RESPONDING TO COVID-19

Health sector preparedness, response and lessons learnt

GOVERNMENT OF NEPAL
MINISTRY OF HEALTH AND POPULATION
KATHMANDU, NEPAL

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Suggested citation:
MoHP. (2021). *Responding to COVID-19: Health sector preparedness, response and lessons learnt.* Kathmandu: Ministry of Health and Population.

Message from the PM

When the first COVID-19 case in Nepal was detected on January 23, 2020, the government of Nepal—much like the rest of the world—was in a state of confusion. The novel coronavirus was like a strange, unwelcome guest humankind knew nothing about. The best the government could do was put together its best doctors who specialised in infectious diseases, isolate the patient who had contracted the virus and protect the rest of the nation while it prepared a robust plan to tackle the virus.

On March 1, the government formed the High-level Coordination Committee for the Prevention and Control of COVID-19, which later became the COVID-19 Crisis Management Centre, to curb the spread of the virus across the country. It imposed a nationwide lockdown and a ban on international flights and Point of Entries to stop the inflow of people into the nation.

Despite having limited resources at hand, the Government of Nepal was able to tackle the crisis effectively and was able to avoid it turning into a catastrophe. This was only possible because of smooth multi-sectoral engagement, with assistance from the World Health Organization, UNICEF, among other partners.

The government also implemented effective information disseminating measures, through SMS and caller tunes services, educating the masses about the importance of social distancing, mask use, hand washing and sanitizing. The government also made COVID-19 treatment free in government hospitals and established quarantine and isolation facilities.

The months-long lockdowns bought the government the time it needed to build the capacity of the country's health system for surge response. The lockdowns also assisted the government in capacity building of the Ministry of Health and Population, including molecular laboratory capacity to increase testing.

Till date, the MoHP, under the government of Nepal, has carried out more than 21,000,000 PCR tests and it promises to continue conducting such tests. The government has successfully built 83 PCR testing laboratories.

Despite these efforts, there was no stopping the virus. Soon, cases grew. And the effect of the lockdowns was soon felt in multiple sectors—from the hospitality sector to the construction field. The very fabric of society was paralyzed.

But the timely measures the government adopted very early on in the pandemic, although distressing to those lowest in the economic strata, helped contain the spread of the virus to a great extent.

Education, health, drinking water and sanitation and employment were among the sectors hurt most by the pandemic, according to the Human Development Report 2020, published by United

Nations Development Program. However, according to the report, Nepal's growth for the next three-year period is projected to be at 5.3 percent—a positive statistics.

When the government eased the lockdowns, to not hamper the economy of the country further, the government did not stop the national pride projects and started working to secure vaccines.

As the number of COVID-19 cases dwindles, the country strives to get back up again. With the aid of India, the Government of Nepal was successful in procuring two million doses of vaccine in February.

Nepal is the second country in the South Asian region to start mass vaccination campaigns. Until March 20, over 1,650,000 people have been administered with the first dose of the two-dose virus.

The coronavirus pandemic brought with it much difficulty and pain, but it also taught governments across the world how important it is to be vigilant and prepared to handle such a crisis—as there will certainly be in the future. That is why, the Government of Nepal is now working on making the country's healthcare system stronger and resilient: already, in hospitals and health posts across the country, from 2492 (or 38. 4 percent) of hospital beds have been added, making the total of hospital beds in the country increased from 6,490 to 8,982.
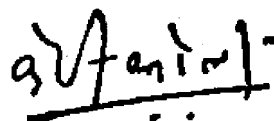
This year alone, the foundation of 309 hospitals at the local level have been laid. Once these hospitals are fully constructed, by the end of the next two years, an additional 8,000 beds will be available in hospitals.

Additionally, next year, 204 new hospitals will be constructed. In total, there will be a total of 300 ventilator beds, 400 ICU beds and 2,000 high-dependency beds. The government is also in process of constructing new 300-bed infectious diseases hospital in Kathmandu and a similar 50-bed hospital in each of the provinces.

The government is currently also committed to reducing deaths and increasing hospital capacity. And while the new variants of the virus might pose deeper challenges, the government is hopeful that strengthening the health system will overcome this issue.

I am glad that MoHP has come up with this useful resource that will serve as institutional memory for the whole nation. I would like to congratulate the team for making this happen.

Like countries across the world, Nepal too was at a loss of how to handle this unprecedented crisis. Economies around the world collapsed, and the stress was felt here too. But the Government of Nepal persevered and with preparedness, resilience and clear communication with the public, it was able to meet the crisis head-on.

Hon. K.P. Sharma Oli
Prime Minister

Message from the Health Minister

There is no doubt that COVID-19 is the biggest viral threat humankind has had to face this century. The pandemic has not only caused immense damage to human life but also put the world economy on a standstill, pushing millions further into poverty.

When the first-ever case surfaced in Wuhan, China, on December 31, 2019, we had no inkling of the crisis that awaited us.

It took less than a week for the virus to reach Nepal, with the first case being detected on January 23, 2020. The country responded quickly with varying public health interventions in an effort to curb the spread of the virus, but the government did not have any infrastructure in place to carry out tests. However, sensing the urgency of conducting as many tests as possible, the Ministry of Health and Population jumped into action and within a few months we were able to enable over 80 labs with the capacity to test over 10,000 samples a day.

To further bolster its response to the virus, under the Deputy Prime Minister and the Minister for Defence Ishwar Pokhrel, the government formed the Corona Crisis Management Centre (formerly functioning as the High-level Coordination Committee) on March 1, 2020 (Falgun 18, 2076).

Under the new body, all three tiers of government worked together tirelessly to keep the spread of the virus under check by conducting as many daily tests as possible while restricting public movement and ensuring the construction of proper quarantine facilities. The Ministry also prepared a number of COVID-19- related directives to be followed by the general public. Anticipating a huge inflow of patients, the Ministry trained hospital staff, doctors, and nurses on how to handle overwhelming situations. As the government had announced a nationwide lockdown much before cases had proliferated, it also had time to train lab technicians to handle tests, as well as security personnel. The Ministry also kept all information related to COVID-19 transparent with the public and broadcast a daily media briefing to provide updated information.

The Ministry effectively coordinated with its neighboring country, India, who generously donated 1 million vaccine doses. The vaccination drive has begun and the MoHP has been directed by the Cabinet to purchase additional vaccine doses directly from India to vaccinate the elderly and other vulnerable groups.

I would like to thank WHO, UNICEF, and other external development partners for their support in combating the crisis. My special thanks goes to MoHP officials, provincial level officials and local leaders for their coordinated efforts in dealing with the crisis.

This report contains detailed information about how the Government of Nepal tackled the crisis brought on by the novel coronavirus. In the following pages, readers will find not only an overview of the decisions, policies, and directives adopted by the Nepal government to fight the deadly pandemic but also the progress the Ministry made in its efforts to prevent and control the spread of COVID-19. We hope readers will be able to actively engage with the information thus provided.

Finally, I would like to thank the doctors, nurses, hospital staff, lab technicians, and everyone else who came forward and put their own lives at peril in such a time of crisis for the greater good of humankind.

Hon. Hridayesh Tripathi
Minister of Health and Population

Acronyms & Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral therapy
CCMC	COVID-19 Crisis Management Centre
CCMC-Ops	COVID-19 Crisis Management Centre-Operation
CCP	COVID-19 Confirmed Person
CDO	Chief District Officer
CEO	Chief Executive Officer
CICI	Case Investigation and Contact Identification
CICT	Case Investigation and Contact-Tracing
CICTT	Case Investigation and Contact-Tracing Teams
CMDN	Centre for Molecular Dynamics
CTCF	Contact Tracing and Contact Follow-up
DCCMC	District COVID-19 Control and Management Committee
DoHS	Department of Health Services
e-LMIS	Electronic- Logistics Management Information System
EDCD	Epidemiology and Disease Control Division
EID	Early Infant Diagnosis
EQAP	External Quality Assessment Programme
FAQ	Frequently Asked Questions
GOARN	Global Outbreak Alert and Response Network
GoN	Government of Nepal
H1N1	Hemagglutinin Type 1 and Neuraminidase Type 1- Influenza A
H2N2	Hemagglutinin Type 2 and Neuraminidase Type 2- Influenza A
H3N2	Hemagglutinin Type 3 and Neuraminidase Type 2- Influenza A
H5N1	Hemagglutinin Type 5 and Neuraminidase Type 1- Influenza A
HEOC	Health Emergency Operation Centre
HIV	Human Immunodeficiency Virus
HLCCC	High-level COVID-19 Coordination Committee
ICS	Incident Command System
ICU	Intensive Care Unit
IEC	Information, Education and Communication
IMU	Information Management Unit
IOM-TU	Institute of Medicine- Tribhuvan University
IT	Information Technology
MERS-CoV	Middle East Respiratory Syndrome Coronavirus
MoFAGA	Ministry of Federal Affairs and General Administration
MoHP	Ministry of Health and Population

