Government of Nepal
Ministry of Health and Population

NEPAL HEALTH SECTOR SIMULATION EXERCISE

19th - 23rd September 2022

Government of Nepal
Ministry of Health & Population
Ramshahpath, Kathmandu
Nepal
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Date : .....

Government of Nepal
Ministry of Health and Population
Ramshahpath, Kathmandu

FOREWORD

The diverse geo-climatic system of Nepal with heavy monsoons, flood prone areas and earthquake renders the country vulnerable to natural disasters. In addition to the natural disasters, there are other risk areas including infectious/communicable diseases, rise of emerging and remerging diseases, and man-made hazards. During disaster or any public health emergencies, the Ministry of Health and Population (MoHP) coordinates with all relevant stakeholders including the National Emergency Operation Center (NEOC), Health Emergency Operation Centers (HEOCs), hub & satellite hospital network, and health & non-health partners for well-organized response. However, from the past experiences, few gaps were identified in terms of coordination between health and non-health stakeholders, information flow between concerned stakeholders, response at hospitals, and coordination between ambulance and dispatch center. Hence, a full-scale simulation exercise was envisioned by MoHP to test the existing coordination mechanisms, identify and capacitate in-country experts on simulation exercise, identify gaps and strengthen coordination between all relevant stakeholders.

The Ministry of Health and Population along with the technical support of WHO SEARO, WHO Country Office Nepal and Respond Global Health Emergency Experts from Australia conducted Nepal Health Sector Simulation Exercise with the goal to strengthen coordination mechanism between central and provincial government entities within and beyond health sector. Also, the Simulation Exercise is one of the core components of the International Health Regulations (IHR) Monitoring and Evaluation Framework which is mandatory for WHO member country. I am optimistic that the recommendations identified through this simulation exercise will be adopted to further capacitate the health care service providers, reinforce the communication pathways between all concerned stakeholders, and better prepare for efficient and effective response during any disasters and public health emergencies.

Lastly, I would like to offer my deepest gratitude to all the members of the HEOC network, WHO SEARO, Respond Global Health Emergency Experts from Australia, and WHO Nepal for extending their generous and continued support. My special thank goes to Dr Allison Gocotano, Dr Subash Neupane, Dr Gaurav Devkota, Dr Bigyan Prajapati, Dr Irana Joshi, Mr Prahlad Dahal, Mr Prakash Chandra Ghimire, Mr Ramdaresh Pandit, Mr Sanjib Gautam, Mr Manish Dhungana, Mr Tribhuwan Bhatta, Ms Deepa Chand, Ms Barsha Thapa, and Mr Ganesh Singh Dhami who were instrumental in successful conduction of the simulation exercise.

Dr Samir Kumar Adhikari
Chief, Health Emergency Operation Center

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Nepal

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FOREWORD

Nepal is among the most disaster-prone countries in the world due to its topography, seismic terrain, and seasonal monsoon weather patterns, with high-risk areas for floods and landslides. Nepal ranked 20th in the overall disaster risk, 4th in risk due to climate change, 11th in earthquake vulnerability, and 30th in terms of floods[i]. It is imperative to have efficient coordination among all health actors across all tiers of government and other sectors to effectively deliver the health response during disasters and public health emergencies. This coordination is primarily done through the Ministry of Health and Population's (MoHP) Health Emergency Operation Center (HEOC) and Provincial Health Emergency Operation Centers (PHEOCs) in Nepal.

To support countries in managing health events that may cross borders, the International Health Regulations (2005) (IHR) provides a broad framework that legally binds the World Health Organization (WHO) Member States, which includes Nepal. The IHR Monitoring and Evaluation Framework (IHR MEF) lays out approaches to review the implementation of public health capacities at country level which are necessary to fulfill the obligations as stated in the IHR. It consists of four components: State Party Self-Assessment Annual Report, After-Action Review (including COVID-19 Intra-Action Review), Joint External Evaluation, and Simulation Exercises. Nepal successfully completed all four components of the IHR MEF in 2022, and I would like to take this opportunity to congratulate Nepal.

One component of the IHR MEF is a Simulation Exercise, which simulates an emergency situation to which a described or simulated response is made. Its purpose is to validate and enhance preparedness and response plans, capacities, procedures, and systems for disaster or public health emergency response, be it for a specific hazard or following an all-hazard approach. Commonly abbreviated as SimEx, these are useful to achieve different objectives. These may include, but not limited to, reviewing and assessing planning assumptions, procedures, operational plans, guidelines, and standard operating procedures; assessing and testing interoperability between these plans and procedures; revealing planning weaknesses and resource gaps; improving coordination and collaboration; clarifying roles and responsibilities; practicing and clarifying chain of command; developing knowledge and skills for emergency response operations; familiarizing staff with new functions and equipment; and gaining recognition and trust in the emergency management processes.

The Nepal Health Sector Simulation Exercise was conducted by the MoHP on 21-23 September 2022 with technical support from WHO and exercise facilitation support from Respond Global. The three-day SimEx, which was preceded by months of preparation, focused on testing the coordination aspect of health response during a large-scale disaster. This included MoHP, HEOCs, various divisions of the Department of Health Services, Hub and Satellite hospitals, and other relevant stakeholders. The SimEx also helped to analyze the communication and information management within the health sector, and formulated recommendations for further improvement.

WHO congratulates the MoHP for its leadership in prioritizing this important work for strengthening Nepal's capacity for health emergency management, and remains committed to further improving health sector's preparedness and response to disasters and public health emergencies.

Dr Allison Gocotano
Team Leader – WHO Health Emergencies Programme
WHO, Country Office for Nepal

[i] Maplecroft 2011, BCPR 2004 cited in MoHA 2015; Nepal Disaster Report 2017-A Road to Sendai

Executive Summary

The Ministry of Health and Population, Government of Nepal (MoHP) completed a three-day face-to-face functional simulation exercise (SimEx) on the 21–23 September, 2022, to strengthen coordination for response activities led by the Health Emergency Operations Centre (HEOC) at central and provincial levels among government bodies or teams within and beyond the health sector (e.g. National, District and local EOCs).

The SimEx was led by the Ministry of Health and Population, with support of Emergency Preparedness and Operations members of WHO Health Emergencies Programme, WHO Nepal, technical officers of WHE SEARO and Respond Global Health Emergency experts.

The simulation included participants from;

- Ministry of Health and Population
- National Emergency Operation Centre
- Health Emergency Operation Centre
- Department of Health Services
- Provincial Health Emergency Operation Centre (PHEOC), Bagmati Province
- National Public Health Laboratory
- Epidemiology and Disease Control Division
- Ambulance Dispatch Centre
- Bir Hospital
- Patan Hospital
- Civil Hospital
- Dhulikhel Hospital
- Sukraraj Tropical and Infectious Disease Hospital
- Tribhuwan University Teaching Hospital
- Paropakar Maternity and Women's Hospital

Additional contributors included the Nepal Army, Nepal Police and Armed Police Force, Nepal.

Participant numbers:

- Day 1, the SimEx included 100+ participants,
- Day 2, 75+ participants and
- Day 3, 400+ persons participated in both a functional and drill exercise.
- Exercise Control team of 10, led by Respond Global, supported by WCO Nepal and WHO SEARO and MoHP.
- Provision of training to 13 local facilitators placed with each participant group.
- Over 15 observers from the WHO WCO supported the facilitators.

