain alert and take action immediately following a disaster so that we might avoid the kind of disorder that we witnessed in the initial days of the quake in 2015.
- The emergency units at the district and central level should have proper records of their staff members with details regarding their allocated duties so that manpower can be efficiently mobilized when the need arises.
- An emergency ID card should also be issued that is valid across the country, regardless of geographical region or health institute—this could help in the effective delivery of services in times of duress.
- A mobile application for standard reporting should be developed which can be used during disasters to store the data and sync it to the national database once

connected to the Internet.

- Technical preparation also warrants attention: the network must be reliable and accessible to enable information collection in any situation.
- Collaboration with telecom companies could additionally include creating a database of mobile numbers of all health workers, so that their duties can be communicated to them during emergencies.
- Since voice calls tend to clog up the network system during disasters, texting is far more resilient and reliable, consuming as it does less volume of data.
- Ultra-high frequency and very-high frequency modes of communication should be brought into use.
- A trained and capable health data-collection and analysis team should be in place that can be mobilized immediately when required.
- There should also be a structured Memorandum of Understanding (MoU) between the Ministry and other government agencies to facilitate data sharing during disaster response.

Logistics management: Essentials at the ready

- Every major hospital should maintain adequate stocks of essential medical items—in the case of national-level and other designated institutions, these stocks should be enough for at least 1,000 patients. For district-level hospitals, the stock capacity should be enough to cater to at least around 500 patients; while Primary Healthcare Centers (PHCs) and health posts (HPs) should look to serving 300 patients with their emergency stocks.
- While it might take some time for the Ministry to assess health facilities all around the country and determine what can be done better, one immediate step could be to support each facility to build a separate room or containers similar to that of the hub hospitals in Kathmandu that can withstand earthquakes and other disasters, so that the stocks may be safely stored for use in emergencies.
- The Procurement and Supply Management contingency plan should be readily available and a list of potential logistics suppliers at the ready.
- The Department of Drug Administration (DDA) should maintain a more accessible database of drug stores, mapping them carefully so that during disasters, they can make it mandatory for the stores to make their goods available.
- The humanitarian staging center on the premises of the Tribhuvan International Airport (TIA) must be in possession of all necessary health and logistical items.
- An immediate review of the drugs and other essentials that are actually required in the event of a disaster is warranted. Such a review would lead to a standard list of necessary drugs and health items, which should then be made easily available.
- A pool-fund mechanism could be established for logistical procurement and preparedness.
- The District Public Health Offices/District Health Offices (DPHO/DHO) should have the autonomy to utilize allocated funds and procure logistical items based on their own perceived requirements.
- Although reporting their needs to the center is necessary to enable proper database management, the center—having allocated the funds—should allow the districts to manage their issues locally as far as possible.

Human-resource management: The right people in the right places

- A central database on human resources for health (HRH) should be developed immediately, one that is put through periodic reviews so as to keep it updated on transfer of staff and other potential changes.
- The data should be carefully mapped and represented in a visually-striking form so as to give officials a better overall picture when planning the response to an event.
- All personnel should be provided a nationally-valid identification card specifying their capabilities so that their skills can be put to good use wherever they may find themselves at the time of a disaster.
- The database should be further utilized in facilitating appropriate redistribution of human resources from less- to more-needy areas.
- Every health facility should have its own contingency plan in place, in line with the district health sector disaster plan. Once this plan has been prepared, the hard copy should be stored alongside the stock of emergency drugs in the safe room/container.
- It should also be made available in the form of a software application that can be installed by all health officials on their laptops and mobile phones.
- The major tasks and allocation of duties as envisioned by the contingency plan should be printed onto a large flex and pasted on a billboard somewhere in the premises of the different health facilities so as to raise awareness among health personnel regarding their respective roles and responsibilities.
- Health facilities should conduct drills and simulation exercises related to mass casualty management (MCM) and trauma management at intervals of around four to six months.
- Doctors and health professionals who worked in health facilities in affected areas during the quake, upon their transfer, should present a written document reflecting on their experience of the crisis, along with recommendations on how they might be able to work effectively in case of future disasters.
- The initially-held drills and simulation exercises should involve all staff members of the health facilities, including non-health personnel.
- The drills and exercises should be made part of the medical curriculum with special emphasis on trauma management. This is of particular importance because doctors who pursue their MBBS degrees under government scholarship have to compulsorily work in remote districts for two years where they often cater to large populations.
- All districts should assemble their own Community Rapid Response Teams (CRRTs), providing these with special trainings so that they are able to react swiftly when a disaster hits.
- In addition, basic first-aid training should also be imparted to as many members of the community as possible.

Management of I-EMTs: Making the most of external help

- There is a need for a strong information mechanism that would help the MoH to clearly outline the kind of support that is needed following a disaster, which should then be placed in the public domain, after consulting with various agencies.
- The Nepal Medical Council (NMC) should work with HEOC and be part of MoH's preparation and planning activities.
- The NMC should open up more to

information technology and try to incorporate digital tools in its activities as far as possible.

- An Emergency Medical Team Coordination Cell (EMTCC) should be activated for the purpose of managing I-EMTs (and also national EMTs), and this should come to comprise a major component of the HEOC.
- The MoH could put on standby a pool of translators with backgrounds in health from across the country, including undergraduate medical students and students of public health and various other relevant courses to help the I-EMTs serve the needy more effectively.
- An accountability mechanism must be developed targeted specifically at I-EMTs. This would involve formulating certain applications that they must mandatorily use to keep the government abreast of their activities.
- For those found to be carrying out activities that are contrary to the laws of the land, the MoH should reach out to the Ministry of Foreign Affairs (MoFA) to come up with specific guidelines on actions to be taken against such I-EMTs.
- An exit policy for I-EMTs should be clearly outlined on the basis of their service level classification and the needs of the country as identified by the MoH.

Agency coordination: Miscommunication between EDCD and HEOC

- The HEOC might be the central command and control unit, but there are certainly many areas especially related to prevention and containment of outbreaks in which the Epidemiology and Disease Control Division (EDCD) possesses more expertise. Rather than duplicating efforts, the disease surveillance unit of the EDCD could immediately start functioning under the command of the HEOC, and its expertise utilized to its maximum potential.
- Instead of centralizing works and creating bureaucratic hurdles, experts from each division within the MoH and DoHS should take up their responsibilities under the direction of the HEOC.
- A revision of pre-existing activities, along with routine monitoring and evaluation, could prove exceedingly beneficial.
- There needs to be a clear prioritization of vulnerabilities so that resources can be channeled effectively.
- The HEOC should be more proactive even in normal periods, rather than just during times of crisis.
- Strategic reviews of the HEOC should be undertaken.

Maternal and child health interventions: Prioritizing vulnerable groups

- The Reproductive Health Cluster should be proactive in helping the concerned authorities stay abreast of reproductive health (RH) issues and needs.
- Training of health workers and managers in the implementation of the Minimum Initial Service Package (MISP) must be accelerated. All stakeholders, partner organizations and professional bodies must be active in their involvement.
- The MoH should support partner organizations in promoting RH quality services in emergencies.
- The Department of Health Services (DoHS) must set up an emergency cascading plan to ensure uninterrupted

RH services.

- An appropriate reporting and recording tool should be designed for crises so that data is preserved for future reference.
- Ensuring a range of medical services: Not missing out anyone with special needs.
- Clear specification of people with special needs, especially in terms of continuation of treatment for chronic conditions such as TB, HIV, Mental Health, Asthma, Diabetes, Hypertension, heart diseases should be an essential feature of the health sector contingency plans at service levels.
- Provisions for identifying such victims in the aftermath of the disaster and ensuring continuity of care for them is critical.

Blood supply management: Improvements in stocking, storing and transfusion

- Blood-storage capacity in health facilities should be increased and stocks of blood bags made readily available.
- Increased government investment is necessary to produce more specialists in technical fields like transfusion.
- There is a need for more spaces where stocks of blood can be kept.
- There is also a need for the installation of well-equipped blood transfusion and storage facilities in each district.
- An emergency airlifting mechanism for blood should be developed so that the central-level blood transfusion facility can immediately dispatch supplies should the districts face shortages.

Management of bodies: A dignified farewell

- All health facilities should have sufficient space, both indoors and outdoors, for storing the bodies of the dead. It would not require a massive investment to construct a garage-like structure on the premises of district hospitals for this purpose.
- Ideally, of course, all sizeable health facilities would be equipped with proper mortuaries.
- Each district hospital should have a stock of at least 300 body bags, and more should be immediately sent out to them from the center in an emergency.
- Central-level hospitals should possess the capacity to keep at least 300 bodies.
- Forensic professionals should be made part of the team responsible for managing bodies so that their expertise can be utilized as early as possible.
- A national-level Medico-Legal Center should be formed as part of the HEOC.
- There are additionally many doctors within the MoH who are knowledgeable and experienced in dealing with bodies, but they were not included in the management committee formed by the government. Such oversights must be avoided.
- Temporary burial sites should be immediately established on available government lands, and proper fences constructed around them.
- Rather than resorting to disposing bodies in mass graves, each person should be thoroughly coded and his or her identifiable details meticulously documented before being buried in individual graves in the temporary sites.

Reconstruction of health facilities: Challenges in the path of recovery

- The MoH should either invest in purchasing its own land or request the government to hand over state-owned

spaces for the installment of health facilities.

- Selection of property for purchase should be done on a scientific basis—for instance, there are areas that are difficult to reach and comprise minimal population. Health facilities should rather be installed in locations where they are able to provide services to as many communities as possible.
- Immediately establish the Project Implementation Unit (PIU) under the MoH.
- A strong monitoring unit dedicated solely to reconstruction works should be erected to scrutinize the progress made.
- Accountability should be sought from all partner organizations.
- Detailed engineering assessments should be conducted of all the health facilities across the country where the WHO Hospital Safety Index tool could be used for this purpose, particularly in those areas deemed vulnerable by experts.
- Adequate measures including prepositioning of tents and drugs such as the WHO camp kits should be undertaken in these areas even if the MoH cannot immediately support the reconstruction of new buildings.

1. When the earth shook

At 11:56 am on Saturday, April 25, 2015, a powerful earthquake measuring 7.8 on the Richter scale struck central Nepal. With its epicenter in Barpak in the Gorkha district, 80 kilometers from the Capital, the effects of the tremor were felt across the country and even in some parts of India. A big earthquake like this had been predicted for some time in Nepal—it had, after all, been over eight decades since the last such event in 1934—and it served as a stark reminder of just how seismically vulnerable the country truly is.

The aftermath was grim, to say the least. According to the Ministry of Home Affairs (MoHA), there were over 8,856 reported deaths, while over 22,309 people suffered some form of injury or the other. Various infrastructure, including private homes, government buildings and historical structures, were affected. Data from the Disaster Risk Reduction Portal (drrportal.gov.np), accessed on the third week of August 2016, shows that 602,257 private homes were heavily damaged, while 285,099 homes sustained partial damages. The data also reveals that 503 health facilities were rendered completely unserviceable while 406 others were partly impaired.

A few hours after the quake hit, a meeting of the Central Natural Disaster Relief Committee (CNDRC) convened inside the National Emergency Operation Center (NEOC) at the MoHA recommended that the government declare a state of emergency for the next month. A cabinet meeting summoned immediately thereafter, chaired by the then-Acting Prime Minister and Deputy Prime Minister Bam Dev Gautam in the absence of the then-Prime Minister, the late Sushil Koirala, delineated 14 districts as the worst-affected based on quick observations from the ground. These were Gorkha, Sindhupalchowk, Dhading, Kavre, Dolakha, Nuwakot, Ramechhap, Sindhuli, Rasuwa, Kathmandu, Lalitpur, Bhaktapur, Makwanpur and Okhaldhunga. The meeting also agreed on the formation of the Response Coordination Centre to expedite the Search and Rescue (SAR) operations, and on appeals to be made to the international community for assistance.

Helicopters were deployed by the Nepal Army and the private sector to affected areas the very next day and the SAR operations on the ground were supported and facilitated by the NEOC. The injured were either airlifted to health establishments, or treated in nearby facilities, where they were available. Bodies of the dead that had been recovered were either taken to health institutes or placed in open spaces.

Understandably, there was a great deal of fear among people during these initial days. The slew of strong aftershocks that followed only fuelled their anxiety as they waited for help in open areas.

An effective healthcare system lies at the heart of any post-disaster effort, serving as it does to prevent any further casualties and the exacerbation of conditions that could otherwise lead to debilitation

Realizing the need for coordinated efforts between actors in the health sector and consistent delivery of health services in times of need, a decision was made in 2012 to establish the Health Emergency Operation Center to act as a central command and control facility for emergency preparedness and disaster management

By April 28, as support began pouring in and the SAR operations were accelerated, 4,680 people had already been declared dead and 9,230 injured. The actual scale of the disaster was becoming more and more apparent at this point with cases of death and injury rising per day.

At the Ministry of Health

A few kilometres from the MoHA offices, meetings were also being held on the premises of the Ministry of Health (MoH). Given the extent of the devastation that was already being reported, the health sector was naturally expecting mass casualties and overwhelming demand for emergency care and trauma management. An effective healthcare system lies, after all, at the heart of any post-disaster effort, serving as it does to prevent any further casualties and the exacerbation of conditions that could otherwise lead to debilitation. It is therefore crucial to identify all available health facilities in affected areas, and ensure that these are functional and equipped with the necessary human resources and medical supplies. This and more were discussed on the first day of the meeting, held at the Health Emergency Operation Center (HEOC), designed precisely to be activated in times like these.

A sanctuary

Walking through the black metal gates by the side of a busy stretch of road between Maitighar and Singhadurbar, one will find the offices of the Ministry of Health looming tall. Across from it in the same compound stands a nondescript single-storey building, diminutive in comparison, but which has a significant role to play. The three-roomed structure, made of converted shipping containers and prefabricated materials, had served as the sole command center for officials of the Health Ministry and its partners for several months following the disaster. Known as the Health Emergency Operation Center, its primary mandate is to coordinate and ease the management of information after any major disasters, when such a task becomes exceptionally daunting.

The HEOC is a sector specific subordinate unit of the NEOC, itself representing an overarching framework for disaster response housed within the premises of the MoHA. The NEOC had been established in December 2010 with the intention of enabling coordination among government agencies during disasters such as this one. Realizing the need for coordinated efforts between actors in the health sector and ways to ensure consistent delivery of health services in times of need, a secretary-level decision had been made on January 12, 2012 to seek the support of the World Health Organization in erecting the HEOC to act as a central command and control facility for effective administration of emergency preparedness and disaster management in the health sector.

Working under the Curative Service Division, the HEOC functions as a high-level operational centre for the MoH's various divisions and the entities under the Department of Health Services (DoHS), such as the Epidemiology and Disease Control Division (EDCD). It hosts necessary resources and data for effective coordination and response during emergencies. Following the earthquake, for instance, the HEOC was running 24/7, manned by a trained and extremely dedicated staff and experts mobilized from partner agencies such as the WHO. Not only is it furnished with basic communication facilities such as landlines, mobile phones, Internet connection and satellite phones, among others, but also has in place the equipment needed to communicate and coordinate with the NEOC, the central referral hospitals and the regional hospitals, so that data can be regularly updated, and

management of health-related issues better facilitated in the wake of disaster. In addition to this, the HEOC also played a pivotal role in maintaining operational linkages between the health sector's preparedness and response mechanisms and the existing and emerging institutions charged with handling the disaster-risk management initiatives at the community, district, regional and central levels. For instance, as the hub of operations during both emergency and non-emergency settings, the HEOC will build on and update the policies, strategies, planning tools and database for the health sector's readiness, response and rehabilitation practices.

Activation of the HEOC

As the earthquake shook Nepal, the lives of people were thrown into disarray. Finding an open space for safety was the foremost priority of the majority, and it was certainly no exception for the officials of the MoH. Nevertheless, some still managed to make their way to the Ministry's offices as early as 20 minutes after the event, and within two hours, most of the officials, including the Health Minister, joint secretaries, undersecretaries and others, had arrived. Given the series of strong aftershocks that were still rattling the country, officials avoided stepping into the MoH building and thronged instead to the far more stable HEOC.

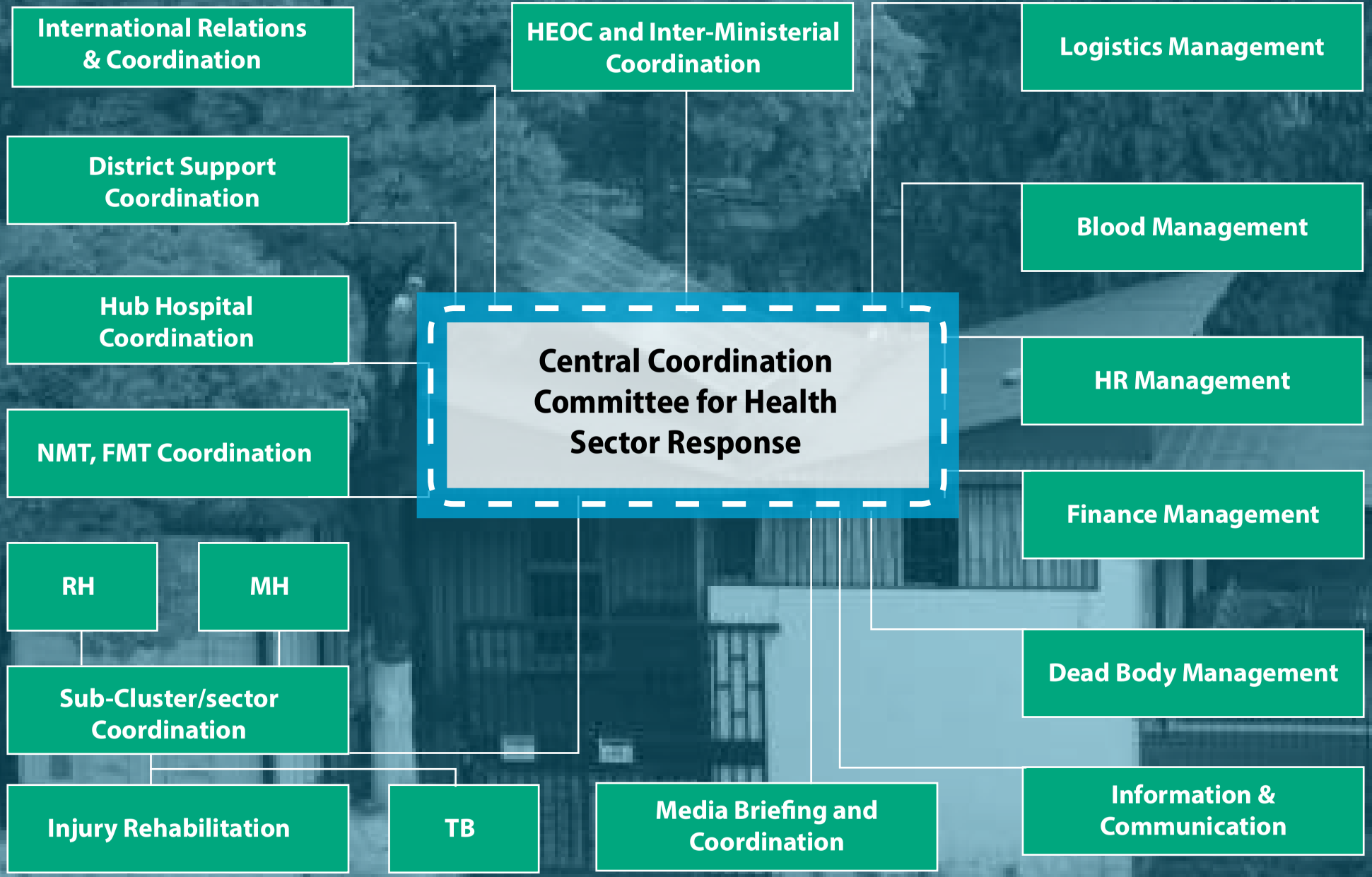
The first task on the agenda was to establish contact with the affected districts and assess the situation on the ground. The extent of the damage was quickly communicated and addressing the health needs of victims immediately prioritized, with the Ministry soon declaring free treatment for all the injured. Attention was then turned to the deployment and stationing of human resources; since the earthquake had struck on a Saturday, when many staff members of health facilities had been on leave, it was essential to direct them to return to their stations. A public notice was duly issued in this regard, instructing people to work from where they were and to treat people any way they could.

Ministry officials then proceeded to divide up their tasks and delegate responsibilities. Some units that were made functional included:

1. Response Management unit led by the Chief of Department of Health Services
   - Coordination with the NEOC
   - Data collection and coordination
   - Coordination with affected districts
   - Information updates
2. Human Resource Management unit led by the Joint-Secretary of the Staff Administration Division
   - Deployment of domestic human resources
   - Deployment of international human resources
3. Medicines and Equipment Management unit led by the Director of the Logistics Management Division
   - Examination and record-keeping of medicines
   - Coordination for customs exemption
   - Airport contact person
   - Ambulance arrangement
   - Monitoring of clinical services
4. Information and Communication Management unit led by the Director of the National Health Education Information and Communication Centre
   - Issuance of press releases
   - Management of call center
5. Financial Management unit led by the Joint Secretary
   - Coordination of financial management
6. Blood Transfusion Management unit led by the Director of the National Public Health Laboratory
   - Sample collection and testing

The first task of the HEOC was to establish contact with the affected districts. The extent of the damage was quickly communicated and addressing the health needs of victims immediately prioritized, with the Ministry soon declaring free treatment for all the injured

Health Emergency Operation Centre (HEOC)



7. Miscellaneous
   - Management of bodies of those killed
   - Technical testing of health facilities and reconstruction
   - Arrangement of transport
   - Management of food and accommodation

Brief descriptions of the units

NEOC and Inter-ministerial Coordination unit

A team led by the Health Secretary was formed with the purpose of coordinating with the MoHA and the NEOC. It sought primarily to liaise with MoHA officials so that rescue and evacuation efforts could be duly prioritised. A central coordination committee chaired by the Health Secretary was also spurred into action whose members comprised the Director General of the DoHS and other division chiefs.

Human Resources Management unit

It was the responsibility of the Human Resources Management unit to ensure that a shortage of human resources in the affected districts would not impede the treatment of the sick and injured. To this end, various first-class officers were sent to the districts in need as coordinators to help those working on the ground to plan and move ahead using existing resources. These coordinators also had the advantage of being able to easily communicate with the center so that issues could be resolved quickly.

Logistics Management unit

In a disaster, efficient management of available logistics is absolutely crucial. For any well-functioning health system, it is imperative to have emergency drugs and health equipment at the disposal of its workers. In this regard, two high-level officials were appointed by the Ministry to ensure the availability of drugs and other required equipment and materials around the country. They were also tasked with effectively channelizing goods that had been sent in from overseas. Similarly, the inventory compiled by the Logistics Management Division further assisted in pooling together resources and furnishing them to designated destinations.

International Relations and Coordination unit

Soon after the earthquake, the Government of Nepal formally reached out to the international community and appealed for their assistance. Having already gained a substantial level of sympathy thanks to the many images and videos shot by people that had been making the rounds on social media, it wasn't surprising that help was forthcoming. International Emergency Medical Teams were soon arriving, and it was the International Relations and Coordination unit that guided them to areas where their help was needed the most.

Hub Hospital Coordination and District Support Coordination units

In 2013, it was agreed that six hospitals—namely, Bir Hospital, Tribhuvan University Teaching Hospital, Civil Hospital, Patan Hospital, Bhaktapur Hospital and Nepal Army Hospital—in coordination with other health institutions, would serve as hub hospitals within the Kathmandu Valley during emergencies. Others outside the Valley, such as the Kathmandu University Dhulikhel Hospital and the Gandaki Zonal Hospital, were also activated for this purpose. In the aftermath of the quake, the hub hospitals promptly began functioning as per prior planning. However, despite their efforts, they still required assistance in connecting with the Ministry for logistical support, for which high-level officials had to be deployed.

Much the same as the Hub Hospital Coordinators, the District Support Coordinators also served to help hospitals better cater to the affected patients.

Information and Communication

Dissemination of relevant and timely information is the topmost priority in times of duress. It is equally important to improve communications between and within government agencies so that duplication of interventions can be avoided and to issue proper press releases to notify the public on any vital developments. The Information and Communication Management unit was therefore of great help to high-level officials from the government in collecting information: it was because of this that the MoH was able to publish consistent situation reports for a month starting from May 1. These reports helped authorities plan and prioritize actions in various areas, while also adding to the institutional memory for future reference.

Blood Management

Treating such a large volume of cases of trauma and injury as can arise following an event such as an earthquake can suddenly raise the demand for blood. In view of the needs of the time, a unit was formed under the director of the National Public Health Laboratory, tasked with maintaining the smooth supply of blood. In addition, blood donation campaigns were held and blood stocks replenished as frequently as possible. Similar campaigns were also encouraged at the district level in affected areas. It was owing to these efforts that shortage of blood did not become an issue in the post-earthquake period.

NEPAL EARTHQUAKE 2015

Bhaktapur	304,651 Population	333 Death	2101 Injuries
Dhading	336,067 Population	680 Death	1218 Injuries
Dolakha	186,557 Population	180 Death	662 Injuries
Gorkha	271,061 Population	450 Death	952 Injuries
Kathmandu	1,744,240 Population	1233 Death	7952 Injuries
Kavrepalanchok	381,937 Population	330 Death	1179 Injuries
Lalitpur	468,132 Population	185 Death	3051 Injuries
Makawanpur	420,477 Population	33 Death	229 Injuries
Nuwakot	277,471 Population	1112 Death	1050 Injuries
Ramechhap	202,646 Population	42 Death	134 Injuries
Rasuwa	43,300 Population	681 Death	771 Injuries
Sindhupalchok	287,798 Population	3570 Death	1573 Injuries
Okhaldhunga	147,984 Population	20 Death	61 Injuries
Sindhuli	296,192 Population	15 Death	230 Injuries
		Total 8864	21163

Source: NHRC, 2017

Inside insights

Dr Senendra Raj Upreti,
Secretary, Ministry of Health

More than a year has passed since the disastrous events of 2015 that claimed the lives of thousands and laid such unprecedented pressure on the country's health system. As devastating as it was, though, we must consider ourselves lucky that the effects were relatively manageable. Even though our preparedness for such a situation was confined largely to theory or within the walls of a classroom, we were able to carry out our responsibilities, and the damage and losses were not as extensive as predicted. For one, the earthquake struck on a weekend, which drastically reduced casualties. Had that not been the case, it would have been a whole different story. This was truly a test of the Nepal government's capacity to deal with disasters and certainly a valuable lesson on coping with similar events in the future.

In terms of the management of logistics, I must emphasize the importance of prepositioning medicines and other emergency supplies, including relief and reconstruction materials, well ahead of the occurrence of the next disaster. However, there will be no point in doing so if the quality of these materials cannot be assured and expired items are not replaced. It is thus imperative that we keep a close eye on logistical stocks and make sure they are well organized.

Furthermore, it's high time we identified disaster-prone areas on a map. These could be categorized in terms of high- or low-risk areas and prioritized accordingly while prepositioning.

In the aftermath of the earthquake, we also witnessed many cases of customers being duped with fraudulent goods. Prices of essential items escalated overnight with businessmen curtailing the supply. For the future, we must remember to enact better laws to prevent incidents like these and also to raise public awareness about various dos and don'ts in such situations.

Laws should also be formulated to address the challenge of managing health workers during emergencies, since there were reports of health personnel being unwilling to travel to disaster-hit or disaster-prone areas after the recent earthquake, leaving the people in such places with no access to succor. We did take the step of suspending those workers who failed both to tend to their duties and report their absences. But in order to curb these problems, there need to be straightforward laws regarding human resources during emergencies—including such issues as monetary and non-monetary incentivization, and a national inventory of all personnel working in the emergency sector across private and public institutions.

A better handle on financial needs could also be ensured if an emergency fund were to be established in different regions. This fund should, however, be non-freezable and operated by a single agency, and its mobilization freed from bureaucratic hurdles.

We also witnessed a massive inflow of International Emergency Medical Teams of various capacities in the period following the quake. The treatment protocol for trauma and

We cannot overemphasize the importance of prepositioning medicines and other emergency supplies, including relief and reconstruction materials, well ahead of the occurrence of the next disaster. However, there will be no point in doing so if the quality of these materials cannot be assured

Among the brighter spots in the experience was definitely the commendable work of non-governmental organizations that played a major role in preventing outbreak of diseases as well as in the WASH sector. They brought with them their expertise and provided valuable insights into various areas

injury had actually been finalized just a few days before the April-25 quake. This was then handed over to the I-EMTs who went around the country and proved of such immense help in reducing the number of amputations, unlike what the experience of similar events in other places around the world had led us to expect.

However, although what we actually needed were fully-functional and fully-equipped I-EMTs who could set up hospitals anywhere and provide immediate services, there were some among the I-EMTs who were more interested in touring the country rather than serving the people in need—disaster tourism at its worst. Such cases should have been averted.

Another notable problem had been the lack of sufficient space for storing the many bodies of those killed in the quakes that had piled up. Neither did we have the appropriate manpower to conduct the identification and recording of these bodies. To be fair, the management of the remains of the deceased should ideally come under the purview of the Home Ministry, but because the hospitals were involved in hosting both the dead and their loved ones, the issue had been slotted under the Health Ministry's responsibility. In the future, perhaps these two ministries could strike some form of coordination in the matter.

Among the brighter spots in the experience was definitely the commendable work of non-governmental organizations that played a major role in preventing the outbreak of diseases as well as in the WASH (Water, Health and Sanitation) sector. They brought with them their expertise and provided valuable insights into various areas. It was owing to this that we invited major INGOs to join important meetings so that they could contribute their ideas. So, while the government might have been in a command position when it came to taking major decisions, the role of the non-governmental organizations was much more participatory. Of course, that's not to say all I/NGOs did an ideal job, but we shouldn't let a few rotten apples overshadow the good that the others have done.

All the lessons this disaster has taught us so far would go down the drain, though, if measures are not taken to record these learnings immediately and action planned accordingly. I would not say we're sitting idle and doing nothing exactly; we are in the process of discussing possible changes that we could make. It is true, however, that we haven't been able to do enough given all the time that has passed.

Khag Raj Adhikari,
Then-Minister, Ministry of Health and Population

April 25, 2015 was actually World Malaria Day, and I had been taking part in a formal program that day, following which the Director General of the Department of Health Services and the Chief of the Planning Division at the Ministry of Health and Population had accompanied me back to my quarters in Pulchowk. We were in the process of discussing some plans for the future of the Ministry when the country was hit by the biggest disaster it had seen in a long, long time. I immediately set about trying to get my elderly mother and daughter out into the open. Once that was done, I left for the Ministry where the Health Emergency Operation Center had been activated.

Since I did not have a vehicle, I borrowed one from the Minister of Industry and headed to the Bir Hospital to see how service delivery was getting on. On the way, I also

helped ferry a number of injured people to the institution. The Trauma Center had just come into operation, and services centralized there since the hospital's main building did not appear too sturdy. Thereafter, I returned to Singhadurbar to attend an emergency Cabinet meeting, where I proposed that free treatment be provided to all victims and that all health facilities spring into action immediately—both of which were endorsed by the Cabinet. Based on preliminary reports that suggested there had been casualties in 11 districts, all the health facilities in the given districts were instructed to start work right away.

Three centers were then fixed outside the Kathmandu Valley for supervising services within their respective catchment areas. Biratnagar, for instance, was assigned with looking after districts in the Eastern Region, whereas Bharatpur would oversee the Central Region and Pokhara the Western Region.

All government hospitals inside and beyond the Kathmandu Valley performed to the best of their abilities, even when this meant having to shift to the ground floors or open spaces in their premises for treatment. A majority of private hospitals, however, remained closed for a few days when the pressure on the health system was at its very peak. In that period, it was solely the government and community hospitals, and their medical teams, who were working to treat the injured. It was only after reimbursement was assured from our side that private institutions were willing to offer services.

Every single day, I would reach the Ministry at three in the morning and stay until 11 pm, because I felt it would motivate other colleagues to work hard. In fact, it was only three days after the disaster that I got to meet my wife, because I had been so occupied with dealing with the aftermath of the quake. It was also in that initial period that I visited Gorkha, Rasuwa, Nuwakot, Sindhupalchowk, Dhading and Kavrepalanchowk in order to inspect how health facilities were functioning and the problems they were facing.

One of the main problems had to do with the supply of steel plates and items needed to address fractures and for carrying out surgeries. Stocks that would have been sufficient for three or four years under normal circumstances ran out in just a few days. Another issue was the supply of oxygen; oxygen plants had remained closed after the quake with workers refusing to return to their stations.

In response, we implored the Energy Ministry to ensure uninterrupted power supply to health facilities, and mobilized Nepal Army personnel, along with our own staff, to produce oxygen at the Balaju and Thankot plants. This was the only way we could envision meeting the increasing demand for oxygen in treating those who were seriously injured and needed to be operated upon. Assistance in this regard also came from Chitwan and other proximal districts before our plants were fully up and running.

At the same time, we were also determined to minimize cases of amputation, and developed strict guidelines that were to be followed by both national and I-EMTs. There had reportedly been over 10,000 amputations following the earthquake in Haiti and we were keen not to see a repeat of that here. The measures we took helped to limit such cases to around 200, much less than was previously feared.

The poorly-constructed structures of health facilities also posed a major challenge for the sector following the disaster since these

All government hospitals inside and beyond the Kathmandu Valley performed to the best of their abilities, even when this meant having to shift to the ground floors or open spaces in their premises. A majority of private hospitals, however, remained closed when the pressure on the health system was at its peak

The poorly-constructed structures of health facilities also posed a major challenge for the sector since these were too risky to use, and there was a serious shortage of operation theatres and Intensive Care/Critical Care Units…. To deal with this, zoning of patients had to be relied on to prioritize those who were truly critical

were too risky to use, and there was a serious shortage of operation theaters and Intensive Care/Critical Care Units. No hospitals had OTs in the double digits anyway, but this became especially difficult in a situation where there were many more cases requiring surgery than usual, particularly since patients were flowing into Kathmandu from other districts as well. To deal with this, triaging of patients had to be relied on to prioritize those who were truly critical, which did work. But had there been adequate OTs, the response could have been much more prompt and patients would have suffered much less, although there were no actual cases of death from lack of treatment at the hospitals.

Another key hurdle was the segregation of goods at the airport, since there was initially no record of what was coming in—resulting in a number of mix-ups, such as medicines being found in food consignments. Then there was the management of personnel, in terms of national and international medical teams and related logistics. Within a few hours of the quake, the Chitwan and Manipal Medical colleges agreed, under our request, to deploy their teams in Dhading and Gorkha respectively. But in the absence of proper information about conditions in rural parts of the district, there were delays in reaching them with assistance. What's more, the blood bank run by the Red Cross had sustained damages at a time when there was a dire need of blood. And so the blood bank at the Tribhuvan University Teaching Hospital had to be brought into full-fledged operation and donation camps conducted everyday to meet the requirements, wherein the cooperation from the public was very laudable.

We were also fortunate to have been able to avert outbreaks of communicable diseases—thanks to hygiene protocols and other safety measures that we had adopted. For instance, celebrities were brought in to endorse awareness campaigns, all of which paid off.