NDRRMA	National Disaster Risk Reduction Management Authority
NGO	Non-Governmental Organization
NHEICC	National Health Education Information and Communication Centre
NHRC	Nepal Health Research Council
NHSSP	Nepal Health Sector Support Programme
NIAC	National Immunisation Advisory Committee
NIC	National Influenza Centre
NPHL	National Public Health Laboratory
NRCS	Nepal Red Cross Society
OPMCM	Office of the Prime Minister and Council of Ministers
OPS	Office of Public Safety
ORI	Outbreak Response Immunisation
PCR	Polymerase Chain Reaction
PhD	Doctor of Philosophy
PHEIC	Public Health Emergency of International Concern
PHEOC	Provincial Health Emergency Operation Centre
PHSM	Public Health and Social Measures
PLHIV	People Living with HIV
PMTCT	Prevention of Mother-to-Child Transmission
PoE	Point of Entry
PPE	Personal Protective Equipment
PSA	Public Service Announcement
RDT	Rapid Diagnostic Test
RRT	Rapid Response Team
RSV	Respiratory Syncytial Virus
RT-PCR	Reverse Transcription Polymerase Chain Reaction
SARS-CoV	Severe Sudden Acute Respiratory Syndrome Coronavirus
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SMS	Short Message Service
SOP	Standard Operating Procedure
SRMNCAH	Sexual, Reproductive, Maternal, Newborn, Child and Adolescent Health
STD	Sexually Transmitted Diseases
TIA	Tribhuvan international Airport
TOR	Terms of Reference
UN RCCE	United Nations Risk Communication and Community Engagement
UNICEF	United Nations Children's Fund
VTM	Vital Transport Medium
WHO	World Health Organization

नेपाल सरकार
...य तथा जनसंख्या मन्त्रालय
...१९ विरुद्ध खोप
...रम्भ

◄ *Rt. Hon. President Mrs. Bidya Devi Bhandari inoculated with first dose of COVID-19 vaccine in Tribhuvan University Teaching Hospital.*

▲ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli receives 1 million vaccines as gift from Government of India handed over by Ambassador of India to Nepal H.E. Vinay Mohan Kwatra. Also, seen in the picture is Hon. Mr. Hridayesh Tripathi, Minister for Health and Population.*
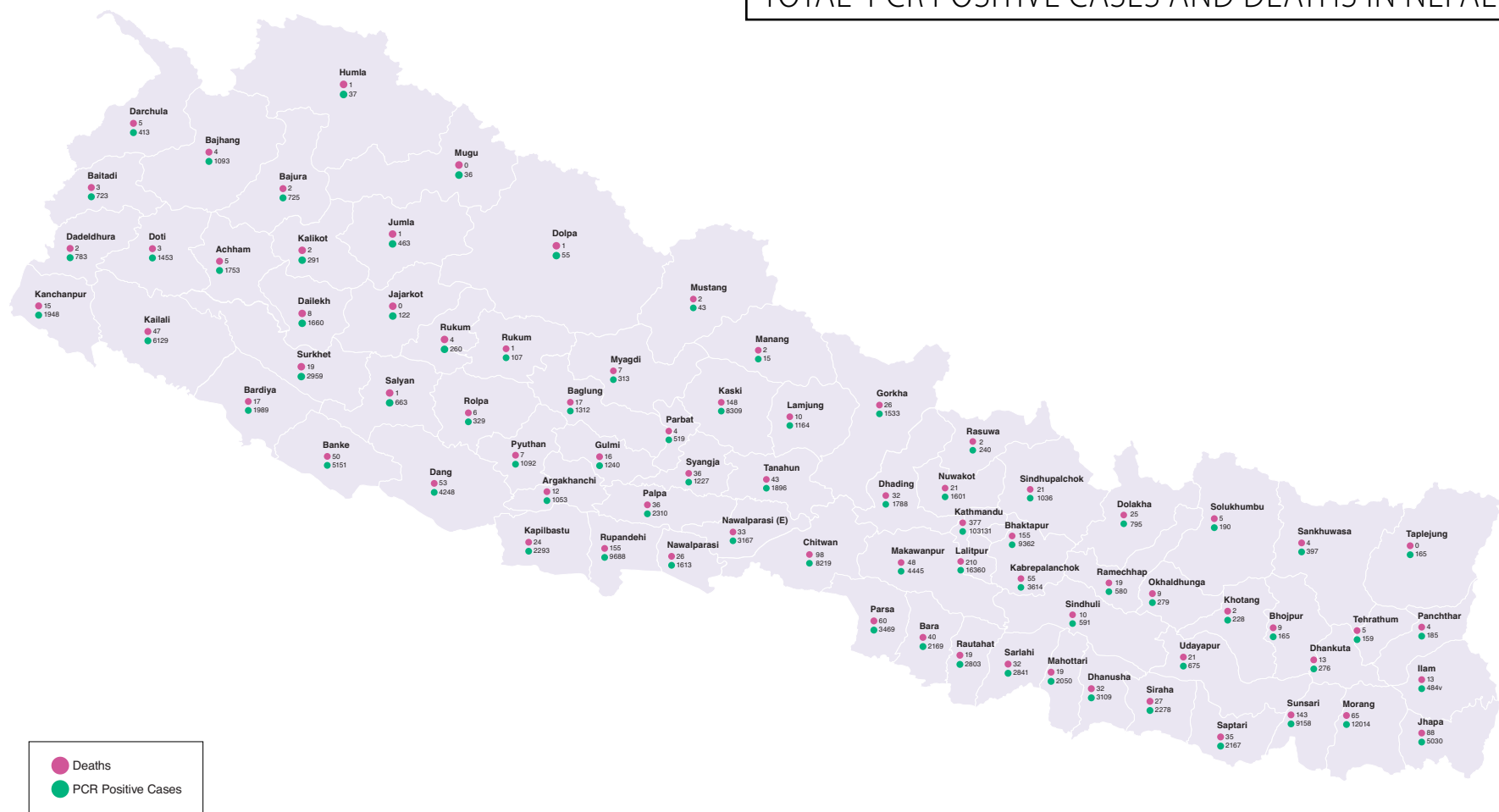
▲ *Hon. Mr. Hridayesh Tripathi, Minister for Health and Population receives 1 million vaccine gifted by Government of India from Ambassador of India to Nepal H.E. Vinay Mohan Kwatra in Tribhvan International Airport.*

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TOTAL PCR POSITIVE CASES AND DEATHS IN NEPAL

Humla
● 1
● 37

Darchula
● 5
● 413

Bajhang
● 4
● 1093

Mugu
● 0
● 36

Baitadi
● 3
● 723

Bajura
● 2
● 725

Dadeldhura
● 2
● 783

Doti
● 3
● 1453

Achham
● 5
● 1753

Kalikot
● 2
● 291

Jumla
● 1
● 463

Dolpa
● 1
● 55

Kanchanpur
● 15
● 1948

Kailali
● 47
● 6129

Dailekh
● 8
● 1660

Jajarkot
● 0
● 122

Mustang
● 2
● 43

Surkhet
● 19
● 2959

Rukum
● 4
● 260

Rukum
● 1
● 107

Manang
● 2
● 15

Bardiya
● 17
● 1989

Salyan
● 1
● 663

Rolpa
● 6
● 329

Baglung
● 17
● 1312

Myagdi
● 7
● 313

Kaski
● 148
● 8309

Lamjung
● 10
● 1164

Gorkha
● 26
● 1533

Banke
● 50
● 5151

Pyuthan
● 7
● 1092

Gulmi
● 16
● 1240

Parbat
● 4
● 519

Rasuwa
● 2
● 240

Dang
● 53
● 4248

Argakhanchi
● 12
● 1053

Syangja
● 36
● 1227

Tanahun
● 43
● 1896

Dhading
● 32
● 1788

Nuwakot
● 21
● 1601

Sindhupalchok
● 21
● 1036

Dolakha
● 25
● 795

Solukhumbu
● 5
● 190

Kapilbastu
● 24
● 2293

Rupandehi
● 155
● 9688

Nawalparasi
● 26
● 1613

Palpa
● 36
● 2310

Nawalparasi (E)
● 33
● 3167

Chitwan
● 98
● 8219

Kathmandu
● 377
● 103131

Bhaktapur
● 155
● 9362

Sankhuwasa
● 4
● 397

Taplejung
● 0
● 165

Makawanpur
● 48
● 4445

Lalitpur
● 210
● 16360

Kabrepalanchok
● 55
● 3614

Ramechhap
● 19
● 580

Okhaldhunga
● 9
● 279

Khotang
● 2
● 228

Bhojpur
● 9
● 165

Tehrathum
● 5
● 159

Panchthar
● 4
● 185

Parsa
● 60
● 3469

Bara
● 40
● 2169

Sindhuli
● 10
● 591

Udayapur
● 21
● 675

Dhankuta
● 13
● 276

Ilam
● 13
● 484v

Rautahat
● 19
● 2803

Sarlahi
● 32
● 2841

Mahottari
● 19
● 2050

Dhanusha
● 32
● 3109

Siraha
● 27
● 2278

Saptari
● 35
● 2167

Sunsari
● 143
● 9158

Morang
● 65
● 12014

Jhapa
● 88
● 5030

● Deaths
● PCR Positive Cases

Till 16 March 2021

XIII

▲ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli and Hon. Mr. Hridayesh Tripathi, Minister for Health and Population, observe as a health professional receives the first jab of the COVID-19 vaccine at TU Teaching Hospital.*