The key objectives of the simulation:

- To strengthen coordination for response activities led by the Health Emergency Operations Centres (HEOCs) at central and provincial levels among government bodies or teams within and beyond the health sector (e.g. National, District and local EOCs)
- To strengthen coordination among the hub and satellite hospitals
- To strengthen the interaction between clinical and public health response agencies, particularly the National Public Health Laboratory and the EDCD
- To strengthen coordination for the deployment of emergency medical deployment teams (EMDTs)
- To strengthen coordination for the deployment of Rapid Response Teams (RRT)
- To strengthen coordination for ambulance dispatch
- To train and mentor facilitators for future Sub-National level simulations and exercises

>575 **Participants**

>750 **Injects and simulated emails sent**

18 **Facilities/organisations participated in the SimEx**

13 **Facilitators trained and mentored**

150 **Actors moulaged**

Key Lessons Identified

- MoHP and its partners have built extensive capacity to absorb lessons from the 2015 Earthquake and the COVID-19 response.
- Existing relationships and cooperation within the Health Sector, including those further strengthened during the simulation exercise, will assist in responding to future crises.
- The simulation exercise demonstrated that some areas within the Health System would benefit from additional strengthening, including:

    - Additional dedicated training in Mass Casualty Incident Management, including triage, coordination of resources and distribution.
    - A better definition of communication pathways with the Provincial structures and the rest of MoHP, mainly to avoid duplication of channels for the Hub and Satellite Hospital Network
    - Greater use of information management tools, such as forms and templates, particularly electronic ones
    - The HEOC would benefit from developing virtual EOC tools to enhance its function and strengthen coordination.
    - Formalised electronic coordination tools, forms and templates.
    - Electronic resource and tasking allocation
    - Use of written Standard Operating Procedures for specific processes

- Simulation exercises can significantly benefit facilities and entities within MoHP and should be practised regularly, led where possible by the facilitators trained and mentored during this exercise.

CONTENTS

1. Introduction

The Ministry of Health and Population, Government of Nepal completed a three-day Simulation Exercise (SimEx) for participants from the MoHP - Incident Command System, Health Emergency Operations Centre, National Public Health Laboratory, Epidemiology and Disease Control Division, Ambulance dispatch, PHEOC, Bagmati Province and seven hospitals in the Kathmandu Valley and Dhulikhel. The Simulation exercise took place on the 21st – 23rd of September 2022, with technical assistance from WHO SEARO and support from WHO Nepal and Respond Global Health Emergency Experts from Australia.

Respond Global was commissioned to assist in the technical delivery of the SimEx involving extensive simulation preparation and an online training platform, as well as a preparation visit and in-country support during the simulation. A comprehensive report was provided to both the Ministry of Health and Population and WHO Country Office Nepal to support future planning and development.

Nepal is among the top 20 disaster-prone countries due to its topography, seismic terrain, seasonal monsoon and several flood-prone and high-fire-risk areas. Therefore, coordination is critical to managing disaster events, and the SimEx presented the opportunity to review current coordination plans. Notably, an analysis of communication during a large-scale disaster between the Ministry of Health and Population (MoHP), Health Emergency Operation Centre including Provincial Health Emergency Operations Centres (HEOC/PHEOC), various divisions of Department of Health Services, hub and satellite hospitals and other stakeholders.

While the country effectively responded to multiple emergencies within the context of COVID-19 and has run frequent simulation exercises, the MoHP plans to strengthen further its coordination mechanisms, particularly coordination of HEOC with PHEOCs, different divisions of Department of Health Services (DoHS), and hub and satellite hospital networks.

WHO has been promoting strengthening HEOCs within the National and Sub-national levels of its member states. This SimEx formed a component of that work, providing an avenue for selected countries to test, learn and strengthen current readiness and response systems.

The simulation objectives included the following;

- To strengthen coordination for response activities led by the Health Emergency Operations Centres (HEOCs) at central and provincial levels among government bodies or teams within and beyond the health sector (e.g. National, District and local EOCs)
- To strengthen coordination among the hub and satellite hospitals
- To strengthen the interaction between clinical and public health response agencies, particularly the National Public Health Laboratory and the EDCD
- To strengthen coordination for the deployment of emergency medical deployment teams (EMDTs)
- To strengthen coordination for the deployment of Rapid Response Teams (RRT)
- To strengthen coordination for ambulance dispatch
- To train and mentor facilitators for future Sub-National level simulations and exercises

The delivery of this simulation was led by HEOC, MoHP and supported by WHO and by health emergency operations experts from Respond Global and the WHO Regional Office in SEARO. The SimEx took place in person in Kathmandu over three days. The preparation for the simulation took place two months before the simulation dates, including a scoping mission in August.

Nominated participants were critical players in the MoHP, other relevant divisions of the MoHP and DoHS, PHEOC, the Bagmati Province, Ambulance dispatch, five hubs, and two satellite hospitals.

A detailed list of participants can be found in Attachment 1. The simulation exercise took place on the 21st – 23rd September 2022 (Attachment 2 – Exercise Agenda).

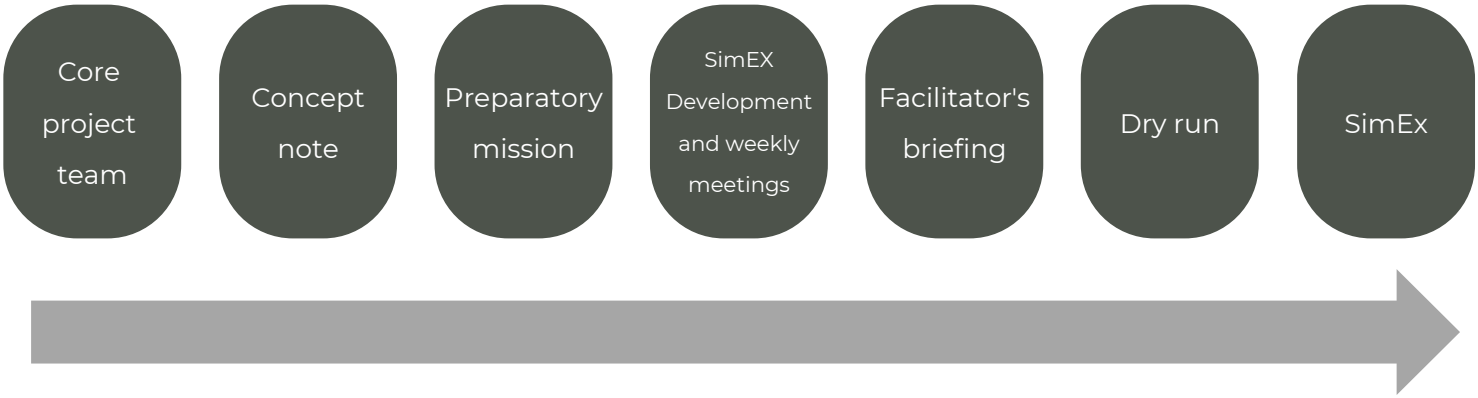
2. Methodology

2.1 Preparation

The MoHP, WHO and Respond Global led the preparation process to develop a practical, relevant, and realistic SimEx.

The project team took the following steps;

- Appointment of a project lead (MoHP, WHO and RG).
- Establishment of a core working group – including MoHP, WHO and RG.
- Preparation of a concept note.
- Preparatory mission to meet and engage MoHP stakeholders and engage on objectives.
- Weekly meetings (WHO, RG).
- Regular meetings between MoHP officials, WHO and RG to evaluate design and realism.
- Specialty Education package for facilitators on SimEx design.
- Facilitators briefing and dry run.



Milestone 1. Preparation of Concept Note

The concept note was shared with the country office for participant nominations and was used to inform the detailed planning process for the SimEx. The concept outlined the general idea for the simulation, the proposed participants, and the concept of operations for the SimEx implementation (Attachment 3).