The most important lesson that we have taken away from this experience is that each province should be fitted with its own well-equipped emergency team, which can be mobilized in case of disasters like the earthquake last year. And the health infrastructure needs to be definitely to be made earthquake-resilient, so we are not forced to rely on temporary outdoor arrangements again. Apart from that, all major hospitals should have sufficient numbers of OTs and ICU/CCUs so that they do not fall short in times of need.

Shanta Bahadur Shrestha,
Then-Secretary, Ministry of Health and Population

On April 25 last year, I was on the first floor of the District Hospital in Surkhet when the earthquake struck. As we were relatively far from the epicenter, I assumed it had been a small tremor, nothing major. It was only after getting in touch with people in Kathmandu that the intensity of the disaster became truly apparent. Although I tried, I could not come to Kathmandu that very day, and had to wait until the next day to get here. However, I had been in constant contact with our officials and had already formed a central-level coordination committee for the treatment of the injured within an hour of the event occurring. From there on, different units were formed to mobilize medics from within the country and abroad, while medical teams under foreign armies were also mobilized under the Nepal Army. The government declared free treatment and medicines for all victims, as well as inviting anyone to come to the country to aid in rescue or treatment activities.

It was a huge challenge to manage our own medical teams, the support from other

countries and of course, provide treatment to the injured. It wasn't just because of the overwhelming number of patients, but also because of how dozens of health centers and hospitals around the country had been destroyed by the quake, as well as the many health workers who had themselves been affected.

We had issued a circular stating that no health worker or official at the Ministry would be allowed to take leave, that all were required to be present in their area of posting, and that action would be taken against those who skipped their duties. They were also not allowed to stay in cities on deputation under various pretenses. In fact, as many as 26 health officials of different ranks faced action in that period.

What I observed was that government hospitals had been at the forefront of efforts, catering fully to victims during the emergency, while many private hospitals were unable to function either because of damage to their infrastructures or because senior doctors therein held permanent positions in government hospitals and were required to serve at the latter instead. However, there were a couple of private or community-run institutions like the Kathmandu Model Hospital, Orthopedic Hospital and Dhulikhel Hospital that performed faithfully throughout the crisis.

The coordination between various government agencies was effective. Rescue missions were being carried out by the Nepal Police, the Armed Police Force and the Nepal Army, and victims were duly brought to hospitals and health centers where health workers were present 24 hours for treatment. The Ministry had deployed one first-class officer as the focal person in each of the 14 worst-affected districts to manage health services at the local level. And with support from the WHO, health clusters were formed to make health services better accessible to the needy. It was painful and difficult, but worked. Every individual brought to the hospital or health center received proper service and care.

The Home Ministry was in charge of rescue and relief. Health workers equipped with vehicles and essential medicines were deployed to the airport to receive victims brought there from different districts and ferry them to the appropriate hospital, done in close coordination with the Ministry of Health and Population. In case health workers or medicines had to be sent to a given district at any point in time, the Ministry would promptly arrange for a chopper service.

Procurement did not pose a major issue as there were already considerable stocks of medicines. We served some 100,000 injured people, including around 22,000 who were seriously affected. The figures were not so excessive that we needed to purchase a huge volume of medicines—besides which, there was also medical support pouring in from different countries comprising essential drugs. Nevertheless, we were preparing to purchase medicines worth Rs 8.2 million and were calling for tenders to be submitted in 24 hours, but a tender worth only around Rs 2.4 million was accepted, meaning that we did not even spend the allocated money. However, affected districts were provided the budget to buy the necessary medicines for victims in their areas.

The strong coordination of subordinate bodies within the Health Ministry and other line ministries was perhaps the highlight of the whole experience. Had all these agencies not been able to work in sync, the level of service we were able to provide would never have been possible. We were also fortunate to

It was a huge challenge to manage our own medical teams, support from other countries and of course, attend to the injured… It wasn't just because of the overwhelming number of patients, but also because of how dozens of health centers had been destroyed, and the many health workers who had themselves been affected

The strong coordination of subordinate bodies within the Health Ministry and other line ministries was perhaps the highlight of the whole experience. Had all these agencies not been able to work in sync, the level of service we were able to provide would never have been possible

have ample resources thanks to the support of the government and the WHO. And, of course, there were so many instances of our cultural trait of helping the needy coming to the fore: Those who had lost their own homes or were themselves injured were ready to be of assistance to others; many health workers who had been victimized themselves were out in the field, supporting others.

When I had taken charge of the Ministry, I had very strongly directed the doctors, paramedics and nurses to be present in the place of their appointment to discourage the practice of staying in cities on deputation. This ensured that there were health workers in every district. And when I initiated action against those ignoring the directive, there was even more incentive to return to their duty stations. This made service delivery a lot more efficient.

The main shortcoming was that we were just so ill-prepared for a disaster of that scale, and the fact that we had no past experience in dealing with such an event. We are so prone to disasters, not just earthquakes, but also landslides and floods. The quake taught us a lesson, that we should be better prepared; losses could've been far reduced if we had in place emergency medical teams that could've been deployed immediately to the field, for instance. A small country like Bhutan was able to send its medical team here the very next day but we are not in a position to offer such help if anyone else in the region should need it. We also lack mobile hospitals that could be quickly set up in disaster-hit areas.

Though the service delivery had been a collaborative endeavor on the part of different agencies, donors and supporters, there emerged a sense of competition in the latter phase in terms of taking credit for the work that was done, which was unfortunate. It should not be forgotten that it was the government that had been at the forefront of the effort and enabled coordination so that all these different actors could come together for the common cause of serving the needy.

As I reflect back on the experience now, we appear to have implemented very little of what we learned, even in the reconstruction process. Eighteen months have passed since the quake, and majority of health posts, health centers and even hospitals have been providing their services from makeshift quarters. There are donors who are ready and willing to support the reconstruction of big hospitals but it is us who are lagging behind in making the most of their offers.

Dr. Guna Raj Lohani

The very first step I'd taken after the earthquake had struck in 2015 was to call the District Health Office in Gorkha to inquire about the kind of impact it had borne, Gorkha being the epicenter and therefore most vulnerable among all the districts. Following that, we moved on to asking after the status of hub hospitals within and beyond the Kathmandu Valley. In the meantime, the Minister for Health and the Secretary, along with the Director General at the Department of Health Services and other senior officials, were already brainstorming to settle on the next moves to make, one of which was to form a coordination team to be led by the Secretary. Similarly, separate teams were also being pulled together to manage staff and their deployment, International Emergency Medical Teams and various other logistical matters.

Things were quite disorganized on the first day, to be honest—medical stores, for instance, were closed and we had to locate

the storekeepers, take them to their stores, and dispatch the drugs and equipment therein ourselves. It wasn't until the evening of the second day that the coordination of the functions of the Health Emergency Operation Center was streamlined. Essentially the HEOC has a dual role to play in these situations: before the disaster and after the disaster. Readying doctors and medics, and making preparations for their deployment, the stock of medicines and necessary equipment, are some of its primary responsibilities prior to the unfolding of any crisis, but it is largely after the crisis hits that it begins to function in earnest.

Despite this mandate, preparation was still inadequate and posed enormous challenges for us, although we did the best we could. A coordination team under the Health Secretary was working in collaboration with committees from other sectors, trying to sort out numerous issues that cropped up in the course of delivering services—meetings would be called as soon as problems arose so as to resolve these quickly. One such decision was to provide grants to hub hospitals, which was taken almost immediately after the need was felt. Terms of Reference for partner organizations were also developed at this time and part of the responsibility for coordination given over to the World Health Organization.

The collaboration with the National Emergency Operation Center was also well-achieved. One of our officers had been posted at the Ministry of Home Affairs to ensure proper communication, and we had teams in the Tribhuvan International Airport to receive medical support sent in by the international community, as well as patients who were being airlifted in from different districts and who were to be channeled to the appropriate hospitals in Kathmandu.

Response at the local level was also given due priority with those who failed to perform their duties being suspended—some 25 health staff in various districts had such action taken against them. These few bad apples aside, however, we were happy to note that most other staff were very dedicated and self-motivated throughout the crisis, doing all they could to help those in need. A treatment protocol had been drafted and provided to all medical teams, including those who had come from overseas, and it was seen to be one of the contributing factors to the limited amputation cases, around 41 to 42, a pleasant surprise given the scale of the disaster. The WHO, too, worked well in activating health clusters, and in just a week's time, we were able to announce that we did not need any more FMTs.

Another positive was the one-door system that we were able to employ in disseminating information, where data collected from the local level would be compiled at the center and then circulated from there. Good practices also included the inter-ministerial coordination, which was fairly smooth. To give an example, stocks of oxygen were running low by the third day, since the interruption in power supply meant gas plants had stopped working. So the Health Minister called the Energy Minister to arrange for continuous supply of power to the Balaju Gas Plant, and once that had been ensured, adequate oxygen tanks were produced.

Admittedly, however, there were many things we could have done better. We should have had stocks of logistics in strategic locations, for instance, so that these could be swiftly

delivered to the nearest hub hospitals. We should have also had in place better incentive schemes for those who worked day and night in the service of victims—most seemed to be operating solely on the basis of a sense of moral responsibility. These are just some of the shortcomings in our approach that were taken note of, and which now serve as lessons for an improved response strategy in the future.

In retrospect, we were quite fortunate that the earthquake's effects were largely concentrated in places surrounding the Capital, meaning that access to resources was relatively unproblematic. If a similar disaster were to occur in the Far West, response would have proved much, much more difficult. It is therefore key that we push away complacency and make preparations at the local level as soon as possible. Setting up a proper database of doctors and medics would be one significant move in this regard, so that they can be mobilized in health institutions close to their residences rather than their duty stations. Better understanding among different government agencies and officials could also contribute to more efficient action in the wake of a crisis like this one. And finally, we also now know that in order to be prepared for another such event in the days to come, it is essential for more awareness and training, not just for health personnel, but all citizens of the country.

TABLE 1.1 OFFICIALS DEPLOYED BY MOH TO EARTHQUAKE AFFECTED DISTRICTS

S.N.	Districts	Name of Coordinators
1.	Kavre, Bhaktapur	Dr Bikash Lamichane
2.	Gorkha	Dr Dipendra Raman Singh
3.	Dhading	Dr Krishna Poudel
4.	Rasuwa	Dr Bhim Acharya
5	Makwanpur, Chitwan	Giriraj Subedi
6.	Dolakha	Ghanashyam Pokhrel
7.	Sindhupalchowk	Chudamani Bhandari
8.	Kathmandu	Mahendra Prasad Shrestha
9.	Lalitpur	Dr Basudev Pandey
10.	Okhaldhunga	Jhalak Sharma Poudel
11.	Nuwakot	Dr Ramesh Kharel
12.	Ramechap	Dhurba Ghimire

Source: HEOC

LEADING THE CHARGE

HUB HOSPITALS

BIR HOSPITAL

TRIBHUVAN UNIVERSITY TEACHING HOSPITAL

PATAN ACADEMY OF HEALTH AND SCIENCES

CIVIL SERVICE HOSPITAL

NEPAL ARMY HOSPITAL

DHULIKHEL HOSPITAL

BHAKTAPUR HOSPITAL

WESTERN REGIONAL HOSPITAL

BHARATPUR HOSPITAL

Bir Hospital

One shock after another

As the country's oldest hospital and the main government referral center, and given its central location in the heart of the Capital, Bir Hospital naturally drew in hordes of panicked victims from surrounding areas

Less than 20 minutes after the earthquake, Bir Hospital was already packed to the hilt. As the country's oldest hospital and the main government referral center, and given its central location in the heart of the Capital, the hospital naturally drew in hordes of panicked victims from surrounding areas. Within the next hour or so, however, owing to the persistent aftershocks that made it impossible to remain inside the building—already listed as one of the most vulnerable to such tremors and whose newest wing was built a good 33 years ago—these patients had to be evacuated outside and new treatment facilities set up in the open. The Khula Manch, across the road from the hospital, was chosen for this purpose, and health professionals attended to the patients there—those who needed further examination were either kept in tents or at the nearby stadium, and those who could recover at home were immediately discharged so as to make room for others.

Chaos reigned at first. Managing the evacuation and the steady arrivals of freshly-injured people—including those who had been in the collapsed Dharahara—was not easy and Bir soon ran out of space. Only then did it dawn upon officials that a viable alternative was staring them in the face: there was a seven-storey building right next door, the Nepal-Bharat Maitri Trauma Center, which had been built with the assistance of

the Government of India, but had been lying unused for years.

It was in this center that the 'hub hospital' of the Ministry of Health would go on to treat 2,462 patients, admitting 427. Out of these, 259 patients would undergo major operations, most of the cases related to orthopaedics and trauma, and there were also other cases that required neurosurgery and general surgery. Bodies of 110 people were brought into Bir to begin with, while an additional seven persons would succumb to their injuries in the course of treatment. The building, practically vacant until this day, was now teeming with patients, their families and volunteers. Every now and then, the air in the emergency unit on the ground floor would fill with the wail of ambulance sirens.

Bir also serves as a teaching hospital for the National Academy of Medical Sciences (NAMS), which proved extremely propitious—since the hospital runs post-graduate residency programmes in medicine and surgery (MD/MS), it had an available workforce of around 80 doctors and 150 nurses, majority of whom were working during the crisis.

As more and more people poured in, necessary drugs and equipment were first obtained from the emergency prepositioned supplies, following which more support eventually arrived from the MoH and various non-government agencies. "The prepositioned drugs were enough for only around 100 patients, while on the other hand, the number of patients was rising by the hour," said Dr. Ganesh Gurung, the Vice-Chancellor of NAMS. "We then immediately directed the pharmacies located inside the hospital to remain operational and maintain a steady supply of medicines as far as possible."

For the purposes of triaging, hospital staff initially distributed different-colored bands so as to be able to easily identify severe patients and prioritize their treatment. After it ran out of bands, however, specific triage areas were allocated for patients to be placed in. The fourth floor of the trauma center, meanwhile, functioned as a space where people would be shifted following preliminary treatment.

On the first day itself, a number of complex neurosurgeries were carried out, along with an amputation. Over the next 72 hours, many more such operations would be conducted, with almost all of Bir's doctors working tirelessly to cater to a seemingly endless sea of patients. Equipment from the hospital was also being moved to the center, while those that it lacked in but were necessary under the circumstances were sought from the MoH and the Indian Embassy, both of which promptly provided the required support.

Appeals were also made to pharmaceutical companies and local distributors. "They agreed to help us either by providing medicines at a reduced cost or waiving the fees altogether," said Dr. Swoyam Prasad Pandit, the then-director of Bir. Immediate purchasing, however, was not done on an ad-hoc basis. Instead, an officer was assigned the task of managing the process and pharmacies duly instructed that medical goods be released only upon the signature of that official.

Then, just as the flow of patients was beginning to ease and the hospital slowly limping back to normalcy, the country was hit by another powerful aftershock on May 12, and it was back to square one.

"We had to be on constant stand-by," said Dr. Gurung. "The Health Emergency Operation Center or Nepal Army would inform us of

Managing the evacuation and the steady arrivals of freshly-injured people was not easy and Bir soon ran out of space. Only then did it dawn upon officials that a viable alternative was staring them in the face: the seven-storey Nepal-Bharat Maitri Trauma Center right next door

Looking back on the experience, hospital officials now realize that decentralizing the division of work and avoiding micromanagement of functions were crucial for the kind of effective response they were able to put forth. But, of course, they admit things could have been better, particularly in the way of preparedness

new patients being airlifted to us, and our team would go receive them."

The aftershocks that continued thereafter made it extremely challenging for health professionals to work and for patients to return home. This time around, to help them cope, the hospital administration also held psychological sessions on the premises with the support of various international organizations. "Yoga and psychological counselling of hospital staffs was part of this," said Dr. Gurung.

Looking back on the experience, hospital officials now realize that decentralizing the division of work and avoiding micromanagement of functions were crucial for the kind of effective response they were able to put forth. But, of course, they admit things could have been better, particularly in the way of preparedness.

"Sufficient measures were not taken to prepare for a disaster as big as the one that occurred in April. Regular drills and mock trainings should have been conducted so that health professionals and administrative staff had a definitive course of action to revert to in such situations," said Dr. Gurung

Hospital officials also recommend the setting up of a communication system specifically within the sector that would remain functional even when normal communication channels break down. Additionally, they suggest proper patient referral be done so that the workload is divided between the various hospitals. Dr. Pandit also laments the lack of a trauma fund. "This time, the government agreed to conduct the treatments for free, but if such a fund had existed, it could have been immediately mobilized," he said.

Dr. Gurung also reckons that the treatment guidelines require modification and that International Emergency Medical Teams in particular should strictly comply by them. "Medical teams from various countries did a wonderful job, but some of their operating procedures were not appropriate for our context," said Dr. Gurung. "For instance, during surgeries, many foreign doctors would treat an open wound and immediately close it up, which later resulted in many cases of bone infection." This ran counter to the standard protocol in Nepal that dictates that a person with an open wound should be properly taken care of and only after his or her wound heals should it be closed back up.

Tribhuvan University Teaching Hospital

Triumph of collective action

When Dr. Deepak Prakash Mahara, the executive director of the Tribhuvan University Teaching Hospital (TUTH), arrived at the hospital on April 25, 2015, the earthquake had just hit, and TUTH's premises were already filling up. The doctors on duty, the nursing staff and the resident staff, as well as the medical students present in the hospital, had been among the first responders to the quake. The first thing that came to Dr. Mahara's mind when he saw the people crowded in the garden—in the thousands, many of them bleeding—was to contact the blood bank right away. Arrangements and announcements for voluntary blood donation camps in the hospital were promptly made. In addition, contact was also made with important faculties for critical care.

Thanks to retrofitting courtesy of the Government of Japan done after the completion of a hospital safety assessment with WHO/DIPECHO support, TUTH's buildings had fortunately remained intact in spite of the tremors. The hospital had also earlier formed a committee called the Hospital Preparedness for Emergencies (HOPE), whose major objective had been to strengthen the institution's physical readiness, ranging from measures such as glass lamination, anchoring or retrofitting of major equipment, water facilities, oxygen plants, steady provision of electricity, emergency supplies and a private helipad.

TUTH's first post-quake surgery was carried out two and a half hours after the event

Thanks to retrofitting courtesy of the Government of Japan, TUTH's buildings had fortunately remained intact in spite of the tremors.

One of the major challenges faced by TUTH at the time was in accommodating a large volume of earthquake-affected patients on top of the 500 regular patients who were already admitted there prior to the disaster …. Hospital officials decided to request NGOs to make room for these patients

took place—by the end of the day, 35 major operations and 17 life-saving operations had been conducted. Over the next 10 days, the six operating theatres in the hospital were running round the clock. Procedures included around 10-12 amputations and 18 limb-saving surgeries. The hospital—which otherwise generally catered to over 2,500 patients per day—was soon converted into a trauma center, with the Out-Patient Department services suspended and all attention and resources focused on treating those injured by the earthquake. Necessary drugs and surgical items were furnished by the on-site pharmacy.

Triaging was conducted from the institution's entrance itself. An open space next to the gate was designated a "black zone" where bodies of the dead would be placed. The emergency ward, meanwhile, was declared a "red zone" for patients who required immediate attention. The BP Koirala Opthalmic Center nearby was deemed a "yellow zone", meant specifically for people who had sustained multiple fractures, but were now out of danger. And finally, the "green zone" comprised the Ganesh Man Singh ENT OPD lobby where those with minor injuries were kept.

One of the major challenges faced by TUTH at the time was in accommodating a large volume of earthquake-affected patients on top of the 500 regular patients who were already admitted there prior to the disaster and who now had to be discharged. However, lack of transportation services and the fact that some of the patients were from outside the Kathmandu Valley rendered this process difficult. Hospital officials decided to request NGOs to make room for these patients, and fortunately, one organization came through. Another measure adopted by TUTH was to hold meetings twice a day across the next 10 days—at 9.30 am and 3 pm—in order to spur into action the in-charges of the disaster committee, operation divisions, logistic divisions and security divisions, and the Head of the Department.

In terms of food and water, on the third day after the earthquake, when almost all small hotels and restaurants were closed, the hospital had to make arrangements to feed its staff, patients and visitors, and was able to do so with the help of an organization. The organization prepared two meals a day—once in the morning and again in the evening—for about two weeks, and distributed mineral water as well.

Officials at TUTH also decided to split its volunteer team into two separate divisions—internal and external volunteers. The internal volunteers basically included the Bachelor of Medicine, Bachelor of Surgery (MBBS) and nursing students and interns, who were familiar with the layout and functioning of the hospital. The external volunteers, on the other hand, were those not acquainted with such details and were therefore assigned tasks such as maintaining cleanliness in hospital premises, and managing transport and drinking water, among others.

"Within two weeks or so, we were back on track," said Dr. Mahara. "Many people, including the international community and the media, had expected things to be a lot worse and imagined that we were looking at a situation similar to that of Haiti. But we proved them wrong."

However, another big aftershock soon struck on May 12. But the response at TUTH was far calmer and more systematic than it had

been the first time around, since a system was already in place and functioning. The hospital was able to deal swiftly with the new arrivals.

As for the many I-EMTs that had come into the country, TUTH officials had made clear that they did not require the additional human resources for two reasons: first, they had sufficient manpower capable of handing the crisis, and second, because the I-EMTs were not familiar enough with the local treatment standards and protocols. Also, allowing I-EMTs access to operating theatres could very well result in more such teams demanding space to conduct their own surgeries, which would have been hard to monitor and regulate. It was therefore decided that whenever contacted by an FMT, staff at the TUTH would refer them to the HEOC, which would deploy them to those districts where their need was most felt.

According to Dr. Mahara, the disaster has also presented the institution with a great deal of opportunities for learning. He was largely satisfied with TUTH's level of preparedness thanks to the initiation of the HOPE program in terms of availability of medicines, regular rehearsals and drills. He also underscored the importance of the structural robustness of any infrastructure. "In addition to this, the availability of open spaces is also very crucial," he said.

Another of the lessons gleaned by TUTH officials from the experience had to do with oxygen supply, where they had faced issues with their oxygen plant in the first few days of the disaster. To prevent such issues in the future, the hospital has already installed two new oxygen plants with a third one set to arrive soon.

Dr. Mahara also touched upon how essential it is to have a competent workforce and advised against underestimating the sheer exigency of establishing a sturdy communication system at both national and international levels.

When another big earthquake struck on May 12, the response at TUTH was far calmer and more systematic than it had been the first time around, since a system was already in place and functioning. The hospital was able to deal swiftly with the new arrivals

Patan Academy of Health and Sciences

A stitch in time

With a thorough disaster management plan in place prior to event in 2015, the Patan Hospital was far better prepared than other institutions to tackle the crisis; frequent trainings and drills had primed the medical team to respond proactively to just such a large-scale emergency situation

If responding to the April 2015 earthquake proved a disorienting experience for many of Nepal's hospitals, that was not the case, however, for the Patan Academy of Health and Sciences (PAHS). With a thorough disaster management plan in place prior to last year's event, the hospital was far better prepared than other institutions to tackle the crisis; frequent trainings and drills had primed the medical team to respond proactively to just such a large-scale emergency situation.

Immediately following the quake, the hospital administration first coordinated a mass evacuation of in-patients to the ground floor of its buildings, and set up tents within the premises from where services could be dealt out. As the hub hospital of the Lalitpur district, it was already seeing a steady flow of injured survivors within minutes of the earthquake.

In addition to catering to those patients already admitted at the hospital, the administration recognized the challenge of managing the huge volume of traumatized quake victims who would be arriving in no time. For this, the hospital requested the Rajdal Battalion of the Nepal Army to set up a field hospital—a request the Chief of the Battalion readily complied with. The PAHS then began triaging patients right from its entrance, which is located by the side of the busy Lagankhel-Jawalakhel road section. This allowed patients to be segregated based on the severity of their injuries as soon as they walked in. Patients in the red zone were directed to the emergency building, for instance; those in the yellow zone were clustered in a

space outside the emergency facilities; while those in the green category—which stood for minor injuries—were sent to the field hospital set-up on the Battalion's premises near the hospital. And since aftershocks were strong and frequent, the staff also had to race to bring equipment from the operation theaters (OTs) and Intensive Care Units to the ground floors.

According to Dr. Pawan Sharma, the then-director at the PAHS, each member of the staff had a specific role to play, as defined in the emergency preparedness plan. "We were the first hospital to have such a plan, and it worked to great effect in our hour of need," he said. The hospital treated as many as 1,680 patients following the quake, while 271 major surgeries were carried out. A total of 209 patients had to be admitted and the number of deaths at the hospital stood at 57.

The hospital administration additionally states that all patients coming to the hospital were given the necessary services for free as per the government's instructions. And apart from a few lapses, Dr. Sharma said that the coordination with the HEOC at the MoH and the District Disaster Relief Committee (DDRC), was satisfactory. He added that support from donors—both with regard to equipment and medication—played a significant role in allowing the hospital to continue its services, despite the odds.

That being said, there was no shortage of challenges either. Though the hospital had stocks of certain essentials, these supplies were meant for only a few days. "Luckily, we didn't have problems with the supply of medicines since we had been maintaining substantial stocks as part of the disaster preparedness plan, and had the support of donors as well," Dr. Sharma said. However, as patient in-flow increased exponentially after the disaster, oxygen and fresh water reserves were soon running low, with the latter posing a particularly difficult issue since water tankers were not operating at the time.

Other major hurdles, according to Dr. Sharma, was the task of moving patients from the ICU, and those who were on ventilators, to the ground floor, without causing them further harm, along with the lack of a centralized and orderly channel for the sharing of information, and the absence of a proper system of referrals for patients. Furthermore, setting up temporary OTs, the compatibility of equipment and maintaining the right temperature within the tents had also proved challenging. The hospital also struggled to accommodate the large number of bodies, given the limited space in its mortuary.

One of the biggest problems, however, was the confusion over remuneration for costs borne by the hospital during the disaster—confusion that still persists to this day. A day following the disaster, the then-Health Minister, Khag Raj Adhikari, had visited the PAHS and promised the administration all the required financial support. Given this assurance, the non-profit, self-sustaining hospital had then proceeded to use its own resources to provide services to patients free of cost. Remuneration, however, hasn't been forthcoming, according to Dr. Sharma. "A total of Rs. 52,913,375 was spent across the emergency period, but the government has reimbursed only Rs. 18,500,000 so far," he said. "It has been over a year since the quakes, but the government is yet to take concrete steps to fulfil the promise it made. This reluctance only discourages the hospital administration from working effectively should the country face another disaster in the future."

Each member of PAHS' staff had a specific role to play, as defined in the emergency preparedness plan… and all patients coming to the hospital were given the necessary services for free as per the government's instructions

The state needs to invest in the infrastructure of public institutions like the PAHS. There is a great need for the availability of essential facilities like ICUs, CCUs and OTs that can remain functional throughout crises like quakes in 2015

The experiences of Dr. Sharma and his team indicate that the state needs to invest in the infrastructure of public institutions like the PAHS. There is a great need for the availability of essential facilities like ICUs, CCUs and OTs that can remain functional throughout crises like last year's quakes. Stakeholders also suggest that in case of a similar event in the days to come, the government should ensure that medical staff are deployed to health facilities near their homes, and not necessarily to the ones they are associated with. "The most important aspect, however, is financial support," said Dr. Sharma. "The government needs to show more generosity in supporting hospitals, though, of course, it should also have monitoring mechanisms in place to check whether the money is being used as intended." He also suggested the maintenance of a record-keeping system that could enable the evaluation of the strengths and weaknesses of each hospital, which will be valuable in managing patients and referring them to appropriate institutions.

"The earthquake and all the difficulties we faced have taught us a great deal, but we've been very slow in putting what we've learned into action, although it's been over 18 months since the disaster," Dr. Sharma lamented. "The government needs to take a leading step in this regard and facilitate a transformation that would equip us for a better response to crises in the future."

Civil Service Hospital

Roots of readiness

In the same way that there were distinct hospitals for the Nepal Army and the Nepal Police, a need was felt to establish a hospital dedicated specifically to civil service employees of the Nepal Government. For support in the endeavor, the government had approached the Peoples' Republic of China (PRC), and once they had acquiesced, on November 14, 2008, the structure of the 132-bed Civil Service Hospital (CSH) was completed and handed over to the government by the PRC.

The CSH is an autonomous government institution that works under the Ministry of General Administration (MoGA). Out-patient services commenced on March 29, 2009, while emergency, in-patient, and operation services were offered starting January 21, 2010.

During the construction of the building, the Chinese team had given assurances that it could withstand earthquakes measuring as high as eight on the Richter Scale. The hospital had additionally prepared a disaster plan and conducted consistent training exercises for the benefit of the staff. A disaster store had also been maintained, as well as pre-allocating areas for triaging.

On April 25, 2015, around an hour after the impact of the first earthquake had been felt, the hospital's Executive Director, Dr. Bimal Kumar Thapa—in accordance with

Having a disaster plan in place was key in enabling the CSH to deal with what could have been an overwhelming situation following the quake, with more and more people arriving by the minute

There exists a chain of responsibility going from the satellite or sub-hub hospitals to hub hospitals to the HEOC, but this hierarchy did not function well, primarily because of lack of communication between satellite and hub hospitals …. Communication and information management were deemed the two biggest stumbling blocks as far as the CSH was concerned

the disaster protocol—had declared that the hospital would now be switching its operations to the emergency mode. By this time, the CSH's grounds in New Baneshwor were already beginning to swarm with people.

"The first few hours were a frenzy," said Dr. Thapa. "But then we stopped and skimmed through the protocol document and were able to decide what we should be doing, starting with triaging patients right from the hospital gate." The plan was key in enabling the CSH to deal with what could have been an overwhelming situation, with more and more people arriving by the minute, and patients who were already admitted in the hospital running outside in fear.

Fortunately, the hospital had not sustained any structural damage in the quake, and the entire lobby was intact and could be used for treatment. Emergency operations were not conducted that first day, and attention given over instead to stabilizing patients. Since there were no neurosurgeons in the hospital itself, patients requiring such services were either referred to the Neuro Hospital in Bansbari or the Annapurna Neuro Hospital in Maitighar. "We were aware that Teaching Hospital and Bir Hospital were already stretched beyond capacity and thought it best to distribute patients to other facilities so as to not add to their burdens," Dr. Thapa explained.

Being a hub hospital, the CSH had various additional duties, such as coordinating with other private hospitals in the district. There exists a chain of responsibility that travels from the satellite or sub-hub hospitals to hub hospitals to the HEOC, but this hierarchy did not function well, primarily because of lack of communication between satellite and hub hospitals, although the other links, namely between the hubs and the HEOC were working as expected. Communication and information management were deemed the two biggest stumbling blocks as far as the CSH was concerned. Transportation was yet another hurdle: owing to damaged or blocked roads, ambulances were not able to travel easily to a lot of areas and many patients had to be evacuated by air.

A total of around 2,500 patients were treated at the CSH, which included 200 surgeries. Bodies of the dead, meanwhile, were stored in the hospital's morgue until claimed by their next of kin.

Though Dr. Thapa said he was pleased with the performance of the personnel in charge of the emergency, orthopedic and surgical operations under such pressure, he did acknowledge that there were improvements to be made based on what the experience has taught them. The first would be to direct every sub-hub and hub hospital to compulsorily draft a Mass Casualty Management plan, given how useful the document had proven in CSH's own response. Hospitals also need to incorporate a series of HOPE trainings so as to gain an idea of preemptive measures that can be adopted. He added that each hub hospital has prepositioned stocks of essentials stored in containers, which need to be appropriately used in emergencies. And, of course, all hospitals need to be retrofitted immediately so as to be ready in case there is another large-scale disaster.

For Dr. Thapa and the staff at the CSH, what the earthquake has made clear is the importance of communication, information and, of course, the availability of medical items and equipment and other general resources in the aftermath of a disaster—three areas in which they feel they could have done much better.

Nepal Army Hospital

A force for good

In most countries, the first government organ to respond in the event of major disasters is the military. And in Nepal's case too, the Nepal Army was mobilized immediately following the April 2015 quake in order to establish communication, ensure security and build confidence. Deploying 66,069 troops in 66 districts for almost two and a half months after the quake, the NA rescued 1,336 survivors and retrieved 1,729 dead bodies. It also played a vital role in tasks such as evacuating casualties, Search and Rescue operations, as well as coordinating with international military medical teams. However, the NA itself was not spared by the disaster: 12 army personnel lost their lives in the quake, while 99 were injured and 10 went missing.

Discussing the aftermath of the quake, Major General Dr. Kishore JB Rana, the Chief of Directorate of the Medicine Sciences Department of the NA, said that relatively little damage had occurred within the Kathmandu Valley, considering the magnitude of the temblor. "It was a different story outside the Valley, of course," he said. "Electricity supply was obstructed almost everywhere in the first two days or so, communication services were erratic, and many medical facilities had been affected." Indeed, in the first 24 to 48 hours after the quake, a majority of hospitals in affected areas had stopped functioning, with strong aftershocks preventing staff from returning to their posts, even if the structures of these facilities had remained intact.

Within two hours of the quake having hit, the Army Hospital had established a Medical Command Center within the headquarters' premises, and activated its disaster management plan. This allowed it to attend to the casualties that were flooding in—both military and civilian

The disaster was rife with lessons for the institution. The first of these was the importance of resilient infrastructures—retrofitting of hospitals being a topmost priority

The Birendra Sainik Hospital or Army Hospital had been among those that had sustained severe damages, thereby forcing it to shift its services to a tented facility close to the army headquarters. This included moving 325 in-patients out of doors, including those kept in the ICU and other post-operation patients, which was not easy. In any disaster, it is the first six hours that are said to be critical: it is in that period that most lives are saved, since after 24 or 48 hours, the chances of survival become increasingly slim. Action, not only at the government level but also that of the community, must be prompt so as to make the best possible use of this small window of time. Indeed, within two hours of the quake having hit, the Army Hospital had established a Medical Command Center (MCC) within the headquarters' premises, and activated its disaster management plan. This allowed it to attend to the casualties that were flooding in—both military and civilian.

The NA also opened two medical cells within the Multi-National Military Coordination Center (MNMCC)—one to coordinate with the Birendra Sainik Hospital and the other to be based at the airport so as to receive the arriving I-EMTs. The airport was where survivors who had been air-evacuated were being provided with first aid before being transferred to various hospitals.

Twenty-four hours after the earthquake, telecommunication services around the country had been jammed by the high traffic of phone calls people were making. However, the army's communication center was still functioning and able to track casualties. On that first day, I-EMTs from the Indian Army were early on the scene, to be followed by a total of 15 I-EMTs—comprising 880 medical personnel from 12 different countries—who flew in over the next few days, and were mobilized by the Nepal Army's MNMCC. They were deployed to high-risk areas within and outside the Valley.

Among the arriving I-EMTs, the biggest was that from Israel, boasting a Level-3 capacity with exhaustive facilities. There were seven teams with Level-2 capacities and six with Level-1 capacities. Importantly, the Army Hospital also welcomed two teams from China that were concerned specifically with epidemic and disease prevention, a crucial area of focus during disasters like earthquakes, where crowded temporary living arrangements in open spaces can result in rapid spread of disease within populations.