EXECUTIVE SUMMARY

Over the past year, the rapidly growing pandemic has brought unprecedented challenges to Nepal's health system. COVID-19 has had, and continues to have, deep implications for individuals, societies, and health systems across the country. When tackling a virulent virus like SARS-CoV-2, the virus that causes COVID-19, early interventions were crucial to stay ahead of the disease. The government was swift to act and impose the strictest restrictions in the early days of the virus spread. Yet, because of Nepal's limited resources, the country's health system is struggled to manage the rising number of COVID-19 cases—especially with regards to screening community cases, establishing diagnosis, and accommodating treatment at the available health facilities.

In order to coordinate systematically, the Incident Command System was activated by the Ministry of Health and Population (MoHP). Similarly, on March 2, the High-Level Coordination Committee—led by Deputy Prime Minister and Minister for Defence Ishwar Pokhrel—took a series of crucial decisions aimed at limiting the spread of COVID-19 in Nepal.

What we learned from our response against COVID-19 is that personal behavioral changes, such as handwashing and mask wearing, helped stem the tide of infections. Meanwhile, careful surveillance by testing and isolating new cases, and tracing their contacts rapidly and extensively were effective as well. Mitigation efforts, such as social distancing, needs to continue for as long as possible to avert future outbreaks.

This emergency has taught politicians and government officials the importance of having a resilient health system and how its absence affects all other domains. The government is therefore working to ensure a better health infrastructure, improve the quality of health services, and develop a strong public health system at large.

Preparing for an emergency

Following the emergence of COVID-19, the government activated the Infectious Disease Act 2020 (1964) to fight the pandemic. Section 2(1) of the Act enables the Government of Nepal (i.e. the federal executive) to take 'necessary action' and 'issue necessary orders applicable to the general public or a group of any persons' to 'root out or prevent' the development or spread of an infectious disease.

The government also formulated multiple guidelines and directives to ease the response process.

Health cluster activation

On April 9, 2020, the Health Cluster for COVID-19 was activated. It was led by the Incident Management System (IMS) coordinator and co-lead. After its activation, cluster meetings were carried out every week on Thursdays and attended by all the high-level officials of the MoHP, including advisors, chief specialist, director general, joint secretaries and chief of the Health Emergency Operation Centre (HEOC), as well as more than 52 agencies and 200 partners and all seven leads and co-leads of the provincial health clusters. From June 9, as the epidemic escalated, the chair and co-chair split the provincial health cluster

The Incident Command System was activated by the MoHP. Similarly, on March 2, the High-Level Coordination Committee, led by Deputy Prime Minister and Minister for Defence, Ishwar Pokhrel, took a series of crucial decisions aimed at limiting the spread of COVID-19 in Nepal.

and partners coordination meetings to Tuesdays and Thursdays respectively. This was done to ensure there was more time for discussions, identification of issues, and challenges and responses by the chair on behalf of the MoHP.

Effective communication

In the early days of the pandemic, government officials realised that raising general awareness about the novel coronavirus would be instrumental in keeping COVID-19 cases under control. Thus, right off the bat, along with issuing strict lockdown measures, the government primarily focused on relaying effective information to the public to increase risk communication and community engagement. The MoHP immediately began issuing press briefings and daily situation briefs to ensure uniformity in the information that was passed on to the press and the public. To ensure the general public remained updated on news related to the virus, the MoHP employed various mediums, such as mobile applications (like Hamro Swasthya), call centre hotlines, and social media platforms like Facebook and Viber, among others. It also made use of specialised COVID-19 programming on TV and radio (supported by UNICEF), direct outreach through social influencers and celebrities, interviews and public/media appearances by MoHP/DoHS officials on national and local media, and daily media briefings. In addition, the MoHP worked hard to beat the infodemic that had been leading to the spread of misinformation around COVID-19 all with the support of a strengthened communication team of WHO as part of the UN-RCCE team.

Points of Entry

After the first COVID-19 case was detected in the country on January 23, 2020, the government spent all its energy on implementing preventive measures, which included the formation of the High-Level Coordination Committee under the chairmanship of the Prime Minister and the Minister of Defence. The country had to make provisions in terms of health infrastructure and resources as well. Following the case detection, thermal scanners were installed at Nepal's only international airport, Tribhuvan International Airport, to monitor the temperatures of people coming into the country.

On March 11, those arriving from countries where community transmission had manifested were mandated to stay in self-quarantine. Furthermore, in all 43-border connecting areas of the country, health screening mechanisms, consisting of questionnaires for symptoms and temperature screening, were instituted. Then, on March 14, all entry visas were suspended and the ground crossing points of entry were shut down and the health desks at the POEs strengthened before reopening later.

Epidemiological and response trajectory

Nepal had very few cases of laboratory-confirmed COVID-19 till about the middle of April, which is when the Nepali New Year is celebrated. Over a period of four months—ending in the middle of July—cases increased, peaked and went down to make up the first but geographically limited wave of the pandemic. These cases consisted of expatriates returning home by air or through land crossings; during this time, polymerase chain reaction (PCR) tests were undertaken at less than 20 laboratories across the country.

The middle of July witnessed the generalised wave. This time, cases were much higher than projected. The healthcare infrastructure was overwhelmed, with a huge burden being placed on the public health system. The total number of laboratories in the country had reached 70 by then, a large chunk of it in the private sector, mostly located in and around Kathmandu. There were more symptomatic cases and the load on hospitals was heavier; distinctions between normal and designated COVID-19 hospitals were removed, and there was major dependency on intensive care infrastructure and ventilator support.

Bagmati was the first province in the country to detect a case of COVID-19 in Nepal, back in early January 2020. The first case developed symptoms on January 3 in China, was in transit and screened at the Tribhuvan International Airport, and confirmed on January 23. February brought in no new cases. March had two and April had four cases—all in Kathmandu Valley. Since May, 12 of the 13 districts started reporting cases regularly with a monthly total of 38. June and July saw cases in the hundreds, and all districts were reporting by then. Cases jumped to 6,721 in August, trebled to more than 21,000 the next month, and reached over 60,000 in October. November witnessed a drop in cases with a total of 38,476.

Towards the end of March, there were five positive cases across Nepal in individuals who had arrived from China, Europe, and the UAE; they were placed in isolation in COVID-19-designated hospitals in Kathmandu. Trained personnel under the Epidemiology and Disease Control Division (EDCD) were mobilised along with WHO field personnel to conduct extensive contact tracing based on their flight details and movement history to identify individuals with potential infection.

By April 4, six additional cases had been recorded in people who had recently returned from abroad. The same day, a 34-year-old woman from Kailali district tested positive for SARS-CoV-2; she did not have any prior travel history. This marked Nepal to be at the second stage of infection transmission.

During this time, Nepal tried its best to increase the number of isolation and quarantine facilities, along with the provision of essential PPE. By April 2, 26,587 beds had been allocated for quarantine facilities throughout the country, while only 3113 beds had been assigned for isolation.

Formation of CICT

The Case Investigation and Contact Tracing (CICT) teams—with the coordination of the EDCD, the district health office team, and local level authorities—in Kathmandu Valley and WHO field personnel were formed as it had the most concentrated number of cases in the country. The first among the three districts in Kathmandu Valley to implement contact tracing was Lalitpur, on July 26, 2020, which was followed by Bhaktapur and then Kathmandu on August 3 and 8 respectively.

In August, meetings were held with the High-Level Coordination Committee for the Prevention and Control of COVID-19 and the mayor forum. In an effort to run contact tracing systematically, measures were micro planned in meetings with mayors, deputy mayors, health office chiefs, district COVID-19 focal persons, health coordinators, and EDCD officials.

The first among the three districts in Kathmandu Valley to implement contact tracing was Lalitpur, on July 26, 2020, which was followed by Bhaktapur and then Kathmandu on August 3 and 8 respectively.