Following the approval of the concept note, WHO SEARO facilitated a face-to-face preparatory meeting in Kathmandu, Nepal, with primary stakeholders. This included officials from;

- The Ministry of Health and Population
- Department of Health Services
- National Emergency Operations Centre
- Nepal Army
- Nepal Police
- Armed Police Force, Nepal
- Local disaster preparedness and response experts
- Directors/coordinators of hub hospitals
- Nepal Ambulance Services
- Ambulance Dispatch Centre
- Nepal Red Cross Society

The objective of the meeting was to affirm an understanding of Nepal's disaster preparedness and response plan and collect feedback and ideas for the simulation exercise. From this consultation, a proposed plan for the simulation was developed and shared with all stakeholders (detailed report Attachment 4).

Following the preparatory mission, the core project team began building out the storyline, injects and relevant resources/content for the SimEx. Respond Global led all aspects of producing content for the simulation, which included;

- developing training for facilitators,
- facilitators guidebook,
- simulation injects and content,
- a delivery mode for the injects,
- agendas and any relevant presentations and briefing documents requested by the MoHP.

In addition, Respond Global created a shared drive for all documents, including participant's documents, the facilitator's guide, the scenarios storyboard, and injects. This shared drive was made accessible to the regional and country office colleagues (the proposed Excon Team) (link to the share drive can be found below).

Link to shared drive

The officials of HEOC, MoHP with support of WHO Nepal managed all ground work, including coordination with leadership of the MoHP and other relevant stakeholders, management of participants, facilitators, observers and actors, logistics (venue, transportation, catering etc.) and administration. In addition, WHO SEARO provided strategic and technical guidance in all aspects of preparedness. The project team met weekly to work through the project plan and complete preparatory elements.

Enabling a local response through capacity-building is at the heart of the World Health Organisation's approach and is the defining element of Respond Global's purpose and vision. Therefore, a secondary goal was to support the Ministry in running future simulation exercises by training and mentoring local facilitators so they could develop and run future drills at a sub-national level.

To ensure facilitators were familiar with the construct of a SimEx and the objectives of the Nepal event, Respond Global developed an online training course, providing this a week before the SimEx.

The pre-learning objective was to support facilitators in developing expert knowledge on how to design simulations, exercise core components and the specific tools required to build functional exercises. The course had an excellent engagement.

Twenty-five facilitators completed the training, with all participants agreeing their knowledge of how to run a simulation had increased and that 96% of course participants were satisfied that the course was a good introduction to the basics of exercise design.

Following the online training, facilitators attended a briefing on 19th September. The session aimed to; provide an overview of the SimEx, brief them on their roles and responsibilities as team facilitators and go through the facilitator's guidebook (Attachment 2 Agenda for the Facilitators Briefing).

On 20th September, Facilitators and Excon completed a rehearsal of the simulation intending to test inject delivery and receipt via the operational platforms, the audio for the video injects and transitions between the exercise time jumps. In addition, the facilitators evaluated and informed the simulation injects. While this was a necessary component of the exercise design, it added challenges to the core project team's ability to have early completion of the complete package, with adjustments required to improve realism or represent the correct process.

The simulation design supported the Excon team to mentor and guide the facilitators in the management of participants, further building their confidence in simulation management.

Attaching facilitators to participant groups provided the added benefit of sustaining participants' engagement on the second and third days when teams were dispersed across several sites. Facilitators became the 'eyes' of the Excon, providing critical direction regarding the team's engagement and active support to the teams working through the simulation challenges.

2.2 Set up and staging

Coordination team

The coordination team consisted of officials of HEOC, MoHP, members of WHO and Respond Global establishing a coordination structure to support effective communication and facilitation of the SimEx.

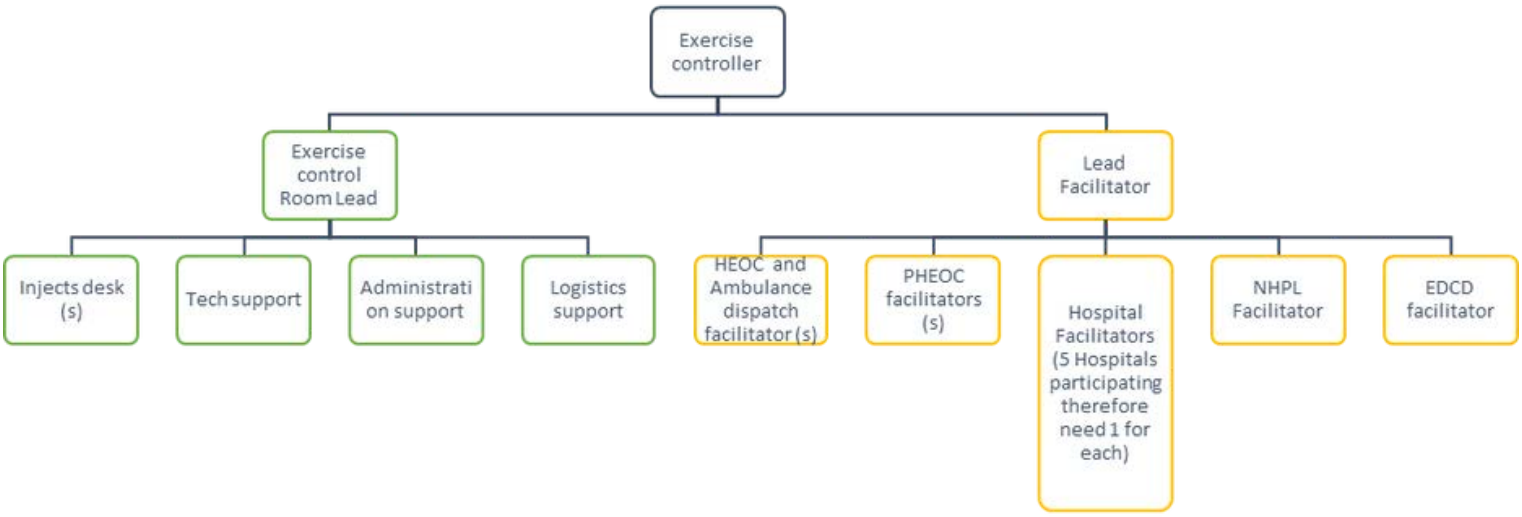
The composition of the coordination team included the following.

- Exercise controller
- Lead Facilitator
- Exercise control Lead
- Exercise control team
- Lead facilitators for each of the participation groups
- Observers for each of the participation groups
- Actors

Due to the simulation's complex nature and size, the control team consisted of 10 members with an overall control room lead. Details of the roles and responsibilities are included in (Attachment 5).

In addition, local expert facilitators were allocated to each team, along with an observer from the WHO Nepal country office, reporting back to the control room. An Excon team member maintained constant communication with both observers and facilitators providing additional guidance and awareness of taskings to each participating team.

SimEx Coordination Structure



The Facilitators received a detailed guide to direct them during the simulation ((Attachment 5) – Facilitators Guide). In addition, observers received a checklist to use, guiding them through the simulation stages (Attachment 6).

Scenario and inject development and delivery

The Scenario

Nepal is the 11th most risk-prone country in the world for earthquakes. The country is located on an active seismic belt, and it has three active fault lines. Therefore, an Earthquake was chosen as the most helpful scenario to test the objectives and impact on the health system.