A team of liaison officers and doctors were sent with each of these teams to help facilitate their work, especially where language posed a barrier. The Army Hospital also coordinated with the MoH, the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and the Chhauni medical team in sending SAR teams and helicopters to deal with casualties in affected areas.

Hospital records indicate that almost 1,242 survivors were treated, among whom 982 underwent surgeries—249 out of these were major surgeries. And the NA's records show that almost 793 were evacuated and around 31% of the patients were referred to the Army Hospital.

The disaster, according to Dr. Rana, was rich with lessons for the institution. The first of these was the importance of resilient infrastructures—retrofitting of hospitals being a topmost priority. Another major hurdle were the encountered shortages of essential logistics, such as body bags, oxygen plants,

tents, surgical stocks, heavy-engineering equipment and air transportation, among others. Lack of space in mortuaries was an additional issue: the Valley can accommodate only 70 to 80 bodies in its mortuaries, and given the high number of casualties in the earthquake, government agencies were struggling to come up with a plan to manage dead bodies.

The Army Hospital, however, proved relatively more prepared in other matters, having conducted prior exercises in anticipation of a mega-disaster exactly like the one that unfolded in 2015, although Dr. Rana admitted these activities were mostly confined to the Kathmandu Valley. They had included joint exercises with the TUTH on tackling mass casualties and issues such as the identification of empty spaces, maintenance of logistical supplies and general coordination, as well as another exercise in 2009 held in coordination with the US health facility command called the Tempest, followed by table talks as well as field activities.

Those exercises proved instructive when it came to dealing with the real-life crisis. "Preparedness is key to success," said Dr. Rana, further adding, "One specific advantage that the Army Hospital has is that the military remains in barracks, so that when disaster strikes, forces can be mobilized easily because they are contained in particular spaces. We have both resources and the discipline."

However, he admits that although rescue operations were carried out fairly efficiently, the country still has a long way to go in terms of a good disaster management policy and its implementation. "Coordinated effort from all sectors is needed," he said. "Disasters like earthquakes cannot be prevented, but the damage, destruction and suffering they cause can most definitely be lessened."

Dhulikhel Hospital

Persevering through chaos

The scene, at least initially, was one of pandemonium: patients were scattered all around the grounds as staff rushed to set up beds and treat patients under the open sky, uncertain if aftershocks would bring down the already-rattled infrastructure

On April 25, 2015, many of the members of staff at the Dhulikhel Hospital had been on their weekly day off when a 7.8-Richter earthquake shook the nation. When the first wave of traumatized survivors began filtering into the premises, the scene, at least initially, was one of pandemonium: patients were scattered all around the grounds as staff rushed to set up beds and treat patients under the open sky, uncertain if aftershocks would bring down the already-rattled infrastructure.

Natural disasters, like the April 25 quake, can exert great pressure on health systems, depending on the number of injured. The Dhulikhel Hospital, identified as a hub hospital by the government, received over 3,000 patients in the period following the quake. As the referral center for survivors in the most-affected districts—including Sindhupalchowk, Ramechhap and Dolakha—the hospital provided free medical services for injuries such as wounds and fractures, as well as cases of trauma.

An often-overlooked issue during an emergency is the importance of distinguishing between patients, their relatives and medical personnel. “When a traumatic event like this occurs, it can become difficult to identify who the care-giver or the care-seeker is. In order to avoid that kind of confusion, triaging was done,” said Dr. Deepak Shrestha, Chief of the Orthopedics Unit. According to

Dr. Shrestha, the hospital also followed the standard procedure of color-coding patients as per the scale of their injuries: black was for the deceased; red indicated that the patient needed to be taken to the shock room or to the OT; orange was designated for less-severe cases; and yellow for those who were out of danger. Green, meanwhile, was used for those suffering minor injuries, who did not require immediate medical attention.

Following the quake, given the rush of patients and time and human resource constraints, the hospital did face a series of difficulties. First on the agenda was diagnosing the patients. More importantly, however, the staff had to determine which category of patients were to be given first priority in treatment—there was a serious dilemma regarding whether the focus should be on children, the seriously injured, or specifically those with spinal injuries. Eventually, it was determined that since open wounds warranted immediate attention, patients with open-wound fractures would be afforded the most priority.

All five OTs at the hospital, according to Dr. Shrestha, were working round-the-clock for the next 40 days: if the OTs had been seeing a little over a dozen surgeries a day prior to the quakes, over 27 surgeries were now being undertaken. Dr. Shrestha also explained how surgeries related to chest injuries, and leg and arm fractures were conducted during the day, whereas spinal injury operations were carried out in the night-time.

Along with treating the steady flow of patients who had been injured in the quakes, the hospital also quickly recognized that controlling the spread of infection would be critical in a post-disaster scenario. To that end, even though the hospital staff were working under immense pressure and duress, they made it a point not to compromise on sanitation and hygiene. Because infections can spread readily through the hands, a concerted effort became necessary to inform patients and their visitors about the importance of hand-washing and regular use of sanitizers.

According to records from that time, over 3,000 operations were performed at the Dhulikhel Hospital on patients hailing from various neighboring districts like Sindhupalchowk, Kavre, Sindhuli, Dolakha, Ramechhap and Bhaktapur after the quakes. With 136 cases, surgery for open fractures, such as a Tibia fracture, comprised the most common procedure at the hospital. The hospital also performed 34 spinal-injury operations.

Dr. Shrestha also confirms that altogether the Dhulikhel Hospital alone treated about 72% of the total injured survivors from the six districts. In something of a complication, however, these patients from hard-hit districts outside Kathmandu were often unwilling or unable to return to their homes after treatment. In response, the Dhulikhel Hospital established a step-down center, a temporary station with tents and mattresses for patients to stay in. The center was also intended for patients who needed follow-ups following their treatment and could not easily travel back and forth. In addition to this, the hospital also set in motion a strategy of 'relief, return and rehabilitate', under which patients were provided a relief package containing all the daily essentials.

Dr. Rajendra Koju, the Medical Director at Dhulikhel Hospital, shared that the earthquake proved that we, as a country, were simply not prepared for an event of such a scale—an important lesson. "We realized that in such times, it is essential to maintain patience and work with the objective of saving as many lives as possible," he said.

The Hospital also established a step-down center, a temporary station with tents and mattresses. The center was intended for patients who needed follow-ups following their treatment and could not easily travel back and forth

"The hospital determined, for instance, that along with trauma management, it was important to provide healthy and nutritious food to patients as well as visitors, for which provisions were kept. We also provided physiotherapy to the injured, and were dedicated to maintaining a clean and healthy environment within the hospital, and put great effort into preventing infections."

Dr. Koju, in a Health Cluster Bulletin published on June 19, 2015, writes, "When disaster strikes, being prepared surely helps. Trained manpower with sound knowledge, skill; medical supplies; enough space; communication and energy backup; mobile hospitals; transportation; food and clean water are factors that play an important role in a hospital following a disaster of this scale. This tragedy showed us our weakness, strength, capabilities and our potential. But most of all we learnt that even with limited resources and under the most challenging of circumstances, a group of people, notwithstanding their own personal tragedies, who are truly compassionate, ethical and determined to save lives and provide relief, could make all the difference."

Bhaktapur Hospital

Shouldering a great burden

As soon as Dr. Hari Bahadur KC, the Medical Superintendent at the Bhaktapur Hospital reached the premises of the hospital—an hour or so after the earthquake—he had immediately busied himself with helping the staff move patients out and away from the buildings to the safety of open grounds. Relentless aftershocks had made it virtually impossible to provide care indoors, so a makeshift shelter was hastily set up outside, from where the hospital would deliver medical services over the next few weeks. And in line with directives from the MoH, the hospital provided all services for free in the immediate aftermath of the quake.

Fortunately, the hospital did have a disaster plan—one that outlined ways to cope with a sudden influx of patients and to systematically handle the flow without exacerbating the patients' conditions—and had conducted several trainings along those lines in the years preceding the disaster. This had included Mass Casualty Management guidelines, a vital component of such plans. "Almost all members of the staff had taken part in the simulation exercises and orientation programs," said Dr. KC. "And we had several review committees going through the plan from time to time and suggest corrections."

Still, the burden was great, particularly since Bhaktapur had been among the most highly-impacted districts in the quake, and Bhaktapur Hospital, as a designated hub, would expectedly be receiving a major chunk of the injured. What's more, the institution further bore the responsibility of coordinating with the nine other private hospitals in the district and supporting them. Coordination was thus quickly initiated among the residential staff, duty staff and with nearby hospitals. The HEOC had assigned Dr. Bikash Lamichhane, Director of the National Tuberculosis Center, to be in charge of the response, with support from the DDRC headed by the Chief District Officer.

Relentless aftershocks had made it virtually impossible to provide care indoors, so a makeshift shelter was hastily set up outside, from where the Bhaktapur Hospital would deliver medical services over the next few weeks

Commendably, the hospital remained unfettered in delivering services despite sustaining severe damages to its oxygen plant, staff quarters and several other buildings. This was accomplished with the active support of the District Administration Office and various INGOs

The staff then began looking for open spaces where tents could be set up so that the huge flow of victims could be managed and patients triaged based on the severity of their injuries. Commendably, the hospital remained unfettered in delivering services despite sustaining severe damages to its oxygen plant, staff quarters and several other buildings. This was accomplished with the active support of the District Administration Office and various INGOs.

Patients with severe injuries were referred to other specialty centers in Kathmandu. And as the Bhaktapur Hospital lacked ambulances, other institutions like Bhaktapur Cancer Hospital and the Human Organ Transplant Center had played a crucial role in providing vehicles to ferry patients to the institution. The hospital, along with the private hospitals, also organized medical camps in the district.

It is also worth noting that civilian volunteers were also of immense help in managing the patients. And various logistics and financial support were provided by the MoH, supplemented by further assistance received from the WHO through a Disaster Preparedness European Commission's Humanitarian Aid and Civil Protection (DIPECHO)-supported project in such matters as the installation of containers at the hospital to store medical and food supplies. In full, the hospital treated over a thousand patients in the fallout of the quakes.

On reflecting back on those difficult times, Dr. KC rued the lack of an ICU and orthopaedic doctors at the institution, which had compelled staff to shift patients to other hospitals in the Valley where such facilities were available. He also worried that if another disaster were to hit soon, the hospital would not be able to function the way it did in 2015—it simply is not ready. "There is still a lot of planning, training and coordination to be undertaken for us to be able to tackle another crisis," he said.

While there was some visible support from the MoH and other development partners, Bhaktapur Hospital officials are of the opinion that had the Health Ministry pre-emptively allocated sufficient budgets to institutions like theirs with such emergencies in mind, the hospitals could have coped far better. "Sadly, even over a year after the earthquake, some of the bills are yet to be reimbursed," said Dr. KC. "These bills were presented to us by private hospitals, and I fear such delayed payments might discourage them."

Also, in terms of infrastructure, Dr. KC recognizes that stronger buildings are an absolute necessity. An earthquake-resistant building that was constructed by Department of Urban Development and Building Construction at the hospital, for example, withstood the quake and played a crucial role in the post-quake response. "All our buildings should be made that resilient if we want a chance to survive the next disaster," Dr. KC said.

TABLE:1.2 SERVICES PROVIDED BY DIFFERENT HOSPITALS

Services	Public hospitals of Kathmandu valley	Private hospitals of Kathmandu valley	Public and private hospitals out-side Kathmandu valley	Total
Major surgery	1265	1483	391	**3139**
Minor surgery	1378	1589	3484	**6451**
Minor injuries	4332	11922	19686	**35940**
Psychosocial problems	53	68	1160	**1281**

Source: EDCD, 2016

Western Regional Hospital

Considering its proximity to the epicenter, it was inevitable that Kaskishould cop some of the effects of the 2015 earthquake. And the Western Regional Hospital—located in the renowned tourist hotspot of Pokhara Valley—had been deemed the go-to health facility when it came to dealing with the 112 people affected by the disaster in the district.

The hospital managed to allocate 354 beds for the patients—25 among them who had sustained life-threatening injuries underwent major surgery, 12 were sent to the Intensive Care Unit for treatment, and a few others with injuries kept under observation.

"We knew that in such times, it was crucial to ensure the right treatment at the right time," said Dr. Guna Raj Lohani. "So while some patients were referred to Kathmandu, because the hospitals there were already so overstretched, many others were referred to the Western Regional Hospital. We had requested the medical team there to remain on standby so that no time would be lost in attending to people."

Hospitals including the Gorkha District and Bharatpur Hospitals, for instance, had made arrangements to ferry patients directly to Pokhara, thereby reducing arrival times, and helping doctors and paramedics deliver the best care possible in the circumstances.

The Western Regional hospital had a disaster management plan in place, which proved very useful in coordinating the work of health and non-health officials during the crisis, and ultimately in ensuring that more lives could be saved, while fewer people had to undergo amputations. In terms of the fear of the spread of infectious disease, a room with two beds had been designated the quarantine section.

Despite all these efforts, however, and such immense effort on the hospital's part to provide quality services and facilities, the number of isolated beds still fell short of what was needed. The Regional Health Directorate and the Ministry of Health and Population had done their utmost to manage resources, but were still encumbered by inadequate guidance and monitoring. Even though the hospital had been allocated a sum of NRs. 1 million by the Ministry, budget release was complicated by a number of bureaucratic hurdles. All these factors, with the addition of a shortage of emergency drugs, meant that timely treatment and rehabilitation proved a very daunting task indeed.

Fortunately, assistance was forthcoming from a number of youth clubs, foundations, NGOs and associations. Child Welfare in Nepal (CWIN), TamuPyeLhu Association, and several others, for example, extended support in terms of food and shelter. While these certainly helped, it goes without saying that swifter action from the District Disaster Management Committee, prior budget allocation for emergency care and a defensible future risk management strategy would have made for a far better response to the quake in Kaski.

The Western Regional hospital had a disaster management plan in place, which proved very useful in coordinating the work of health and non-health officials during the crisis, and ensuring that more lives could be saved

Bharatpur Hospital

The upsurge in patients being admitted to the Bharatpur Hospital had posed a significant challenge in terms of the limited human resources, budget and infrastructure at the facility, but the response on the part of paramedics and staff was immediate and unwavering

Although the earthquake caused fewer casualties in Chitwan, a considerable number of injured people still sought treatment at the Bharatpur Hospital, many of whom had been flown in from more severely-impacted districts like Nuwakot, Dhading, Gorkha and Tanahu, among others. This upsurge in patients being admitted to the hospital posed a significant challenge in terms of the limited human resources, budget and infrastructure at the facility, but the response on the part of paramedics and staff was immediate and unwavering.

Soon after the earthquake hit, the Bharatpur Hospital Development Committee had assembled a quake-relief team to provide free treatment and care for patients and visitors. Out of the 435 available beds, 11 were designated for emergency cases. And altogether, over 300 technical and non-technical staffers were engaged at the facility, among which 28 doctors were under government sanction.

"We had already decided that Bharatpur Hospital would function as one of our key referral centers outside the Kathmandu Valley," said Dr. Guna Raj Lohani. "Our conviction was based on the hospital's exemplary track record over the past years."

The hospital building had sustained some minor damages, but remained functional so services were not impeded. Still, a need was felt to set up a separate disaster management ward for more specified treatment. Data shows that in Chitwan, there were 15 operation-theatre cases. Lack of space meant that many patients brought to the facility had to be treated outdoors, but the staff worked diligently to ensure they were as comfortable as possible, and kept under strict observation. Although an outbreak of viral infection had been anticipated in these conditions, this did not materialize and fears soon abated. A 24-hour emergency operation facility was also launched so as to monitor the ongoing treatments and check-ups.

For all these the post-quake efforts, Bharatpur Hospital had received funds amounting to NRs. 3 million from the Ministry of Health and Population. Provision of services was further facilitated by the Development Committee.

Once they were recuperating and ready to return home, the hospital made arrangements to provide each patient some cash to cover their travel expenses and a few logistical goods, including clothes and food. Hospital officials had donated a day's salary for this scheme.

Bharatpur Hospital's remarkable performance in the aftermath of the quake has convinced Ministry officials that the facility is more than capable of handing the responsibilities of a hub-hospital outside of Kathmandu in times of disaster—multiple meetings have been held in this regard, and the hospital is itself working to develop the necessary arrangements to meet the specified parameters.

It takes a village: Mobilization of International Emergency Medical Teams

On April 25, 2015, news of a devastating 7.8-Richter earthquake that had struck Nepal—leaving thousands dead and many more injured—made headlines around the world. Given the unprecedented scale of the disaster at hand, a Cabinet meeting held immediately following the quake decided to seek international support and promptly waived the custom duties on relief goods and visa fees of Search and Rescue teams, as well as other humanitarian workers, to expedite the post-disaster response. It was a call that was answered resoundingly by the world community.

As our closest neighbor, India was the first to deploy its SAR team to Nepal, flying into the Tribhuvan International Airport with relief goods—including medical supplies—just a few hours after the first quake. While the initial days primarily witnessed military medical teams coming in from India, China, Israel and Pakistan, among others, with the Nepal Army serving as liaison, a variety of International Emergency Medical Teams from the world over soon began arriving in legions. According to the Nepal Health Research Council, there were altogether 143 such teams. Under the coordination of the Ministry of Health, the Nepal Army, the World Health Organization and other humanitarian agencies, the many I-EMTs remained loosely connected as they ventured to provide the critical care quake survivors were desperate for. And as stated in an NHRC report titled *Review of Effectiveness of the FMT Deployment in Nepal Earthquake, 2015:* "Of the total I-EMTs providing relief work, 70% of the I-EMTs were from non-government and non-military agencies, 18% of the I-EMTs were from civilian government agencies and 12% from military agencies."

Fanning out

The Health Emergency and Operation Center (HEOC) was charged with looking after and deploying the I-EMTs to various areas depending on the needs of the populations therein. Within and beyond the Kathmandu Valley, these I-EMTs established field hospitals or camps—as per their capacity—to provide treatment to survivors. The Health Emergency Operation Center was, however, thrown off-guard by the overwhelming response on the part of I-EMTs across the globe, and, at least initially, could do little more than manage the teams in a hotchpotch manner. It would take some time after the earthquake for the government agency to finally get a grip on the situation and begin coordinating deployments in earnest.

It was only after April 29, for instance, four days after the disaster, that a registration system was put in place. In an effort to iron out logistics, the WHO headquarters had set up an online registry for any I-EMTs interested in joining the relief efforts in Nepal. Later on, the I-EMT Coordinator from the WHO headquarters also arrived and almost immediately, an official registry was initiated at the TIA. These measures, it was hoped, would serve to alleviate problems including ad-hoc deployment without assessing the capacity and capabilities of the I-EMTs, as well as the political insensitivity shown by some countries, and a lack of data regarding the areas of deployment (Mahat, 2015).

Before being deployed—though the requirement of having to obtain a temporary license to practice from the Nepal Medical Council had been waived in their case—the I-EMTs were required to present a number of documents, including copies of their passports, medical licenses, the WHO FMT registration form and a cover letter addressed to the MoH. The I-EMTs would then be allowed placement in 12 districts—

While the initial days primarily witnessed military medical teams coming in from India, China, Israel and Pakistan, among others, a variety of I-EMTs from the world over soon began arriving in legions. According to the Nepal Health Research Council, there were altogether 143 such teams

TABLE:1.3 DISTRICT WISE BREAKDOWN OF DIFFERENT TYPES OF INTERNATIONAL EMERGENCY MEDICAL TEAMS

District	Government teams	Military	NOGs
Bhaktapur	1	1	9
Dhading	2	0	9
Dolakha	2	1	8
Gorkha	1	1	8
Kathmandu	7	6	14
Kavrepalanchowk	6	1	10
Lalitpur	1	3	4
Makawanpur	0	0	1
Nuwakot	1	1	6
Ramechhap	1	0	2
Rasuwa	1	1	3
Sindhupalchowk	1	1	22
Total	**25**	**16**	**96**

Source: NHRC, 2017

including Bhaktapur, Dhading, Dolakha, Gorkha, Kathmandu, Kavrepalanchok, Lalitpur, Makwanpur, Nuwakot, Ramechap, Rasuwa and Sindhupalchowk.

The NHRC report states that in terms of the FMT human resources, 42.41% were doctors, while the rest were nurses, allied health workers, and logistical and administrative personnel. And among the I-EMTs, 28 had been able to establish full-fledged field hospitals. .

FMT classification

A 2013 handbook of the WHO titled *Classification and Minimum Standards for Foreign Medical Teams in Sudden Onset Disasters* classified I-EMTs into three categories: Types 1, 2 and 3. This division is primarily based on "level of care, size, capacity and capabilities to deliver predefined services" (Norton, Schreeb, Aitken, Herard, & Lajolo, 2013). The handbook lists the definitions of the three categories as follows:

Type 1: Outpatient Emergency Care: Provides outpatient initial emergency care of injuries and other significant health care needs.
Type 2: Inpatient Surgical Emergency Care: Provides inpatient acute care, general and obstetric surgery for trauma and other major conditions.
Type 3: Inpatient Referral Care: Provides complex inpatient referral surgical care including intensive care capacity.

In the case of the disaster response in Nepal, only one of the I-EMTs belonged to the Type-3 level, whereas there were 21 of the Type-2 variety, and 61 that were Type 1. The remaining 28 I-EMTs were mobile teams.

Data from the NHRC shows that altogether, the I-EMTs delivered health services to 139,299 people, out of which 17,312 were trauma cases and 870 were cases that had been referred by different hospitals and health institutions. The I-EMTs also conducted 393 surgeries.

Challenges encountered

The NHRC report points out that despite their considerable contribution, most I-EMTs could have arrived earlier to supplement the rescue and relief efforts. The report also identifies the language barrier as a major impediment for I-EMTs in the course of their work around the country. It also describes the tendency of I-EMTs to disregard national treatment standards and pursue their own systems as a problem in this period. "In some cases, I-EMTs were accustomed to treatment with different medical equipment and procedure than practiced in Nepal that required thorough orientation to local context which was often a time-consuming process," the report reads. "Health workers also reported that there were challenges in dealing with minor injuries due to the patient load while I-EMTs were only looking after severe and complicated cases. In most of the cases, I-EMTs lacked information about the local context, national medical protocols and treatment procedures."

Apart from the NHRC's report, interviews conducted with concerned officials also indicate a lack of communication at the central level regarding the deployment of the I-EMTs. Coordination at the HEOC, for instance between the Information Management Unit and the International Cooperation Unit, was not smooth. This was seen to have further affected the dispatching of the I-EMTs to locations where they could have provided critical services. Although these issues were gradually detangled, the report suggests that results might have been better had coordination been sorted out at the earliest possible point in time after the disaster.

Problems had also arisen in relation to the reporting of exact treatment data. Over a week following the earthquake, the FMT Unit at the HEOC had just begun to collect information from across affected districts. Two dedicated personnel were tasked with making phone calls to the focal persons of each FMT, and recording all the information accumulated over a given day—from OPD visits to surgeries and patient admissions, among other areas. This experience, according to the NHRC report, showed the need for a proper recording system to accurately chronicle the activities of I-EMTs.

The experience also made clear the kind of teams and support that are best suited to respond to natural calamities like the 2015 quakes. Had an assessment in this regard been conducted prior to the disaster, it would have been of valuable help to the I-EMTs in terms of their logistical preparation before heading off to a foreign land.

The report recommends that treatment guidelines, licensing procedures and, most importantly, the management of information, be taken as essential components in mobilizing I-EMTs in disaster response. In terms of treatment guidelines, the report advises that the information should be made freely available on the Internet beforehand, so that prior to their arrival in a disaster-hit country, I-EMTs can, at the very least, briefly skim and acquaint themselves with the national standards. Given that there is a high likelihood of a general communication breakdown during large-scale disasters, the report suggests that it might be prudent to pre-identify specific communication tools so that the health system and emergency response entities can continually gather data to inform and direct rescue and relief efforts accordingly. The report also highlights the importance of a one-door reporting procedure insofar as information collection is concerned, so that I-EMTs are not further shackled in having to

Although the efforts of the I-EMTs that flew into the country from all corners of the world were critical in dealing with the worst disaster Nepal had seen in generations, it also laid bare many procedural loopholes and inadequacies at the policy level

maintain multiple reporting channels, which can be a hassle, especially under conditions of duress where every second is precious. In all, though the efforts of the I-EMTs that flew into the country from all corners of the world were critical in dealing with the worst disaster Nepal had seen in generations, it also laid bare many procedural loopholes and inadequacies at the policy level. The onus now lies with the state mechanism to learn from the strengths and the limitations of the response to the earthquakes, and prepare adequately for the next nationwide medical emergency, whenever that may be.

TABLE: 1.4 Temporary Hospital Establishment

19+1* temporary hospitals: Nuwakot, Sindupalchok, Gorkha, Rasuwa, Kavre, Kathmandu, Lalitpur and Bhaktapur (WHO supported stock-piled containers also used for health services)

District	Location	Support
Kathmandu	Army Hospital, Chauni	Israel
	Singhdurbar	China
	Teaching Hospital, Maharjgunj	
	APF Hospital, Balambu	
	Sinamangal	Indian Army
Lalitpur	Patan	
	Lagankhel	India
Bhaktapur	Sallaghari	Pakistan
Nuwakot	Bidur	Bhutan
	Bidur	Qatar Redcross
Sindhupalchowk	Barhabise	Japan, JICA
	Melamchi	Czech Republic + Japan
	Chautara	Norway
	Sipaghat (15 bed)	Thailand
	Jhalbire	Germany
Kavre	Dhulikhel	China
Gorkha	Gorkha	Turkey
	Aarughat	MSF France
Rasuwa	Dhunche (50 bed)	Canada + Norway

*Indian Army Team - Divided and a team deployed to Dolakha after May 12, earthquake.

Works Cited

Norton, I., Schreeb, J. v., Aitken, P., Herard, P., & Lajolo, C. (2013). *Classification and Minimum Standards for Foreign Medical Teams in Sudden Onset Disasters.* Geneva: World Health Organisation.

Mahat, A. (2015). *Coordination of Foreign Medical Teams after the Nepal Earthquake*. Kathmandu: World Health Organisation Country Office for Nepal.

NHRC. (2017). *Review of Effectiveness of the Foreign Medical Team Deployment in Nepal Earthquake, 2015.* Kathmandu: Nepal Health Research Council.

2. On ground zero: The worst-affected districts

The worst-affected districts

Not too long after the earthquake had struck, the government had designated 14 districts as the "worst-affected" based on the then-estimated losses to life and property.

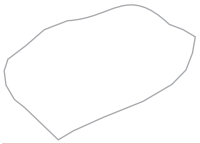
Different though the districts might have been from one another in terms of their ground realities, what they shared in that fateful hour—the implications of which became more and more evident as time passed—was a regrettable lack of preparedness and institutional capacity to deal with a disaster of such a scale.

Yet, they hunkered down and weathered the crisis to the best of their abilities. Health facilities propped themselves up however they could with whatever they had and treated the injured locally as far as possible, although serious cases had to be referred to specialty centers. Another accomplishment was the prevention of disease outbreak and speedy resumption of routine healthcare services.

However, it is distressing to see that today, more than a year since that devastating event, the health sector has not made much progress in terms of preparing the districts for the next crisis. Many health facilities are still delivering services from tents while there are still a substantial number of hospitals and other institutions that are yet to be equipped with adequate human or logistical resources. This has given rise to concerns that should another disaster strike, health systems will once again be caught off-guard and have to start from scratch.

In the sections that follow, we present the efforts of each of these districts in dealing with the health issues that inevitably arose in the post-earthquake period, and the challenges that marked the process. The text is based on data collected through visits to the field, review of presentations and annual reports produced by different entities, and the reflections of numerous relevant individuals, including public health officials, medical superintendents and other health professionals.

Different though the districts might have been from one another in terms of their ground realities, what they shared in that fateful hour was a regrettable lack of preparedness and institutional capacity to deal with a disaster of such a scale



Bhaktapur

The Bhaktapur district had witnessed over 333 deaths and over 2,000 cases of injuries in the 2015 earthquake. And a majority of these were treated at the Bhaktapur Hospital, another of the MoH's hub hospitals.

As the injured began to stream into the hospital, stakeholders were thankfully prepared to provide the necessary support. The District Public Health Office, for one, had all the logistics ready and was able to start supplying these to the hospital almost immediately. The Human Organ Transplant Center also opened its doors to patients.

A meeting had been held early on in which stakeholders from private hospitals had been present and who had agreed to treat victims free of cost and assure them any other required care. While absenteeism among health officials did not pose a major hindrance in the district, there were a few who did not return to their duty stations and against whom swift action was taken.

The proximity of the district to the main bureaucratic hubs and the MoH meant that coordination was comparatively well-ordered: local officials could go to the Ministry in person on a daily basis and provide briefs on the situation in the district, as well as convey their human resource and logistical requirements

Among the various areas in which the DPHO was focused, one of the most important had to do with surveillance of disease. This was an issue of particular concern because there were thousands of people who had been displaced from the nearby Dolakha and Sindhupalchowk districts who had come to Bhaktapur and were living in temporary shelters in various open spaces around the district.

These settlements were cramped, and marked by poor hygiene and sanitation conditions, creating a dangerous breeding ground for disease. Several organizations had provided water purifiers and other goods, which were dispatched to these temporary camps to ease their hardship somewhat. And health teams were also deployed to these sites on a daily basis to monitor any signs of outbreaks so that preventive measures could be taken right away. At one point, there were unconfirmed reports of an outbreak of dysentery in one of the settlements. However, when the health teams were sent to verify the story, laboratory tests confirmed that there was no cause for concern.

The proximity of the district to the main bureaucratic hubs and the Ministry of Health meant that coordination was comparatively well-ordered and impediments fairly limited: local officials could go to the Ministry in person on a daily basis and provide briefs on the situation in the district, as well as convey their human resource and logistical requirements. In response, the MoH would request concerned units to dispatch the necessary items.

In the days that followed, logistical assistance arrived from international agencies, which was not easy to manage since the consignments frequently also included goods that could not be used for a variety of reasons, such as being labeled in foreign languages. But eventually, supply was sorted out and usable goods provided as per the needs of respective health facilities.

Although meetings of the District Disaster Relief Committee were held on a daily basis, health officials in Bhaktapur express that there should have been better allocation of roles and responsibilities within the committee. Oftentimes, this caused delays in sending items to affected VDCs and taking immediate action on various health-related matters.

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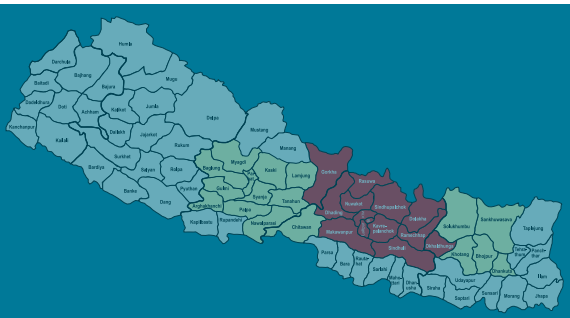

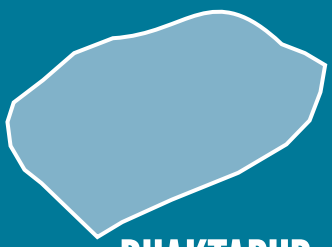

BHAKTAPUR

304,651
Total Population

333
Total Deaths

2101
Total Injuries

2
Major Surgery

29
Minor Surgery

683
Minor Injuries

Damage Status of Health Facilities

Hospital		Health Post		PHCC	
0 Collapsed or Irreparable Damage	**1** Partial Damage	**3** Collapsed or Irreparable Damage	**5** Partial Damage	**1** Collapsed or Irreparable Damage	**1** Partial Damage

Reconstruction

3
Assigned Works Completed

000
Assigned Works On-going

Dhading

With over 600 deaths and substantial injuries, there was no doubt that Dhading—positioned between Gorkha and Kathmandu—was significantly impacted by the earthquake. And it was the northern VDCs of the district, in particular, that copped the brunt of the devastation.

Close on the heels of the quake, Dhading's Health and Nutrition Cluster, mandated to focus immediately on the injured patients who were thronging the district hospital, was activated. While many were treated in the institution itself, some critical patients had to be referred to health facilities in Pokhara, Chitwan, and Kathmandu.

Realizing that people on the ground would need more healthcare support, eight MBBS doctors were mobilized in four VDCs. Other health professionals—including auxiliary health workers, nurses and midwives—were also recruited for the short term. Additionally, 10 staff nurses were brought into the district hospital.

With many of the health facilities either destroyed or rendered too unstable to use thanks to the recurring aftershocks, tents were supplied to the district. Medical Camp Kits (MCK) proved a sturdy means of providing speedy delivery of services while assessment and rebuilding plans were underway. These MCKs could withstand heavy downpour and so offered reliable shelter for patients and health workers in the interim. Cellphones were also distributed to facilitate communication.

The outbreak of disease remained a major concern in the post-quake period in Dhading.

The outbreak of disease remained a major concern in the post-quake period in Dhading. Daily surveillance was therefore conducted to prevent this, and action, based on reported trends, was taken swiftly.

Daily surveillance was therefore conducted to prevent this, and action, based on reported trends, was taken swiftly. Due to this surveillance, the response was prompt when a chickenpox outbreak was reported from a VDC. Many other rumors were also verified and measures taken instantly.

To overcome the shortage of drugs and other logistics, a list of 91 essential medicines and surgical items was prepared. External development partners supplied these immediately and once the stocks were replenished, they were dispatched to the needy VDCs. Additionally, prepositioning of medicines that were to be used during outbreaks was carried out. Along with the drugs, other supplies including piyush, Navajivan, soap and sanitary pads were also given.

While over two weeks were spent on trauma care and management, the district also began focusing on providing safe places to house pregnant women and those in postpartum conditions. For this, maternal- and child-transition homes were established in five places where mothers and their newborns could live while they recuperated. Their nutrition and diet were also supported in these facilities.

In later months, psychological counseling and mental health support were made available to the community. Furthermore, in August and September of 2015, successful campaigns targeting measles, rubella and polio were also organized.

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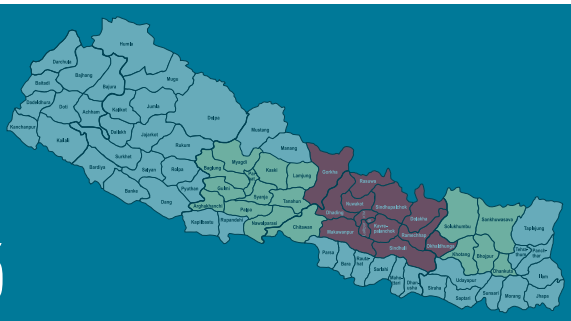

DHADING*

336,067
Total Population

680
Total Deaths

1218
Total Injuries

15
Major Surgery

3056
Minor Surgery

407
Minor Injuries

Damage Status of Health Facilities

Hospital

1
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

21
Collapsed or Irreparable Damage

9
Partial Damage

PHCC

0
Collapsed or Irreparable Damage

2
Partial Damage

Reconstruction

24
Assigned Works Completed

17
Assigned Works On-going

733
Psychosocial Problems

Dolakha

In Dolakha, tents were being used to create temporary treatment facilities within the premises of the Charikot Primary Healthcare Centre as health workers began attending to patients injured by the earthquake. As the number of patients grew, emergency drugs and medical supplies were made available from the district store.