Dead body management

In March 2020, the government gave the responsibility of managing the bodies of those who had died of COVID-19, or were suspected to have died due to the coronavirus, to the Nepal Army.

When a COVID-19 patient passed away, whether in a hospital or at home, the hospital management or the local unit informed the COVID-19 Crisis Management Centre, after which a Nepal Army team was mobilised. The army verified the COVID-19 positive report and death certificate to deal with the dead body; it has detailed records of each body it has managed for funerals. Although there was some discrepancy in the data produced by Nepal Army and the deaths reported by the MoHP, the issue was resolved.

Information management

Initially, when there were only a few cases being reported, the National Public Health Laboratory would send the information to the EDCD, where the details were maintained in an Excel sheet. However, as cases began to surge and as multiple laboratories began reporting COVID-19 cases, handling the data in that format proved to be challenging. Therefore, other platforms such as GoData were then put to use.

In April, when cases began to surge, COVID-19-designated hospitals, laboratories, health directorates, Provincial Health Emergency Operations Centres (PHEOCs), and the Ministry of Social Development all began to report their own cases. This called for the development of a uniform reporting template, which was immediately shared with the stakeholders. However, challenges emerged due to the low compliance to the reporting template and the sharing of data in multiple forms—scanned copies, Excel sheets, or directly via email, among others.

The collection and collation of information was essential for the central HEOC since it had to disseminate information to the public and the media through daily situation reports, which depended on accurate information from laboratories across the country. The development of the IMU application and its maturity going forward will address this critical need.

Laboratory capacity

Early on, the National Public Health Laboratory (NPHL) knew that increasing its testing capacity would not only help curb the spread of the disease, but also help the government take stock of the real situation of the virus spread, which would aid in planning mitigation measures. But it had little experience in dealing with a crisis of this scale.

As the only reference laboratory in the country, the NPHL required high-level technical support in molecular diagnostics—which it lacked. This void was filled by an international expert, mobilised by WHO through the Global Outbreak Alert and Response Network (GOARN), who developed over 20 Standard Operating Procedures (SOPs) for COVID-19 testing in the country and provided hands-on training to the NPHL staff. With the training and SOPs in place, the NPHL started to formulate surge testing plans.

As cases increased dramatically (owing to infrastructural limitations, the PCR technology was perceived to be inadequate to detect all cases), the rapid diagnostic test (RDT) was introduced. This, however, was met with major challenges mainly due to the results that were generated and the variety of

kits that were employed. The RDT kits were used for the sake of getting early results and to allow for mass testing. However, observations showed a variation of results, indicating that RDT might have missed many positive cases despite its ease of use. Later, RDT-based testing was brought to a halt and real-time PCR-based diagnosis was solely promoted.

Laboratory capacity had to be increased across the country; the NPHL did not have the capacity to handle all the samples alone. The Ministry of Health and Population then began expanding its capacity for laboratory testing of COVID-19. Over the course of a year, starting with one public sector COVID-19 diagnostic laboratory in the country, the MoHP has now enable a network of 83 COVID-19 laboratories—in both the public and private sector. While many existing health institutions were repurposed for COVID-19 diagnosis, many new laboratories were established and covered all seven provinces. At present, there are 47 laboratories in the public sector and 35 in the private sector, with more in the process of approval. These 82 laboratories are capable of confirming COVID-19 through molecular testing. This rapid expansion of laboratories has increased access for testing and intern-contributed early case identification and contact tracing to contain the spread of the virus.

With the support of WHO and partners, MoHP is currently initiating the national consortium for pathogen gene sequencing that will address the enhancement of country capacity for early detection of variants of SARS-CoV2.

Health services and clinical management

Hospitals with reliable networks and strong capacity are essential for dealing with pandemics.

Although there are 25 hub hospitals across the country, this number was not enough for a public health emergency of international concern like the COVID-19 pandemic. The MoHP therefore added over 150 additional hospitals, including private service providers as designated COVID hospitals.

In April 2020, the Curative Services Division of the MoHP led a multi-sectoral and multi-partner team to design and develop a rapid assessment tool to assess 12 designated COVID-19 Level II hospitals.

The assessment showed gaps in multiple areas, including in ICU capacity, ventilators, infection prevention and control (IPC) measures, and human resources, among others. The major recommendation from the report was to increase human resource capacity while also developing a robust IPC programme. Among others, this would need to include training components for all healthcare workers and support staff, and a dedicated IPC budget.

The assessment paved the way to further plan resources in areas that needed enhancement.

The government also issued a guideline for COVID-19 and non-COVID-19-related services. Its main objective was to ease the treatment of suspected, possible, and confirmed cases of COVID-19, and continue non-COVID-19 services as well.

Operations support and logistics

It was during this time that the MoHP worked on the quantification of COVID-19 supplies and commodities, based on the estimated number of cases that might be admitted to hospitals. A joint project with the COVID-19 Crisis Management

Centre sought to identify potential hospitalisations of patients and the required hospital items.

During this process, it was agreed that 50 percent of the commodities would remain in stock, while the remaining would be distributed according to the needs of Level I, Level II and Level III hospitals.

Meanwhile, it was important for purchased and distributed items to be regularly monitored and to be planned accordingly. For this, the MoHP directed all its units to integrate the information on pandemic commodities within the e-Logistics Management Information System. This would provide an integrated platform to track the items and also identify procurement needs.

Similarly, to ensure the quality of the purchased goods, the MoHP developed technical specifications for COVID-19 commodities, based on the WHO Disease Commodity Package. This helped ensure the quality of materials while also maintaining uniformity of the items.

Personal interventions

Along with many policy-level interventions, the Government of Nepal devised a number of timely initiatives to curb the spread of the coronavirus.

Under the MoHP, various information, education and communication (IEC) materials were created with the motive of spreading awareness about social distancing, hand hygiene, cough etiquette, movement restrictions, as well as for identifying the symptoms of the disease and for staying alert. These messages were particularly directed towards the most vulnerable populations.

The materials—mostly in the form of infographics and other forms—were broadcast on television, print, and radio, or published on social media and the MoHP's official sites. Information boards about COVID-19 preventive measures were also placed at major public junctions. Such initiatives helped raise public awareness about COVID-19; this turned out to be of vital importance in combating the virus, and in reducing fatality rates. As of January 2021, Nepal's fatality rate is 0.72 percent.

Besides the dissemination of educational materials, public engagement programmes were also organised. A major focus of these programmes was to teach people to make use of quarantine facilities. This was successfully done by providing them incentives for self-registration and home quarantining for those returning from abroad.

Another major focus of the educational materials was stigma mitigation. As cases rose significantly, stigma related to COVID-19 positive patients increased, particularly in quarantine camps against people from the lower class and caste strata. The purpose of the educational materials was to eradicate that stigma.

Community interventions

Meanwhile, the government also initiated contingency planning and preparedness interventions, including the dissemination of communication materials to raise community-level awareness across the country.

In terms of community interventions, the first step the government took was to effectively shut down operations of public places that hosted more than 25 people. These included offices, schools, malls, and others.

The first nationwide lockdown began on March 24, right after the confirmation of the country's second COVID-19 positive case. Though damaging to the economy, the move was crucial in building the capacity of the nation's response efforts. The complete lockdown, which included the closure of everything except essential services, stopped any kind of movement in the country. This gave the MoHP enough time to control cases while training their personnel, in terms of handling the novel virus and in dealing with the mental pressures that came with it.

The government also encouraged all offices to issue work-from-home and shelter-in-place orders. It ordered the release of prisoners to less congested jails, waived off school examinations, and made mask wearing mandatory during outings; it even started fining those who refused to wear masks and did not follow social distancing rules. The government also made it mandatory for services that were open, like supermarkets, to mark their floors for social distancing in queues, and to provide hand sanitisers and thermal scanners at all entrances.

Essential service continuity

The COVID-19 pandemic threatened to derail the triumphs made over the years in the public health sector. With the introduction of national lockdowns as part of the pandemic control strategy, concerns around the disruption of essential healthcare services, including child and maternal health, was anticipated.

Yet, on March 23, 2020, following the COVID-19 outbreak, the government decided to suspend the Measles-Rubella vaccination campaign. However, stopping it for a long period would mean a surge in these cases. Thus, after a month, the MoHP

requested all units to continue the vaccination programme by following adequate precaution measures. More importantly, a cabinet decision on May 6 asked all government entities to not stop the immunisation programme as it could derail the public health gains achieved over the years.

Despite the pandemic, the government successfully launched the Rotavirus vaccine under its routine immunisation. Since then, health facilities have been administering the required immunisation to children.