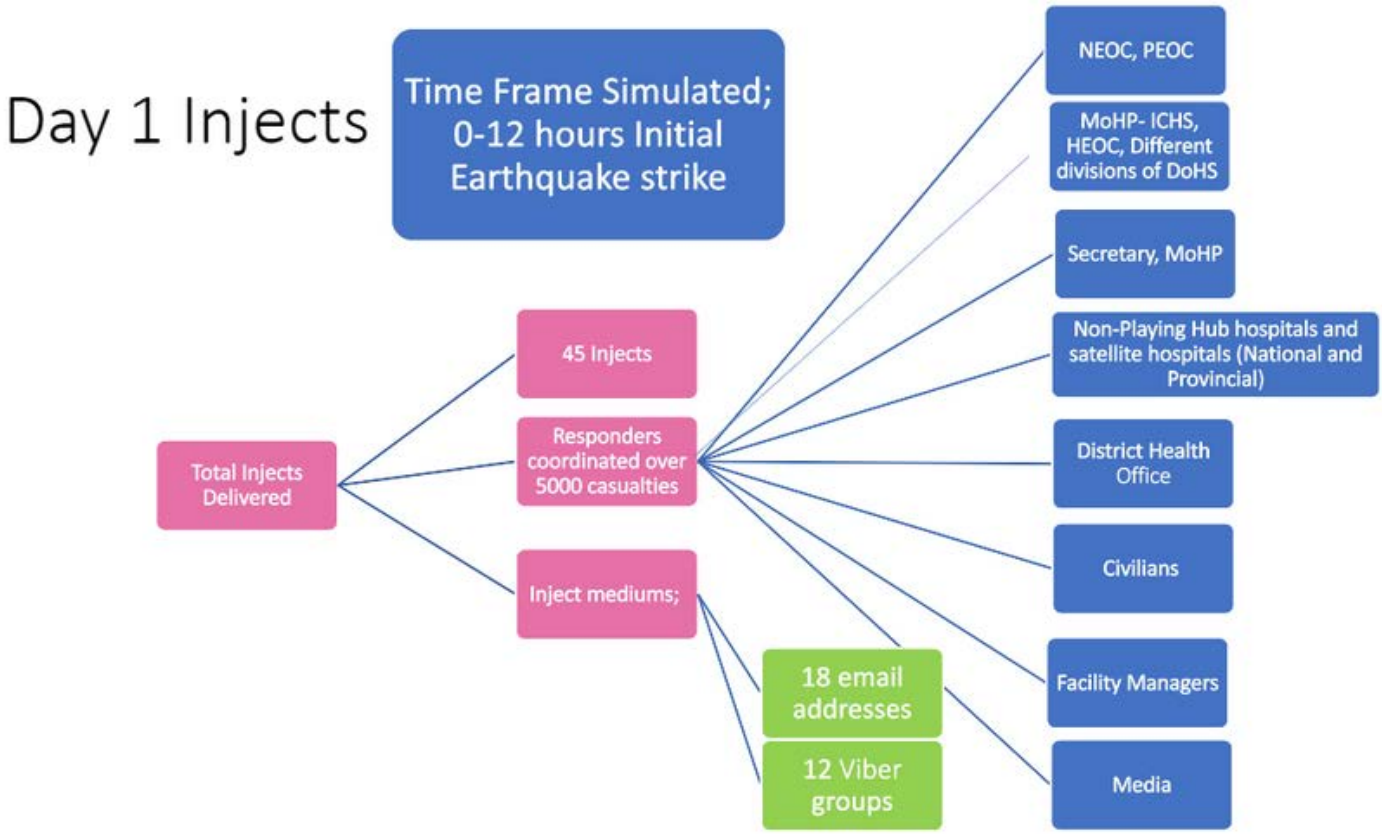
The design included a 7.8 magnitude earthquake with an epicentre in Barabishe, Sindulpalchok district, Bagmati, and four-time jumps to support the different disaster response requirements over time. The overlay to the scenario included the ongoing COVID-19 and Dengue outbreaks. In addition, trauma and other disease outbreaks, such as acute watery diarrhoea, were presented at the appropriate time.

- Day 1 of the exercise addressed the first 12 hours of response to the earthquake,
- Day 2 of the exercise commenced participants to the 3rd day from the earthquake with a second-time jump at midday, propelling the participants forward to the 7th day of operations.
- Day 3 of the exercise began on day 17 from impact.

Scenario and inject resources

Introductory information about Nepal was accessed online and from officials of MoHP, NEOC, HEOC and WHO WCO Excon members. These included;

- Background information about the participating groups (e.g., current capacities of the Hub Hospitals),
- Key policies, plans and operational documents,
- Current public health issues,
- Maps, photographs,
- Geographical and demographic data and
- Key contact persons.

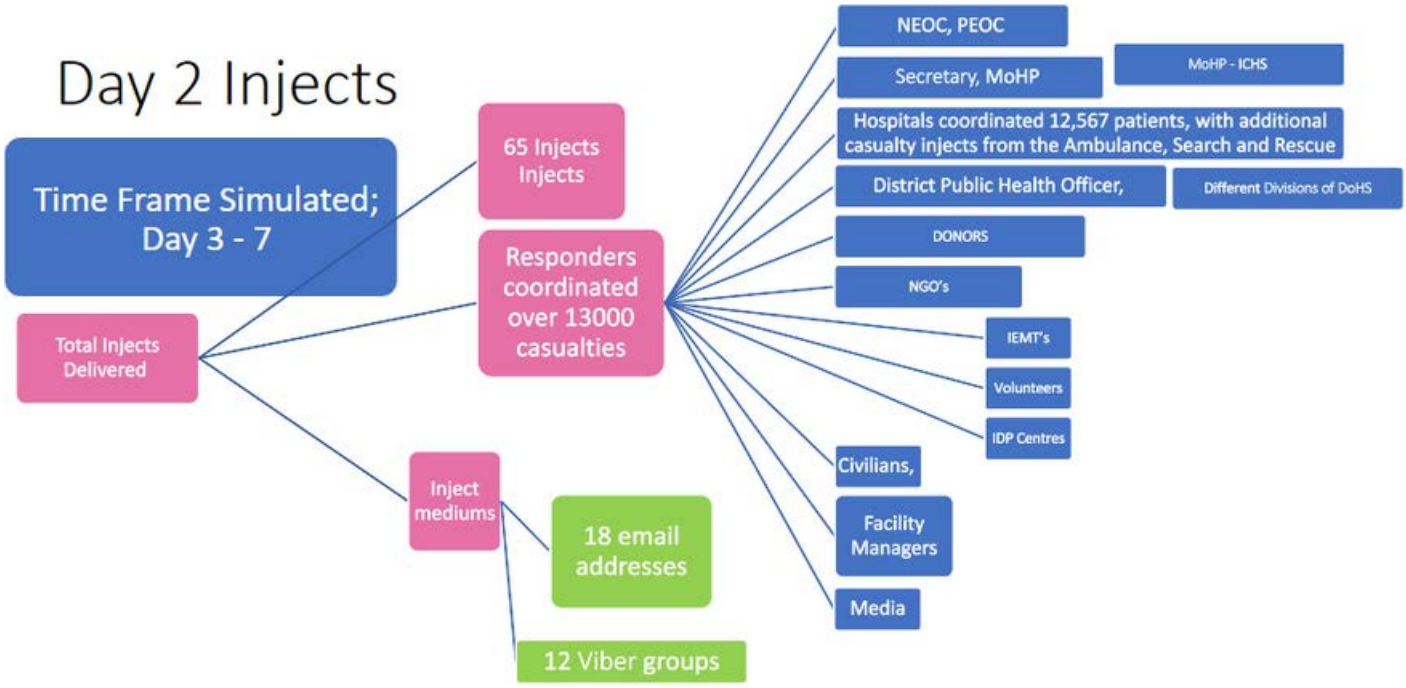


The Excon team simulated injects based on the Gorkha Earthquake, 2015.

- Death and injury rates,
- Damage data,
- Displaced persons
- Other challenges

The members of HEOC, MoHP reviewed this information before the exercise, informing the development of credible information injects.