While the headquarters-based health institute was able to acquire necessary supplies and had enough human resources, there were still problems on the ground, particularly with regard to areas in the district that were either too remote or not connected to the road network, or to which access had been blocked off by landslides. To help cope with this, health workers had been directed to cancel their planned breaks and even those who were on long-term leave were asked to return to work immediately. Helicopters were also used to drop drugs and other essential items in the hard-to-reach areas.

There were problems, particularly with regard to areas that were either too remote or not connected to the road network, or blocked off by landslides. To help cope, health workers had been directed not to leave their stations and helicopters were used to drop essential items in many hard-to-reach VDCs

An Information Management Unit, led by a health official, was additionally formed by the District Health Office a day after the earthquake. The team would collect information on injured patients, the condition of infrastructure, availability of human resources and medicines, among other issues. This information was then used to respond to needs and communicated to the Health Emergency Operation Center accordingly.

Given the geographic ruggedness of the terrain and difficulty in accessing the district headquarters, outbreak of diseases remained a major concern for Dolakha. This was the priority issue raised by health officials during the District Disaster Relief Committee meeting held on April 26. This meeting agreed to invest more on health promotion and resulted in health information being aired via local FM stations, including messages on hand-washing practices and safety of drinking water. Along with this initiative, a health team comprising of two doctors was kept on standby for deployment in case outbreaks were reported. And in the event that an outbreak did occur, development partners were also ready to provide medicines, to be sent immediately to health centers.

Nutrition remained another big issue for the district for which various orientation programs were organized. In areas where outpatient units had been established, treatment for the severely and acutely malnourished was being conducted through Ready-to-Use Therapeutic Food (RUTF) and multi-nutrient powder. In addition, vaccination coverage for measles and rubella was also being extended, and ORS, zinc, iron, folic acid tablets, and other essential medicines dispatched to the health institutes.

To support pregnant women and new mothers, a safe maternity home was established within the premises of the Charikot PHC. The mothers and their newborns were provided food and other supplies for several months. In the meantime, birthing centers were also equipped to promote more institutional deliveries since people appeared more inclined to give birth at home rather than visit health facilities after the disaster.

In later days, health camps were run in various VDCs and psychological counseling provided to patients and families who had lost their loved ones in the quake.

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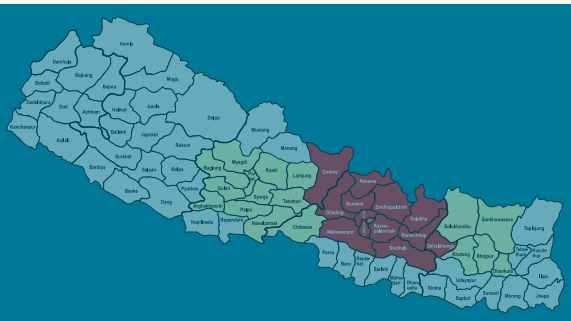
EARTHQUAKE 2015



186,557
Total Population

180
Total Deaths

662
Total Injuries

000
Major Surgery

000
Minor Surgery

000
Minor Injuries

Damage Status of Health Facilities

Hospital

1
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

26
Collapsed or Irreparable Damage

12
Partial Damage

PHCC

1
Collapsed or Irreparable Damage

1
Partial Damage

Reconstruction

23
Assigned Works Completed

22
Assigned Works On-going

Gorkha

As the epicenter of the April 2015 earthquake, health workers were naturally expecting the worst in Gorkha. And true to their fears, health facilities in the area did suffer substantial damages—the 50-bed district hospital, for instance, was affected and patients therein had to be immediately evacuated.

Within an hour of the quake having hit, the hospital had already used up its emergency kits, enough only to cater to around 50 patients. Luckily, the institution was equipped with its own pharmacy, so the supply of emergency drugs and other necessary items was not extensively disrupted. There were, of course, some shortages to be dealt with: running out of plasters for trauma patients, for example, meant locally-available materials had to be used to stabilize fractures and serve as immobilizers, such as plywood.

There were issues with the communication and coordination between the Gorkha District Office and the DHO:the hospital had converted into an autonomous institution, putting it beyond the purview of the Health Office

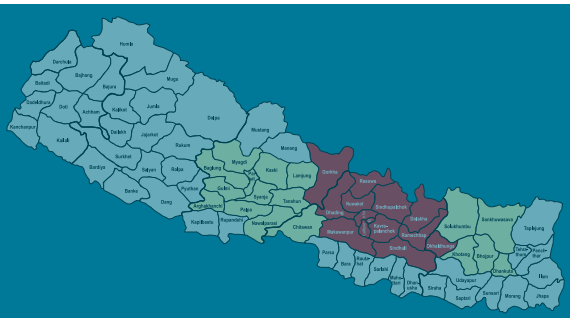
As per the decision of the UN Country Team, a coordination hub had been set up in the district to ensure better coordination of the response. The WHO also established a field office in the District Health Office to assist in providing regular support. As a Health cluster co-lead, it offered crucial backing to the Ministry of Health in managing International Emergency Medical Teams, as well as flow of medicines, information and other logistics, and surveillance and financial resource mobilization. And, in order to cater to the specific needs of patients, and make the best of available expertise and response capacity, clusters were further divided into four sub-clusters: Mental Health and Psychosocial Support, Tuberculosis, Reproductive Health, and Injury, Disability and Rehabilitation.

The world's eyes were expectedly focused on Gorkha in those days, and support quickly began to pour in, to the point where it was almost overwhelming, with the hospital having to actually turn down some offers when these were proving too difficult to manage. Instead, the institution prepared a list of essential drugs and equipment, and help was sought only from those who met the criteria. The rest were sent to the DHO, which was in charge of organizing and sending teams and support to various PHCs and health posts on the ground.

There were, however, issues with the communication and coordination between the Gorkha District Office and the DHO. Once the hospital had been upgraded to a 50-bed facility, it had automatically converted into an autonomous institution, putting it beyond the purview of the Health Office. Whereas the DHO was concerned about the supply of goods and human resources to ground-level health institutes, the district hospital was more invested in treating the patients that had been referred there.

The DHO was also occupied with monitoring and analyzing outbreaks in the area, and deploying health workers accordingly, along with activating Rapid Response Teams at the district and community levels, so that victims could be attended to and their needs identified and communicated to officials—thereby playing a crucial role as first responders to potential outbreaks. While the hospital, with the support of the Swiss medical team—a Type-1 FMT—was handling the majority of the critical cases. People who had undergone major surgery were kept for several months at the makeshift facility and offered

NEPAL
EARTHQUAKE 2015



271,061
Total Population

450
Total Deaths

952
Total Injuries

45
Major Surgery

79
Minor Surgery

416
Minor Injuries

Damage Status of Health Facilities

Hospital

1
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

43
Collapsed or Irreparable Damage

15
Partial Damage

PHCC

1
Collapsed or Irreparable Damage

2
Partial Damage

Reconstruction

28
Assigned Works Completed

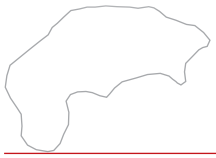
26
Assigned Works On-going

185
Psychosocial Problems

physiotherapy sessions until they were able to recover, either fully or partially depending on the case. This program is still in operation at the hospital, and has now come to include many patients whose surgeries were conducted in other health facilities outside the hospital. Mental health clinics were also established on the premises of the hospital for those who needed counseling to cope with the shock and trauma of the event.

In line with the Sendai Framework on Disaster Risk Reduction, community centers were formed for patients' use, as well as for stockpiling rescue and relief materials. The ensuing reconstruction process has rightfully focused on resurrecting public structures and private housing, and refrained from building in seismically fragile areas. New construction has been pushed to comply with the national building code in a bid to Build Back Better and Safer, awhile also maintaining open spaces and sufficiently wide roads—keeping with the Framework's vision of developing guidance for land-use planning and improvement of structural standards—to facilitate evacuations and commuting.

The Framework also lays emphasis on strengthening the capacity of local administration, particularly security personnel—Nepal Police, the Armed Police Force and the Nepal Army—to respond to disasters, given the significant role they played in the rescuing people during the earthquake. In addition, Nepal Scouts—with support from the Ministry of Youth and Sports—is readying to form a squad in each public school and VDC, to be trained and mobilized in case of another major event. All these initiatives are geared at boosting the ability of local communities and authorities in terms of immediate rescue and relief operations.



Kathmandu

The hub hospitals in the Kathmandu district were at the forefront of the response to the earthquake, taking on much of the patient burden in the area. Of course, there were several other private institutions that were able to relieve some of the pressure and reduce the workload of the hubs. Luckily, none of the hubs were found to have suffered major structural damages and hence remained functional throughout the crisis period, and most were also relatively prepared, with prepositioned logistics that were put to immediate use. A mechanism had also been set up at the TIA to transfer patients who had been evacuated from various hospitals in other districts to hospitals within Kathmandu.

Although delivery of health services in the district was not entirely free of glitches, issues such as shortages of goods and logistics were rare, and even when they did occur, were fairly quickly resolved … The primary reason behind such an easy resolution was the priority these specialty hospitals enjoyed in the supply chain

Delivery of health services in the district was not entirely free of glitches, however, particularly in the immediate aftermath of the disaster. But issues such as shortages of goods and logistics were rare, and even when they did occur, were fairly quickly resolved. When hospitals found that they were running low on oxygen cylinders, for instance, they sought the support of the Nepal Army and line agencies to reopen closed oxygen plants and ease supply. The primary reason behind such an easy resolution was the fact that these specialty hospitals enjoyed priority in the supply chain—every day, officials would take data from these institutions, and based on the reported usage of supplies, promptly replenish the stocks.

The DPHO might not have had much of a role in supporting hub hospitals and other specialty centers, but the office did activate its RRT. Communication was also established with health personnel on the ground, instructing them to stay at their duty stations. Although there were many health facilities around the district that had suffered damages in the quake, services were being delivered either out in the open or via tents made available by the public.

The DPHO had also installed treatment desks in around 10 different spots, including Baneshwor, Babarmahal, Gaucharan and Bansbari, among others. These were intended to provide first aid to victims and those who needed minor treatments, thereby reducing the pressure on specialty hospitals.

The office also initiated promotional activities for the benefit of those who were living in crowded temporary shelters and were at risk of contracting communicable diseases. Teams were sent to furnish these people with water purifiers and scatter bleaching powder to disinfect the surrounding areas. Health officials had additionally directed FCHVs to run community-based programs on water-borne diseases at the ground level, and other teams from Kathmandu were also involved in visiting various localities in order to urge people to maintain stringent hygiene and sanitation practices to avert the spread of illness. In this, the health office was also supported by the Epidemiology and Disease Control Division and the HEOC, both of which had been collecting and analyzing data on potential outbreaks. A cholera outbreak was reported a few months later, but the cases were found to be sporadic rather than indicative of a big-scale epidemic.

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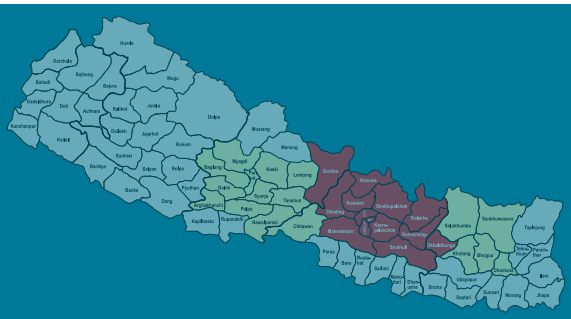


1,744,240
Total Population

1233
Total Deaths

7952
Total Injuries

2268
Major Surgery

2636
Minor Surgery

13334
Minor Injuries

Damage Status of Health Facilities

Hospital
- **2** Collapsed or Irreparable Damage
- **2** Partial Damage

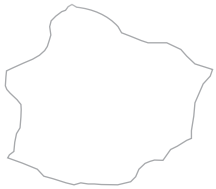
Health Post
- **7** Collapsed or Irreparable Damage
- **10** Partial Damage

PHCC
- **1** Collapsed or Irreparable Damage
- **3** Partial Damage

29
Health Workers Death

114
Psychosocial Problems

Reconstruction
- **1** Assigned Works Completed
- **3** Assigned Works On-going



Kavrepalanchok

The treatment of majority of victims in Kavrepalanchok district took place at the Kathmandu University Dhulikhel Hospital, one of the government's designated hub hospitals outside the Kathmandu Valley. Availability of facilities for specialty care and access to consultants and other health personnel were among the reasons why the institution was able to respond far better to the disaster than many of its contemporaries. Patients were triaged out in the open and those with serious conditions were operated on indoors and provided intensive care. Apart from Kavrepalanchok, the hospital also received patients who had been referred there from nearby districts, including Sindhupalchowk, Ramechhap and Dolakha.

The Dhulikhel Hospital provided free services for injuries such as wounds and fractures, as well as cases of trauma. It had followed the standard procedure of color-coding patients as per the nature of their injuries: black for the deceased; red for those who needed to be taken to the shock room or operation theatre; orange for comparatively less-severe cases; yellow for those already out of danger; and green for those with minor injuries. Some days after the disaster, the institution also deployed teams of doctors and other medical workers to conduct health camps in the district to reach patients who could not travel to the hospital.

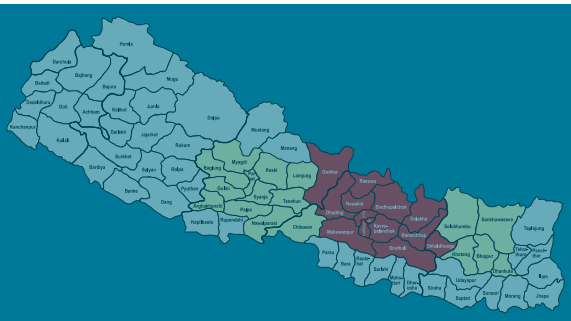
The RRT found that 22 health posts in Kavre had been completely destroyed, and these were the very ones that had the most extensive contact with communities. Consignments of drugs therefore had to be rerouted to other alternative health facilities in order to resume basic healthcare services

Another area of activity in the district was the Dhulikhel Primary Healthcare Center, which is where the District Health Officer himself is stationed. The PHC saw the in-flow of many patients following the quake, and while it promptly attended to those it had the capacity to treat, the others were referred to specialty centers and other health facilities, including the Dhulikhel Hospital and institutions in Kathmandu.

The district had also activated its RRT, which was occupied in monitoring the condition of health facilities and the status of service delivery in the area. Twenty-two health posts were found to be completely destroyed, and these were the very ones that had the most extensive contact with communities. Consignments of drugs therefore had to be rerouted to other health facilities in order to resume basic healthcare services. Much of the work was initially being conducted in the open, until tents and other health-related kits later become available and made service delivery somewhat easier, although challenges still remained.

In terms of surveillance of potential outbreak of disease in the district, both the DPHO and the Dhulikhel Hospital had been proactive in the matter, testing water samples from various areas, for instance, and taking action as required. In one such case, out of 32 samples taken, a sample of water from the Baluwa VDC had been found to contain fecal coliform, and immediately after that, efforts had been made to clean and purify water sources. The health office had also commenced a Water, Sanitation and Hygiene promotion and awareness campaign in the district.

NEPAL
EARTHQUAKE 2015



KAVREPALANCHOK

381,937
Total Population

330
Total Deaths

1179
Total Injuries

000
Major Surgery

000
Minor Surgery

000
Minor Injuries

Damage Status of Health Facilities

Hospital

0
Collapsed or Irreparable Damage

1
Partial Damage

Health Post

22
Collapsed or Irreparable Damage

10
Partial Damage

PHCC

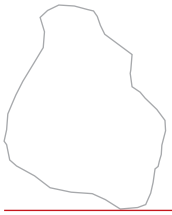
0
Collapsed or Irreparable Damage

0
Partial Damage

Reconstruction

6
Assigned Works Completed

31
Assigned Works On-going



Lalitpur

Earthquake-hit districts within the Kathmandu Valley did not suffer the same hardships in the aftermath of the disaster faced by others elsewhere, thanks to comparatively better flow of resources and functional roads, among other factors. That was certainly the case for Lalitpur, where health officials were able to quickly reach out to bureaucratic centers—including the MoH—and bid for priority in the response.

Within two hours of the quake having struck, and with the help of the Health Ministry and the HEOC, available consignments of drugs were already being dispatched to various hospitals around the country. The Lalitpur district, however, had its own contingency plan: there was a stock of drugs and other emergency items that had been boxed and stored for use in precisely such situations. The items were then ferried to all major government and private hospitals in the district, as well as the many rural health facilities therein.

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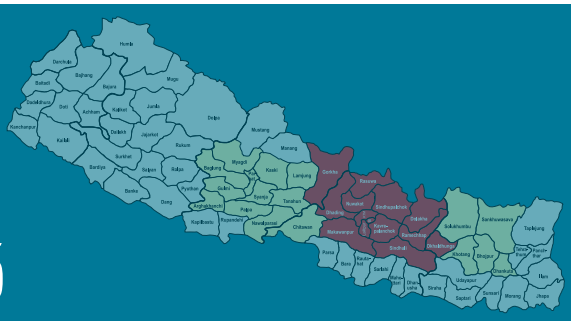
Local officials in Lalitpur had been quick to communicate with the HEOC. And soon, they were identifying open grounds that could be used both as temporary shelters and for delivering health services to the injured—including the Jawalakhel ground, the premises of the Institute of Engineering and Chyasal, among others. In addition, the Nepal Army also extended a helping hand by providing tents as well as a space to treat patients.

It was a major advantage for the district to have a hub hospital located within its boundaries. The Patan Hospital, an institution that is perhaps the most well-equipped among all hospitals around the country in terms of disaster preparedness, played a crucial role in the immediate post-disaster period as just such a hub. The hospital remained in constant contact with the DPHO and provided updated information on the victims, which helped the office to categorize patients according to priority and send them to other specialty private centers in the district where appropriate. This sharing of the workload allowed hospitals to give their full attention to those people who had suffered serious injuries in the quake. The burden was further lightened thanks to the I-EMTs that had either established field hospitals or other treatment centers in the district.

However, even though Lalitpur is but a few short kilometers from the country's center, it does comprise a number of remote and underdeveloped VDCs. What's more, every year, it is in these VDCs that outbreaks of diseases like cholera are witnessed. It was thus vital to ensure that such an outbreak was prevented this time around, and various measures were taken, such as setting up temporary toilets in makeshift shelters and using bleaching powder to sanitize the surroundings of settlements every day. Efforts were also made to ensure the water being consumed by the victims was clean. And because some VDCs could not be accessed by road and would take hours to reach on foot, the district later on sought the support of helicopters to convey essential drugs in the remote reaches of the district.

When patients had undergone treatment at a given health facility and were en route to recovery, many would get sent to the various rehabilitation centers that were being run within the district. Here, they could get physiotherapy and other services necessary for recuperation, so that the likelihood of their conditions becoming exacerbated and leading to debilitation could be reduced.

NEPAL
EARTHQUAKE 2015



468,132
Total Population

185
Total Deaths

3051
Total Injuries

478
Major Surgery

302
Minor Surgery

2237
Minor Injuries

Damage Status of Health Facilities

Hospital
0
Collapsed or Irreparable Damage

2
Partial Damage

Health Post
13
Collapsed or Irreparable Damage

4
Partial Damage

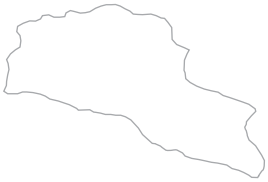
PHCC
0
Collapsed or Irreparable Damage

3
Partial Damage

Reconstruction
0
Assigned Works Completed

6
Assigned Works On-going

7
Psychosocial Problems



Makwanpur

The Makwanpur district had witnessed 33 deaths, around 400 serious injuries, and as many as 15,012 houses collapsing completely while another 17,042 had suffered partial damages. And health facilities also copped the effects: records at the DHO show that 16 health posts had been badly hit, along with eight others that had sustained minor impact.

The consignment of drugs to Makwanpur was dispatched first by the Ministry, and the involvement of the Indian Embassy and donor agencies in the process began a few days later. Consistent support from various donors meant that a shortage of medicines was not felt in the wake of the disaster.

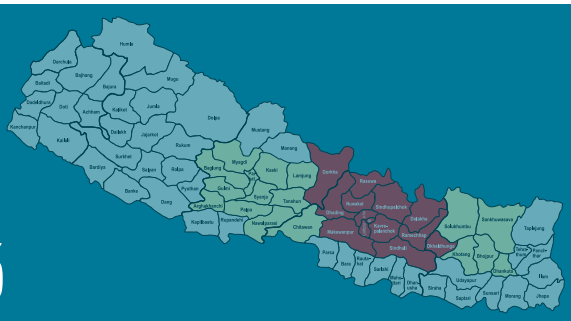
The DHO and functional health posts had started treating victims immediately after the event. This was possible thanks largely to the Rs. 500,000 released by the MoH on the same day and the Rs. 200,000 given out from the Prime Minister's Disaster Relief Fund, the first form of support to reach the district in that initial period. It was the DDRC that had directed the DHO in the effective delivery of services and coordination with the MoH, as well as the I-EMTs.

An RRT had also been formed to cater to urgent needs, and information was simultaneously being collected via landlines, mobile phones and text messages. Those coming to the DHO were treated on the ground floor and in tents that had been set up outside since the upper floors had developed cracks. Medical and logistical support took some time to commence, however. The Ministry dispatched the first consignment of drugs, and the involvement of the Indian Embassy and donor agencies in the process began a few days later. Consistent support from various donors meant that a shortage of medicines was not felt in the wake of the disaster. Chlorinating tabs to be used for purifying water to drink were also being regularly supplied, along with campaigns to raise awareness regarding the possibility of disease outbreak.

As for equipment, the United Nations Population Fund (UNFPA) distributed 10 sets of maternity tents at various health facilities that had become impaired in the quake; 20 sets of tarpaulin came from the DDRC; and 32 solar lamps were also given. But because the distributed tarpaulins were not sufficient, the DHO had to purchase additional sets worth Rs. 200,000 itself.

Psychosocial counseling was also being offered to those who had suffered mental trauma. It was recognized that such events can have a particularly significant impact on mental health, and that disaster preparedness plans and the budget allocation therein need to take this aspect into account—besides maintaining good stocks of drugs—when designing the terms of emergency response.

NEPAL
EARTHQUAKE 2015



MAKAWANPUR

420,477
Total Population

33
Total Deaths

229
Total Injuries

5
Major Surgery

32
Minor Surgery

397
Minor Injuries

Damage Status of Health Facilities

Hospital

0
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

9
Collapsed or Irreparable Damage

10
Partial Damage

PHCC

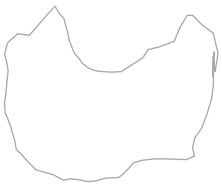
0
Collapsed or Irreparable Damage

1
Partial Damage

Reconstruction

4
Assigned Works Completed

3
Assigned Works On-going



Nuwakot

With a death toll of over 1,000 people, Nuwakot occupied a high position even among the worst-affected districts, and the district hospital was absolutely chock full of injured people on the very first day. And while there was some communication and coordination gaps between the hospital and the DPHO—since both function independently of one another—the problem was not as severe as in other districts like Sindhuli and Gorkha.

Since both the hospital and the DPHO had sustained severe structural damage in the quake, work-stations were set up in tents. The officials at the DPHO immediately deployed RRTs to affected VDCs, and the Health Cluster was also activated. Although the district hospital was on the verge of suffering a shortage of drugs and other supplies two days into the crisis, the Royal Bhutanese Medical Team soon arrived, playing the role of a much-needed backbone in Nuwakot's health response. Not only were they well-equipped and comprised of expert members, but since they spoke Nepali, were also able to easily converse with patients when diagnosing their conditions and treating them, unlike other I-EMTs who needed translators all throughout the process. In the following days, the Italian medical team, the Qatar Red Cross and the Korean medical team all descended on Nuwakot as well, basing themselves in different locations.

Communication posed a major hurdle in responding to the effects of the disaster in Nuwakot. Disruptions in the supply of electricity and the functioning of telecommunication networks also complicated the delivery of immediate support

Of course, there were cases of serious injury necessitating specialty care that might not have been available in health facilities in the district itself. Difficulties in communication, and the fact that the Kathmandu Valley—though the closest in distance—was itself still reeling from the effects of the disaster, meant that these patients were referred instead to centers in Chitwan and Pokhara.

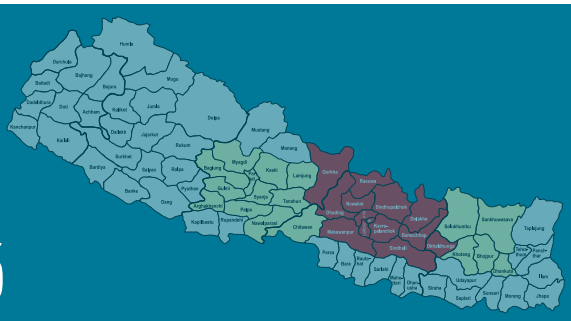
Indeed, communication posed a major hurdle in responding to the effects of the disaster in Nuwakot. Disruptions in the supply of electricity and the functioning of telecommunication networks also complicated the delivery of immediate support.

Once communication systems were back up—in around three days' time—the MoH began sending out medical supplies and other essentials to Nuwakot. By then, the district hospital was also receiving supplies from other donors. Besides the above-mentioned I-EMTs, national medical teams also arrived to extend their support so that the health workforce was sufficient in the district.

In the meantime, the DPHO had heightened the surveillance of disease outbreaks and all health facilities were required to report cases on a daily basis, so that if experts perceived a spike in a certain condition, an RRT could be immediately deployed to deal with the situation. Some time later, the district also started reproductive health and other general health camps for the benefit of people who, for whatever reason, were not able to avail themselves of the services at the health facilities.

Psychosocial counseling sessions were also organized in the district hospital and other institutions. A rehabilitation center was additionally established in the premises of the hospital to offer various recuperative services, encouraging seriously injured patients who had gone elsewhere for treatment to return to the district.

NEPAL
EARTHQUAKE 2015



277,471
Total Population

1112
Total Deaths

1050
Total Injuries

73
Major Surgery

126
Minor Surgery

5409
Minor Injuries

Damage Status of Health Facilities

Hospital
1
Collapsed or Irreparable Damage

0
Partial Damage

Health Post
28
Collapsed or Irreparable Damage

13
Partial Damage

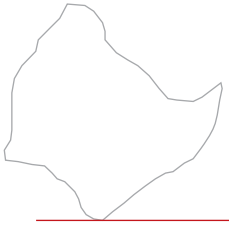
PHCC
0
Collapsed or Irreparable Damage

1
Partial Damage

Reconstruction
22
Assigned Works Completed

26
Assigned Works On-going

139
Psychosocial Problems



Okhaldhunga

Okhaldhunga was among the less-affected of the 14 districts in the country that suffered the most losses and damages in the earthquake. The area, for instance, saw fewer casualties and severely-injured patients than the rest.

There might be a couple of reasons for this. First is, of course, the fact that there were just fewer victims in Okhaldhunga compared to other districts. Secondly, even though the western areas of Okhaldhunga had been severely affected by the disaster, given their close proximity to Ramechhap district, many patients reportedly chose to go to health centers there rather than hospitals in Okhaldhunga. However, this view is disputed by Ramechhap officials, who say they did not receive many patients from the neighboring district.

Health institutions in Okhaldhunga were able to manage the cases they encountered after the earthquake. However, over a year later, the district health facility is still unprepared for similar situations, should they arise again

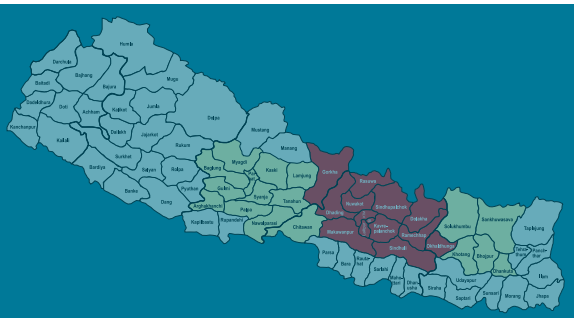
Those people who did get treated in Okhaldhunga itself relied primarily on a mission hospital and a 15-bed government hospital in Rumjatar. While there were a number of minor injuries to be dealt with, the hospitals did not receive any serious trauma cases, and because of the lack of a standard referral mechanism, are not able to say for certain where such patients might have gone, making it difficult for loved ones and the DHO to track them down.

The Rumjatar Hospital is under the supervision of the DPHO. Immediately following the quake, doctors, paramedics and hospital management committee members had gathered for an emergency meeting where they came to the conclusion that the hospital did not have the capacity to deal with a large influx of patients. This realization rang true with a majority of health facilities in the country that did not have proper plans or institutional setups for disaster management. The responses then were entirely based on previous experiences or determined on an ad-hoc basis.

However, with a central command led by the DPHO, the deployment of medics and doctors was not a major issue in Okhaldhunga. A few weeks after the earthquake, the Department of Health Services also deployed two medical officers to the district, who have been working at the Rumjatar Hospital ever since. The DPHO also began syndromic disease surveillance and later medical camps were conducted in various affected VDCs.

The health institutions were able to manage the cases they encountered after the earthquake. However, over a year later, the district health facility is still unprepared for similar situations, should they arise again. The medical officers and other staff are still not trained in trauma management and are little aware of the hospital contingency plan and the mechanisms needed to activate it. The transfer of medical officers and the failure to document what they learned has also made it hard for the district to deal with trauma and emergency cases in the future.

NEPAL
EARTHQUAKE 2015



OKHALDHUNGA

147,984
Total Population

20
Total Deaths

61
Total Injuries

000
Major Surgery

000
Minor Surgery

131
Minor Injuries

Damage Status of Health Facilities

Hospital

0
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

20
Collapsed or Irreparable Damage

14
Partial Damage

PHCC

0
Collapsed or Irreparable Damage

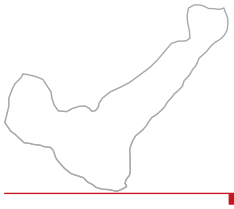
0
Partial Damage

Reconstruction

0
Assigned Works Completed

6
Assigned Works On-going

35
Psychosocial Problems



Ramechhap

Going by property damages, Ramechhap was among the worst sufferers in the earthquakes of 2015, but the district was fortunate in that it witnessed the least number of casualties and injuries during the event. This meant that there was comparatively less pressure on the health system, and victims could be effectively attended to.

That is not to say there were no challenges. The district hospital had not been spared by the quakes: both the in-patient department and the buildings housing the X-ray and laboratory facilities had been damaged, and two people seriously injured within the hospital itself. So, like many other such institutions in affected areas, services were being run in tented facilities set up in the open. The administrative building, meanwhile, was being used for admitting patients and for emergency services. Serious cases were being referred to a specialty center that was coordinated by the DHO with security agencies.

The district hospital in Ramechhap had previously developed a contingency plan for disasters, and while it served to sensitize health workers to an extent, it had not been effectively implemented: no drills or simulation exercises had been carried out. And though stocks of medicines had been set out for the district, they had yet to be dispatched

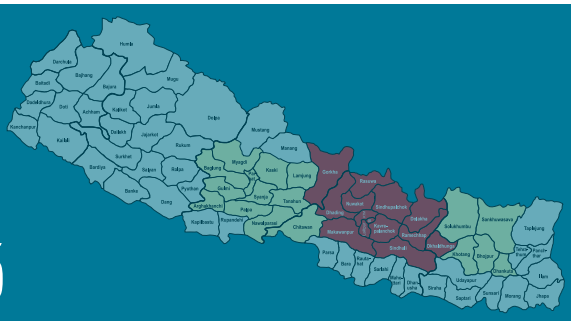
The district hospital had previously developed a contingency plan for disasters, and while it did serve to sensitize health workers to an extent, it had not been effectively implemented: no drills or simulation exercises had been carried out. And though stocks of medicines had been set out for the district, they had yet to be dispatched. Problems also cropped up in coordinating with the health posts and health centers around the district, primarily owing to poor telephone connections.

Fortunately, the roads were still functional with minimum obstructions, enabling the delivery of victims to health facilities. Connectivity was also established with the MoH on the day of the quake itself, and four seriously-injured patients airlifted to Kathmandu by 4 pm.

For effective management of health services, a health command post had been formed under the chairmanship of the DHO, along with six sub-committees tasked with looking after logistics, information management, epidemic preparedness, health-service revival and rehabilitation of facilities. Former Ilaka (area cluster) health centers were reactivated to disseminate data on outbreaks and treatment. FM stations were also employed in airing information related to prevention and control of outbreaks, with health situation updates and health surveillance reports submitted daily to the Ministry. Meetings of the command post were held every afternoon in order to analyze daily happenings and determine the course of action. Meetings of the DDRC were, in the meantime, also being conducted under the Chief District Officer to further refine plans.

While hospital staff busied themselves in attending to a steady flow of patients and stabilizing trauma cases in the next few days, the DHO had started sending national medical teams to different VDCs, taking along drugs and equipment. I-EMTs were also being mobilized: for example, the Spanish team—Medicos De Monde or Doctors of the World—provided a generator, various medicines and lab kits, later going on to even support the reconstruction of the DHO's damaged buildings; while another team comprising Nepali doctors and Filipino and Korean health workers were conducting health camps, cleaning water storage tanks and helping the DHO retrieve the goods trapped in its wrecked storage facility.

NEPAL
EARTHQUAKE 2015



202,646
Total Population

42
Total Deaths

134
Total Injuries

000
Major Surgery

000
Minor Surgery

163
Minor Injuries

Damage Status of Health Facilities

Hospital

1
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

22
Collapsed or Irreparable Damage

11
Partial Damage

PHCC

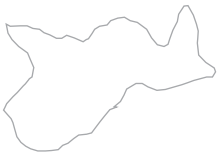
0
Collapsed or Irreparable Damage

0
Partial Damage

Reconstruction

2
Assigned Works Completed

16
Assigned Works On-going



Rasuwa

The DHO and district hospital in Rasuwa is located on a hillock facing the Langtang range, just a short walk from the main settlement. Both were completely destroyed in the earthquake, with nothing left of the old buildings. The only structure that still stood was a recently-built prefabricated room that was being used as a store.

The damage to the health facilities in Rasuwa was so severe that majority of equipment and drugs were buried in the rubble, impossible to extract. A medical officer who had himself been partially trapped under debris was fortunately able to pull himself out, and once he had his minor wounds attended to, had immediately commenced treating the many victims in the area, an act that reminds us of the generosity of spirit of health workers who work so diligently to help others even as they put their own lives and safety at certain risk. Sadly, the earthquake did claim the lives of several health personnel, including two nurses, one health worker and four FCHVs from Rasuwa.

Helicopters had to be used to reach patients who needed urgent medical help in the most remote parts of the district. And there were many such people, given how the entire district had been virtually ravaged by not just the quake but also the avalanches and floods that had followed in its wake

The MoH had first sent out a team of experts to the district. Health workers had then busied themselves in finding usable material and alternatives—collecting tents and recovering around 20 hospital beds from the wreck. Temporary tents and beds were subsequently set up in a plot of flat land so that patients could be treated. The garage-style store—the only building that had withstood the quake—was cleared in two days with the help of the Nepal Army and others and used as a space for service delivery.