Sexual, reproductive, maternal, newborn, child and adolescent health (SRMNCAH) was formally included as part of the Country Preparedness and Response Plan strategy to combat the consequences brought about by the coronavirus, and the interim guidelines for these SRMNCAH services were endorsed. Two rounds of rapid assessment also took place to check maternal and neonatal health and sexual and reproductive health service readiness and functionality. Furthermore, SRMNCAH services were monitored for maximum utilisation and availability, along with mapping for partners involved in SRMNCAH services. Also initiated was a separate department for C-section delivery. Additionally, a facilitators guide was developed, and more than 60 facilitators at the national and sub-national levels in all 77 districts were trained through orientation programs via online mediums.

In order to mitigate the burden of the disease, several HIV programmes were conducted during the COVID-19 pandemic. On March 20, 2020, an urgent meeting was carried out with the Ministry of Home Affairs in order to get approval for takeaway doses for opioid substitution therapy. Following this, on March 27, the interim guidance for managing

PLHIV and harm reduction programme for people who inject drugs was developed and then further updated on August 2.

Status of research

Nepal Health Research Council (NHRC) has been conducting research activities within the objectives and jurisdictions. During the one-year period, NHRC took an initiative to lead a SARS-CoV-2 /COVID-19 research. NHRC has been complementing Ministry of Health and Population to generate evidence to address the COVID-19 burden in the country.

Working in a federalised system

The federal government formulated various policies, guidelines, approaches, documents, and directives, and facilitated their implementation at the sub-national level to mainstream COVID-19 preparedness and response. It also built the capacity of various communities at the sub-national level through Incident Command Systems, district disaster risk management committees, rapid response teams, and Case Investigation and Contact Tracing Teams. In addition, the federal government provided provincial and local governments with supply chain management of diagnostic test kits, such as real-time polymerase chain reaction (RT-PCR) and rapid diagnostic tests (RDT) as well as personal protective equipment (PPE).

Aligned with the federal guidelines and directives, the respective provincial ministries of social development and provincial health directorates executed various preparedness and response measures.

The provincial governments developed guidelines on COVID-19 preparedness and response activities. They carried out risk communication and community engagement for the dissemination of real-time information and updates through the Internet and regular press releases and media briefings. Additionally, the governments coordinated with designated and hub hospitals for the management of COVID-19 cases and referrals to higher centres. They also worked on the supply chain management of essential commodities, such as PCR kits and PPEs, to local governments.

Local governments implemented preparedness and response activities according to the federal and provincial government mandates.

They followed guidelines from the federal and provincial governments to develop and distribute information, education and communication (IEC) materials, and mobilised community people, Female Community Health Volunteers in particular, to raise awareness about COVID-19 preventive measures. Local rapid response teams (RRTs) were also activated for this task. Additionally, municipal RRTs were made functional, and health desks were established at points of entry to screen returnee migrants.

Health system financing

The Ministry of Health and Population has disbursed funding to 72 different institutions to execute activities for the prevention and control of COVID-19. The funds have been allocated for infrastructure development, human resources support, medicine and instrument purchase, capacity development, as well as to run prevention and control programmes and other miscellaneous activities.

Lessons learnt and key successes

- Although necessary preparations were made in the health system to cope with the COVID-19 pandemic, things did not go as they should have. The government had enough time to establish laboratories and prepare isolation and quarantine sites, but work moved at a slow pace. This showed the limited intersectoral coordination and the lack of clarity in the roles of the three tiers of government. The government could also have taken steps to increase public confidence in its health system. This could have been done early on by establishing testing l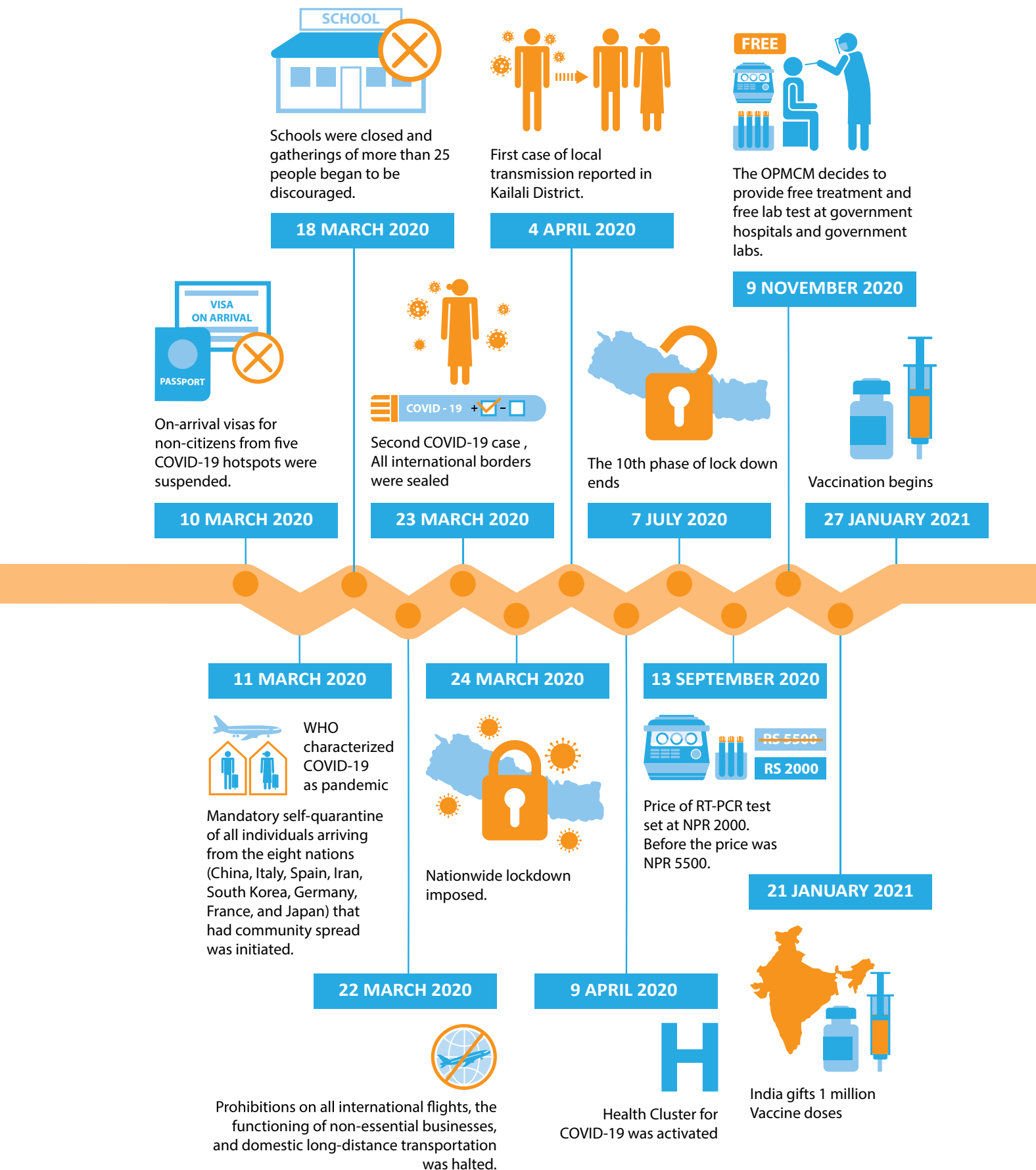aboratories and isolation sites, purchasing or producing essential items, and fulfilling the requirements of health workers. However, this did not happen. Local level budget and authority allocation in preparation for the pandemic could also have been carried out in advance, but this too took time.

- In order to address the pandemic, a test-trace-isolate strategy should be strictly and effectively implemented and conceived as a priority action. The testing capacity should be expanded to the vulnerable population as well as to people presenting signs and symptoms and their contacts. Coping with the pandemic—from the local to the federal level—will require proper training, a strong reporting and communication system, and strengthened capacity to increase testing services and contact tracing.

- The clinical management of cases needs to be effective, with a focus on hospital beds, ICU ventilators, and other medical supplies. Proper planning with different stakeholders is required while preparing infrastructure to combat COVID-19. At the same time, non-COVID patients should not be ignored by the health system.

- The MoHP should collaborate with the private sector to produce PPE, masks, and medical equipment, among others items. Industries and businesses, who have been severely impacted by the pandemic, should be given financial recovery packages as well.

- Compliance—in terms of social distancing, mask wearing, and sanitiser use—needs to increase among the public. To engage the public and increase compliance, respected personalities should be brought in to build community trust.

- The COVID-19 pandemic has shown the importance of international collaboration. International organisations should therefore be involved in training health workers and creating awareness about COVID-19 transmission. Diverting their regular programmes towards combating the coronavirus is the need of the hour.