- Damage data was informed by the epicentre location and using examples from past earthquakes.
- The team created a repository of casualties for all the hub and satellite hospitals in the Kathmandu Valley, specifically the epicentre, Sindulpalchock.
- Past Casualty numbers from previous earthquakes informed patient numbers used in this scenario
- The distribution of casualties to each Hospital was calculated based on distance from the epicentre (Attachment 7 – example of Casualty List).
- Patient detail included Injury type, detail of the body part affected and their demographics to support realistic simulation of mass casualty management at the hospitals.
- The team developed public health content for time jumps on days 3, 7 and 17 (see attached for examples).
- Past earthquakes data informed the modelling of disease outbreak numbers
- COVID-19 and dengue outbreaks data came from actual current data in Nepal.

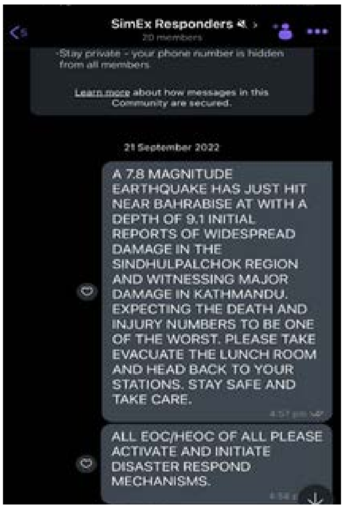


Other resources created included

- NEOC SITREP
- COVID-19 SIT REP and
- Email recipients
- Social media posts
- TV broadcasts
- Photographs
- Maps

Some examples of injects can be found below:

Access to the documentation is via the preparation section of the shared drive provided.



Situation update of Dengue 2022 as of the 28th of September 2022

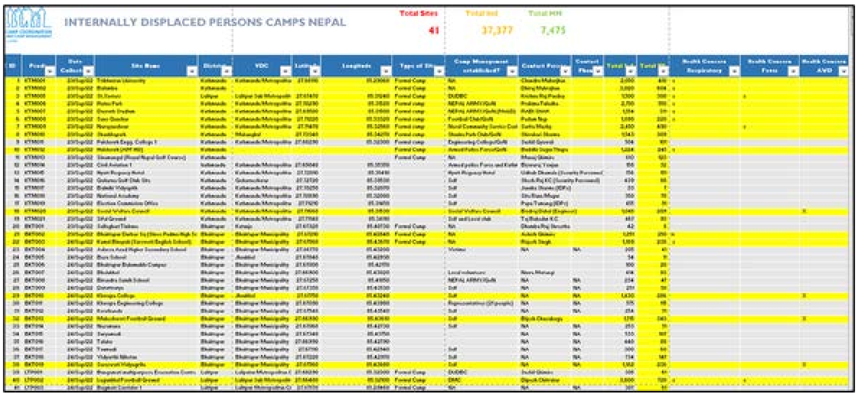
As of 28th September 2022, a total of 24261 dengue cases have been identified, with Bagmati province reporting highest number followed by Lumbini province. As seen in the **Table 1**, the increment in cases aligns with the rainy season with cases peaking in each province, this was further exacerbated with the recent events with the earthquake. The numbers have doubled since the 12th of September 2022. Given the state of the health system during this time, this is considered an outbreak.

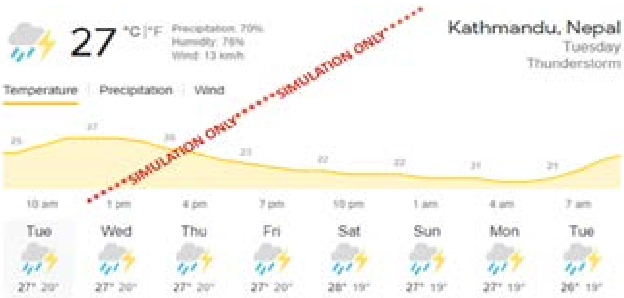
Table 1: Number of Dengue cases by Provinces (2022, EWARS and district line list)

Dengue cases as of 28 Sept 2022										
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Total
Province 1	2	0	1	2	3	19	47	130	416	620
Madhesh Province	1	0	1	0	5	5	4	91	423	492
Bagmati Province	0	1	1	1	1	38	427	2389	15279	18047
Gandaki Province	0	0	0	3	1	3	28	58	416	597
Lumbini Province	2	2	11	8	8	15	152	495	2315	3054
Karnali Province	1	0	0	3	2	2	8	13	136	165
Sudhur Paschim	0	0	1	1	4	8	13	57	682	771
	11	3	15	18	23	93	720	3700	19600	24201

The top 10 districts have reported the highest number of cases (19248, 84%), with sporadic cases reported from other districts, as highlighted in Table 3. Out of the top 10 districts reporting dengue cases, the highest numbers of cases are being reported from **Lalitpur** (5476), **Kathmandu** (6492), and **Dang** (1178) as shown in Table 2. Till date, 14 deaths due to dengue are verified.

Table 2: Top 10 districts reporting dengue cases by months (2022, EWARS and District line list)





From: Excon Play <Nepalexchange@respondglobal.com>
Sent: Wednesday, 21 September 2022 5:39 PM
To: Civil Hospital
Cc: Excon Control
Subject: 012 Casualty Numbers at ED as of now.

******SIMULATION ONLY******SIMULATION ONLY******

Dear Sir,
Please see below ED casualty numbers as of 1pm today.
Kind regards
Emergency Department.

Civil Hospital	Males				Females	
	UNDER 15	15-25	25-64	64+	UNDER 15	15-25
	15%	20%	50%	15%	15%	20%
Skull fracture	0	0	1	0	0	
Head injury / contusion	0	0	1	0	0	
Eye and orbit injury	0	0	1	0	0	
Spinal Column Fracture	1	2	5	1	1	
Chest Trauma	1	2	5	1	1	
Ribs fractures	0	0	1	0	0	
Pelvis fracture	0	0	0	0	0	
Fractures Humerus	1	1	2	1	1	
Fractures Radius and Ulna	1	1	3	1	1	
Fractures Phalanges of hand	0	0	0	0	0	
Multiple fractures of hand bones	0	0	1	0	0	
Fracture of the Femur	1	2	5	1	1	
Tibia and Fibula Fracture	1	1	3	1	1	
Malleolus Fracture	0	0	1	0	0	
Fracture Metatarsal Bones	1	1	2	1	1	
Fracture Phalanges of foot	0	0	1	0	0	
General Surgery	3	4	9	3	3	
Burns and plastics injury	0	0	0	0	0	
ENT injury	0	0	0	0	0	
Dental injury	0	0	0	0	0	
Crush lower limb	0	0	1	0	0	
Wounds	1	1	2	1	1	

From: Excon Play <Nepalexchange@respondglobal.com>
Sent on: Wednesday, September 21, 2022 8:57:47 AM
To: HEOC Nepal <HEOCNepal@respondglobal.com>
Subject: 022 Media Interview Request

******SIMULATION ONLY******SIMULATION ONLY******

From Journalist

To HEOC

Namaste
I am emailing from the Himalayan Times. We would like to ask for an interview to

Kind Regards
Krishna Ragmat

Cas#	Gender	Age
23	Female- Adult	23
Detail	deep laceration on left hand	
Cause	Falling Rubble	
Ambulation	Walking	
Breathing	walking and breathing	
Pulse	Pulse Yes	
Capillary Refill Test		
Conscious state	Obeys	