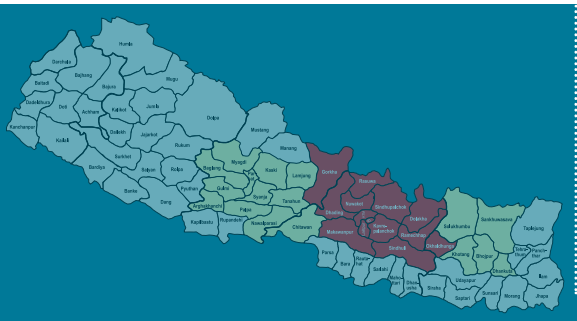
Contact was duly established with the center and helicopters had to be used to reach patients who needed urgent medical help in the most remote parts of the district. And there were many such people, given how the entire district had been virtually ravaged by not just the quake but also the avalanches and floods that had followed in its wake—settlements throughout the trekking region, for instance, had been flattened, burying hundreds and causing serious injury to the rest.

As the bodies of the dead began to pile up, managing them was proving difficult since district officials did not have enough body bags and at one point, bodies were strewn haphazardly around open grounds. Some were not claimed for days and were decomposing then and there, remains that were later sent to Kathmandu for forensic tests.

Since health and sanitation facilities in the district had already been compromised, preventing outbreaks was one of the main priorities of the DHO. To ensure this, it deployed FCHVs and medical teams to different areas and ran awareness campaigns via the local media.

While many of the other affected districts have, by now, made use of at least some temporary structures or pre-fabricated rooms for the delivery of health services, in Rasuwa, however, except for one single public health building, all other hospital services are still being run in tents today—almost two years since the disaster.

NEPAL
EARTHQUAKE 2015



43,300
Total Population

681
Total Deaths

771
Total Injuries

000
Major Surgery

000
Minor Surgery

000
Minor Injuries

Damage Status of Health Facilities

Hospital

1
Collapsed or Irreparable Damage

0
Partial Damage

Health Post

10
Collapsed or Irreparable Damage

2
Partial Damage

PHCC

0
Collapsed or Irreparable Damage

1
Partial Damage

Reconstruction

6
Assigned Works Completed

12
Assigned Works On-going

Sindhuli

An hour after the earthquake struck, Sindhuli's DDRC called for a meeting in which the situation was briefly assessed and information collected so that treatment for victims could be started immediately. Additionally, all health workers and other staff had been directed to remain in their respective workplaces and avoid leaving until further notice.

In the meantime, the injured were already flocking to the 51-bed district hospital, where services were being provided free of cost. However, as an autonomous institution, the hospital had poor coordination with the DPHO—similar to the story in other districts where the two institutions function independently.

The injured flocked to Sindhuli's 51-bed district hospital, where services were being provided free of cost. However, as an autonomous institution, the hospital had poor coordination with the DPHO—similar to the story in other districts where the two institutions function independently.

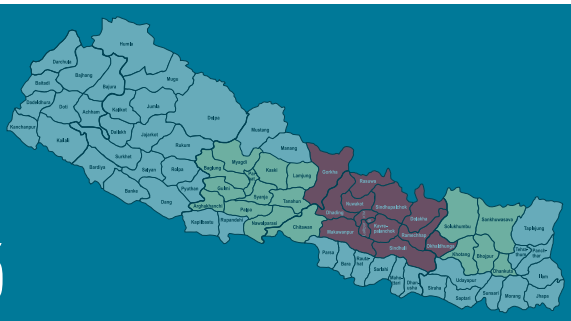
Due to the sheer number of patients, the hospital quickly ran out of supplies. It was then agreed that medicines would be purchased from the local market and sent to health posts and PHCs. The same drugs were also used for buffer-stock maintenance that could be immediately dispatched to the necessary areas. After communication systems were back on, officials sought medical supplies from the Regional Office and the HEOC. For critical patients, contact was made with the NA, the Home Ministry and the MoH, which would subsequently send helicopters to evacuate the patients.

Two days after the quake, an RRT meeting was held where the status of the health institutions based in the VDCs was assessed. It was during this meeting that the decision to form a new RRT team took place. This team, comprised of nine members from the DPHO and the district hospital, would coordinate with other RRTs and inform and offer suggestions to the DDRC for any further actions. A referral mechanism was also quickly planned out. Patients from the PHCs and health posts would be brought to the hospital and if they were unable to handle the situation, the staff would further refer patients to centers such as Janakpur Zonal Hospital, Bardibas Hospital and other health institutions based in Biratnagar, Chitwan and Kathmandu.

In a similar vein, information on the damage to the health institutions was also collected, and the availability of open spaces where temporary shelters and makeshift facilities could be established was explored. Later, a rapid health assessment format was developed that assessed the condition of health institutions and service delivery more accurately and in greater detail. Supplies soon began flowing into the district hospital and medical teams arrived to help. The stocks were so well-replenished that the hospital only recently ran out of the drugs brought during the earthquake.

The district hospital had developed its contingency plan and while officials admit that they did not have enough time to go through the documents, the phone numbers listed in it were of great help since they made tracking down health workers easier for the officials.

NEPAL
EARTHQUAKE 2015



SINDHULI

468,132
Total Population

180
Total Deaths

3051
Total Injuries

0
Major Surgery

47
Minor Surgery

10647
Minor Injuries

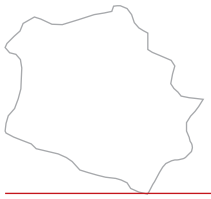
Damage Status of Health Facilities

Hospital		Health Post		PHCC	
0	0	15	2	0	0
Collapsed or Irreparable Damage	Partial Damage	Collapsed or Irreparable Damage	Partial Damage	Collapsed or Irreparable Damage	Partial Damage

000
Health Workers Death

000
Missing

5
Psychosocial Problems



Sindhupalchowk

The EDCD had been planning to conduct an orientation for the preparation of a hospital contingency plan in Sindhupalchowk, on April 26, 2015. A day before that could happen, however, the earthquake had struck, with particularly devastating effects in the district, in terms of both human and property loss

Sindhupalchowk was the only district out of those that had been badly affected that did not have its own hospital contingency plan in place. Ironically, the EDCD had been planning to conduct an orientation, leading to a preparation of just such a plan in the district, on April 26. A day before that could happen, however, the earthquake had struck, with particularly devastating effects in the area, in terms of both human and property loss. Many thus posit that the absence of a plan to cope with the disaster was a major reason why the district had suffered so many casualties, although, of course, more research is needed to substantiate that conjecture.

Further complications arose from the fact that the district hospital—operating out of a building newly-constructed by the Department of Urban Development and Building Construction—had itself sustained structural damages, and patients had to be treated out in the open. On the first day, 500 patients were brought into the institution for treatment—surgeries had started right away—along with the bodies of 32 deceased.

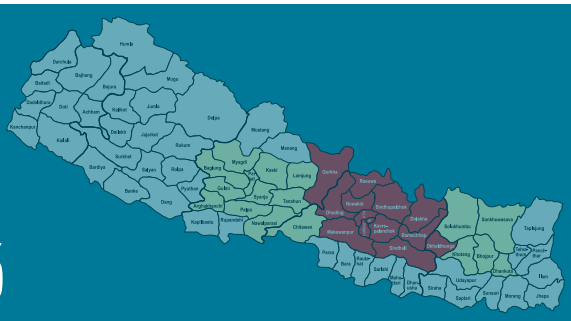
Having realized the fact, the second coordination hubs as per the decision of UNCT was set up in the district while one of two field offices of WHO was also established in the district to support the MoH for effective coordination in delivering the services to the victims. The WHO field office in the district assisted the Ministry in the mobilization of the International Emergency Medical Teams and the management of medicine and logistics, information flow, surveillance and financial resource mobilization. To ensure effective response, the clusters were divided into four sub-clusters: Mental Health and Psychosocial Support, Tuberculosis Reproductive Health and Injury Disability and Rehabilitation which were led by the officials from Ministry of Health and supported by the donor agencies.

Majority of settlements in the district headquarters, Chautara, had been affected, among various other areas. The panic and chaos that reigned in the hours following the earthquake meant that delivering health services was a challenge. Still, health workers and volunteers who were mobilized to various areas abutting Chautara, the district headquarters, worked mightily from the very beginning. By the second day, tents were set up on the hospital premises and triaging conducted to make sure patients most in need of help were attended to right away. And on the fourth day, when reports of a diarrheal outbreak came from the Bhimtra VDC, it was promptly brought under control by the deployed district health team.

Although a health and nutrition cluster meeting had been held on the second day itself, it was only on day five that it bore fruit. To enable daily updates on conditions, SMS reporting from health facilities was now underway, helping authorities track and nip any chances of disease outbreak in the different VDCs in the bud.

A brief assessment of health facilities—many of which were found working under open skies—was completed over the next week.

NEPAL
EARTHQUAKE 2015



SINDHUPALCHOWK

287,798
Total Population

3570
Total Deaths

1573
Total Injuries

28
Major Surgery

Minor Surgery

1569
Minor Injuries

Damage Status of Health Facilities

Hospital

0
Collapsed or Irreparable Damage

1
Partial Damage

Health Post

48
Collapsed or Irreparable Damage

12
Partial Damage

PHCC

1
Collapsed or Irreparable Damage

1
Partial Damage

Reconstruction

43
Assigned Works Completed

16
Assigned Works On-going

Emergency medicines were being distributed through health and security personnel, as well as volunteers from the local community. Related to this, three motorbikes were being used to dispatch small amounts of drugs and other essential kits to health facilities in more remote reaches of the districts that were inaccessible to four-wheelers.

Supply of drugs overall, however, was not entirely smooth, and essential medicines had to be either borrowed from medical suppliers or acquired via assistance from partner agencies. In line with Sendai Framework for Disaster Risk Reduction, which emphasizes the stockpiling of necessary materials, various medical donors were requested to provide support for boosting stocks of drugs and equipment.

In order to treat people with serious injuries who required routine physiotherapy, a 20-bed step-down facility was also established with the help of different partners. Short of staff and medical equipment, hospitals were quickly overwhelmed with patients after the earthquake. To prevent the development of permanent disabilities, many of the injured needed immediate rehabilitation care.

Though preparedness in terms of disasters is still lacking, despite the losses suffered during the earthquake, some response recovery exercises have been ongoing, like, evacuation drills, training and strengthening and empowering the local hospitals and health centres as envisioned in one of the provisions of the Sendai Framework.

With the reconstruction phase now underway the National Reconstruction Authority has given due focus for building back better and safer through improvement in structures, adoption of proper building code and land-use policy. The Authority has also been avoiding reconstruction work areas fragile land that is vulnerable to earthquake.


WHO
WHO

3. Steering from the center

Preparing for the worst

In early 2000, an urgent need was expressed to build a health system that would prove resilient against disasters. Nepal's geographic location and topography have marked the country also being highly vulnerable to numerous natural calamities, including floods, avalanches, windstorms, lightning strikes and, of course, earthquakes. *The Health Sector Emergency Preparedness and Disaster Response Plan Nepal,* prepared in 2003, for instance, had touched upon the indispensability of strong health mechanisms able to deal with "natural hazards in general and on earthquakes in particular". And this is just one of the many national plans and policies that have prioritized reinforcing the health sector so as to render it better prepared to cope with disaster.

We know that it is weak, substandard buildings—rather than an earthquake itself—that causes deaths and injuries in such an event, and the collapse of hospitals and other health facilities is very possibly the worst-case scenario in these kinds of circumstances. And certainly, there were early speculations on the susceptibility of health facilities, as detailed, for example, in such reports as *A Structural Vulnerability Assessment of Hospitals in Kathmandu Valley,* which had warned that even in case of an earthquake of "moderate intensity (MMI=VIII), 60% of facilities would potentially be out of service, 10% could collapse, leaving only 10% fully operational." If this was the expected toll a moderate-intensity quake was expected to take, it would not have been difficult to imagine the widespread extent of devastation that an earthquake of high intensity might wreak.

Disaster Health Working Group

The 2003 Emergency, Preparedness and Disaster Response Plan had also served to revitalize the Disaster Health Working Group (DHWG), a policy-making body, which is led by the Director General of the Department of Health Services. This entity—formed in 1993, but which has long remained dysfunctional—comprises among its members various donors and national and international partners, and the Director of the Epidemiology and Disease Control Division as its Member Secretary. In fact, it was the DHWG itself that had developed the 2003 disaster plan, a document that continues to play a significant guiding role during times of crisis to this day.

Health Emergency Operation Center: Advisory committee

The DHWG was the sole focal body in disaster planning until an advisory committee was formed in 2013 to steer the functions of the Health Emergency Operation Center (HEOC), established with the technical support from WHO. This nine-member committee was assembled by the Ministry of Health, to be chaired by the Health Secretary and with the chief of the Curative Service

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Contingency planning training has been conducted by the MoH in 59 districts so far, including 13 among the worst-affected in 2015 quakes, all of whom had their plans ready apart from Sindhupalchowk, and it is telling that this was the district that suffered the most damage and losses in that event

Division as the Member Secretary, and it was mandated to endorse the plans and tasks conducted by the DHWG.

Apart from the DHWG and the HEOC's advisory committee, the establishment of a pre-fabricated structure to serve as the command center in a disaster was another major milestone in preparedness. Indeed, this single-story building proved crucial for over three months after the earthquake (refer to the section on the HEOC in Chapter 1 for additional details).

Mass Casualty Management and HOPE

The MoH, with the support of the World Health Organization, has been conducting Mass Casualty Management (MCM) trainings in health facilities, designed so that the given institute can eventually develop its own MCM plan.

Similarly, support during MCM training is also received from Hospital Preparedness for Emergencies programs. These programs have been felt to be very effective in that they provide various necessary skills to deal with large in-flow of patients during disasters.

Health Sector Contingency Planning

Among the major ventures of the MoH, the Health Sector Contingency Planning is aimed at equipping health facilities with a sound plan that they can refer to during crises. The planning approach is multi-hazard: not just limited to earthquakes, but a range of hazards and risks faced by the respective district. It essentially deals with three major areas—risk identification and mapping; resource mapping; and communication and coordination. Contingency planning training has been conducted by the MoH in 59 districts so far, including 13 that were among the worst-affected in last year's quakes, all of whom had their plans ready apart from Sindhupalchowk, and it is telling that this was the district that suffered the most damage and losses in that event.

Rapid Response Team formation

A number of Rapid Response Teams (RRT) were formed in 2000. These were intended for surveillance of any potential disease outbreaks, and would be the first responders, while also communicating information immediately to the district and central levels. These same groups were then later converted to respond to general disasters as well.

There are presently four tiers of RRTs: at the central level, the regional level, the district level and the community level.

Logistics prepositioning

In view of potential disasters and the chaos that tends to follow in their wake, various strategic locations were identified for the stockpiling of required drugs and health logistics to be used in times of crises. Such buffer stocks have been maintained at the Logistics Management Division of the DoHS; the Regional Health Directorates; certain districts; as well as within the UN-house. The drugs in these stocks are regularly updated and replenished.

Retrofitting

Retrofitting serves to raise the resistance of buildings—including the infrastructure of hospitals and other health facilities—to disasters. There are two ways by which this can be achieved: structural and non-structural retrofitting. Structural retrofitting, which involves reinforcing the structural system of a given building, has been done in various hospitals such as Patan Hospital, among others. Non-structural retrofitting, on the other hand, involves fixing hospital beds and equipment to anchors or walls nearby, as well as placing

wooden planks or strings across shelves to prevent equipment from falling, or laminating glass surfaces so that the shards do not scatter and cause injuries should they break.

Information Management

A vital tool

Proper management of information is always critical to assessing and responding appropriately to disasters like the recent earthquake, particularly in ensuring the effective delivery of health services. For the first few days after the quake, the MoH had been reacting primarily on an ad-hoc basis, but it became increasingly clear that a separate unit needed to be set up to manage information. Such an entity was thus established, tasked mainly with the deployment of International Emergency Medical Teams, human-resource mobilization, logistical delivery and various other crucial functions.

Uninformed decisions

A major challenge that emerged following the disaster was in identifying the needs of victims and prioritizing relief and response efforts accordingly. There were visible overlap of efforts in many cases, as well as haphazard deployment of human resources—for instance, while there were medical workers who were returning to the MoH premises because they had been sent to places where there was nothing to be done, other areas were reeling under an acute shortage of both human and logistical assistance. Indeed, in the absence of reliable information, the Human Resource Unit was found to be allocating medics to different places without proper planning and evaluation, resulting in wastage of crucial time and medical expertise at an hour when these could mean the difference between life and death for victims.

In order to create a distinct Information Management Unit, the MoH sought the support of various partners, including the WHO, while other agencies such as the United Nations Children Fund, Gesellschaft für Internationale Zusammenarbeit and the Health Research and Social Development Forum helped supply volunteers since the staff at the Ministry would not suffice for the collection, entry and evaluation of data. Gathering of information was first carried out over phone calls to the districts, and in a few days time, focal persons were appointed in each of the worst-affected districts to facilitate collection and reporting of data to the center.

The information collected would then be categorized under various labels such as death, types of injuries, needs of medics and logistics, among others. Initially, the reports were collected on a daily basis through phone calls and emails—volunteers would compile the data and enter it into a system, from where it would be subsequently analyzed. The final reports would then be sent to the related departments the next day based on their content. The process was not entirely scientific at this point, but it still offered an outline of sorts for the management of information, a far cry from previous arrangements.

The work of the Information Unit proved useful not just in terms of organizing logistics and human resources, but also in determining the deployment of the I-EMTs. The daily briefing of injuries by the National Emergency Operation Center was also based on the data collected by the unit.

In addition to this, disease surveillance was being carried out simultaneously at 108 sites to prevent any outbreaks of communicable diseases. However, since such cases were mainly dealt with by government hospitals, surveillance units were later limited to 48 health facilities. This disease surveillance comprised a significant component of

In the absence of reliable information, human resources were being allocated to different places without proper planning and evaluation, resulting in wastage of crucial time and medical expertise at an hour when these could mean the difference between life and death for victims

information management, since there were fears that Nepal could be facing epidemics such as the cholera outbreak that was reported in Haiti following its earthquake.

However, as more and more attention was focused on disease surveillance, particularly by organizations like the WHO, and a growing number of epidemiologists were hired to keep tabs on the process, data management was given short shrift, which affected health emergency response. Fortunately, there were no cases of influenza or cholera reported—this was good news because otherwise emergency management would have posed a far more complex problem.

District-level data

On any given day, information from different districts would be conveyed over the telephone, jotted down by the person receiving the call, and the details then entered into an Excel format. Once the data was analyzed, reports would be drafted and sent to the related department the next day. While phones comprised the sole medium of data collection in the beginning, email was also used later on.

There were certainly some shortcomings when it came to the response from the districts, but it was enough to allow the gathering of basic information for reports that would communicate the overall logistical and human resource needs of a given area so that these could be addressed. Lack of sufficient trained and competent persons for the collection and management of data did pose an issue, but I/NGOs helped mitigate this somewhat by providing volunteers, so that the result was satisfactory in totality.

Coordinating with I-EMTs

Nepal did not have much experience of working with I-EMTs so there was bound to be some gaps in coordination. Three agencies were involved in the mobilization of I-EMTs—the Nepal Army, the MoH and the WHO—but there were some teams already out in the field on their own without the knowledge of any of the three. This was owing to the very little priority generally afforded to information management in the health sector, a task that is deemed to be beyond the jurisdiction of health workers. This led to a lot of confusion, particularly among I-EMTs arriving from different parts of the globe, about who exactly they were meant to be reporting to.

Instead of setting up a mechanism to orient the I-EMTs and ensure regular reporting from their end, attention was directed rather towards limiting cases of amputation before foreign medics could be deployed to various areas. Such cases had been rife in Haiti in the post-disaster period and the WHO was determined to prevent a repeat in Nepal, to the point where the issue dominated other priorities, such as reports from the I-EMTs. This lack of foresight in dealing with I-EMTs meant that there were few measures in place to secure their accountability.

Logistics Management

Maintaining an uninterrupted flow of essentials

Easy availability of drugs and medical equipment is among the prerequisites when it comes to the response of the health sector to any disaster. And in an event like the 2015 earthquake, where there is a surge in the number of trauma cases, an unhindered supply of such logistics is absolutely key to saving lives and averting disabilities.

The task of managing health logistics falls on the Logistics Management Division (LMD) of the Department of Health Services, along with the Department of Drug Administration, which is responsible for identifying and checking the flow of medicines within the country, including in emergency situations. While the MoH had already designated various hospitals as 'hubs' to serve as specialty-care centers during disasters, the LMD and the DDA were assigned to ensure that the hospitals' medicine stock was consistently replenished so that there were no disruptions in supply. Aside from drugs, arrangements also had to be made with regard to health technologies, equipment, surgical items and diagnostics.

Prepositioning of stocks

The LMD has stores on its premises in Teku, Kathmandu, from where it supplies drugs to the rest of the the country as needed. The drugs are ferried to the Regional Medical Stores, which further send medicine stocks to ground-level health institutes. While the LMD maintains drug stocks for over six months, it has prepositioned essential supplies in the above-mentioned regional facilities and some select hospitals. Thanks to the multi-year procurement system for medicines that had been in place for the past few years, there were ample stocks of many medicines during the disaster.

Supplies during the disaster

After the earthquake struck the country, the LMD's stocks were immediately opened up and essential supplies kept on stand-by. Although the division certainly boasted stocks of many medicines, as previously noted, there were some essential drugs and logistics that it still needed to procure, and this was made possible through South East Asia Regional Health Emergency Fund of USD 175,000 released by the WHO. This budget was thereby mobilized to acquire the needed items based on a contingency plan to support the victims of the disaster.

Call for support

Health facilities that had not been rendered unusable were identified, and inquiries made regarding the stock status at Regional Medical Stores and suppliers of various ministries. Similarly, the Association of Pharmaceutical Producers of Nepal, the Nepal Chemist and Druggist Association and the Chemical and Medical Suppliers Association were all invited for a meeting wherein they disclosed the nature of their stocks and provided the price-lists of all the required medicines and equipment. By the fourth day, an order based on the inventory had been given. The manufacturers then supplied the items they had in stock since production could not be easily resumed.

International reinforcement

In a few days' time, medicines donated by other nations started coming in. The list of required medicines had been uploaded onto the Ministry's website so that donors could refer to it while preparing their contributions. Water purification units, disinfectants, surgical gloves, bandages, masks and chlorine were initially in high demand; soon, medicines and items related to reproductive health, as well as sanitary napkins and diapers, were also increasingly sought-after; and by the time the relocation of victims had begun in places like Tundikhel, there was an immense need for items such as chlorine powder.

At first, the Nepal Army was solely in charge of airport management, including dealing with the stock of medicines being sent over by various friendly countries. Eventually, the information was sent to the HEOC along with a list of what had been contributed. Some days later, a central inventory was formed, and staff members of the DDA

In an event like the 2015 earthquake, where there is a surge in the number of trauma cases, an unhindered supply of medical logistics is absolutely key to saving lives and averting debilities

and the MoH set up a desk at the airport to handle the international donations. A team of pharmacists from the WHO and UNICEF assisted with managing the inventory and dispatching the supplies to designated stores. The medicines were then distributed across 14 districts, as well as hospitals within the Kathmandu Valley.

The I-EMTs that arrived with logistics generally took these supplies along to the places where they were stationed at, whereas those who came without logistics were supported by the LMD. Focal persons appointed in each district would inform the LMD about their respective area's requirements in terms of drugs and other items, requirements that would then be evaluated thoroughly before logistics were allocated.

Although the procurement process was set in motion almost immediately, there was not a great deal of medicines to be procured, thanks to the immense support received from donors in the matter. However, the absence of a proper screening system meant that there were some problems such as a large stockpile of unneeded medicines from different donors, like those donated by India that included a large portion of physician's samples, many of which were not registered with the DDA, for example.

Medicines from countries like South Korea, Russia and China, on the other hand, were often labeled in their native languages, which meant that the details had to first be translated into English before the drugs could be used. As a way to alleviate this problem, the LMD later on made it a point to first seek information on a given medicine from the prospective donors before requesting that it be sent. Another issue was the growing collection of medicines with short expiry dates that would soon become useless. A great deal of such drugs had to be disposed of, a process that is still going on to this day.

One of the overarching difficulties faced right after the disaster was the poor coordination among the line ministries. Even though the NEOC had been the first to take charge, the airport was initially managed by the police and the army so they were the only ones dealing with donor support. It was only some time later that a proper communication system was established.

And, in order to enable a smooth flow of consignments from overseas, free custom facilities were enabled for only three months following the disaster, even though support from donors continued for many months after. Getting custom clearance for these supplies became a major problem after the three-month window, owing entirely to the lack of inter-ministerial coordination.

Human Resources Management

Deploying manpower

When a meeting was held at the HEOC immediately after the earthquake to discuss the possible response, most of those involved were relatively unaware of the overall circumstances. Information had been flowing in bits and pieces, and as such, it was difficult for officials to make sense of what was going on and what kind of action needed to be taken.

On the first day of the disaster, rallying the necessary human resources did not pose a big issue in the Kathmandu Valley since all the designated hub hospitals had their own pool of doctors, a majority of whom lived at distances that could be easily travelled. So, on the second day, during the HEOC's morning meeting, responsibilities were divided in terms of collecting information from the affected districts so that the workforce could be mobilized and other arrangements made—all

done in coordination with the team from the Home Ministry. Until then, RRTs had been mobilized on the ground and were proving a vital source of information.

A ministerial-level directive immediately instructed all health workers to report to their respective duty stations and begin working. People who did not heed this request were summarily dismissed and further departmental action taken against them. Additionally, a Human Resource Unit led by the Joint-Secretary of the MoH had also been activated, which began mapping human resources and deploying professionals in needy areas.

A high-level decision to dispatch first-class officers and specialists to all the 14 districts was taken in a bid to help districts coordinate with the central level. These officers who stayed for over a week after the disaster were tasked with managing the logistics and human resources on the ground and communicating with the center regarding any urgent need. The MoH also contacted a number of Kathmandu-based hospitals such as the Tribhuvan University Teaching Hospital, the Institute of Medicine, Dhulikhel Hospital and Bir Hospital regarding support from their teams of specialists. Most of these institutions were ready and willing to provide teams of four to five experts. The Ministry then sent these teams to the worst-affected areas with the required logistics.

In the meantime, I-EMTs had started to arrive. A temporary desk was set up at the airport to help manage their flow during those first few months. This, however, did not go exactly as planned, and there were problems such as lack of time for the MoH to even check the passports of the medical personnel coming in from overseas. To rectify this, it was proposed that special ID cards be created for the I-EMTs.

Seven or eight days after the earthquake, the Ministry decided to send the I-EMTs to new areas so that there would be no overlaps between them. And so, on the basis of the demands and recommendations raised by the District Health/Public Health Offices, the teams were dispatched to different places. However, there were some teams that insisted on heading to districts where other I-EMTs had already been mobilized, so overlapping could not be entirely avoided as planned.

Just as things had slowly begun to settle down, the second earthquake struck, pushing the MoH into yet another quagmire. Once more, a meeting was held at the HEOC; health workers around the country were once again instructed not to abandon their positions at health posts and hospitals. Those workers who were not back on duty and had not taken informed leave were suspended after the fifth day of being absent—over 20 health workers faced suspension in this way. Soon after, when referral notices regarding the call for health workers were circulated, there were many requests from districts like Nuwakot, Dhading, Gorkha and Lamjung urging the center to take action against absentees in their jurisdiction.

Aside from the medical professionals, the Ministry also eventually realized that there was a need for a separate team to assess the damage sustained by cultural artifacts and heritage sites. An 11-member group of representatives was thereby constituted to collect information on the impact of the earthquake on cultural heritage in all of the 14 most-affected districts.

One of the major lessons gleaned from the experience was the sheer lack of preparedness and training on the part of the MoH in

A ministerial-level directive immediately instructed all health workers to report to their respective duty stations and begin working. People who did not heed this request were summarily dismissed and further departmental action taken against them

The financing model to be adopted had to consider the extent of the disaster, the number of injured/ wounded and the process of their treatment. On the other hand, resuming basic healthcare services at the community level was also essential

dealing with such a high-magnitude disaster, especially in terms of human resources. In the absence of documented guidelines and designated persons who could offer proper counsel, the Ministry had to rely on its existing knowledge and skills. The lack of such an updated document, along with delays in receiving its allocated budget were among some of the Ministry's biggest perceived hurdles during the earthquake.

The MoH also required central health data before being able to mobilize human resources in the various districts. Fortunately, although there were workers who were hesitant in going to their assigned areas, the Ministry was still able to mobilize 90% of the health workforce. However, even once they had been dispatched, the MoH was still not able to fully verify the human resources that were sent out, although it did make sure to inform officials at the district about the arriving teams. Coordination with various NGOs and INGOs was another challenge thanks to variations in ideology and working style.

Financial Management

The significance of disaster financing

It was evident that very little had been previously done in the way of financial management, aside from budgets allocated to deal with diseases and epidemics—efforts that were not nearly enough to counter an emergency of the scale that was witnessed in 2015. The earthquake, then, was a catalyst that forced the MoH to acknowledge the significance of well-planned disaster financing.

The financing model to be adopted had to consider the extent of the disaster, the number of injured/wounded and the process of their treatment. On the other hand, resuming basic healthcare services at the community level was also essential; a small oversight in this regard could derail years of progress made in such areas as immunization and maternal/ child mortality.

The costs incurred in the process would then be divided across these two fronts: helping health institutes to effectively treat victims and incentivizing health workers in delivering basic healthcare. It would also be vital to strengthen the supply system during the disaster.

The state had promptly declared free treatment for those injured in the quakes, but it also realized that it would be very difficult for government hospitals alone to cater to the needs of the public. However, since private institutions might not be motivated to work without incentives, it was decided they would be reimbursed for the services they provided. But there were a great many variables to be considered—including costs of medicine and other supplies; charges for a surgeon; costs of laboratory tests in line with the National Public Health Laboratory rates; and other

TABLE 3.1: SUMMARY OF RECOVERY NEEDS

	District level (NPR Million)	Central level (NPR million)	Total (NPR million)
Immediate team	86	109	195
Intermediate term	1,150	197	1,348
Medium term	7,171	5,977	13,147
Total needs	**8,407**	**6,283**	**14,690**

Source: PDNA, 2015

TABLE 3.2: YEAR WISE BUDGETARY NEEDS FOR RECOVERY AND RECONSTRUCTION

	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Total
Centre	109	447	1,694	1,350	1,350	1,333	6,283
District	42	2,094	1,620	1,596	1,528	1,528	8,407
Total	152	2,541	3,314	2,946	2,878	2,860	14,690
Total (%)	**1.0**	**17.3**	**22.6**	**20.1**	**19.6**	**19.5**	**100.0**

Estsimation by Assessment Team based on district assessment and activity plan, PDNA-2015

utility expenses—before the amount could be disbursed to these facilities.

A committee was thus formed by the MoH to calculate these costs, keeping in mind the diversity of conditions that would have to be treated, ranging from a minor fracture to complex injuries that could require multiple surgeries and months of hospital stay. The committee did discover though that there were far fewer complicated cases necessitating a great deal of time and money compared to injuries that could be treated relatively easily. Eventually, it came to the conclusion that an average of Rs. 25,000 per patient was the right amount for the purposes of calculation.

The decision was presented before the Cabinet and soon approved. The figure, however, excluded bed charges and other management costs levied by private institutions. Fortunately, the MoH was able to make a convincing argument that it would be a pertinent act of social responsibility for these private hospitals to waive these additional costs at a time when the country was facing one of its worst humanitarian crises in decades.

There were also discussions on whether hospitals should be provided advances for the treatment they would be offering. The idea did not garner much support, however, since it would be difficult to hold health institutions accountable for the amounts spent, and lax reporting mechanisms meant that there was a high likelihood of fraud and wrongdoing. Even while furnishing block grants, a thorough documentation process was followed—where each patient and his or her treatment was verified, and grants released only after the reports were approved by the verification committee. Further proof that offering advances to hospitals would have not been effective came from the discoveries made by the committee of some private facilities having falsified names of patients.

What became most evident at the time was that the country's financial sector could, when

What became most evident at the time was that the country's financial sector—generally deemed sluggish thanks to a cumbersome bureaucracy and resultant procedural hurdles—could, when the need arose, function just as efficiently as any other

Financial Management

IN	OUT
■ GoN = NPR 145,00,000	■ Grant to the public hospitals, District Health Office
■ CNDRC = NPR 5,50,00,000	■ Reimbursement to institution other than public hospital
■ WHO = NPR 175,28297.50	**Treatment and Follow up Free**
■ NSI = NPR 10,16,00,000	■ ICU = NPR 3000/day
■ Total = NPR 18,86,28,298.50	■ Major Operations= NPR 25,000/Pt
	■ Spinal, Neuro, More than 1 Major op= NPR 50,000

TABLE 3.3: UNIT COST FOR THE ESTIMATION OF DAMAGES OF INFRASTRUCTURE

Amount in NPR

Unit cost	Demolition cost	Value of building	Partial damage
Health Post	100,000	4,500,000	675,000
PHCC	150,000	10,000,000	1,500,000
District hospital	1,000,000	47,500,000	7,125,000
Central hospital block	1,500,000	35,000,000	5,250,000
Private facilities	1,000,000	47,500,000	7,125,000

Source: PDNA, 2015

Following the 2015 earthquake, a total of 1.4 million women and girls of reproductive age were affected, out of which 93,000 were pregnant at the time. This was particularly concerning given the destruction that had been sustained by health facilities around the country since 10,000 women were expected to deliver each month

the need arose, function just as efficiently as any other. The decision to provide the grant and all the necessary exercises that followed before the Rs. 25,000 amount was settled on was concluded within a span of 48 hours. Of course, there were some setbacks: for instance, some time later, the MoH had elected to disburse an additional Rs. 300,000 to the affected districts for any additional emergency procurement and essential goods. The commitment, however, was made a touch too late and many districts returned the funds, having already managed resources locally beforehand.

In around a month's time, the MoH also contributed to the implementation of the Post-Disaster Needs Assessment, designed to estimate the losses across various sectors and the funds needed to build back better.

All these activities had been part of the initial response phase. As the country began moving towards recovery and reconstruction, the MoH encountered some problems related to international support. It had been mandated that all aid should go through the Finance Ministry before being channeled elsewhere, which risked slowing down the process at a time when quick access to funds was crucial. The MoH had therefore requested the Cabinet for autonomy in the matter, and it was decided to allow the Ministry to sign direct Memorandums of Understanding (MoU) with various international partners who had pledged their support for reconstruction in the health sector. This move helped mitigate bureaucratic hurdles and expedite work, and MoUs were subsequently signed with over 40 organizations.

Such a resolution, however, could not be offered to the problem of tracking expenditure. When data on the spending is not available, it becomes difficult to assess the outcomes of any given project. Despite directing all districts to adhere strictly to the Transaction Accounting and Budget Control System after the earthquake, many agencies fell back when it came to reporting, thus making it difficult for both districts and the center to gauge the progress made.