- A fast and strong health response is critical for containing any pandemic. In the wake of the COVID-19 outbreak, the authorities need to show commitment towards refining the national health system—by enhancing surveillance and warning systems for contagious diseases and enriching the capacity of health workers—which will prepare Nepal for possible future health emergencies. Consistency and transparency are vital in information sharing. The sharing of real-time information about pandemic updates via advanced mobile technology is of utmost importance.

- A functional logistics system needs to be a top priority for the timely delivery of medical supplies. It is absolutely essential to procure sufficient quantities (while certifying quality) of medical supplies, and ensure a secure supply chain. Stable supply chains are necessary to make sure that supplies are provided on time during crises.

The first press meet to update on COVID-19, chaired by Secretary. Thermal Scanner installed at TIA.

24 JANUARY 2020

High level monitoring, steering & Technical Committees formed. Preparation of SOP for repatriation and quarantine initiative.

31 JANUARY 2020

All the samples collected from Quarantine site (175) tested negative for COVID-19.

19 FEBRUARY 2020

A Hubei, China returnee Nepali with suspicious symptom visited Shahid Shukraj Tropical and Infectious Disease Hospital. Throat swab was collected and sent to the WHO designated laboratory in Hongkong for confirmatory diagnosis.

The trading border with China was closed. HEOC started publishing daily Situation Update on CoVID-19.

Hotline service established 9851255839, 9851255837, 9851255834 to provide information to the public on COVID-19 (8:00 AM-8:00 PM).

COVID-19 Control and Management High-Level Committee was established to coordinate the federal government's response.

13 JANUARY 2020   **28 JANUARY 2020**   **4 FEBRUARY 2020**   **1 MARCH 2020**

23 JANUARY 2020   **30 JANUARY 2020**   **16 FEBRUARY 2020**

National Public Health Laboratory (NPHL) confirmed COVID-19 positive.

WHO declared COVID-19 as a "Public Health Emergency of International Concern" Medical teams deployed to PoE at Rasuwa & Tatopani; established health desk.

Nepal Airlines' aircraft airlifted 175 Nepali evacuees from Wuhan & kept in quarantine site at Kharipati for 14 days.

27 JANUARY 2020   **3 FEBRUARY 2020**   **26 FEBRUARY 2020**

NPHL capacited for 24/7 lab test of COVID-19 using the real-time RT – PCR tech. Video conference with PHEOCs.

for "Quarantine Procedure for Nepali Students repatriating from China, 2076" issued.

Activation of HEOC ICS

SCHOOL

Schools were closed and gatherings of more than 25 people began to be discouraged.

18 MARCH 2020

First case of local transmission reported in Kailali District.

4 APRIL 2020

FREE

The OPMCM decides to provide free treatment and free lab test at government hospitals and government labs.

9 NOVEMBER 2020

VISA ON ARRIVAL

PASSPORT

On-arrival visas for non-citizens from five COVID-19 hotspots were suspended.

10 MARCH 2020

COVID - 19 + –

Second COVID-19 case, All international borders were sealed

23 MARCH 2020

The 10th phase of lock down ends

7 JULY 2020

Vaccination begins

27 JANUARY 2021

11 MARCH 2020

WHO characterized COVID-19 as pandemic

Mandatory self-quarantine of all individuals arriving from the eight nations (China, Italy, Spain, Iran, South Korea, Germany, France, and Japan) that had community spread was initiated.

24 MARCH 2020

Nationwide lockdown imposed.

13 SEPTEMBER 2020

RS 5500
RS 2000

Price of RT-PCR test set at NPR 2000. Before the price was NPR 5500.

21 JANUARY 2021

22 MARCH 2020

Prohibitions on all international flights, the functioning of non-essential businesses, and domestic long-distance transportation was halted.

9 APRIL 2020

H

Health Cluster for COVID-19 was activated

India gifts 1 million Vaccine doses

▲ *Health workers attend to patients admitted at the Intensive Care Unit at Teku Hospital.*

TESTING TIMES

Since 1900, several disease outbreaks have become global pandemics or have turned out to be massive threats. These events include the influenza pandemics of 1918 (H1N1), 1957 (H2N2), 1968 (H3N2) and 2009 (H1N1); the 1997 H5N1 influenza outbreak in Hong Kong; and the Sudden Acute Respiratory Syndrome (SARS-CoV) outbreak in 2003; and the Middle East Respiratory Syndrome (MERS-CoV) outbreak in 2012.

Then came COVID-19.

On December 31, 2019, a novel coronavirus outbreak was reported to the World Health Organization (WHO) by Chinese authorities. On January 7, the WHO announced that they had identified the new virus. The novel virus was named 2019-nCoV, and was identified as belonging to the coronavirus family, which includes SARS and the common cold. The new coronavirus disease (COVID-19) caused by a novel pathogen (SARS-CoV-2) spread rapidly around the world in the early months of 2020, and within two months, on March 11, the WHO declared the viral outbreak a global pandemic.

It did not take long for the virus to make its way to Nepal. On January 5, a 31-year-old man, who was doing his PhD in Wuhan returned to Kathmandu from the Chinese city. He visited a hospital for respiratory problems and was admitted on January 13. He was discharged on January 17 after being put on observation for five days and after his health conditions improved. On January 23, he was confirmed Nepal's first COVID-19 patient. Following his positive confirmation, immediate actions were taken to strengthen the country's response to the spread of the virus, such as the strengthening of health desks at Tribhuvan International Airport—the country's only international airport—and gradually at other airports as well. The ground crossing Points of Entry (PoE) at the Nepal-China border and the Nepal-India border were also strengthened with health desks. Travel limitations were put in place on both sides of the borders.

The current COVID-19 pandemic has shown the world the devastating impacts emerging zoonotic diseases can have on societies. Over the past

It did not take long for the virus to make its way to Nepal. On January 5, a young man, who was doing his PhD in Wuhan returned to Kathmandu from China.

▲ *A health worker collects nasopharyngeal swab for PCR testing of COVID-19 of a person visiting Teku Hospital.*

year, the rapidly growing pandemic has brought unprecedented challenges to Nepal's health system too. COVID-19 has had, and continues to have, deep implications for individuals, societies, and health systems across the country. Due to its novelty and adverse impacts, the virus has put to immense test the country's already fragile health care system.

When the COVID-19 pandemic started to grip the world, Nepal responded quickly with varying public health interventions, such as border closures, quarantining, and physical distancing.

On March 2, the High-Level Coordination Committee, led by Deputy Prime Minister and Minister for Defence, Ishwar Pokhrel, took a series of crucial decisions aimed at limiting the spread of COVID-19 in Nepal. Then, on March 29, when the country was on the sixth day of a nationwide lockdown, the COVID-19 Crisis Management Centre, also headed by the Deputy Prime Minister,

was formed as the implementing agency under the High-Level Coordination Committee.

By early March, the coronavirus outbreak had already killed 213 people and infected over 9,000 in 20 countries, according to the WHO. Cases had since spread rapidly throughout the world at an alarming rate. But in Nepal the virus had yet to make its presence felt significantly.

On March 23, a 19-year-old Nepali student who had returned to Nepal from France via Qatar on March 17, tested positive for COVID-19. It was the second COVID-19 positive case for the country. Alarmed, the government announced stricter measures: a complete lockdown across the country; restrictions on incoming passengers, including Nepali citizens, from more than 50 countries in Europe, the UK, the Gulf and West Asia; the shutdown of all non-essential services; and a ban on all long-haul travel across the country. In addition, the nation-wide Secondary Education Examinations were

▶ A laboratory health worker processing specimen for SARS-COV-2 PCR Testing.

postponed; all gyms, health clubs, cinema halls, and dance bars were asked to close; and all gatherings of more than 25 people were forbidden.

The nationwide lockdown was imposed while the newly written law passed through Parliament, provided special powers to the government to address the pandemic situation.

Besides these measures, the Government of Nepal took initiatives to bring back Nepalis stranded in foreign lands. On February 15, the government repatriated 175 Nepali citizens—mostly students—from Wuhan, the site of the pandemic outbreak. They were quarantined and allowed to go back to their families after testing negative.

In May, the Ministry of Health and Population developed a COVID-19 emergency response plan, with a strategy of 'flattening the curve' and delaying the epidemic peak to reduce the health impact of the pandemic. Under the plan, adequate institutional quarantine facilities were arranged by mobilising available infrastructure, such as schools, campuses, hostels, hotels and other facilities across the country, particularly focusing on Kathmandu Valley and its bordering districts. Additionally, case-investigation and contact-tracing teams (CICTTs) were also formed and mobilised at the local level.

To ensure public safety, existing public health and community-based networks, community-based organisations, and youth networks were engaged to disseminate trustworthy information regarding COVID-19 transmission.