Inject Delivery

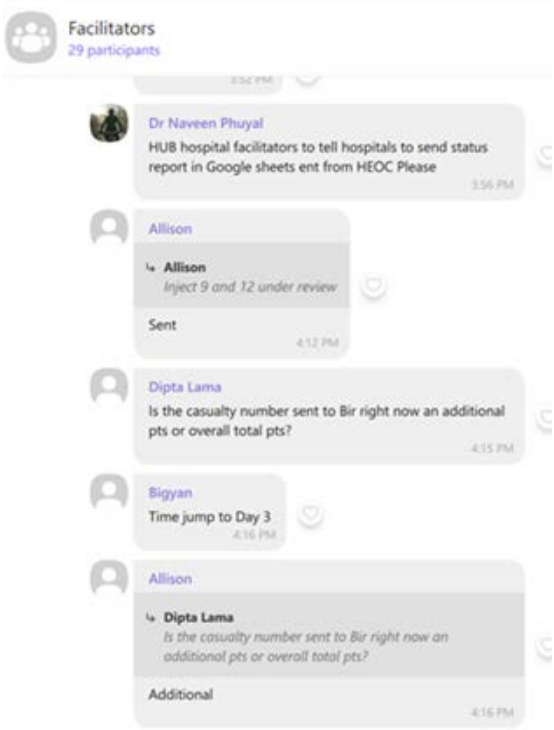
An inject matrix was developed to support the operational running of the exercise. The matrix included the following;

- A detailed description of the information inject,
- The time frame that was allocated to the participants to work on each inject,
- The time Excon would send to participants and
- Information for the facilitators (clearly identifying when they will be stepping into the scene) was developed as the master document to guide the SimEx (Attachment 8).

The matrix guided the control room and served as a backup document if there were issues with the internet connection. During the simulation, the Excon team adapted the matrix to changes on the day, such as time delays and participants' ability to respond and accommodate the injects. The Excon team sent information via electronic platforms such as email, Viber and phone calls. Participants were provided "simulation only" addresses to avoid confusion or external disruption. Detailed instructions on how to use each technological platform were provided to all the participants, facilitators, and observers (Attachment 9). Monitoring of all emails and Viber group platforms occurred throughout the exercise.

Viber groups were used for instant messaging amongst the EXCON, facilitators, observers, participants, and actors; a total of fourteen groups were created.

- For all the facilitators
- For all observers
- For all actors
- EXCON group
- Each Functional group (HEOC, Bagmati PHEOC, EDCD, NPHL, Ambulance Dispatch, Bir Hospital, Patan Hospital, Civil Hospital, Dhulikhel Hospital and STIDH)



Outlook email was selected as the primary mode for the delivery and receipt of injects.

- Each functional group was allocated an email account with an access username and password.
- Outlook was chosen to allow the EXCON team to monitor the responses and communications that occurred amongst the participants.
- While A single reply email was allocated to the participants should they require to send a report or a query to the control room, there were several injects that required one functional group to pass on an inject to another.

The excon team had four primary email addresses;

- Exconplay. Used to send messages from various 'actors.'
- Exconexchange. Used to support the direction of emails to 'actors' that required simulating
- Excon NEOC. Used to simulate the function of the NEOC
- Excon simulation. Used for any other correspondence outside of 'play'

The EXCON had allocated persons to monitor each email to ensure necessary communication and information is being passed on.

2.3 Execution

Over the three days, The SimEx took place in various sites across Kathmandu.

Day 1: 21st September 2022

On 21 September 2022, an opening ceremony of the simulation exercise was held in presence of Honorable Mr. Bhawani Psd. Khapung, Minister, MoHP, Ms. Dev Kumari Guragain, Secretary, Dr. Guna Raj Lohani and Dr. Sangita Mishra, additional Secretaries, MoHP and Dr. Rajesh S. Pandav, WHO representatives to Nepal along with other government officials.

Commencing at midday Nepal Local time, the SimEx began in a conference hall (Hyatt Place), which was set up to allow participants to sit in their functional groups.

The Excon team familiarised participants with the rules and objectives of the SimEx, which was officially commenced with simulated breaking news of Earthquake and pre-recorded video message from Dr. Roshan Pokhrel, Secretary, MoHP to activate ICS and proceed forward.

Facilitators were encouraged to actively engage and support participants in response to the first 12 hours of the earthquake scenario. Supervision was provided directly by Respond Global within the conference room. Observers monitored each group and reported back if issues were identified. This approach supported the participation and confidence building of both responders, facilitators and observers.

The EXCON team was allocated a separate room in the same premises however removed from the participants. This location supported the Excon team in adapting to emerging issues by increasing or decreasing the tempo of the information injected, providing a coherent realistic scenario.

Day 2: 22nd September 2022

Participants returned to their respective day-to-day operations rooms with their facilitators and observers.

The EXCON team remained in the control room used on day one to support consistency.

The operation room setting was chosen to add additional reality to the simulation.

"How would they respond to an emergency in their operations room?"

This setting also allowed for participation by other members of their workforce who would not usually travel to the conference venue.

Day 3: 23rd September 2022

Day 3 included a field exercise and the continuation of primary participants staged in their operational rooms across Kathmandu responding to day 17 of the simulation.

The field exercise simulation was staged at a national stadium in Kathmandu. Unfortunately, due to an aftershock, the stadium partially collapses, trapping hundreds of people and creating a mass casualty incident.

- The Nepal Army provided 150 'actors', each allocated a casualty card with an injury image.
- They were classified by the START triage system, used in Nepal as either red, yellow, green or black.
- Thirty red casualties were moulaged to simulate a realistic scenario for the first responders.
- Nepal Police controlled entry and exit to the stadium.
- The Excon team remained mobile to support and witness the drill and continue other information injects to participants.
- Armed Police Force, Nepal supported with technical assistance for Collapsed Structure, Search and Rescue (CSSR) and Men First Responders (MFR).

Due to the complex nature of the field exercise, MoHP with support of WHO arranged for all participants to wear coloured T-shirts with large prints identifying Actors, Organisers and Facilitators. The T-shirts also decreased confusion at hospitals when first responders transported the casualties.

2.4 Debrief

At the end of each day, the Excon team conducted a hot debrief with the participants. This provided a quick reflection on the exercise and briefing them on what they needed to prepare for the next day. A similar debrief but conducted separately, occurred with the facilitators, aimed at identifying necessary improvements for the next day.

Respond Global conducted a comprehensive detailed debrief for all the participants, facilitators, and observers at the end of the third day. All were given a specific debrief question to discuss and then asked to present to their table group.

The broader discussion that followed included a presentation from each table to everyone on what went well, what did not go well and what to improve for the future; this was a combination of both the SimEx process, implementation, emergency preparedness systems and procedures.

2.5 Evaluation

Respond Global created two online forms provided on the second day of the SimEx to gather feedback from the participants, facilitators, and observers on the outcomes of the simulation.

One form was created specifically for the participants, evaluating the relevance of the SimEx and if learning objectives have been achieved.

The facilitators addressed questions on the SimEx process, how the participants engaged with the injects, and the training objectives and outputs.

3. Feedback and Recommendations

3.1 Observations from the simulation

This section will detail observations and feedback from the facilitators, observers and participants. First, it will go through the facilitator's and observers' opinions and then the analysis of the outputs of the simulation (email/Viber).

Observer feedback summary

Excon provided Observers and Facilitators with a manual form to complete, with some respondents completing them in writing and some completing word documents (that omitted the quantitative scoring). A compendium of survey results can be found in Attachment 10.