Maternal and child interventions

Mitigating the vulnerabilities of women and children

Women and children are among society's most vulnerable groups, and are oftentimes disproportionately affected when a disaster strikes. The United Nations Population Fund estimates that following the 2015 earthquake, a total of 1.4 million women and girls of reproductive age were affected, out of which 93,000 were pregnant at the time. This was particularly concerning given the destruction that had been sustained by health facilities

around the country since 10,000 women were expected to deliver each month and between 1,000 to 1,500 of these were at risk of pregnancy-related complications.

Health issues aside, there was also a heightened likelihood of women and adolescent girls being exposed to gender-based violence in the aftermath of the earthquake. According to the UNFPA, "based on estimated numbers of affected people and using calculations from the Minimum Initial Service Package, around 28,000 women potentially required post-rape treatment."

Protecting mothers …

Recognizing the criticality of the issue, the HEOC had formed a Reproductive Health Sub-Cluster to systematize interventions in the sector and analyze gaps therein so that measures to address these could be formulated. Since the issue of reproductive health is cross-cutting, links were also established with other government agencies so that duplication of work could be avoided and coordination improved.

The Family Health Division, with the support of the UNFPA, distributed 1,311 Emergency Reproductive Health (ERH) kits and dignity kits to over 56,000 women. The ERH package included clean-delivery kits, clinical tools for management of rape, contraceptives and various drugs, among others, while the items in the dignity kit included a housedress, a sweater, shawl, sari/dhoti, petticoat, toothbrush and toothpaste, comb, underwear, towel, reusable sanitary napkins and a flashlight, among others. These kits were provided to district hospitals, health facilities and health camps. Relief packages were also furnished to Female Community Health Volunteers.

Health facilities were additionally made recipients of various essential items, such as medical tents for birthing centers, and mobile health camps conducted that catered to pregnant mothers and other women in places where access to health facilities was challenging.

Once a delivery had taken place, it was essential to keep the post-partum mother and baby in a secure place, for which transition homes and shelter houses were established where the mothers and children could remain for the duration of their recovery. Here, they—along with their attendant relatives—would be given nutritious meals and cared for. This proved an effective strategy in those districts where it was applied.

Counseling centers were also set up in a number of places in the months that followed, targeted primarily at identifying and addressing issues related to adolescent girls. The management of cases of gender-based violence and establishment of safe spaces were thus crucial steps in mitigating the vulnerabilities of women after the disaster.

… and babies

When it came to the needs of children, nutrition and immunization were the two main areas of priority for the Child Health Division (CHD) at the DoHS following the 2015 earthquake. In this regard, an emergency nutrition program was launched in the 14 worst-affected districts and the Nutrition Cluster activated, reaching approximately 700,000 children and women through a number of different works (UNICEF, 2016).

One of the fundamental focuses of the CHD was to promote more exclusive breastfeeding for newborns. Officials were concerned that living in temporary shelters might dissuade new mothers from breastfeeding. Community mobilizers and FCHVs were thus entrusted with making sure this did not happen.

When it came to the needs of children, nutrition and immunization were the two main areas of priority. In this regard, an emergency nutrition program was launched in the 14 worst-affected districts and the Nutrition Cluster activated, reaching approximately 700,000 children and women

The FCHVs were also tasked with gauging the nutritional status of children across various districts by conducting upper-arm circumference assessments. The many children who were thereby categorized under Severe Acute Malnutrition were then made to undergo therapeutic feeding. In later months, interventions were also conducted that focused on children with Moderate Acute Malnutrition.

In May, 2,428 children between six to 59 months of age were given the Measles Rubella (MR) vaccine, among other programs, including a three-day health education workshop held in temporary camps in Bhaktapur, Lalitpur and Kathmandu. The number of children in the camps, however, was often lower than the initial estimates predicted since many families were found returning to their homes around the Kathmandu Valley or other districts during this period. The MR campaign was eventually extended by the MoH—with technical support from UNICEF and the WHO—across all 14 affected districts, where approximately 596,761 children were estimated to reside.

With funding from UNICEF, Child Nutrition Week was also observed in June/July, during which time further coverage of additional services was started.

A substantial volume of blood was required on the first day of the quake. From the second day, however, routine surgery had been stopped, and more deaths were being reported, which meant the supply of blood exceeded demand. So that on day three, blood stores were already full, even as more stocks were still coming in

Management of blood supply

Every drop counts

In the aftermath of the disaster, it was the NPHL that was tasked with managing blood supply and safety, functioning as a regulatory body for blood-transfusion services. Dr. Geeta Shakya, Director of NPHL, led the team, and their very first order of action was to assess blood stocks across the affected areas. Following this, it had proceeded to establish contacts in less-affected districts—including Chitwan, Pokhara, and a number of mid-western districts such as Nepalgunj and Dhangadi—and directed them to ferry blood to the capital. The very next day onwards, stocks of around 200-500 liters of blood were being transported to Kathmandu from these regions.

A substantial volume of blood was required on the first day of the quake. From the second day, however, routine surgery had been stopped, and more deaths were being reported, which meant the supply of blood exceeded demand. So that on day three, blood stores were already full, even as more stocks were still coming in from different parts of the country, and the blood management team therefore had to halt the arrivals. This was one of the few challenges the team faced.

In addition to the stocks arriving from other districts, there were also numerous blood donation camps organized in different places around Kathmandu immediately following the quake.

The donation process would be as follows: it began with a physical examination or screening of the donor in terms of fitness, weight, age (ideally between 18 to 65 years) and testing for diabetes, blood pressure or Hepatitis (B and C). If deemed eligible, the donor's blood was then extracted and quarantined so that the type of blood group could be separated, and then screened for Transfusion-Transmissible Infections (TTI) such as Hepatitis, Diabetes and Syphilis.

Indeed, there was such a surfeit of individuals and organizations volunteering to donate blood that the extractions had to be carried out on a first-come-first-serve basis. But while there was plenty of blood to go around, and a great number of volunteers facilitating the donation process, the management team did feel the shortage of screening kits, due to which they had to seek the assistance of the WHO and the

South Asia Transfusion Committee (SATC). The Red Cross did have a one-year tender to provide blood bags and TTI-screening services, but the blood stock itself was only sufficient for a limited number of days, and there was no capacity to conduct mass screening.

The NPHL's management team, however, did not have a role to play in coordinating supply across the 14 highly-affected districts, since, for one, most seriously-injured patients from these regions were being transported to Kathmandu anyway, and secondly, the district blood banks were being managed at the district level, while the central team was looking after its own supplies.

The central blood bank, which suffered heavy damages, has now been moved to the emergency blood bank at Balkumari. Years ago, however, the British Red Cross had warned that the building would not be able to withstand a 7.5 magnitude earthquake. The NPHL team has thus proposed the construction of prefabricated structures to house the blood bank in places such as Tundikhel, Civil Service Hospital, trauma centers and even the TUTH. Though a blood bank had been established at TUTH, it has not been utilized well. And at present, the Thai Red Cross is also supporting the building of a modern blood bank.

Syndromic disease surveillance

A finger on the pulse

In the aftermath of disasters, public health systems are generally overstretched; while treatment of victims is the utmost priority, routine healthcare delivery must not be disrupted. What is more, post-disaster periods are often marked by increased possibility of disease and infection: after earthquakes, for instance, with people forced to huddle together in temporary arrangements in open shelters, chances are that basic sanitation and hygiene will be compromised. Additionally, the sheer density of such arrangements, where families are found living in close proximity to one another, would represent an ideal environment for communicable diseases to resurface and spread easily throughout the settlements. Fears of disease outbreak—particularly the water-borne variety—were therefore rife following the quakes last year, partly stemming from the fact that Haiti had witnessed one of its worst cholera outbreaks in history following its earthquake.

It was with these fears in mind that immediately after the disaster had struck, the EDCD had initiated active syndromic surveillance in hospitals to consistently monitor outbreak status. This surveillance system was able to cover 96 treatment sites including 66 hospitals and temporary camps inside the Kathmandu Valley, and 30 hospitals and camps in other districts.

According to the Review of Health Sector Response to Nepal Earthquake 2015 and Lessons Learnt prepared by the EDCD, "the surveillance system triggers alert when there are increase in the number of syndromes crossing the threshold level (doubling of the average of the previous seven days, with a minimum of five cases). But only one case triggers the alert for suspected cholera and fever with rash. Similarly more than five cases in a seven-day period trigger an alert for fever with jaundice."

Just a few days after the earthquake, the surveillance system was launched with five syndromes, including Trauma; Acute Respiratory Illness; Watery Diarrhea; Bloody Diarrhea; and Fever. The districts began reporting all these syndromes through a format developed by the MoH, and the syndromes were again revised in a month's time. Now, the new list comprised eight

This system of surveillance had many advantages. A Hepatitis A outbreak was reported from Gorkha that was locally managed, and an outbreak of dysentery was reported from Sindhupalchowk, which was also soon brought under control

Table 3.4: NUMBER AND PERCENTAGE OF REPORTED POST-EARTHQUAKE SYNDROMES

By age group and type of condition (May-December, 2015)

Syndrome	No of reported cases (N=59,000)			Percentage of total patient treated (N=798,173)
	Under 5	Above 5	Total	
Severe Acute Respiratory Infection (SARI)	2,984	2,822	5,806	0.7
Influenza-Like Illness	5,481	3904	9,385	1.2
Acute Watery Diarrhoea	5,994	11,444	17,438	2.2
Bloody Diarrhoea	310	970	1,280	0.2
Fever with Jaundice	228	630	858	0.11
Fever with Rash	500	553	1,053	0.13
Fever with No Jaundice, No Rash	8,366	14,814	23,180	2.9
Fever with Jaundice	228	630	858	0.11
Fever with Rash	500	553	1,053	0.13
Fever with No Jaundice, No Rash	8,366	14,814	23,180	2.9
Total			**59,000**	**7.4**

Source: EDCD, 2016

syndromes, including Influenza-Like Illness (ILI); Severe Acute Respiratory Infection (SARI); Acute Watery Diarrhea; Acute Bloody Diarrhea; Suspected Cholera; Fever with Rash; Fever With Jaundice; and Fever Without Jaundice and Rash.

This system of surveillance had many advantages. A Hepatitis A outbreak was reported from Gorkha that was locally managed, and an outbreak of dysentery was reported from Sindhupalchowk, which was also soon brought under control. Some three months after the earthquake, cholera was reported from Kathmandu Valley. Although the disease is endemic in the area, and has broken out almost every year, this particular resurfacing, so soon after the disaster, was of special concern. Over 100 people had been confirmed to be suffering, but no casualties were reported.

International Professional Officers and Surveillance Medical Officers were deployed by WHO to support district health offices for outbreak surveillance and monitoring. Later WHO Emergency District Support (WEDS) officers were deployed in all the 14 districts with support from USAID/OFDA. They have been supporting the district health office in strengthening disease surveillance and response and in other post disaster recovery activities.

The EDCD's response review states that a total of 798,173 patients had made visits to health facilities between May and December 2015. According to the report: "A total of 59,000 new visits were reported for the eight reportable conditions, which represents 7.4% of the total number of patients who visited. Of all health-facility visits, the most commonly reported diagnoses were fever without jaundice and rash (n = 23,180 [2.9%]), acute watery diarrhea (n = 17438 [2.2%]), and influenza-like illness (n=9385[1.2%])."

Managing bodies

Dealing with the deceased

The management and disposal of the bodies of those killed is an important aspect that is oftentimes overlooked during the routine drills

and simulations conducted as part of disaster preparedness. And sure enough, the problem did surface in the aftermath of the recent earthquakes, which had claimed more than 8,500 lives—some of whom had been instantly killed, and others having later succumbed to their injuries.

Too few mortuaries meant that bodies were often strewn around open spaces for lack of choice. Considering that even the central hospital based in the capital city quickly ran out of proper storage space for the remains of the deceased, so that these had to be stored in a hall or an open area, one can only imagine the kind of difficulties districts outside of Kathmandu must have faced. Reports suggest that the bodies were either kept outdoors or frequently on school grounds before they could be identified and claimed by loved ones.

To gain a better grasp over the situation, the government had soon formed a management committee that was tasked with coordinating with all the affected districts and managing the storage and disposal of bodies. Earlier, on February 24, 2012, a Cabinet decision had endorsed a specific work plan or guideline dealing with the matter.

This plan had assigned the chief of the District Police Office as the coordinator while the Deputy Chief District Officer would play the role of secretary in the process. Various measures were outlined for the identification of bodies—first was the primary method, which would employ fingerprint, forensic deontology and DNA-testing, among other means; and second would be to identify the body by simply looking, either in person or via photographs, for any identifiable marks or any documents or papers found on and around the person. Once detailed documentation was completed, the bodies would then be handed over to the claimants. The plan additionally states that in case the bodies are not claimed for a prolonged period of time, their final rites would be conducted upon approval from the management committee of the given district.

In the case of foreigners, the concerned agency was instructed to communicate with the Ministry of Foreign Affairs, which would then get in touch with the related embassy. If bodies were not claimed, a postmortem would be conducted to extract any other possible details regarding their identity.

Management of bodies was particularly challenging in the Kathmandu Valley given the vast numbers of people from across the country that enter the area for different purposes—whether for work opportunities or to access administrative services—on a daily basis. This meant there was a substantial pile-up of bodies in health facilities in the area, and was one of the reasons why the identification of the deceased was held off until there were family members coming to claim them. In other cases, mobile phones found alongside the remains also proved helpful in identifying them. A large number of bodies were kept in the Forensic Unit of the TUTH, but in a few days' time, they began decaying, causing distress to both personnel and patients.

Quite some time later, after the dust had settled and many of the deceased taken away, there were still some 34 bodies that remained unclaimed at the TUTH and the police decided to hold a mass cremation to dispose of them. But when they were being loaded onto trucks, the doctors of the Forensic Unit had opposed the move vehemently, arguing that family members might someday come to claim the bodies and cremating them would mean wiping out any evidence of their loved ones. So it was that 11 months after the disaster, following proper coding and identification

Too few mortuaries meant that bodies were often strewn around open spaces for lack of choice. Considering that even the central hospital in the Capital quickly ran out of proper storage space, one can only imagine the kind of difficulties districts outside of Kathmandu must have faced

The MoH formed the Injury and Rehabilitation Sub-Cluster to assess the immediate rehabilitation needs of injured persons and the ability of health facilities to address these needs. But since most hospitals had limited capacity in this regard, various organizations would aid the process by sending in their physiotherapists and counselors

processes, the remaining bodies were buried at the TUTH's premises.

Injury rehabilitation

Long road to recovery

In the weeks following any given disaster, treatment and rehabilitation of the injured is generally a prime area of focus. This is because leaving injuries neglected and unaddressed for an extended period, and failing to make time for physiotherapy after hospital treatment, can raise the likelihood of life-long disability.

Immediately after the 2015 earthquake, public and private hospitals in the country reported having handled a total of 15,367 trauma cases, out of which 3,221 cases necessitated major surgeries, and 4,103 cases minor surgeries—50 percent of these were managed by the public and government hospitals. And according to Handicap International's quarterly report, presented in the Nepal Health Sector Support Program August-October 2015 bulletin, data collected from the three main health facilities in Kathmandu that were treating earthquake victims showed that of the 1,005 people who received care within four weeks of the disaster, 71% (714) had suffered fractures, 8% (80) spinal cord injuries, and 4% (40) of cases had required amputations. "Based on additional information from MoHP's (now MoH) Health Emergency Operation Center (HEOC) and sample data from hospitals and international organizations, it is estimated that between 1,500 and 2,000 patients require medium- or long-term nursing and rehabilitation support," the report reads.

The MoH, following the HEOC's activation, had promptly formed the Injury and Rehabilitation Sub-Cluster that began assessing the immediate rehabilitation needs of injured persons after the earthquake and the ability of health facilities to address these needs. It was later decided that since most hospitals were found to have limited capacity to deal with injury rehabilitation, various organizations would aid the process by sending in their physiotherapists and counselors to visit a given hospital on a daily basis and help patients either return to normalcy or cope with their new lives.

A strategic group was formed in May 13, 2015, to work on the short-, medium- and long-term plan to support the MoH to integrate injury rehabilitation into the overall health sector plan (NHSP-III). Members of the group were sourced from the MoH (Curative Division), the Ministry of Women, Children and Social Welfare, the Ministry of Federal Affairs and Local Development, the Leprosy Mission Nepal, World Health Organization, International Organization for Migration, CBM, Handicap International and the Nepalese Physiotherapy Association.

In the meantime, in recognition of the importance of early rehabilitation for communities, step-down facilities were also erected in various areas inside and outside the Kathmandu Valley. A Cuban Medical Team based in the Ayurveda Campus in Kirtipur, for instance, was supporting a rehabilitation program for patients recuperating from major surgeries. Other agencies outside the Valley were also involved. Additionally, transport services to these step-down facilities was also offered to patients who lived close by and who were medically stable and therefore did not require life support during the move. However, since they still had to be accompanied by nurses and health assistants, and given the overall cost of running the ambulances, managing the budget for transport did pose a problem.

A model of a step-down facility was also developed in Sindhupalchowk, a mock

building constructed with locally-available resources that was used to demonstrate how injury rehabilitation could be carried out. Almost the entirety of the facility was made of bamboo and other easily-acquired materials in the area, and all the rooms, including the bathrooms, had been made accessible to wheelchairs. Physiotherapists had additionally been stationed here round the clock and counselors were also at hand to attend to patients. That facility, however, has since shut down.

The MoH's serious efforts to set up rehabilitation centers at the district level is a positive step, and one that could strengthen the entire health system if it were to be properly implemented. It would expedite injury management and rehabilitation, not just during major disasters, but also when dealing with injuries caused by traffic accidents and impacts of various diseases.

Of course, it should be remembered that given the nature of society in Nepal and the ascendency of family bonds, long-term rehabilitation refers more to being cared for at home by loved ones. These realities need to be taken into account when developing mechanisms for injury rehabilitation. There is, after all, no more effective therapy than integration within society but there has to be community-based care plans in place so that victims rehabilitated in the communities don't have post-operative infections.

Mental-health assistance

Delivering psychological first aid

The stress of dealing with circumstances during and after a disaster can very well take a toll on the mental well-being of victims. In the context of the April and May earthquakes in Nepal, for instance, not only were people already greatly traumatized and shocked by the main event itself, but there was also the seemingly unending wave of aftershocks to contend with, serving to amplify fears and fuel anxiety. In such situations, then, it is of paramount importance that any form of response take into account the mental health needs of people and seek to provide them the necessary care and counsel.

There were two sub-clusters operating at the MoH in this regard: the Psychosocial Support Sub-Cluster of the Protection Cluster and the Mental Health Sub-Cluster of the Health Cluster, which worked together. While the former consisted of semi-skilled trained personnel, the latter comprised technical experts such as psychiatrists and psychologists. A number of rapid trainings had also been conducted on various aspects of counseling and handling of mental-health patients to create a pool of additional counselors and supporters. FCHVs were also coached and mobilized so that they could at least offer a first level of counseling to victims before referring them to specialty centers if they appeared to require further help.

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The necessity of activating these sub-clusters had become apparent about a week after the disaster, when the magnitude of the impact of the event on the mental health of the survivors was slowly coming into focus. The main responsibilities of these teams was then to visit affected districts and reach out to the victims—children were given top priority considering they were among the most vulnerable groups in such situations, easy targets for injury, exploitation and trafficking. Child-friendly spaces were thus established for their benefit, to afford them a sense of security.

In the first month following the disaster, patients mostly complained of fear and inability to sleep. As time went on, however, more complex conditions were reported: 16 different mental disorders were diagnosed

among those who took up counseling services in the mental health outreach clinics, a majority of which were women. Those who retained the symptoms even after a month were then treated for anxiety disorders, and referral channels put in place so that patients requiring specialty treatment could have access to hospitals and organizations that provided these services. The referral list of institutions also included contact details of focal persons in these places, allowing partners to get in touch directly and refer their patients to the nearest such facility.

Psychosocial programs were also extended to schools immediately after reports about a suspected mass conversion disorder among school children began to emerge. Mental health guidelines received from the WHO's Regional Office for South-East Asia (WHO-SEARO) containing psychological first aid instructions were also translated into Nepali and distributed to the various partners and response workers operating in the field. Furthermore, with the help of different partner organizations working in Mental Health and Psychological Support Services (MHPSS), a simple screening tool for community case detection (CIDT), in both Nepali and English, was devised and distributed. The tool was designed for the use of FCHVs as well as laypersons, and was very helpful in enabling early detection of cases and thereby early referral.

Besides dealing with the concerns of earthquake victims, it was also essential to ensure that people who had been suffering mental health problems prior to the disaster did not see a disruption in the care provided to them, since they were at high risk of having their conditions exacerbated by the circumstances.

In later days, resident doctors from the Psychiatric Department of the TUTH established treatment centers in Sindhupalchowk; while doctors from the Mental Hospital in Lagankhel also offered similar services in Nuwakot.

What proved extremely problematic amidst all this, however, was the lack of proper transportation facilities, leading to deficiencies and delays in providing mental health support to those who needed it immediately after the disaster. And the predicament is far from over today: prolonged waits and obstructions in the reconstruction process, which have compelled many affected communities to continue to live under extremely arduous conditions, have exposed them to higher risks of mental health problems, the dire consequences of which are bound to become more and more apparent further down the line.

WASH this way: Post-disaster efforts in water, sanitation and hygiene

Water, sanitation and hygiene (WASH) comprise an integral part of public health, more so when people are living in close proximity in temporary settlements as many were found doing following the Nepal Earthquake. Finding safe drinking water sources can be daunting at such times, and lack of toilets can add to the risk of transmission of water-borne diseases.

Two days after the disaster, a WASH cluster meeting was held and joint monitoring teams comprising members from the Ministry of Urban Development (MoUD), Department of Water Supply and Sanitation (DWSS), WHO, Unicef and Fedwasun were formed to respond to the needs of affected communities, with the mandate of ensuring sufficient water for drinking and cooking, and maintenance

of personal hygiene through bulk water treatment/supply/storage support, among other objectives. Within a week, these teams had visited the sites to conduct assessments that would inform coordination with other agencies for relief work and to hand out WASH materials. These included drinking water (in bottles, jars and tankers), water storage tanks, temporary toilets, water purifiers (in the form of chlorine tablets or liquids) and hygiene kits (complete with educational materials). The joint teams' monitoring report was made available after May 3, 2015.

Although an Open Defecation Free (ODF) campaign had been ongoing in the country for some time, as per the Sanitation and Hygiene Master Plan 2011 which envisioned the construction of toilets with permanent sub-structures to discourage open defecation, the earthquake threw a spanner in the works. Temporary toilets or pit latrines had to be set up, and youth volunteers—many of whom were affiliated to different NGOs—played a major role in this regard, erecting these makeshift toilets and disinfecting the area with chlorine, as well as being orientated and mobilized in hygiene promotion. Despite these efforts, however, there were many places where such facilities could not materialize immediately, owing to a variety of reasons, forcing people to resort to open defecation.

To keep an eye on water quality, the DWSS and WHO dispatched teams to all 14 quake-ravaged districts; technical support was received from Kathmandu University to monitor water in Kavre and Sindhupalchowk. In Kathmandu Valley, mobile labs were also used in places where Internally Displaced Persons (IDPs) were residing, along with some healthcare facilities. The report showed that in the valley, fecal coliform had been detected in 49 out of 173 tested samples, which immediately led to instructions to suppliers to carry out proper disinfection and distribute purifying agents in these areas.

Not too long after, the MoUD also deputed a higher-level official (Joint Secretary) in all the worst-affected districts to examine the damages that had been sustained by water supply and sanitation facilities, and how these were being dealt with. Temporary toilets were swapped with better, portable, semi-permanent structures, and water purifiers and bleaching powder distributed to communities to ensure they these toilets could be disinfected.

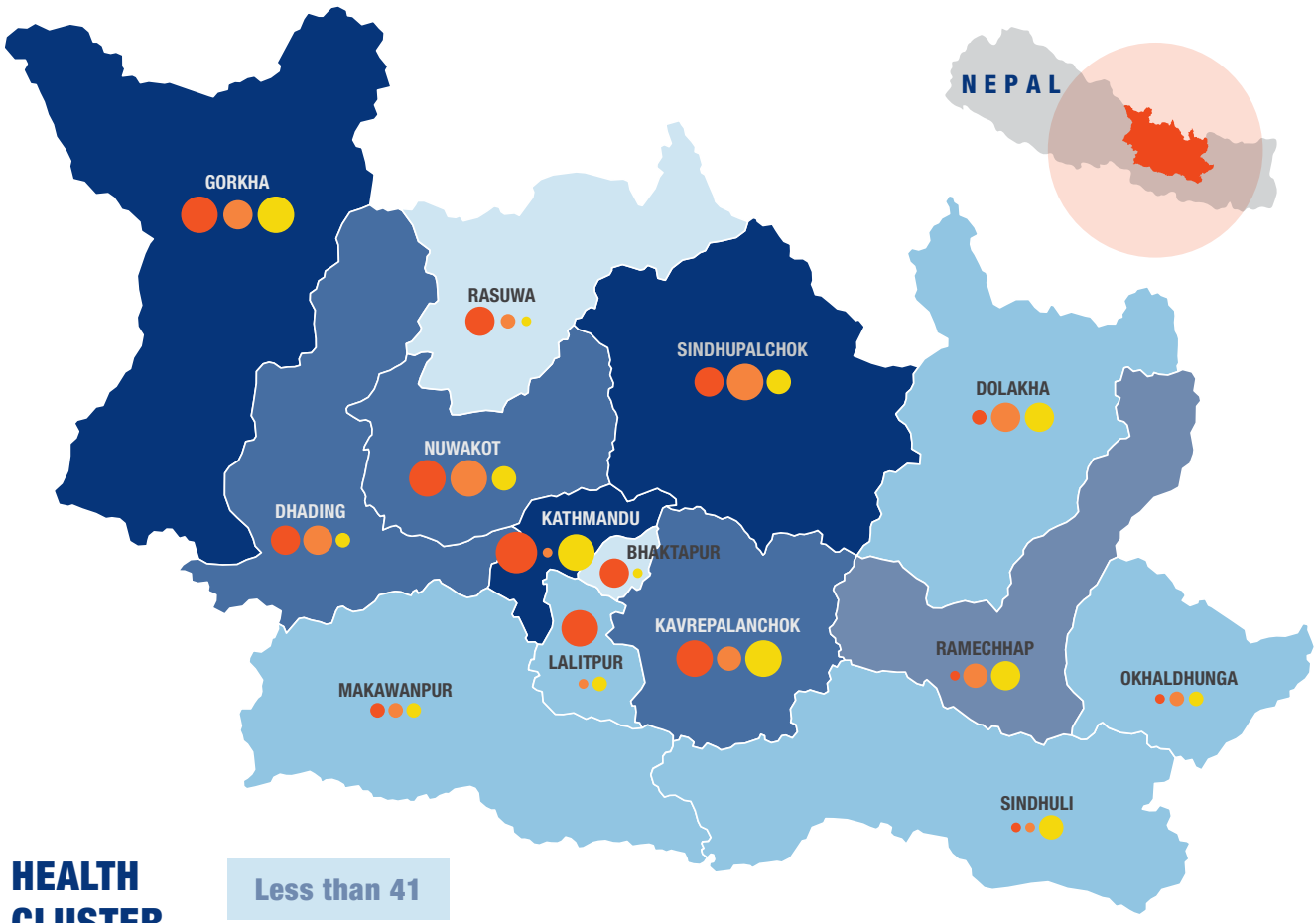
The WASH cluster reached a total of more than 100,000 people with water for drinking, cooking and personal hygiene. It also managed to provide hygiene awareness and information to 77,160 people in seven severely-hit districts (Gorkha, Dhading, Dolakha, Sindhupalchowk, Kavrepalanchok, Lalitpur and Kathmandu); install more than 200 water storage tanks in 14 camps in Kathmandu Valley; support chlorination of many water sources with different treatment materials; and distribute chlorine tablets via health facilities, NGOs and Water and Sanitation Division Offices (WSDOs)—interventions that all bore fruit, considering there was not a single death owing to diarrhea, a more positive result than could have been hoped for.

Although an Open Defecation Freecampaign had been ongoing in the country for some time, the earthquake threw a spanner in the works. Temporary toilets or pit latrines had to be set up, and youth volunteers played a major role in this regard

NEPAL
Earthquake 2015

Health Cluster response

World Health Organization
Regional Office for South-East Asia

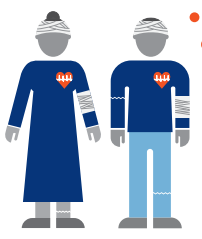


HEALTH CLUSTER ACTIVITIES

- Less than 41
- 41 - 60
- 61 - 80
- 81 - 120
- More than 120

Design: www.infonauts.in

Injured



- less than 100
- 101 - 500
- 501 - 1000
- 1001 - 2000
- 2001 - 4000
- more than 4000

Completely damaged health facilities

- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- more than 40

Partially damaged health facilities

- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- more than 40

4. An eye on impact: Post-disaster assessments

Rapid Hospital Needs Assessment

Capacity and requirements of health institutions

Three days after the earthquake, the Ministry of Health, with support from the World Health Organization, had deployed 12 teams to conduct a Rapid Hospital Needs Assessment to examine the conditions at these institutions and determine their current requirements.

The resultant *Rapid Hospital Needs Assessment Report—Mega-Earthquake in Nepal* states that the teams were tasked with appraising all district and other main hospitals, including private hospitals, and their primary purpose in this endeavor was to address three main questions:

1. How functional are the main hospitals?
2. How overwhelmed have they been between the occurrence of the earthquake and the time of the team's visit?
3. What are their immediate needs?

The report elaborates: "…data was then collected between 29 April and 3 May 2015. In order to provide timely information for decision making, the data collected over the first two days on 21 hospitals in 11 of the 12 most affected areas was analyzed and a preliminary assessment report released on 1 May–six days after the occurrence of the main earthquake."

According to the assessment, seven large hospitals were found to be in need of a variety of medical and non-medical items, including tents and mattresses. Some had even sought food for in-patients.

The assessment was valuable for the insight it provided into the immediate necessities of the health facilities, thereby enabling these to be addressed accordingly. Some key findings have been extracted below:

1) District hospitals were found to be the most vulnerable, particularly in districts east of Kathmandu Valley and Gorkha district, where the aftershocks occurred frequently and in high magnitude. It is therefore critical that contingencies are implemented in the short- to medium-term to ensure continued healthcare delivery capacity in areas served by these facilities. These assessment findings triggered the immediate deployment

Twelve teams were deployed to conduct a Rapid Hospital Needs Assessment to examine the conditions at all the main health institutions and determine their current requirements

The objectives of the study was to predict and identify pathogens that could cause outbreaks—a bid to locate the potential sources of diseases that had the ability to affect large groups of people and undertake measures to thwart their effects

of four International Emergency Medical Teams (Canadian Red Cross, Norwegian Red Cross, MDM Spain and MSF Spain) and national medical teams to provide level-2 medical care in the areas, where the four non-functional district hospitals were located.

2) Of the functional hospitals, five were considered in urgent need, as they continued to struggle with large volumes of activities, particularly in the OPD, and delivered services in partially damaged infrastructure with limited materials (including body bags, tents, and mattresses), medical supplies and essential medicines.

3) The limited volume of in-patients that was observed during the assessment is probably explained by consultation or hospitalizations that were not free of cost.

4) Of the four hospitals that were able to provide data on volume of activities, all but one showed a decrease in the peak numbers of trauma-related IPD patients (Sindhupalchowk district hospital) observed on 25–26 April. Although this decreasing trend may suggest that we have passed the peak of the emergency, anecdotal reports indicate that persons from many of the peripheral districts sought care directly in main hospitals of the Kathmandu Valley. Additionally, many vulnerable populations in remote areas are likely to have limited access to healthcare facilities. It is likely that the increased medical care capacity that will be provided by foreign and deployed national medical teams will increase demands for care, particularly among the most vulnerable communities.

(Rapid Hospital Needs Assessment Report – Mega-earthquake in Nepal, 2012)

Outbreak assessment

Nipping illness in the bud

The National Public Health Laboratory (NPHL) commenced its assessment of the post-disaster outbreak situation in May 2015. The objectives of the study was to predict and identify pathogens that could cause outbreaks—essentially a bid to locate the potential sources of diseases that had the ability to affect large groups of people and undertake appropriate measures to nip these in the bud.

In this effort, the NPHL surveillance system focused on water-, food-, air- and vector-borne illnesses:

- Water/Food-borne disease surveillance
  - Samples investigated: Stool, Blood, Water, Food
  - Diseases covered: Cholera, Dysentery, Typhoid, Non-typhoidal Salmonella, Rotavirus, other enteric/diarrheal pathogens
- Air-borne diseases surveillance
  - Samples investigated: Throat swab
  - Diseases covered: Influenza A, B, C
- Vector-borne diseases surveillance
  - Human: Blood, Vector (mosquito for pathogen identification)
  - Diseases covered: Dengue, Chikungunya

Table 4.1: Assessment results

S. No.	Sample type (number); N=360	Sample tested district*	Total district tested	Remarks
1.	Stool (n=59)	Kathmandu, Bhaktapur, Lalitpur, Dhading, Dolakha, Sindhupalchowk, Nuwakot, Kavre, Gorkha, Rasuwa	10	Rotavirus (n=2) from Kathmandu and Lalitpur; *Shigella dysenteriae* (n=1) from Sindhupalchowk; *Salmonella* spp. (n=1) from Dhading
2.	Water (n=230)	Kathmandu, Bhaktapur, Lalitpur, Dhading, Dolakha, Sindhupalchowk, Nuwakot, Kavre, Gorkha	9	- Overall 25% water samples potable - Bottled/Treated/Filtered water samples: 83% potable - Ground water (Well/Boring/Source/Raw water/Spring): 16% potable - Supply system water (Tap, Tank, Tanker): 13% potable
3.	Throat swab (n=52)	Kathmandu, Bhaktapur, Lalitpur, Dhading, Dolakha, Sindhupalchowk, Nuwakot, Ramechhap, Sindhuli, Solukhumbu, Makawanpur, Rupandehi	12	Influenza B (n=1) from Kathmandu
4.	Blood (n=3)	Kathmandu, Dhading, Gorkha	3	None positive for pathogens (*Salmonella* spp. n=2; *Varicella zoster*, n=1)
5.	Food (n=5)	Kathmandu	1	None positive for pathogenic bacteria
6.	Mosquito (n=11)	Kathmandu	1	None positive for Dengue virus

Source: NPHL, 2015

The PDNA

Need for a needs assessment

Countries around the world are vulnerable to a multitude of hazards and disasters, more today than ever before. This makes it crucial for detailed assessments to be carried out in times of crises, not only to guide and facilitate immediate humanitarian response to deal with perceived needs, but additionally, in the long run, to identify essential areas of intervention and to enable the construction of a more resilient system than existed in the past, based on the idea of "building back better."