Another distinct feature of Nepal's response was the recommendation by the government that widespread use of facemasks (mass masking) be adopted to reduce disease transmission by infected

▲ A health worker fills the form of a person before collecting their swab for PCR testing for COVID-19.

people (regardless of symptoms), as well as to protect the symptom free probably as yet uninfected.

Despite the measures in place, many COVID-19 cases were reported in quarantine centres, with intermittent clusters noted in densely populated areas. Thus, stringent contact tracing and isolation of suspected patients were advocated by the community health teams at local levels and polymerase chain reaction (PCR) testing was expanded, keeping up with the WHO's 'Test, Test and Test' strategy.

Moreover, health facilities and testing methods were identified and readied for possible community spread. The early identification of such patients was further facilitated by the deployment of rapid tests, with results issued within 24 hours.

In addition, an existing legislation in the Nepalese Infectious Disease Control Act 2020 (1964) was activated, which enabled officials to access information

Despite the measures in place, many COVID-19 cases were reported in quarantine centres, with intermittent clusters noted in densely populated areas.

▲ *Doctors and nurses attend to a COVID-19 patient admitted at Teku Hospital.*

that could aid in controlling/containing COVID-19 if necessary. The close contacts of confirmed cases or travellers returning from high-risk countries were required to be quarantined at home for 14 days. During this period, people were monitored through a combination of personal phone calls by a call centre and occasional in-person checks.

When tackling a virulent virus like SARS-CoV-2, early interventions are crucial to stay ahead of the disease. And in Nepal, the government was swift to act and impose the strictest restrictions in the early days of the virus spread. Yet, because of Nepal's limited resources, the country's health system struggled to manage the rising number of COVID-19 cases— especially with regards to screening community cases, establishing diagnosis, and expanding treatment at the available health facilities.

As a part of its public health measures, Nepal exercised a series of complete lockdowns starting March 24, 2020. The country made impressive progress in expanding its laboratory capacity from one to 82 during the past year.

Yet, the existing diagnostic facilities for testing and confirming COVID-19 cases are insufficient, and the provision of such services in the peripheral parts of the country is still largely inadequate. Many hospitals in Nepal have been designated as hub hospitals, which provide dedicated spaces with isolation facilities for COVID-19 patients. However, most hospitals struggled with the surge of COVID-19 infections, mainly due to limitations on resources, including intensive care units (ICUs), isolation wards, and human resources.

The response measures have included the 6Ts: timely action, testing, tracing, tracking, treatment, and togetherness. Primary focus was given on contact tracing, testing and isolation of cases, and quarantine of close contacts. But despite these efforts, the country only managed to delay the spread, and did not succeed in preventing the transmission of the virus. Still, the current trend indicates that new cases are decreasing. To contain the spread of the virus and continue protecting people from COVID-19, the government needs to increase active surveillance, PCR-based testing, case detection, contact tracing, isolation, and quarantine measures especially to content emerging strains of the virus from spreading.

Over the last 12 months, the COVID-19 pandemic has created significant public panic and distress. The challenges that Nepal has faced during this crisis— particularly in relation to its health system, its infrastructure, coordination and resources—has been immense. In its struggle to tackle the pandemic, the country has strained its limited human and financial resources. And the consequences of the crisis have been severely felt by front liners, particularly health care service providers and daily wage-workers, and the repercussions of the pandemic on the country's economy have been devastating. This emergency has taught politicians and government officials the

importance of having a resilient health system and how its absence affects all other domains, and the government is working to ensure a better health infrastructure and ensure the quality of services.

Despite the challenges, especially those arising from Nepal's being a low-income country, the government and its people have done their best to tackle the disease. The containment of the virus requires extraordinary efforts, trust, and cooperation from the government and citizens. It also requires regional and international cooperation and assistance.

In the meantime, vaccine was also made available.

On December 11, 2020, the world's first vaccine to treat COVID-19, produced by Pfizer-BioNTech, was approved for emergency use in the US. On December 30, 2020, the Oxford-AstraZeneca vaccine was approved for emergency use in the UK. In Nepal, the Indian version of the Oxford-AstraZeneca vaccine was approved for emergency

use on January 15, 2021. The Government of Nepal is also in talks with other vaccine manufacturers to procure more vaccines, and it will also be provided with vaccines by the global alliance COVAX.

In the meantime, the government has begun inoculating the frontliners and other at risk groups following the donation of 1 million vaccine doses from the Government of India. It has also been in talks with multiple companies and international agencies to secure the required vaccine doses to vaccinate the people.

Till date over 1,650,000 people have been vaccinated.

But vaccinating Nepalis in the required numbers will take time. In the meantime, prevention is still the best option we have, to ensure which the best intervention is breaking the transmission chain of the virus. At the moment, Nepal is managing to keep its head above water. But the fight against COVID-19 is far from over.

The containment of the virus requires extraordinary efforts, trust, and cooperation from the government and citizens. It also requires regional and international cooperation and assistance.

◀ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli and Hon. Mr. Hridayesh Tripathi, Minister for Health and Population, launch the nationwide COVID-19 vaccination drive with health workers and frontline workers on 27 January 2021.*

THE FRONTLINERS

The good doctor

In the past year, Dr Anup Bastola, chief consultant at Sukraraj Tropical and Infectious Diseases Hospital (Teku Hospital), has barely been home. The beginning of 2020 had looked promising for him—work had been going well and he had recently become a father. But by the end of January, COVID-19 had arrived in Nepal. By March, more cases had been confirmed and things were starting to look grim.

"I have been pretty much living at the hospital since March last year," says Bastola, who has been leading the COVID-19 team at Teku Hospital. "Whenever I've gone home, I've stayed in isolation. I have aging parents, a wife and a child. I cannot put them in danger."

When the pandemic was in its early days, Bastola's son was about six months old; now, he's a year and a half. "I have missed so many priceless moments," says the doctor. But although staying away from his child and family has been tough, Bastola knows that work needs to come first during these unprecedented times. "As a doctor, when duty calls, I have to answer," he states.

At the beginning of the pandemic, Teku Hospital was the only COVID-19 designated hospital in the country, which meant all positive cases came to Bastola and his team. As the virus was new then and the information paltry, there was a lot of anxiety and fear. "Everyone was scared of contracting the virus while handling patients. We had no idea what we were dealing with," he recalls.

To add to it, the hospital, like many across the world, was ill-equipped to tackle the virus.

"The PPEs that we had were not enough; there were no ventilators and only a few beds in the ICU. We had to make quick decisions and make do with what we had," says Bastola, who has 13 years of experience in handling infectious diseases. Thus, instead of focusing on what they lacked, Bastola prioritised on what he could do to lead his team through the crisis. Proactively, he started work on floor planning

"There was not enough PPE, no ventilators and only a few beds in the ICU. We had to make quick decisions and make do with what we had."

■ *Dr Anup Bastola, Senior Consultant, Teku Hospital*

"I remember a patient, an old man in his 60s. He was in very low spirits and he just hugged me and cried with me for 30 minutes. He had recently lost his son, and here he was isolated with strangers fighting for his own life while still coming to terms with his son's death"

informed by IPC assessment and contingency planning that was performed during the initial days of pandemic followed by training human resources, and providing his team and patients counselling to reduce mental stress.

Bastola also put together four teams, each having four doctors. Under his leadership, 29 beds of the hospital were dedicated to COVID-19 patients. Additionally, 13 anesthetists were inducted, quarantine facilities were quickly managed, five new ventilators were added, the general ward was turned into an ICU, and an oxygen plant was built. Bastola also started a counselling and a physiotherapy team for COVID-19 patients. Furthermore, a team of nursing staff (totaling 26 nurses) was available 24/7.

The uncertainty and the disconnect that the patients in isolation felt was not unnoticed by Dr Bastola. He ensured that there was Wi-Fi for them to stay in touch with the outside world, and also arranged phones for patients to speak to their families. Yet, every day, new challenges arose.

Cases were rising daily and the hospital was flooded with patients. The staff, along with the doctor, had to toil around the clock. "We worked every single day for the past year. We gave it all we had," he says.

But despite the long hours and exhausting days, the most difficult responsibility for Dr Bastola has been something else: informing the families and friends of patients when they've passed away. "There's no worse feeling than that. It is even more challenging now because they do not even get to say their final goodbyes," he states.

It is not easy for the doctor to see his patients lose the battle against COVID-19 either. "I remember all of our patients. Pudasini ba, Pariyar ba, Panta ba, Karki ba—I remember them all," he says. "While they were here with us, we were all they had and they us. Losing them was tough on all of us."

Patients spent at least a month in the hospital, particularly in the early days when they were not allowed to be discharged without two negative tests. This meant the patients and the hospital staff became close.