Area	Observer Feedback
Infrastructure, systems, and roles and responsibilities	Overall, Observers and Facilitators reported that the infrastructure and systems were effective for this exercise. However, roles and responsibilities in a few locations, including the HEOC, were observed to improve over time, with Day 1 sometimes producing duplication from multiple personnel engaging in the problem. In addition, actions tended to be reactive rather than proactive (following plans).
Plans and Procedures	Some facilities/players did not have written procedures to follow that indicated they might need updating or revising. For example, in the HEOC, the initial absence of the regular incident commander resulted in some confusion, which the HEOC resolved as the SimEx progressed.
Coordination and communication	Communication and coordination were observed to have been well done, particularly between those with pre-existing working relationships. However, some teams reported that communication was not as strong between regular work units and external actors or between different departments, e.g. medical and admin teams, government and Nepal Red Cross Society. In addition, meetings could have been more efficient and productive with more explicit agendas and directive facilitation with limited timing.
Outcomes	The observers that actual outcomes did meet the expected results, with many reporting excellent participation by participants. Identified areas for improvement between the Hospitals, HEOCs and PHEOCs, including using defined templates when seeking reporting information and improving the information pathways, as often the HEOC and the PHEOC requests/communication to the hospitals duplicated.
Health Emergency Operations Centres (HEOCs) at the central and provincial level	There was good coordination within the health sector via the HEOC. The HEOC, at the commencement of the SimEx, managed the information flow via the central email. The HEOC quickly identified that this was insufficient to meet the incoming tsunami of information. The HEOC quickly established additional role-based emails, e.g. HEOC Logistics, to alleviate the bottleneck, transitioning to a more functional role-based response.
Coordination beyond the health sector	This was observed to be well done but not as strong as the coordination within the health sector. However, it also was observed to improve over time.
Hospital and Satellite Network	Observers noted that bed availability and data relating to casualties were well coordinated, but during the field exercise, there was some confusion related to the transfer of patients. In addition, some areas of information flow between the hub and satellite network could be improved with more frequent meetings, email templates, and agreed reporting times.

Emergency Medical Deployment Teams (EMDT)	Observers noted that EMDT were deployed somewhat effectively, but there were issues with the communication back to some of the hub hospitals. In addition, some EMDTs did not use the triage system, and the triaging of survivors in the initial phase of the Mass Casualty Incident was absent, creating confusion and not supporting the planning of patient distribution.
Rapid Response Teams	Rapid Response Teams were well used by those connected to public health entities, and more could be done to utilise this asset regarding their role with the rest of the health system. Some hospitals identified a weakness in infectious disease management and low utilisation of RRTs.
Ambulance Dispatch	Despite referral mechanisms reported to be well functioning, the Ambulance Dispatch stated dispatch delays during the field exercise. It was observed that hospitals did not coordinate well with the dispatch service, and elements of duplication of resources and separate coordination created additional confusion. Observers reported that there were information gaps in the communication between the ambulance service and the HEOC.

Analysis of email traffic

What went well

- ✔ Most emails and requests were responded to promptly
- ✔ EDCD very professionally managed the Offers of Assistance, and generally, EDCD and the HEOC used tools and templates to help systematically gather information.
- ✔ By 1010 the morning of the stadium collapse, the HEOC had sent a shared document to collate the information on casualties.

Areas for improvement

- ✔ Responses to emails had varying levels of detail and formality, with inconsistent formats used despite the need for central collation and analysis. While email was an inclusion in the SimEx, and it's understood that phone and Viber are more preferred communication methods, it's vital that accurate records of decisions are maintained throughout a disaster. Record keeping can be in the form of a log book, administrative scribe, or minutes from meetings, conversations and taskings, considering the best methods during future planning and staff trained in record keeping during disaster periods.
- ✔ Media inquiries were managed in an ad hoc and reactive manner. For example, media management could include a joint strategy with the NEOC and a regular timed press conference or media release that coincides with situation reporting. Ensuring the language is not technical and consideration is given to the actions the HEOC requires from the public.
- ✔ When receiving emails/contact from the public, a clear plan of which agency will manage these enquiries/concerns and how to manage visibility that a response has been actioned when the matter is critical.
- ✔ On occasion, the PHEOC managed offers of assistance, such as equipment or supplies. Coordinating these offers is critical to avoiding duplication and ensuring high-priority areas receive goods first. In addition, clarifying who is responsible for accepting, monitoring needs and distributing may decrease confusion and duplication.

3.2 Observations on Simulation Process/Facilitation

This section will detail observations and feedback from the facilitators, observers, actors, and participants. First, it will go through the facilitators/observers and actors' observations and then the participants.

What went well

- ✔ Participants participated actively and managed well despite a highly complex scenario. Great collaboration was observed between clinical and public health/laboratory services under the coordination of the HEOC.
- ✔ Participants also took time to look after each other and arranged breaks, despite the pressure rising. There was excellent participation, with some observers noting that the involvement of health secretaries and other health officials helped all participants take the simulation seriously.
- ✔ After the years of COVID-19, it was noted that this exercise helped refresh skills in coordination and revised the critical contact points as they were responding, and responders and facilitators were engaged.
- ✔ Using emails and having the functional elements of the exercise was cited as useful to keep records of the simulation communication and to practice the management of large amounts of information and correspondence. This was a new element not used in previous simulations.

'For the first time (our hospital) tested the coordination with Nepal Army, Armed Police, Police, DHO, Satellite hospitals, CDO and municipality. It was great to see that within an hour our whole district was in alert and helping hands from army, police and members from municipality and DHO arrived to hospital premises.' - Hospital-based Facilitator

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Areas for improvement

- ✔ Sound system for field site.
- ✔ One observer reported that the hub and satellite network didn't believe the scenario set up for the simulation, and there was some confusion relating to the communication of the stadium scenario.
- ✔ Excon could further reinforce 'Rules of Play" as some players sought to verify simulated incidents.

4. Recommendations

SimEX Process

Facilitators trained prior and who supported the SimEx as mentors completed an evaluation form.

They described much appreciation for the functional simulation style, templates of injects and materials to be retained by MoHP for future use.

Feedback from facilitators included that they would like to ensure exercises like this become regular.

The feedback further endorsed the functional style of the simulation for its ability to test the incident management systems and EOC setup within facilities and improve and test communication pathways.

'This time (our Hospital) wanted to test coordination among organizations outside the hospital, it was successful. It was very nice to up-to-date communication with HEOC. Communication of HEOC was very poor in actual disasters. But this simulation taught how to establish good communication with HEOC and other government bodies.' - Hospital-based Facilitator

'It was a very nice opportunity for me personally and for the institution to upgrade the knowledge of (Mass Casualty Incident) management. This type of simulation should be organised in local level to enhance the coordination between hub and satellite hospitals. Such drills should not be focused for Kathmandu only. Every province should organise such simulation in regular basis. Central government and donor organisation should provide budget and expertise to provincial government to conduct such drills.' - Hospital-based Facilitator

Recommendations for Health Emergency Preparedness in Nepal

Training

Mass Casualty Management training would be particularly beneficial to build on the learnings from the field exercise. Ensuring EMDTs are trained in the triage system the same as the ambulance and other first responders and one method of triage is used across the country will save many lives in the response phase of an emergency. In addition, this would encourage using casualty clearing stations to ensure consistent triage approaches between first responders from different areas, particularly between ambulances and EMDTs.

The cross-training of personnel allows for cross-over roles depending on the crisis. E.g. Consider where EMDT personnel could be used to bolster RRT capacity. In addition, consider a broader health familiarisation on the part of RRTs and how they coordinate within the greater health system. This could also include training for non-clinical staff to assist incident commanders with communication and reporting during mass casualty incidents.

Follow-up simulations and debriefs should be conducted by newly trained facilitators, including at the facility level, to test Hospital Disaster Preparedness Plans and respond to early warnings or crises when necessary.

Information management

A suite of structured forms for situation collection and agreed channels could help with information collection and collation. This could include creating impact assessment forms and situation reports. These forms could also be used to gather information on beds, occupancy, presentations, damage and logistics issues, including requests for assistance. To save time and manage multiple data sources, forms could also be made electronic, allowing for information collation and more accurate communication of the situation.