It was with this in mind that the United Nations Development Program, the European Union and the World Bank had long stressed on the exigency of incorporating Post-Disaster Needs Assessments (PDNA) in Nepal as well. In 2008, the three had signed a joint declaration "committing to collaborate on a common approach to assessing, planning and mobilizing support for recovery to countries and populations affected by disasters."

The PDNA looks at four basic dimensions—infrastructure; service delivery; governance and risks—and tries to examine how these areas have been affected by the given disaster and how other vulnerabilities and risks can be assessed so that the country can put in place stronger mechanisms in the future. The government is meant to take the lead in this effort, with support from various agencies.

Essentially, there are four main elements to a PDNA:

- Pre-disaster context and baseline information
- Assessment of disaster effects
- Assessment of disaster impacts
- Recovery strategy to determine sector recovery needs

(Post-Disaster Needs Assessments, Volume A Guidelines, 2013)

The PDNA looks at four basic dimensions—infrastructure; service delivery; governance and risks—and tries to examine how these areas have been affected by the given disaster and how the country can put in place stronger mechanisms in the future

Health sector PDNA

The PDNA's section on health needs is categorized under the social sector and has been conceptualized around the six 'building blocks' of health systems as set out by the WHO: service delivery; health workforce; information; medical products, vaccines and technologies; financing; and leadership and governance. These are further linked to the aforementioned four dimensions of infrastructure, service delivery, governance and risks as assessed by the PDNA.

A PDNA for the 2015 earthquake

The National Planning Commission had taken the lead in preparing the PDNA following the 2015 Nepal Earthquake. According to the NPC, the production of the document—covering 23 sectors—had taken a month, and involved the input of over 250 national and international experts.

In terms of the results for the health sector, the PDNA had outlined that among the total public health facilities in the country, 19% had been based in the worst-affected 14 districts, and 23% in the 17 districts that were moderately affected. The report goes on to state that the total estimated value of disaster effects to the health sector was Rs 7.5 billion—approximately Rs 6.4 billion in damages and Rs 1.1 billion in losses—out of which, the share of the public sector is a staggering 81.5%.

The PDNA further notes: "as a result, the ability of health facilities to respond to health care needs has been affected and service delivery is disorganized. Consequently, vulnerable populations, including disaster victims, were further disadvantaged in accessing health services in remote areas."

In terms of a strategy for recovery, the report explains that the MoH has adopted a three-pillar strategy for recovery and reconstruction—the first or immediate term lasting until mid-July 2015; an intermediate term that comprised the fiscal year 2015/16; and a medium term running from the FY 2016/17 to 2019/20. The PDNA describes these pillars as follows:

> The first pillar is to furnish the districts with necessary logistics and human resources by mid-July 2015 to ensure follow-up treatment of those injured, resume health services, and enable the district offices and facilities to deal with foreseen risks and vulnerabilities of an immediate nature by providing necessary logistics such as drugs and supplies and a budget for preparedness and rapid response.
>
> The second pillar is to replace the temporary arrangements (for example, sheds or tents) with short-term arrangements to ensure the continuity of service delivery, cater to the changing pattern of healthcare needs, and provide routine services in an uninterrupted manner. This would also include demolition of damaged buildings, accomplishment of repair works and reinstitution of peripheral health facilities by setting up pre-fabricated structures. Similarly, work will be initiated for setting up of hospitals and rehabilitation centres, and strengthening of institutional capacity for disaster preparedness.
>
> The third pillar is chiefly focused on the reconstruction of the sector from a longer term perspective to build back better which would entail setting up of new physical health infrastructure. This will be done after carrying out a more rigorous assessment of the existing network of health facilities and their capacities giving due consideration to geography and size of catchment population. (PDNA, 2015)

Tuberculosis PDNA

Gains interrupted

Nepal has been at the forefront of a regional drive to eliminate tuberculosis. TB services have now been extended across the country and are presently being delivered through 4,221 treatment centers, 564 microscopy centers and 22 GeneXpert centers (NPC, 2015).

However, while significant leaps were being made in the effort to eradicate the communicable disease in terms of the coverage of and access to facilities, earthquakes in 2015 had caused notable disruption to the progress. So, in order to assess the degree of this disruption, the National Tuberculosis Center (NTC) had conducted a post-disaster needs assessment (PDNA) of TB programs in affected areas.

In line with the framework developed by the National Planning Commission, and that used by the MoH to develop its own PDNA for the health sector, the TB PDNA was developed. Subsequently, the NTC conducted assessments in 11 of the worst-hit districts, namely, Kathmandu, Lalitpur, Bhaktapur, Sindhupalchowk, Dhading, Nuwakot, Gorkha, Dolakha, Ramechhap, Rasuwa and Kavrepalanchowk. Data on damages and losses were collected and collaged and TB patients tracked—particularly drug-resistant (DR) TB patients—so as to identify the "post-disaster needs for reconstructing and rebuilding TB services with the broader concept of building back better".

According to the report titled *A Report on the National Tuberculosis Program: Post-Disaster Needs Assessment and Recovery Plan:* "The work accomplished by the assessment team has provided (i) analysis of the situation before the earthquake, (ii) a thorough assessment of damage and losses incurred following the earthquake and an estimation of the effect of the earthquake on TB services; and (iii) identification of needs for recovery and reconstruction in the intermediate, medium and long terms." This report asserts that a total of 151 DR TB patients and 2,411 male and 1,609 female drug-susceptible TB patients experienced varying degrees of disruption in their TB care.

> In the 11 most affected districts out of a total of 738 TB treatment facilities including administrative building, 340 (46%) (5 hospitals, 9 Primary Health Care Centers, 318 Health Posts, 2 Urban Health Centres and 12 private facilities) are completely destroyed while a total of 209 (28.3%) TB treatment facilities (204 public and 5 private) structures are partially damaged. Likewise, out of total 112 microscopy centers, 19 (17%) microscopy centers are completely destroyed while a total of 35 (31.2%) are partially damaged…..As a result, the ability of the health facilities to respond to the healthcare needs has been affected by the destruction and service delivery is disorganized. Consequently, vulnerable populations, including disaster victims, have been further disadvantaged in accessing health services in remote areas. A total of 1 DTLO, 7 Health Workers and 10 FCHW volunteers have lost their lives and 75 got injured adding further challenges in health resumption of services delivery.
>
> (TB PDNA, 2015)

Recovery plan

Just like the overall PDNA for the health sector, the TB PDNA also divides its recovery phase into three pillars: the immediate period that lasted until end of November 2015; the medium term (during FY 2015/16); and the long term (FY 2015/16 to 2019/20). Various interventions outlined in the report include the repair and rebuilding of damaged infrastructure, speedy resumption of service delivery and addressing of new risks, among others, all of which have been spread across the above-mentioned three phases of recovery.

While significant leaps were being made in the effort to eradicate TB in the country, the earthquake caused notable disruption to the progress. In order to assess the degree of this disruption, the National Tuberculosis Center conducted a PDNA of TB programs in affected areas


WHO

5. From response to recovery: Moving forward

In the period immediately following the earthquake, the Ministry of Health was primarily focused on providing treatment to the injured and resuming basic healthcare services as quickly as possible and with whatever means were available. We discuss below some of the health sector's key efforts during the response phase and the challenges that accompanied them.

Rent or tents

Since initial assessments had relied disproportionately on verbal communications, there were many instances of misreporting, leading to an unfortunate loss of time and resources. And in circumstances like these, when information had become exceedingly unreliable, the MoH, reeling from the damage sustained by health facilities around the country, had the difficult task of finding appropriate spaces from which to deliver health services—either through tented facilities or by renting buildings that had not yet been damaged. However, since renting structures was not always possible, particularly in hard-hit rural areas where both public infrastructure and residential buildings had not been spared by the disaster, the MoH had to resort to providing medical tents and hospital tents that would work to offer a range of services—everything from birthing to outpatient services. This was good enough for the short term because these temporary arrangements at least ensured continuity in service delivery, and allowed some protection from the elements.

Digging for details

Detailed engineering assessments were to follow in later months, based on comprehensive surveys carried out by engineers that illustrated the actual damage status of health facilities, types of damages incurred and other information. The study was so in-depth, it even inventorized the kind of cracks that were seen in structures—42 altogether, including their length, width and photographs. The findings were collected in a report and uploaded online in real-time. Also useful was open-source software such as the Covert toolbox. Engineers would use their mobile phones and tablets to take pictures, which would be sent to a central system using a cloud-based server. They would then get immediate feedback from experts on whether the photographs would work or whether they needed to retake them.

The essential utility of the report was in the way it revealed how accessible an affected area was, the condition of the roads leading to it—including the width and whether they are pliable all year around—the status of skilled manpower, and the consistency of electricity and water supply in the area. However, the assessment only covered those health facilities that were based in buildings that were owned by a person or organization; records are not available for

The MoH had the difficult task of finding appropriate spaces from which to deliver health services in the wake of the earthquake—either through tented facilities or by renting buildings that had not yet been damaged

TABLE 5.1: TYPE OF STRUCTURE NUMBER OF HFS TO BE CONSTRUCTED

Type of structure	Number of HFs to be constructed
Pre-fabricated structures	248
Semi-permanent structures	36
Shelters	12
Repair/maintenance	39
Permanent structures	13

Source: PDRF, 2016

others that were located in schools and VDC buildings, aside from a few exceptions.

No land for health facilities

The Post-Disaster Recovery Framework (PDRF)'s section on the health sector notes the lack of land owned by health facilities as a major impediment in reconstruction work. Since many facilities, especially sub-health posts, were operating out of VDC buildings or schools, they had no land of their own for use in reconstruction—and such spaces had to quickly be identified and acquired. "The updated data from the assessment showed that many of the facilities had already acquired land, or at least were in possession of usage rights for public land. This information was used to prioritize building and for assigning the reconstruction of facilities to different organizations: facilities with confirmed land ownership were given highest priority, followed by facilities with usage rights on public land," the PDRF states.

Under reconstruction

The PDRF's section on the health sector envisions that the type and number of health facilities will have been reconstructed by 2016 (see Table 5.1).

While works are currently ongoing to meet the above targets, the border blockades have caused significant delays. In fact, the unavailability of fuel and other essentials has set the reconstruction work back by over four months. The PDRF has also made plans for the following structures (see Table 5.2) to be constructed in the next five years following reconstruction of damaged health facilities.

TABLE 5.2: RECONSTRUCTION OF DAMAGED HEALTH FACILITIES

Type of structure	Number of HFs to be constructed	Unit cost, approx. (NPR million)
Prefabricated structures	256	
• Type I (covering > 5,000 population)		6
• Type II (covering < 5,000 population)		4
Permanent structures	888	
• Primary Health Care Center		36
• 15-bed hospital		60
• 30-bed hospital		90
Repair/maintenance of buildings	643	0.3

Source: PDRF, 2016

NEPAL
Earthquake 2015

Medical Camp Kits

World Health Organization
Regional Office for South-East Asia

MCK (Medical Camp Kit) Nepal 2015

Male ward

24 m²

Female ward

24 m²

Per Ward:
- **6** x mattress
- **1** x fan
- **2** x bulb
- **2** x mobile partition
- **1** x extra tarpaulin + ropes

Toilet Toilet

2 x toilet slab
+ tarpaulin
+ ropes

Staff room

24 m²

- **4** x mattress
- **1** x fan
- **2** x bulb
- **2** x mobile partition
- **1** x extra tarpaulin + ropes

Power storage
Solar panel = **100** watts
Battery = **200** amps

Consultation room

42 m²

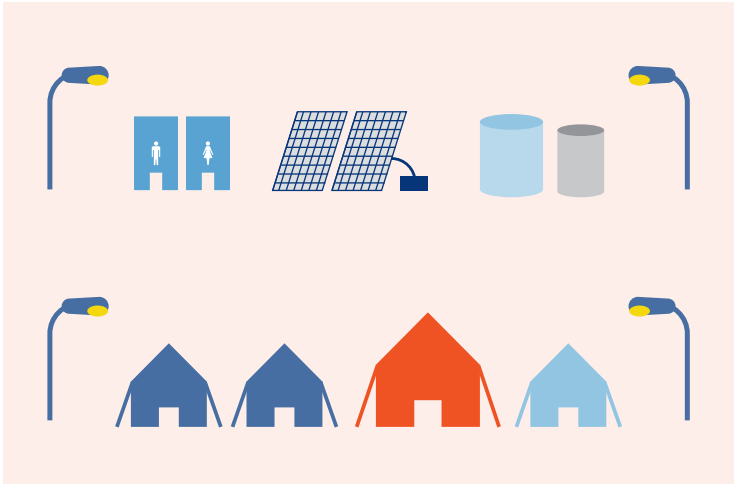
Interagency Emergency Health Kit essential medicines and supplies

- **15** x hygiene kit
- **1** x solar refrigerator
- **2** x table + **3** x chair
- **1** x autoclave
- **1** x mattress + pillow
- **2** x fan
- **2** x bulb
- **1** x stationary kit
- **1** x extra tarpaulin + ropes

1x Water tank

1x Waste pit

250 to 300 m² surface required for MCK operations



Partners supporting MoHP with WHO on MCKs

- AmeriCares
- FairMed
- IOM
- UNFPA
- UNICEF
- WFP

Design: www.infonauts.in


WHO
OHA

6. Build on history: Lessons learned

Reinforcing readiness

Walk the talk

Predictions have been rife for the past year or so regarding potential future earthquakes in the country, and there really is no better time than the present for the Ministry of Health to ramp up its readiness for the next crisis. Compiling an overarching report on the activities in this recent period—with particular attention to what measures worked and what could have been done better—is perhaps a crucial first step in documenting the response efforts and enriching institutional memory, so that regardless of whoever happens to be in a position of authority at a later date, they would at least have a point of reference by which to make informed decisions. But clearly, more is to be done, and given the pace at which preparedness is proceeding, there is reason to be concerned. Because the next time disaster hits—considering the beating already taken by health systems and infrastructure in this last one—the devastation could very well be much worse and recovery much more challenging than we have so far witnessed.

Mapping resources

It is essential to be aware of the availability and capabilities of different actors. All supporting partners of the MoH and other government agencies boast distinct expertise and resources and these need to be mapped thoroughly. This could be achieved, for instance, by employing the four Ws—who, what, where, when—although there are suggestions that this approach should be revisited: during a Lessons Learned conference, participants had noted that there need to be more standard definitions, for example, of what the term "activity" encompasses: some agencies were reporting small activities while others were focused on large-scale, strategic efforts.

Standards to abide by

The importance of having a Standard Operating Protocol in place to guide the functioning of the MoH during a disaster cannot be overemphasized. It should be part of a national-level arrangement and should incorporate discussions on a wide range of issues, including the easing of the finance and procurement processes, among others.

More medical tents

In light of the fact that the MoH has yet to conduct a full-fledged assessment of the status of health facilities across the country and gauge their capacity to withstand another earthquake as they stand today, the very least that can be done is to ensure the availability of more medical tents for these institutions. Similar to how the medical camp kits provided by the WHO following the earthquake functioned, these would prove exceedingly helpful in giving continuity to basic healthcare delivery and treatment of the injured until the reconstruction process reaches a conclusion.

Compiling an overarching report on the activities in this recent period—with particular attention to what measures worked and what could have been done better—is a crucial first step in documenting the response efforts and enriching institutional memory

Drills and simulation exercises are among some of the most vital components of disaster preparedness. It would be ideal if these exercises had the participation of not just health professionals but also non-health staff and members of the community, so that when adversity strikes, everyone can contribute to the relief efforts

Resilient buildings

The sight of cracked and damaged health facilities during the 2015 earthquakes was a wake-up call for the sector. What was particularly distressing about the level of destruction suffered by the buildings of such institutions as the Chautara District Hospital in Sindhupalchowk, the Khimti Primary Healthcare Center in Dolakha and the Aru Chanaute PHC in Gorkha, to name a few, was that these structures had only recently been built and were deemed to be 'earthquake-resistant'. Not only is there a pressing need to investigate such incidents and bring those guilty of such erroneous claims to book, but it also could not be clearer that there is no alternative to boosting resilience than by strict adherence to building codes and undertaking of intensive retrofitting efforts.

Home away from home

Aside from the main buildings, the staff quarters in many hospitals also suffered considerable damage in all worst- and moderately-affected districts in the last earthquake. It is necessary to ensure that these housing facilities are made resilient as well, especially in districts outside the Kathmandu Valley, where there might be a considerable number of health workers who rely on such quarters. Resilience of living spaces would further translate to a strong workforce that is able to promptly attend to patients in both normal circumstances as well as emergencies.

Reliable referral mechanisms

Poor referral mechanisms can cause several issues: for one, health workers end up struggling to determine where to send patients in case of complications, thereby wasting precious time that they simply cannot afford to lose; secondly, for patients who have been evacuated, it becomes difficult for families and health workers to locate them later on. In fact, some said it took months before they were able to contact the person in question and take stock of their health conditions. It is therefore imperative that the MoH invest in developing a more strengthened referral system that both eases the burden on health facilities by redistributing patients and keeps necessary track of patient movements.

Steady supply of electricity and communication

There are few things as essential as uninterrupted supply of electricity and functional communication channels during a disaster. But when these are affected, as happened in the Kathmandu Valley and other areas in last year's crisis, there should be alternatives already in place, such as solar power, or very high-frequency and ultra-high-frequency means of communication, among other examples.

Drills, drills and more drills

Regular drills and simulation exercises are among some of the most vital components of disaster preparedness. But it would be even more ideal if these exercises had the participation of not just health professionals but also non-health staff and members of the community, so that when adversity strikes, everyone can contribute better to the relief efforts. This is also the first step in establishing Community Rapid Response Teams in each locality to act as first responders and provide basic medical assistance in the immediate aftermath of disasters until professional help arrives.

Follow up and monitoring

Although the rescue and treatment work done by health facilities in affected areas, under the Health Emergency Operation Center's coordination, was commendable, there appear to be no monitoring mechanisms in place to follow up on either the activities undertaken or the resources that were deployed. And, in a

sign that lessons learned have not been taken to heart, there is a similar neglect of such mechanisms in the ongoing reconstruction process as well, with concerned divisions simply unable to keep track of updates.

Lessons in information management

The primacy of data

It is clear that few components proved as crucial as the proper collection, management and use of information during the disaster. The 2015 earthquake provided some valuable lessons when it came to the importance of proper information management, lessons that are bound to be key in planning for an improved response in the future.

Preparedness in data management

In the course of dealing with the disaster, it soon became strongly apparent that the country's level of preparedness in terms of data management was stunningly low. A vivid instance of this is the fact that the need for an information unit was realized four days after the event—such a unit should have already been in place and activated immediately following the quake, and action taken based on whatever preliminary data the unit would have been equipped to collect.

Although the MoH does have a Health Management Information System (HMIS) set up as its information wing to collect data relevant to health services, which is then analysed and presented in the flagship Annual Report of the Department of Health Services, no disaster-specific iteration has been installed. During crises, each unit of the MoH switches to emergency mode, and it was as part of this process that the role of the HMIS was shifted to the HEOC. The HEOC had then remained the central body in the health sector's overall response, including the task of information management.

It is, however, still unclear whether the expertise of the HMIS over its years of functioning was employed in any way while collecting data from the districts. The lines between the HEOC and HMIS appear to have blurred even further as the country moved from the immediate relief phase to that of recovery and reconstruction. Who then should be vested with the responsibility of handling the information collected? Who should analyse the data and produce findings and recommendations? These questions remain unanswered.

Recommendations:

- A standard data-collection format should be immediately developed, based on the reflections of those professionals and experts who were involved in gathering data during the latest disaster. The format should be finalized as soon as possible and thereafter posted online and dispatched to all districts.
- Districts and their subordinate units should then review the format developed at the center and localize it according to various contextual factors, so that it becomes the public health system's sole standard reporting mechanism. When adversity strikes, this format should be adhered to.
- Concerned authorities must also remain alert and take action immediately following a disaster so that we might avoid the kind of disorder that we witnessed in the initial days of last year's quake. Every health station should be given a standard code, and their Geographic Information System (GIS) location made readily available in emergencies so that interventions are not delayed. During the April 2015 crisis, a reported two-week period was spent in deriving GIS locations for these stations, resulting in massive

A standard data-collection format should be immediately developed, based on the reflections of those professionals and experts who were involved in gathering data during the latest disaster. The format should be finalized as soon as possible and thereafter posted online and dispatched to all districts

delays in dispatching support.

- The emergency units at the district and central level should have proper records of their staff members with details regarding their allocated duties so that manpower can be efficiently mobilized when the need arises.
- Work related to developing a central database of health professionals, including doctors, nurses, paramedics and other public health officials, should be expedited. An emergency ID card should also be issued that is valid across the country, regardless of geographical region or health institute—this could help in the effective delivery of services in times of duress.
- A mobile application for standard reporting should be developed which can be used during disasters to store the data and sync it to the national database once connected to the Internet. A pilot study on the feasibility and workability of such a program should be conducted as soon as possible.
- Technical preparation also warrants attention: the network must be reliable and accessible to enable information collection in any situation. For this, the MoH should have a Memorandum of Understanding with telecommunication companies to set up emergency communication systems. Even if all VDCs cannot be thus connected, each district can at least be divided into four or five clusters where the necessary technical mechanisms are installed to link them to the rest of the world. It would be wise to make these changes before the next disaster takes place.
- Collaboration with telecom companies could additionally include creating a database of mobile numbers of all health workers, so that their duties can be communicated to them during emergencies. While data must be shared with all concerned authorities, reporting should be limited to the HEOC.

Although more than two years has passed since the April 2015 earthquake, as far as preparedness for a similar disaster down the line is concerned, very little has actually been achieved. There is the individual learning among health professionals who worked during the disaster and who are well-aware of the nitty-gritty issues and necessities, but unless such learning is systematically recorded, there is a high chance it will soon be forgotten. At this point, however, efforts at such record-keeping are practically non-existent, and no initiatives have so far been under taken to encourage further coordination and networking among agencies involved in responding to the recent quakes.

A one-door policy

Need has also been felt for the development of a two-tier information collection system—first at the district and then at the central level. In the districts, the District Health/Public Health Offices should rely on the standardized format for data collection, which can later be either directly or indirectly submitted to the center. The central level should then proceed to disseminate the information across all relevant components of the concerned sector.

Conversations with district health officials and health professionals indicated that they had spent quite a bit of time over the last year disseminating information to various government and non-government agencies. They complained that the process had been somewhat frustrating because of how they were compelled to repeat the same facts and statistics over and over again for the benefit of different entities, and how it would have been

far more efficient to have the information in one place for all to refer to.

Recommendations:

- A centralized data unit should be established in the districts that can then pass on necessary information to security agencies involved in rescue and relief work. Furthermore, data-management sub-units or clusters should be formed within the subordinate bodies of the districts for even better management of information.
- The HEOC, following its activation, should be the only focal body at the center for the dissemination of data. This would prevent health workers from having to spend time providing information and allow them to focus instead on treatment of victims.

All lines down

Nepal was fortunate in that at least all communication channels had remained intact following the quake and people were able to get in touch with one another soon after. This was also how health officials at the central and district levels had managed to come together almost immediately. But given how Nepal is situated in such a seismically-vulnerable region, and scientists continue to assert that the April 2015 earthquake was not the 'big one' they had long been expecting and that there might be another one in the pipeline for the country, it is important to consider what might happen in the event of a disaster massive enough to bring down mobile towers and other communication apparatus. What if these remained functional but electricity supply were disrupted? How should the health sector prepare for such a scenario?

Recommendations:

- Since voice calls tend to clog up the network system during disasters, texting is far more resilient and reliable, consuming as it does a lesser volume of data. Even more resilient, in case Internet and data remain operational, would be other modes of communication such as Viber.
- A professional health data-collection and analysis team should be in place that can be mobilized immediately when required. In the absence of such a team, information management becomes more cumbersome and time-consuming, ultimately affecting the disaster response. A close coordination with the Central Bureau of Statistics is essential to train these personnel to be of use during disasters.
- There should also be a structured MoU between the Ministry and other government agencies to facilitate data-sharing during the disaster. In addition, the standard format for data collection should also be made readily available.
- A three-phase reporting system should be developed and followed in earnest: the critical phase, i.e. immediately after the disaster; the next phase coming a week after, where an expert team is mobilized to get detailed information; and the final phase to follow in a month's time where evaluative data on what worked and what did not work is collected. This kind of phase-wise system would produce a decent picture of the overall state of affairs.

Lessons in logistics management

Essentials at the ready

A reliable supply of logistics, including drugs and other medical goods, is indispensible insofar as the effective treatment of patients injured in disasters such as earthquakes is concerned. The statement "buildings, not

Most health facilities and officials had failed to visualize and plan for the sheer mass of casualties that would follow the quake…. The fact that even the LMD itself did not possess any prepositioned stock speaks volumes of the quality and extent of preparedness on their part

An immediate review of the drugs and other essentials that are actually required in the event of a disaster is warranted. Such a review would lead to a standard list of necessary drugs and health items, which should then be made easily available

earthquakes, kill people" rings very true in these scenarios, a reference to the high number of trauma cases that dominate the aftermath of such events, where falling debris and other materials can cause serious injuries. And in circumstances where there are so many awaiting treatment, a consistent flow of medical supplies is crucial.

One of the perceived obstacles in the area of logistics during the last earthquake was in arranging for shelter and warehouses, as well as a lack of proper inventory management. However, despite the problems faced in this regard, very little has been presently done in terms of rectifying errors in preparation for similar events in the future. The fact that so little initiative has been taken when it has been over a year since the disaster indicates a dangerous reluctance to institutionalize lessons learned.

Sparse stocks

Except for a few hospitals in some areas, most health facilities and health officials had failed to visualize and plan for the sheer mass of casualties that came knocking on their doors following the earthquake. They either had no stocks of drugs or stocks that were just enough to cater to less than 30 people, which had been maintained with an eye towards the regular road accidents that take place around the country and injuries sustained therein. For a disaster of such a scale as that which occurred last year, however, preparation was dismal. The fact that even the Logistics Management Division within the Department of Health Services itself did not possess any prepositioned stock meant for such a massive event speaks volumes of the quality and extent of preparedness.

Recommendations:

- Every major hospital should maintain adequate stocks of essential medical items—in the case of national-level and other designated institutions, these stocks should be enough for at least 1,000 patients. This might seem an inordinately high number, but this would further ensure the hospital does not have to suffer shortages even in normal times. It would, however, help if a checklist could be kept so as to identify drugs that are close to expiry and those that are not to be used until replaced by a fresh batch. This stock should be regularly monitored by the MoH and the DoHS.
- For district-level hospitals, the stock capacity should be enough to cater to around 500 patients, while PHCs and health posts should look to serving 300 patients with their stocks.
- A detailed assessment of items that are truly essential should be carried out by the districts and the center so as to avoid confusion and conflict later on. The resultant lists should then be prioritized during the procurement process—whether annual or otherwise.
- In several hospitals, despite possessing the necessary stocks, these ended up being buried under debris. In fact, even structures built under the aegis of the Department of Urban Development and Building Construction—purported to be earthquake-resistant—were found to have collapsed or been damaged. So, while it might take some time for the Ministry to assess health facilities all around the country and determine what can be done better, one immediate step could be to support the facilities to build separate rooms or spaces that can withstand earthquakes and other disasters, so that the stocks may be safely stored for use in emergencies.

- The Procurement and Supply Management contingency plan should be readily available and a list of potential logistics suppliers at the ready.
- The Department of Drug Administration should maintain a more accessible database of drug stores, mapping them carefully so that during disasters, they can make it mandatory for the stores to make their goods available. The DDA should also ensure strict action against those stores that refuse to cooperate.
- The humanitarian staging center on the premises of the Tribhuvan International Airport must be in possession of all necessary health and logistical items. This would be an ideal place to keep the goods since proximity to the airport means that it would be easier to ferry items to affected districts when required.

Fine-tuning the list

In the absence of a standard list of drugs and other medical essentials that the country would need in a disaster, the support that it received from various quarters had soon become overwhelming. Much of the materials coming in was useful, no doubt, but there was also plenty that did not fit the requirements of the hour—making it difficult to separate the wheat from the chaff. In fact, the LMD is today still struggling to dispose of some of the drugs that came in during the earthquake.

Recommendations:

- An immediate review of the drugs and other essentials that are actually required in the event of a disaster is warranted. Such a review would lead to a standard list of necessary drugs and health items, which should then be made easily available to stakeholders. And when disaster strikes, all concerned officials can simply refer to this document and prioritize their actions accordingly.
- The list should be circulated to other government agencies as well, including the Ministry of Home Affairs and the Customs Department after briefing staff there on the value and use of the document.

Beyond outbreaks

Disaster preparedness has to do with more than just planning for disease outbreaks. While the Epidemiology and Disease Control Division does allocate some amount ranging from Rs. 100,000 to 300,000 to respond to any outbreaks, very little of this sum is used in actual preparation. A need has thus been felt to review the drugs that are prepositioned to halt outbreaks and to include more components of emergency drugs.

Recommendations:

- Funds meant for controlling outbreaks should be more flexible, and a national protocol developed whereby, during emergencies, funds can be channelized for other, more relevant, purposes.
- A pool-fund mechanism could be established for logistical procurement and preparedness.
- There needs to be strong store-management arrangements and expertise in handling inventory records and documentation, along with a logistics-delivery system that is more receptive to prompt dispatching.

Overwhelming gifts

Donations of drugs and other health-related items from foreign nations proved both a boon and a bane for Nepal during the recent earthquake. While the arriving supplies certainly helped ease the flow of medical necessities within the country, and were

crucial in being able to reach the most remote areas, on the other hand, the haphazard piling up of drugs, particularly stemming from the waiving of custom fees by the government, at a time when there was little idea of what the needs of the country really were, created massive inconveniences. There were countries that were found to be 'dumping' drugs here, medicines that were either already past their expiry date or so close to it that they would have been useless in the time it took to get them to the designated districts.

Political interference also proved something of a hindrance. Student unions, for instance, were demanding huge quantities of drugs for health camps, and there were many people who were keen to use their political clout to gain advantages, and were found muddling matters at the LMD.

Recommendations:

- As previously mentioned, a standard list of essential drugs and medical items would help narrow down the needs of the country and set priorities accordingly. This list should be immediately publicized across the globe within the first 24 hours of a given disaster to serve as a guide for potential donors. This would help mitigate unwanted donations.
- The requirements, laws and practices of the country should also be similarly outlined in clear detail. For example, there was such an over-abundance of tetracycline antibiotics—used to contain cholera, among other illnesses—after the earthquake that much of it went unused. And fixed-dose combination and combipack medicines had also been supplied by foreign donors, which are not used in Nepal.
- Although voluntary initiatives looking to offer support, such as through health camps in affected districts, were admirable, they were not always aligned with the actual needs of the communities. For student unions and other bodies, such needs should have been based on the recommendations of the DPHO/DHOs.
- Political interference in such matters should be thoroughly discouraged.

Unscientific demands

There were many times when the demands made for the districts were simply not based on proper assessments or evidence. Cases existed where the same drugs were being requested for each day, at increasing amounts, but it was not clear from the reports at the MoH where exactly these were being used. Such unreasonable demands were seen mainly in the case of iron tablets and Oral Rehydration Solution (ORS) packets.

Recommendations:

- Requests for drugs and other materials should be based on needs, to identify which it is important to have a strong information system in operation. Developing digital-reporting mechanisms could prove helpful in this regard, allowing districts to set out clear requirements and demand logistics accordingly.
- Items sent from the center should be properly documented, and files reviewed before a new consignment is sent the next time.

Better-equipped health offices

The very fact that health facilities around the country have to rely on the central level for the most minor forms of assistance is proof of the drawbacks of the centralized system of governance in the country. This can have significant impacts on service delivery at the ground level—for instance, there might

be times when the chiefs of health offices are reluctant to take bold decisions for fear of reprisals from the center. It is therefore essential that efforts be made to enhance the capacity of local-level health authorities in terms of procuring and utilizing logistics.

Recommendations:

- The DPHO/DHOs should have the autonomy to utilize allocated funds and procure logistical items based on their own perceived requirements.
- Although reporting their needs to the center is necessary to enable proper database management, the center—having allocated the funds—should allow the districts to manage their issues locally. Oftentimes, there are significant delays when the center attempts to address district-level problems, and there is also a negative impact on the sense of ownership of local officials over such efforts—which could have latter repercussions on the public and other beneficiaries.
- The MoH should be involved in international cooperation and in managing support instead of directly dealing with sending individuals drugs and other items.
- Many hospitals and health facilities around Nepal were found turning to locally-available resources in the treatment of patients—such as the use of plywood and bamboo-made items as immobilizers and for other purposes. These kinds of exercises in self-reliance should be promoted.

Lessons in human-resource management

The right people in the right places

The workforce represents a core building block of any health system, and disasters such as the one Nepal faced in 2015 is the ultimate test of the strength and quality of human resources. In the April earthquake, while the size of the health workforce was more or less adequate, it was in the management of said workforce that problems arose.

Tracking personnel

The MoH had great deal of trouble keeping track of its human resources—officials were not entirely sure as to who was on duty, who was on leave and who was attending training programs or workshops. What this amounted to, firstly, were complications to do with the redistribution of personnel: the MoH could have rerouted human resources from other none-affected districts to those where the workers were most needed, but was unable to do so owing to the absence of a comprehensive database.

Recommendations:

- A central database on Human Resources for Health (HRH) should be developed immediately, one that is put through periodic reviews so as to keep it updated on transfer of staff and other potential changes. The database needs to be circulated across the country. Each DPHO and DHO should also have its own HRH database, maintained as a fundamental component of preparedness.
- The data should be carefully mapped and represented in a visually-striking form so as to give officials a better overall picture when planning a response to an event.
- All personnel should be provided a nationally-valid identification card specifying their capabilities so that their skills can be put to good use wherever they may find themselves at the time of a disaster.
- The database should be further utilized in facilitating appropriate redistribution of human resources from less-needy to more-needy areas. Even among the 14 most-affected districts

A central database on human resources for health should be developed immediately, one that is put through periodic reviews so as to keep it updated on transfer of staff and other potential changes. The database needs to be circulated across the country

Health facilities should conduct drills and simulation exercises related to mass casualty management and trauma management at intervals of around four years …. Though the MoH should provide seed money to begin the program initially, the resources for these exercises should eventually be generated locally as far as possible

in the last earthquake, there were some districts that had witnessed relatively less pressure on their health systems and whose professionals could have had much more impact had they been deployed to other districts where health facilities were being overwhelmed.

Contingency planning

It is now more or less clear that preparedness activities prior to the earthquake were heavily focused inside the Kathmandu Valley and other major centers. In most districts, the headquarters alone appear to have had some preparation mechanism in place, but areas beyond the headquarters were not equipped to deal with a large-scale disaster. Such disparity in prioritization is unfortunate.

What is more, a majority of these facilities around the country that were affected in the last quake have still to take any concrete measures to prepare for the next such event. So much so that some are yet to develop any contingency plan or conduct a single simulation exercise or drill. While respondents expressed a keenness to take part in such exercises, in most cases, they were not exactly sure where to begin.