Expanded virtual EOC capacity included trained cadre to monitor central inbox simultaneously (e.g. heocnepal@) and refer to relevant incident management unit or incident commander when necessary. This will build the capacity to process large amounts of information, strengthen the central log/data repository and free key decision-makers for strategic oversight. Within this vein, **consider a shared central point of truth (battle boards/tables)** to keep track of critical information (clinical, logistics, public health, ambulance, lab etc.) to aid decision making.

Plans, policies and systems

Standard Operating Procedures (SOPs) for key processes during first 24 hours, 48hours -2 weeks. SOPs should be connected to the structured forms sent out for completion. In addition, some emails can be pre-drafted and even automated, depending on the system. During the SOP development, it will be essential to clarify coordination, particularly concerning the Hospital network and the PHEOC and HEOC.

Consider **adding additional cells/functions within the HEOC**. One possible functional area could be related to the coordination of EMDT and RRT deployments. Another potential area could be a dedicated liaison function between NEOC and HEOC, or routing whole of government issues like Ministry of Foreign Affairs (MOFA) communications at least.

Consider **confirming a consistent information pathway** that allows for a seamless transition between trauma to public health phases which require similar approaches to data sharing and maintaining situation awareness.

Revision of **Mass Casualty Planning.** One outcome of revising plans/SOPs around MCIs, in addition to consistent triage systems, will be improved communication to HEOC (and hospitals) via coordination between ambulance, MFR and EMDT by assigning onsite commander(s) and sharing real-time information to HEOC as well as NEOC.

5. Conclusions and Next Steps

This SimEx was one of the most complex simulations MoHP Nepal has been involved in. Participants appreciated the opportunity to partake and demonstrated the strong capacities gained since the 2015 earthquake response and the COVID-19 outbreak but also informed important and specific recommendations to strengthen health emergency systems further.

The SimEx had the added benefit of developing a new cadre of simulation facilitators attached to many different areas of the Ministry. The lessons learnt during this exercise can be used to improve the SimEx package and rolled out in other countries. This package can also be adapted to suit either onsite SimEx or a virtual SimEx.

Likewise, the practical recommendations identified by countries can be used to inform WHO of its planning to support Nepal and to inform similar simulations in other countries.

6. Photo Gallery

Preparatory Meeting 4th August 2022

WHO Nepal/ Subash Neupane

WHO Nepal/ Subash Neupane

Preparatory meeting of Exercise Control Team (EXCON) 19th September 2022

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

Facilitator Dry Run 20th September 2022

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

Opening Ceremony - 21st September 2022

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

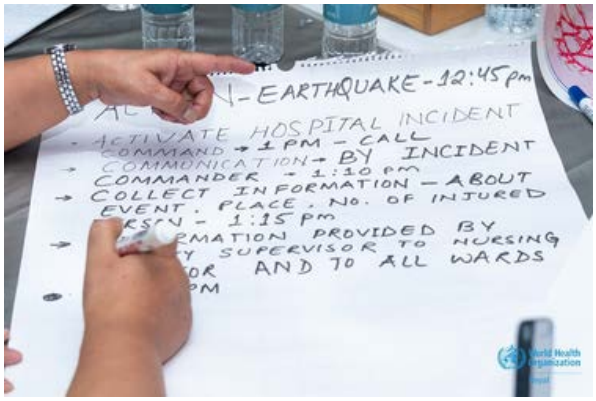
WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

First Day of Simulation at Hyatt 21st September 2022

WHO Nepal/ Bishal Sigel

WHO Nepal/ Bishal Sigel



WHO Nepal/ Bishal Sigel

WHO Nepal/ Bishal Sigel

WHO Nepal/ Bishal Sigel

WHO Nepal/ Bishal Sigel

Second day of Simulation at normal response locations 22nd September 2022

WHO Nepal/ Yagya Raj Gyawali

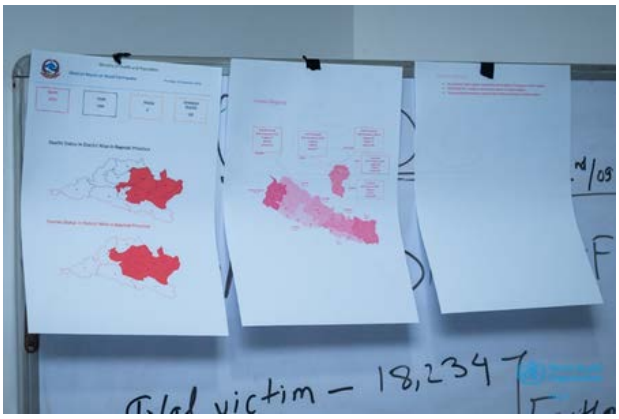
WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

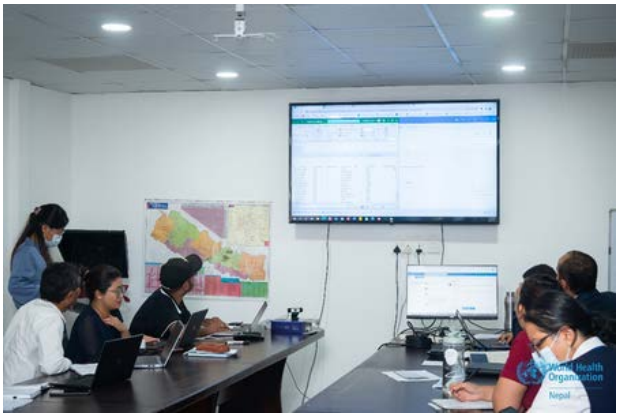
WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bishal Sigdel

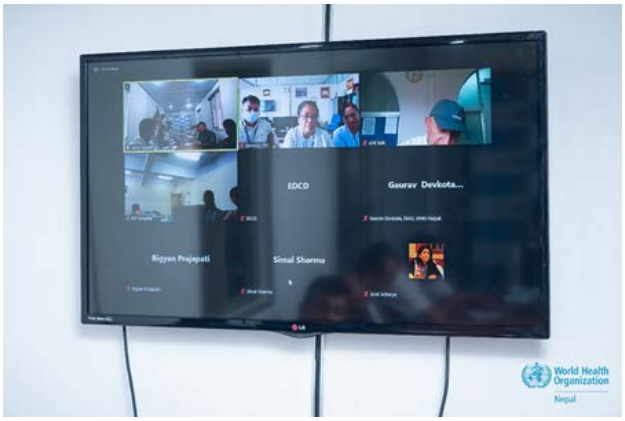
WHO Nepal/ Bishal Sigdel



WHO Nepal/ Bishal Sigdel



WHO Nepal/ Bishal Sigdel



WHO Nepal/ Bishal Sigdel

Field Exercise at Dasharath Stadium, HEOC and Hospitals 23rd September 2022

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Yagya Raj Gyawali

WHO Nepal/ Yagya Raj Gyawali

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Yagya Raj Gyawali

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WHO Nepal/ Yagya Raj Gyawali

WHO Nepal/ Yagya Raj Gyawali

WHO Nepal/ Bishal Sigdel

WHO Nepal/ Bishal Sigdel

WHO Nepal/ Bishal Sigdel

WHO Nepal/ Bibek Maharjan

WHO Nepal/ Bishal Sigdel

WHO Nepal/ Bishal Sigdel

Debrief and Closing Ceremony Everest Hotel
23rd September 2022

WHO Nepal/ Yagya Raj Gyawali

WHO Nepal/ Yagya Raj Gyawali

WHO Nepal/ Bishal Sigdel

WHO Nepal/ Bishal Sigdel

WHO Nepal/ Yagya Raj Gyawali

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