Recommendations:

- Every health facility should have its own contingency plan in place, in line with the district disaster plan. Once this plan has been prepared, the hard copy should be stored alongside the stock of emergency drugs. It should also be made available in the form of an application that can be installed by all health officials on their laptops and mobile phones.
- The major tasks and allocation of duties as envisioned by the contingency plan should be printed onto a large flex and pasted on a billboard somewhere in the premises of the different health facilities so as to raise awareness among personnel regarding their respective roles and responsibilities. This is a particularly important recommendation in light of how many health professionals said they had difficulties locating strict guidelines to follow when dealing with health cases during the crisis, and had to therefore rely on their 'intuition'.
- Health facilities should conduct drills and simulation exercises related to mass casualty management and trauma management at intervals of around four years. For the first round of exercises, the center should deploy teams to facilitate the process and provide training of trainers (TOT). Thereafter, local health officials will be responsible for conducting the drills on their own. Though the MoH should provide seed money to begin the program initially, the resources for these exercises should eventually be generated locally as far as possible.
- Doctors and health professionals who worked in health facilities in affected areas during the quake, upon their transfer, should present a written document of their experience of the crisis, along with recommendations on how they might be able to work more effectively in case of future disasters. This would, on one hand, improve communication between the health facilities, and, on the other, set a positive precedent for building institutional memory within the sector.
- The initially-conducted drills and simulation exercises should involve all staff members of the health facilities, including non-health personnel. Later, when all staff members are fully trained, the exercises should be extended to the wider community, for instance, through

youth clubs and schools.

- The drills and exercises should be made part of the medical curriculum with special emphasis on trauma management. This is of particular importance because doctors who pursue their MBBS degrees under government scholarship have to compulsorily work in remote districts for two years. And though they might be the chief of the PHC, many doctors are not well-versed in trauma care and managing mass casualties, which could put their often-large dependent populations at great risk should a disaster strike.

Patching a perilous rift

The MoH has provisioned that any hospital with over a 50-bed capacity can function as an autonomous entity, whereas those with 15- to 25-bed capacities should work in conjunction with the DPHO/DHO. In districts where the former situation applies, there is often a miscommunication between the two entities over the sharing of resources, such as was visible in Gorkha and Dhading during the recent emergency. No such issues, however, were reported in districts where the DPHO/DHO were in control. The rift, according to respondents, is primarily owing to parallel rankings created at the hospital and health offices—such as chiefs who often bear the same gazette positions. This unhealthy competition between the two is said to have hampered service delivery and brought on a reluctance to work together, even during a humanitarian crisis.

Recommendations:

- The MoH should work to resolve the issues between the district hospitals and health offices. One way could be by allowing the DPHO/DHO chief to function as the leader of the health cluster, commanding other units or sub-units, including the hospital, during emergencies. This would be appropriate because having been in charge of a whole network of health facilities in the district—including other lower-capacity hospitals, PHCs and health posts—he or she would be far better-placed to take district-level decisions and mobilize resources compared to the chief of the hospital, whose expertise is largely confined to the walls of his or her institution. When the crisis period is over, everyone can then return to working independently.
- Though some district hospitals might have been upgraded owing to the number of beds they have, most of these 50-bed institutions do not meet the government's set standards, with services that are not much improved compared to when they offered only 25 beds. There is thus a sense that the upgrade has been superficial. These hospitals need to be better equipped so that in case of another disaster, they are able to care for patients on their own, and lessen pressure on the specialty centers.

Assembling rapid responders

The presence of CRRTs means having people on the ground to handle things in the crucial first few hours of the disaster, and such teams certainly showed their worth in the recent earthquake, playing a major role in rescue operations. In the days that followed, they also proved key in reporting information to the district and in areas such as health promotion.

Besides CCRTs, a National Rescue and Response Team could also prove invaluable in the immediate aftermath of a disaster—particularly given how experts have been predicting yet another earthquake, this time

There were occasions where I-EMTs that had been deployed to a certain district had to return either because they had found other I-EMTs already based in the area or because the services they were offering were just not needed in the given community

in Western Nepal, where health systems are particularly weak. Creating regional-level expert medical teams, for instance, would be a prodigious move at this point.

Recommendations:

- All districts should assemble their own CCRTs, providing these with special trainings so that they are able to leap right into action when a disaster hits.
- In addition, basic first-aid training should also be imparted to as many members of the community as possible.
- Although the formation of Search and Rescue teams might fall under the jurisdiction of other government agencies, the MoH can still take the lead by forming its own expert medical team, similar to International Emergency Medical Teams. The team would be equipped with all the necessary medical equipment and modeled initially on Type-2 facilities, eventually graduating to a Type-3 facility if possible.
- Such teams should be formed on a regional-level for now, and later, on a provincial-level.
- The Regional and Sub-Regional hospitals should also put in place such teams so that response can be made more effective.

Reward and punishment

While much debt is owed to those health personnel and other staff who worked round-the-clock throughout the crisis to serve the needs of the public, there was a feeling among many workers of not receiving due credit from the MoH's side. Although those who had shirked their responsibilities were taken action against, it is also crucial to incentivize those who did fulfill their duties by making more of an effort to acknowledge them.

Furthermore, the performance of health workers who have been serving in the same place for a considerable amount of time should be assessed. Some respondents believe that a long-term stay like this can lead to stagnation of both service and staff quality.

Lessons in management of I-EMTs

Making the most of external help

There is little question that I-EMTs can play a vital role in disaster response, thanks to the mix of skills and expertise they bring to the table, stemming from their diverse experiences with similar events the world over. Their ability to quickly assess and respond to needs arising during a crisis makes them particularly valuable to resource-constrained countries like ours. Of course, that is not to say all I-EMTs are alike: though there are some who offer crucial treatment options that are not available locally, others might peddle only basic services that the host country might not necessarily need, while still others could be more interested in partaking in disaster tourism than providing medical assistance. But the fault does not lie entirely with the I-EMTs—the ability of the host country to plan and manage I-EMTs is just as important, if not more, than the capacity and focus of the I-EMTs themselves.

Need-based response

The MoH and its subordinate bodies had struggled to fully grasp post-quake conditions thanks to the absence of reliable information channels and preparedness programs. So when the I-EMTs began arriving in the country in droves, officials were easily overwhelmed. There were several occasions where I-EMTs that had been deployed to a certain district had to return to the Ministry either because they had found other I-EMTs already based in the area or because the services they

were offering were just not needed in the given community. These issues testified to the dearth of communication between and within the Ministry and other agencies.

Recommendations:

- There is need for a strong information mechanism (refer to Lessons in Information Management for further details) that would help the MoH to clearly outline the kind of support that is needed following a disaster, which should then be placed in the public domain, after consulting with various agencies. Needs and priorities might change in time, but the file and format could at the very least serve as reference material for officials in the future.

New strength to the NMC

The Nepal Medical Council (NMC) is responsible for the verification of all foreign teams offering assistance. However, it was clear in 2015 quakes that this government body had little idea of what protocols and procedures should be followed in such a situation. The verification was therefore done on an ad-hoc basis, and there was no attempt at cross-checking the many doctors and paramedics entering the country. Although no untoward incidents have been reported as a result of that, the MoH cannot risk handling I-EMTs in a similar fashion come the next disaster.

Recommendations:

- The NMC should be made part of all the HEOC and the MoH's preparation and planning activities. The council should also work on developing an SOP to apply during crises so that I-EMTs and the expertise they offer can be effectively verified and deployment arranged accordingly.
- The NMC is also in need of a sound database of all experts and doctors available in the country, a task in which it could solicit the support of the MoH. The Council should also be involved in designing and facilitating the issuance of a standard identification card to all health professionals.
- The NMC should open up more to information technology and try to incorporate digital tools in its activities as far as possible.
- The NMC should strive to maintain close contact with all of the medical regulatory bodies in countries from where the I-EMTs originate, or at the very least with the central agencies responsible for deploying these I-EMTs. This would help bridge the communication gap somewhat, and allow the NMC and MoH to collaborate on a detailed reporting format to be used in case of future emergencies.

Envisioning an Emergency Medical Team Coordination Cell

Many of the health sector's working procedures and the few preparedness measures that were in place were simply unable to predict the kind of in-flow of I-EMTs that occurred after the earthquake. This just goes to show how our policymakers had neglected to take heed of international practices and lessons, and instead, decided to formulate policy based solely on their own experiences. Such policies that are formulated without adequate literature review are doomed to miss out on major features, proof of which can be found in the lackluster SOPs developed for the HEOC.

Recommendations:

- An Emergency Medical Team Coordination Cell (EMTCC) should be activated for the purpose of

Reviewing the performance of I-EMTs is an absolute must. A checklist could be developed for this purpose, complete with tangible indicators and outcomes that would make it possible to gauge the quality and relevance of their work

managing I-EMTs, and this should come to comprise a major component of the HEOC.

- FMT activities following the quake is presently being reviewed by the Nepal Health Research Council, but the findings are yet to be made public. The MoH should request that the NHRC present the report as soon as possible so that discussions can be held and an action plan developed.

Lost in translation

Language remains a major barrier for I-EMTs, as was seen after the earthquake in 2015, where many of the teams had to hire translators and interpreters to ease communication with patients. And when there were teams such as the Royal Bhutanese Medical Team, whose members could speak Nepali, the diagnosis and treatment process were found to proceed more smoothly. Communication is thus vital, not just so medical personnel can assess what the problem is with a given patient, but also to give patients and their relatives a valuable sense of confidence in the treatment being administered.

Recommendations:

- The MoH could put on standby a pool of translators with backgrounds in health from across the country, including undergraduate medical students and students of various other health-related courses. This would eliminate the inconvenience of having to locate and hire interpreters when there is precious little time to waste and allow I-EMTs to get to work as quickly as possible.

Demanding accountability

Accountability was a major issue among the I-EMTs coming into Nepal. Some were found to be already working on the ground without even registering with the government, while there were other groups that were involved in activities barred by law, such as promoting certain religions. The underperformance of a number of I-EMTs and the inability of the government bodies to compel the arrivals to share information and provide daily updates on their undertakings was a prime shortcoming in the post-disaster response.

Recommendations:

- An accountability mechanism must be developed targeted specifically at I-EMTs. This would involve formulating certain applications that they must mandatorily use to keep the government abreast of their activities. There should also be strict measures in place to bring about their compliance if they prove reluctant in any way.
- For those carrying out activities that are contrary to the laws of the land, the MoH should reach out to the Ministry of Foreign Affairs to come up with specific guidelines on actions to be taken against such I-EMTs.
- Reviewing the performance of I-EMTs is an absolute must. A checklist could be developed for this purpose, complete with tangible indicators and outcomes that would make it possible to gauge the quality and relevance of their work. This would also help to make a decision on whether to reject support from those teams that did not meet the given requirements, as well as allowing I-EMTs to reflect on their own performance and hopefully make improvements.
- Given that I-EMTs do not appear to have enough incentive to complete the reporting and exit processes, mechanisms such as scoring I-EMTs on their compliance with the host government and WHO directives and

issuing certificates reflecting the results might be effective to some degree but are not adequate in themselves. Additional measures should thus be adopted to compel all I-EMTs to fulfill all the reporting requirements so that accountability and transparency can be ensured and the work done by I-EMTs recognized and credited (Mahat, 2015).

Capacity transfer

Transfer of capacity is an essential part of the recovery process and should be mandatorily supported by I-EMTs, for instance, by handing over equipment and imparting skills to local officials and workers.

Exit policy

When should I-EMTs leave? This came to comprise a crucial question in the post-earthquake period, where some of the teams had left quickly after helping in the initial phase of treatment and rehabilitation, while others stayed on for over a year. An exit policy should be clearly outlined on the basis of the I-EMTs' classification and the needs of the country as identified by the MoH. And when exiting the country, the I-EMTs should be instructed to provide all the information on the patients they have treated, the surgeries they have conducted, among other activities, during their time here. Many I-EMTs neglected to do this in the recent disaster, with the result that the MoH and its bodies remained in the dark about the exact contribution of these teams.

Lessons in agency coordination

Miscommunication between EDCD and HEOC

The Epidemiology and Disease Control Division had initially been established as a statistical division—that is, until a new structural organization had proposed its transformation into the present-day EDCD. Its primary responsibility has to do with addressing epidemics and communicable diseases, including zoonotic conditions. It also boasts an Early Warning and Reporting System (EWARS) that is designed to examine various syndromes and disease reports, thereby plotting trends to identify any possibilities of outbreak.

HEOC on the other hand, is a central body to be activated in periods of crisis, and which functions as the main command and control center. It functions as a subordinate unit under the National Emergency Operation Center of the MoHA.

Although the jurisdiction of the two agencies would appear fairly well marked out, in the wake of the 2015 quake, the lines were found to be blurring. So that when the HEOC made the move to establish its own information unit and began gathering data, the EDCD was undertaking a similar effort at precisely the same time, testifying to the dismal level of communication between them. Part of the impact of this duplication of activities fell on the district officers who were compelled to relay the same information twice.

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Recommendations:

- The HEOC might be the central command and control unit, but there are certainly many areas in which the EDCD possesses more expertise. Rather than duplicating efforts as happened last year, then, the disease surveillance unit of the EDCD could be immediately moved to the HEOC, and the expertise utilized to its maximum potential.
- Instead of centralizing works and creating bureaucratic hurdles, experts from each division within the MoH and DoHS should take up their responsibilities under the direction of the HEOC.

Extending the coverage of assistance to geographically-remote areas was an immediate obstacle. There were also difficulties to do with the adequacy of human resources, speed and quality of service delivery, the capacity of temporarily-established services and correct distribution of logistics

- A revision of pre-existing activities, along with routine monitoring and evaluation, could prove exceedingly beneficial. For instance, it was expressed in interviews and focus group discussions conducted as part of this study that many districts struggled to make use of their contingency plans. If the disaster unit of the EDCD could be dramatically revamped and its capacity enhanced so that it can effectively implement the formulation and execution of the contingency plans, history might not repeat itself the next time we face a similar disaster.
- There needs to be a clear prioritization of vulnerabilities so that resources can be channeled effectively.
- The HEOC should be more proactive even in normal periods, rather than just during times of crisis. At present, for example, the center has stagnated, with no officials designated to work there. There should be efforts at boosting ownership over the HEOC and ensuring it is always functioning.
- Strategic reviews of the HEOC should be incorporated.

Lessons in maternal and child interventions

Prioritizing vulnerable groups

Saving the lives of pregnant women, new mothers and their babies—all of whom are particularly vulnerable to the effects of events such as earthquakes—is a major focus of any post-disaster response. While similar priority was afforded to the issue in Nepal during the crisis in 2015, numerous challenges were encountered going forth.

Critical gap

To begin with, extending the coverage of assistance to geographically-remote areas was an immediate obstacle. In places without road access, helicopters were the only alternative means, but the costs were extremely high. There were also difficulties to do with the adequacy of human resources, speed and quality of service delivery, the capacity of temporarily-established services and correct distribution of logistics. A clear dearth of awareness in the community regarding service availability, emergency supplies and government efforts was also evident in the studied areas, with the social and physical security of women, children and other vulnerable populations becoming legitimate points of concern.

Other challenges and constraints had to do with the high expectations of the community insofar as basic relief commodities such as food and shelter were concerned, leading to disappointment and reluctance to cooperate. These sentiments were compounded further by delays in supplies of basic goods as well as medical logistics, to which the fuel crisis contributed significantly. The birthing centers that did exist had extremely limited resources. And there were many health workers and Female Community Health Volunteers who had themselves been affected by the quake, making it understandably difficult for them to commit themselves fully to their work.

Recommendations:

- The Reproductive Health Cluster should be made more proactive so that concerned bodies can be kept alert to RH issues and needs.
- Training of health workers and managers in the implementation of the Minimum Initial Service Package must be accelerated. All stakeholders, partner organizations and professional bodies must be active in their involvement.
- The MoH should support partner

organizations in promoting quality services in emergencies.

- The DoHS must set up an emergency cascading plan to ensure uninterrupted RH services.
- An appropriate reporting and recording tool should be designed for crises so that data is preserved for future reference.

The MR drive

Figures from previous Measles Rubella (MR) campaigns in Nepal show that each health worker was able to immunize 125 children in a single day. Going by this, it was determined that to conduct an MR campaign in 14 districts over 15 days, through 8,375 immunization posts, at least 600 health workers would have to be mobilized. However, limited accessibility due to landslides, destruction of health facilities, cold chain equipment and loss of immunizers in districts comprised some of the setbacks when it came to carrying out a successful MR drive.

Recommendations:

- Advocacy and social mobilization are required to engender acceptance and community support for such a campaign.
- Human resources should be mobilized from all available sources including NGOs and Community-Based Organizations.
- Logistics to reach children in the most remote reaches of districts should be prioritized.

Lessons in Blood Supply Management

Improvements in stocking, storing and transfusion

Turn-out in terms of voluntary blood donation was commendably high following the earthquake in 2015. In fact, donations were so abundant in Kathmandu, they actually had to be stopped at one point. Outside of the Kathmandu Valley, however, some districts did face problems arising from poor stocks of blood.

Recommendations:

- Blood-storage capacity in health facilities should be increased and stocks of blood bags made readily available.
- More government investment is necessary to produce specialists in technical fields like transfusion.
- There is a need for more spaces where stocks of blood can be kept.
- There is also a need for the installation of well-equipped blood transfusion and storage facilities in each district. In case it is not possible to extend such services to all districts right away, efforts could at least be made to establish them in strategic locations from where they may cater to several districts at once.
- An emergency airlifting mechanism for blood should be developed so that the central-level blood transfusion facility can immediately dispatch supplies should the districts face shortages.

Lessons in management of bodies

A dignified farewell

It is clear that not enough attention was afforded to planning for the management of dead bodies when it comes to disaster preparedness. However, especially in a country like ours that boasts such a diversity of castes, ethnicities and religions among its people, it is important to ensure that appropriate final rites are conducted. This is because, despite modernization and changes wrought in cultural practices over time, funeral rituals are still followed by most, either by their own wishes or owing to societal obligations. Dealing with the dead, then, is not merely a

There is a need for well-equipped blood transfusion and storage facilities in each district. In case it is not possible to extend such services to all districts right away, efforts could at least be made to establish them in strategic locations

matter of strict medical guidelines but also a social and often very emotionally-charged act.

The responsibility to ensure this act is conducted with dignity rests in the coordination between government agencies, primarily the MoHA and the MoH. Such a sense of cooperation between the two agencies, however, was visibly absent during the recent disaster.

No space

The lack of sufficient space to store the remains of the deceased until they could be identified was a major issue in and outside the Kathmandu Valley, with the result that these were either scattered around school-grounds or the premises of hospitals. This was not ideal, to say the least, neither in terms of aesthetics nor cultural values. Things worsened when said bodies began to decompose in the absence of proper storage, emitting a foul smell.

Recommendations:

- All health facilities should have sufficient space, both indoors and outdoors, for storing remains. It would not require a massive investment to construct a garage-like structure on the premises of district hospitals where bodies could be kept. Ideally, of course, health facilities would be equipped with proper mortuaries.
- Body bags can be very important following a disaster that has left many casualties in its wake. Each district hospital should have a stock of at least 300 such bags, and more should be immediately sent out to them from the center in an emergency.

Lack of mortuaries

Many specialty or hub hospitals were found keeping the deceased in their lobbies since they did not have enough space in their mortuaries. Already, more than one body had been stacked in a single compartment to make room for more, but it was still not sufficient.

Recommendations:

- Central-level hospitals should possess the capacity to store at least 300 bodies.

Imperfect identification

It was only on the fifth day after the earthquake that the Nepal Police had sought the help of experts from the Tribhuvan University Teaching Hospital in identifying bodies via different methods since by that time, the bodies had begun to decompose, making facial identification next to impossible. The fact that they had relied so long on merely looking at the bodies to identify them meant that there might have been errors in the process—forensic support could have helped reduce that possibility to a great extent.

Recommendations:

- Forensic professionals should be made part of the team responsible for managing remains so that their expertise can be utilized as early as possible.
- There are presently 47 members in the Medico-Legal Society of Nepal, an association of forensic experts. During the disaster, each of these experts could have been sent on temporary deputation to the worst-affected districts to work with local authorities in managing and identifying the deceased.
- A national-level Medico-Legal Center should be formed as part of the HEOC.
- There are additionally many doctors within the MoH who are knowledgeable and experienced in dealing with remains, and the very fact that they were not included in the management committee formed by the government demonstrates

Rather than resorting to disposing of bodies in mass graves, each person should be thoroughly coded and his or her identifiable details meticulously documented before being buried in individual graves at the temporary sites

a lack of preparedness on the MoH's side. It is, after all, not about sending a first-class officer to take responsibility of such matters; what the circumstances call for are persons with several years' worth of specific forensic experience.

Temporary burial sites

When bodies are not claimed for an extended period of time, the law states that mass cremations can be held for their disposal. This, however, is heavily criticized by forensic experts who believe cremating is tantamount to eliminating any chance of the deceased ever being identified in the future.

Recommendations:

- Temporary burial sites should be immediately established on available government land, and proper fences constructed around them.
- Rather than resorting to disposing of bodies in mass graves, each person should be thoroughly coded and his or her identifiable details meticulously documented before being buried in individual graves at the temporary sites.
- This would ensure that should anyone come looking to claim the body sometime in the future, DNA testing can still be conducted and the remains dug out and handed over to kin in case of a match. The family can then determine whether to carry out final rites, bury or cremate the body—it would be up to them to decide, rather than the state.
- The 2012 guidelines need to be amended on a number of points, including that of mass cremation.

Lessons for reconstruction of health facilities

Challenges in the path of resurrection

Although the health sector's immediate response to the quake, in terms of attending to the injured, had been commendable overall, planned activities did not quite proceed as hoped for during a reconstruction phase that was punctuated by more than a few challenges to health facilities.

Landless HFs

At least 40% of health posts around the country are not in possession of any land of their own, based instead in buildings that are provided by VDC offices or unused school rooms. This can have significant impact on their capacity to treat and their general functioning.

Recommendations:

- The MoH should either invest in purchasing its own land or request the government to hand over state-owned land for the installment of health facilities.
- Selection of property for purchase should be done on a scientific basis—for instance, there are areas that are difficult to reach and comprise minimal population. Health facilities should rather be installed in locations where they are able to provide services to as many communities as possible.

Formation of a Project Implementation Unit

If the reconstruction of health facilities is to gain necessary speed, a Project Implementation Unit (PIU) should be promptly established at the MoH. Currently, since such a unit has not yet been formed, the MoH has failed to coordinate with the National Reconstruction Authority and other concerned agencies to push for action in the matter.

Recommendations:

- Immediately establish the PIU under the MoH.
- Experts who were closely involved

A strong monitoring unit dedicated solely to reconstruction works should be erected to scrutinize the progress made. Those who fail to meet the set deadlines should be made to offer clarifications

in designing the reconstruction plans should be brought in during the formation of the unit since it would cause further costly delays if new persons had to be recruited and reoriented regarding earlier works.

- In the meantime, given how many health facilities—including a couple of district hospitals—are still working out of tents to this day, these need to be replaced with prefabricated structures as soon as possible.

Monitoring and evaluation

The MoH has forged agreements with many organizations on reconstruction works, some of which are proceeding on schedule, while others have been delayed.

Recommendations:

- A strong monitoring unit dedicated solely to reconstruction works should be erected to scrutinize the progress made. Those who fail to meet the set deadlines should be made to offer clarifications.
- Accountability should be sought from all partner organizations.

All-encompassing assessment

Amidst warnings of another big earthquake, it is essential that the health sector stay prepared for the worst. This would not be complete without reviewing all existing health facilities.

Recommendations:

- A detailed engineering assessment should be conducted of all the health facilities across the country, particularly in those areas deemed vulnerable by experts.
- Adequate measures including prepositioning of tents and drugs should be undertaken in the areas even if the MoH cannot immediately support the reconstruction of new buildings.

Lessons in injury management

Reducing further casualties and debilities

The sheer volume of injuries caused by the 2015 earthquake—over 22,000 cases—meant that the MoH and its partners had to leap into action to reduce further casualties and debilities, and, for the most part, these efforts were well-founded. There were still, however, many lessons to be learned regarding ways in which the process could have been refined to better results.

Lack of awareness regarding emergency preparedness and response

Some of the staff in hub hospitals were found to be unaware of the Emergency Preparedness and Response Plan, Mass Casualty Management Plan and Hospital Emergency Plan as pertained to their own institutions. And many hospitals did not have disaster management plans in place, a situation further affected by inadequate coordination from the HEOC.

Recommendations:

- All hub and satellite hospitals need to first ensure that they are equipped with solid disaster management plans, and then to provide their staff training on proper execution of the same, entailing regular drills and exercises to keep them at the ready for dealing with injuries when a disaster strikes.
- The HEOC should maintain a rigorous database that compiles information regarding staff deployed in different places, medicine stocks and availability of equipment, among other facts. Step-

down facilities and rehabilitation units also need to be activated, and measures taken to make sure these function effectively and efficiently.

- Health services and programmes need to be made more inclusive towards people with disabilities, as has been noted in the NHSP-III, which recommends communication and information, accessibility, individualized support, and participation of people with disabilities in the planning, implementation and evaluation of health services.
- The broader aim of strengthening the health system with respect to handling injuries, disabilities and rehabilitation must be kept in focus, so that the sector is not just prepared to responds to post-disaster outcomes, but also other scenarios such as road traffic accidents, and injuries/disabilities caused by inadequate care for various diseases.

Lessons in mental health management

Coping with the mental toll and trauma of disasters

The MoH and its partners certainly coped the best they could with the psychosocial fallout of the disaster, but far more needed to be done in terms of preparedness and planning if the response was to be effective.

An ad-hoc approach

In the absence of a clear and farsighted plan for activating the MHPSS in emergencies, mental health interventions conducted in the wake of the 2015 earthquake by the government and other stakeholders were largely ad-hoc.

Recommendations:

- More resources should be allocated to the mental health sector than is presently being done by the Nepal government.
- A separate mental health unit/section—or at the very least, a mental health desk—should be established under the MoH.
- The Mental Health Policy needs to be updated and operationalized.
- Given that Nepal is prone to earthquakes and other disasters that can have deep impacts on the mental health of affected communities, it is crucial that due attention be given to this issue, alongside efforts to enhance overall disaster preparedness, strengthen government capacity and ensure better inter-sectoral coordination.
- Realistic strategies must be devised to cope with the mental health issues triggered by such disasters so that early interventions can be formulated and implemented, and mental health support more easily incorporated into regular health services.
- Mental health disaster response plans should be in place and communicated to all stakeholders from the centre.

Not enough community-level service providers

The mental health support program was hampered by a lack of sufficient trained service providers at the community level, delaying diagnosis and treatment for affected persons.

Recommendations:

- Trained counselors—one for each Primary Health Care Centre—should be prepared and deployed.
- Instead of relying inordinately on external personnel, local teachers and youths should be given training in counseling and support so that they are able to respond to the mental-health needs of their communities in an emergency until professional help can arrive.

All hub and satellite hospitals need to first ensure that they are equipped with solid disaster management plans, and then to provide their staff training on proper execution of the same, entailing regular drills and exercises

Lessons in WASH

Recasting our priorities

Although the weakened state of sanitation and hygiene in a lot of earthquake-hit areas did not quite yield the kind of fatalities that was feared, there was no question that these interconnected issues needed to be dealt with in a more integrated and farsighted manner—on the part of both the government and external agencies—than was the case in Nepal.

Toilet troubles

Ensuring proper toilet facilities to affected communities immediately after the disaster posed a great challenge to the government and other humanitarian responders. Toilets in a lot of camps were in very poor condition, dirty and unfit to use. Hazardous waste was mixed with normal waste, or burnt openly. In many places, people were happy to provide their land for temporary settlements but not for construction of toilets. What's more, the quality of water being provided by private tankers could also not be vouched for, and it was hard to tell whether people were properly chlorinating the water they were consuming.

Instead of relying inordinately on external personnel, local teachers and youths should be given training in counseling and support so that they are able to respond to the mental-health needs of their communities in an emergency until professional help can arrive

Recommendations:

- Awareness regarding WASH needs to be heightened, with priority laid on disseminating information on how hygiene is to be maintained after a disaster.
- More volunteers and agencies working in the WASH sector should be trained in building temporary toilets.
- Affected communities should be encouraged to chlorinate their drinking water supplies before consumption.
- Toilets should be installed on a shared basis in communities where people are living nearby their homes.
- Associations of water tankers and other distributors should be orientated on their vital role in containing any outbreaks associated with unsafe drinking water. They should be held accountable should any outbreak be reported linked to the consumption of water supplied by these units.
- Sanitation and waste disposal are not considered as essential as drinking water supply following a disaster, which is an erroneous attitude and needs to be corrected as these are all important fields of work in their own right.
- Environmental health, including WASH and healthcare waste management, isn't given as much priority as it deserves, until and unless an outbreak occurs. This should change, and more preventive attention afforded to this sector.
- For essential WASH items, a one-door policy might not be the best approach, since persons encountered during interviews and assessments may not be too well-behaved.
- WASH items need to be made integral part of medical camps. The government should identify some places for medical camps with and without WASH facilities.
- HCW need to be managed by the camp holders.

The role of international agencies

A large number of humanitarian agencies were involved in WASH efforts after the earthquakes. Many of these, however, were working for a short period of time and often saw frequent changes of responsible persons. There was also unevenness in terms of the kind of packages they were offering: some

focused on water, others sanitation, and a few came with hygiene-related activities. The WASH cluster was also dominated by external agencies, and regular WASH stakeholders were not fully on board.

Recommendations:

- International agencies should offer a basic WASH package, comprising certain essential and commonly agreed-upon elements.
- The cluster meeting should be redesigned to encourage the attendance of all stakeholders for more effective action.
- WASH packages should be incorporated into logistic lists so as to be ready for use when the government officially seeks international assistance in the wake of a disaster.
- Special WASH responses must be devised to specifically target those remote areas that are inaccessible except by air.
- Inter-cluster coordination during emergency needs assessment requires a thorough review and subsequent improvement.

Sanitation and waste disposal are not considered as essential as drinking water supply following a disaster, which is an erroneous attitude as these are all important fields of work in their own right

Interviews and consultations

Amit Aryal
Ashish KC
Baburam Khanal
Baburam Marasini
Bachu Ram Shestha
Bal Krishna Khakurel
Bhagawan Koirala
Bhim Acharya
Bhim Singh Tinkari
Bibek Kumar Lal
Bikash Lamichhane
Bimal Kumar Thapa
Binod Mandal
Damodar Adhikari
Deepak Prakash Mahara
Deepak Shrestha
DIG Bam Bahadur Bhandari
Dilip Sharma
DSP Dinesh Kumar Acharya
Ganesh Gurung
GD Thakur
Geeta Shakya
Giulia Vallese
Guna Nidhi Sharma
Guna Raj Lohani
Gyan Bahadur Basnet
Harihar Wasti
Jaya Regmee
Jiwan Malla
Kedar Marahatta
Kedar Parajuli
Kedar Parajuli
Khagendra Gelal
Khem Karki
Kiran Regmi
Kishore JB Rana
Krishna Aryal
Krishna Mijar
Laxman Khadka
Mahendra Shrestha
Meera Upadhyay
Mukunda Yadav
Padam Bahadur Chand
Pawan Sharma
Pradeep Poudel
Pradeep Vaidya
Prahalad Dahal
Pramod Kumar Yadav
Pranaya Kumar Upadhyay
Pushpa Chaudhary
Rajendra Koju
Rajendra Pant
Rajendra Sah
Reuben Samuel
Rohit Pokhrel
Sagar Dahal
Sagar Raj Bhandari
Santosh Poudel
Saroj Kandel
Saurab Bhattarai
Senendra Raj Upreti
Shanta Bahadur Shrestha
Shree Krishna Bhatta
Subash Pathak
Sudan Panthi
Sudha Devkota
Sudip Pokhrel
Sunil Khadka
Sunny Bajracharya
Suresh Tiwari
Susheel Chandra Lekhak
Sushil Baral
Tulsi Prasad Dahal
Yaduchandra Ghimire

ANNEX 1

Composition of Technical Working Committee

Chief of HEOC, MoH	Chair
Policy Planning and International Cooperation Division, MoH	Member
Public Health Administration, Monitoring and Evaluation Division, MoH	Member
Disaster Management Section, EDCD, DoHS, MoH	Member
Nepal Health Research Council (NHRC)	Member
World Health Organization (WHO)	Member
Nepal Health Sector Support Programme (NHSSP)/DFID Nepal	Member
GIZ Nepal	Member
UNICEF Nepal	Member
USAID Nepal	Member
World Bank	Member
Section Officer, HEOC/Curative Division, MoH	Member

References

Chaudhary, P., Vallese, G., Thapa, M., Alvarez, V. B., Pradhan, L. M., Bajracharya, K., . . . Goyet, S. (2017). Humanitarian response to reproductive and sexual health need in a disaster: The Nepal Earthquake 2015 case study. *Reproductive Health Matters,* 25-39.

EDCD. (2003). *Health Sector Emergency Preparedness and Disaster Response Plan Nepal.* Kathmandu: Epidemiology and Disease Control Division.

EDCD. (2016). *Review of Health Sector Response to Earthquake 2015 and Lessons Learnt.* Unpublished manuscript.

Mahat, A. (2015). *Coordination of Foreign Medical Teams after the Nepal Earthquake.* Kathmandu: World Health Organisation Country Office for Nepal.

MoH, & WHO. (2015). *Lessons Learnt Conference: Presentations and Reflections.* Kathmandu: Ministry of Health; World Health Organization.

MoHA. (2015). *Nepal Nepal Earthquake 2072 : Situation Update as of 11th May.* Kathmandu: Ministry of Home Affairs.

MoHA. (2016, August 23). *Ministry of Home Affairs.* Retrieved from Nepal Disaster Risk Reduction Portal: http://drrportal.gov.np

NHRC. (2017). *Review of Effectiveness of the Foreign Medical Team Deployment in Nepal Earthquake, 2015.* Kathmandu: Nepal Health Research Council.

Norton, I., Schreeb, J. v., Aitken, P., Herard, P., & Lajolo, C. (2013). *Classification and Minimum Standards for Foreign Medical Team in Sudden Onset Disaster.* Geneva: World Health Organisation.

NPC. (2015). *Nepal Earthquake 2015: Post Disaster Needs Assessment Vol. B: Sector Reports.* Kathmandu: National Planning Commission.

NPHL. (2015). *Post-earthquake Outbreak Surveillance: NPHL Activities and Outcomes.* Kathmandu: National Public Health Laboratory.

NRA. (2016). *Nepal Earthquake 2015: Post Disaster Recovery Framework.* Kathmandu: National Reconstruction Authority.

NTC. (2015). *A Report on The National Tuberculosis Program Post-Disaster Needs Assessment and Recovery Plan.* Bhaktapur: National Tuberculosis Centre.

Sherchan, S., Samuel, R., Marahatta, K., Anwar, N., Ommeren, M. H., & Ofrin, R. (2017). Post-Disaster Mental Health and Psychosocial Support: Experience from the 2015 Nepal Earthquake. *WHO South-East Asia J Public Health,* 22–29 .

WHO. (2015). *Rapid Hospital Needs Assessment Report : Mega-Earthquake in Nepal.* Kathmandu: World Health Organisation.

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2017