"We had a patient, a man in his 60s," says Bastola. "He was in very low spirits and he hugged me and cried with me for 30 minutes. He had recently lost his son, and here he was isolated with strangers fighting for his own life while still coming to terms with his son's death."

Despite all these challenges, under his leadership, Dr Bastola was able to successfully turn around the stagnated image Teku Hospital had for so long. "For the public, Teku Hospital was where people went to for snake bites. But in the past year, the hospital became the general public's centre for COVID treatment," says Bastola. "People trusted our services and came to us. At the end of a long day at work, the fact that they trusted us with their lives gave us strength to continue."

None of this would have been possible without the backing of his staff. "A leader is nothing without a hardworking, loyal team," he states. He credits the services the hospital provided to the public to the extra effort, time, and dedication given by the staff. "Despite our limited resources, we had a low case mortality rate of 10-12 percent. I think it was because of all the other factors that we paid attention to that patients were able to find strength in fighting the virus," he says.

As challenging as the past year has been, Dr Anup Bastola believes it was a chance for frontliners like him to write history. "The pandemic has put to test everything we know," he says. "It has taken away loved ones, exhausted us, even made us cry. But the year was also a chance for us to do our best to save lives, and I believe we have done great work."

Carrying on in the face of adversity

When 2020 began, Dr Runa Jha, like millions across the world, did not think the year would turn out the way it did. While news on the suspicious flu cases that were being reported in Wuhan, China, was widely followed, few anticipated the manner in which the novice virus would upend lives across the world.

"When the first case was reported in Nepal on January 23, we conducted an influenza test, which came out negative. At that time, we did not have the means to test for the novel coronavirus. So, we sent the sample to Hong Kong which sent back a positive confirmation," says Jha, chief pathologist and director at the National Public Health Laboratory (NPHL). The NPHL is linked with 277 government laboratories across the country and is the only lab authorised to conduct COVID-19 testing. "Realising the virus had made its way to Nepal, we immediately set up PCR testing services at the lab," she adds.

In the past year, Jha and her 67 team members have played a crucial role in the frontline response to COVID-19.

Her team, which originally only consisted of six people, was put to its paces for the first time when they had to test all 175 Nepalis who were evacuated from Wuhan by the Nepal government on February 15, 2020. "Considering how little we knew about the virus, everyone was scared of contracting it," she recalls. "In addition to the fear that was there, we had only one night to run all the tests. We worked all night to deliver the results." In the end, all 175 Wuhan evacuees tested negative.

But her team, which originally only consisted of six people, was put to test for the first time when they had to test all 175 Nepalis who were evacuated from Wuhan by the Nepal government on February 15.

■ *Dr Runa Jha, Director, NPHL*

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"We had to mobilise personnel from other labs and switch to automated extraction for the tests. This meant we could conduct at least 1,000 tests a day. Everything happened suddenly, but we did our best to prepare with the limited means we had."

This news was met with a lot of scepticism. "People did not believe in the authenticity of our reports," she says. With naysayers questioning the laboratory's credibility, Jha had to prepare for what was to come.

The first step was coming up with a working schedule to mobilise personnel. "In the initial days, and with the lockdown in place, there weren't a lot of cases and we could make do with the staff we had," says Jha. But as panic spread across the world and people started coming back home, the number of cases started to grow exponentially. The NPHL thus had to mobilise personnel from other labs and switch to automated extraction for the tests. This meant they could conduct at least 1000 tests a day. "Everything happened suddenly, but we did our best to prepare with the limited means we had," she adds. By now, Jha's teams had started working in two 10-hour shifts, with the lab closing only from 3 am to 8 am. "Everyone was working day and night, with many living here at the lab itself. We forgot what a day off was like," says Jha.

Still, despite the team's efforts, their work was met with a lot of criticism. "It was very discouraging," says Jha. "We were all in this very new situation, tackling a virus no one knew anything about. Working day in and out with such a contagious virus, knowing very well you could get it and infect your family took an emotional toll on all of us." But then all Jha had to do was remind herself of why she had become a pathologist in the first place. "I pushed on because I'm here to help save lives."

There were also other logistical challenges in addition to the criticism. For instance, dispatching reports was tough because the channels were not defined yet. "But over the months, we started SMS facilities, which have made things much easier," explains Jha.

Overall, the pandemic has been a learning experience for the pathologist. One major lesson has been the importance of being prepared for crises. "And the most important thing I learned is that when there's a lot of pressure there is also a lot of negativity. But in the face of adversity, we learned to keep going."

To the point of exhaustion

No family, no sleep, no food or water, not even bathroom breaks—this was how the staff at Patan Hospital worked through the COVID-19 pandemic.

"It was a difficult time," recounts Rachana Shrestha, deputy nursing director and administration and infection control officer at Patan Academy of Health Sciences (PAHS). The staff at Patan Hospital—which is the PAHS' teaching hospital—had to work 12-hour shifts, with only one break, which was for lunch. They had to don Personal Protective Equipment (PPE) and stay in the COVID-19 ward the entire time. "We could not drink water, eat snacks, or go to the bathroom because that would require taking off the PPE and putting it back on again, which was just too time-consuming," explains Shrestha. "The female staff could not even change their pads when on their period." In her capacity as the infection control officer, Shrestha also had the added responsibility of coordinating among the various departments, supervising the treatment of infected patients, and managing equipment, such as testing kits. She was on-call 24 hours a day. In fact, for the first three months of the lockdown from March to June, she did not even go home.

A major issue that Patan Hospital faced during this time was a shortage of PPE, masks, and sanitisers. Nevertheless, the hospital managed to purchase a certain number of the items, while some were acquired through donations. But the PPE suits they received happened to be of the wrong size.

"The suits were designed according to the height of tall foreigners. So, they did not fit our personnel,

"We were dealing with COVID-19 patients first-hand but we didn't know much about what we were actually dealing with, and that caused a lot of panic."

■ *Rachana Shrestha, Deputy Nursing Director, Patan Academy of Health Sciences*

especially the women," says Shrestha. "They were difficult to put on and take off and, as a result, increased the chances of the wearer getting infected."

To get around this problem, PAHS started making its own PPE, which were multi-layered, waterproof, and included a balaclava, gown, shoe cover and boot. These suits could be used a handful of times and were made considering the proportions of the hospital personnel. So, they fit perfectly. The housekeeping staff at PAHS also made cloth masks for health workers stationed outside the COVID-19 ward.

Patan Hospital's preparations for the pandemic had begun even before the coronavirus reached the country. In fact, the hospital and its team had been making arrangements since the virus first emerged in Wuhan, China. On January 26, 2020, Patan Hospital held a multispecialty meeting and formed a task force that consisted of representatives from various departments, each having specific roles and responsibilities. This task force held continuous meetings and oriented other employees about infection control. Other hospitals also approached PAHS for training and, even though it stretched their resources and added to their already long list of responsibilities, they did not turn down the requests.

The hospital also allocated 11 beds for coronavirus patients and converted a new 21-bed Intensive Care Unit (ICU) into a COVID ICU. A whole floor of its surgical ward was adapted for isolation, and an under-construction building was completed within a matter of days to be used as a COVID ward. All of this helped the hospital separate 127 beds for infected patients in its three wards: ICU, COVID, and Isolation. But, as the number of patients grew, this proved insufficient and the hospital increased its capacity to 249 beds and added COVID NICU and BICU and COVID maternity wards.

While Patan Hospital was grappling with a shortage of beds, it was also facing a lack of human resources. Nearly 500 of its staff were infected and had to be isolated, and it could not recruit new workers. Many did not wish to go into the COVID ward. Shrestha, along with other higher officials, regularly received calls from staff members' families, who either wanted their related personnel to be assigned away from COVID-19 patients or let go from the hospital entirely. Some medical professionals even sought resignation. Everyone faced immense pressure from their families.

"However, we counselled them, telling them that they would not catch the virus if they took the necessary precautions. And for the most part, we were successful," says Shrestha.

Shrestha herself is unmarried and is fortunate enough to have an understanding family that did not put any pressure on her. It would have been tough if her siblings and nephews had not supported her profession. "But they were very understanding. They knew it was my duty and appreciated me serving others in a time of crisis. My relatives were very proud," she says.

Eventually, other health workers also started enjoying their work, especially motivated by the incentive allowance they were assured by the government. Unfortunately, that allowance has not materialised yet. "The staff keep inquiring about the allowance and the hospital is more than ready to give it. But the hospital has not received the money from the government," states Shrestha.

"Regardless, everyone is super proud of the work they are doing and are happy that the hospital did not slash our salaries despite the economic difficulties it faced during the pandemic," she says.

Managing an isolation centre

The first days of the pandemic were hard, more emotionally than physically, according to Dr Amit Man Joshi, research officer at the National Ayurveda Research and Training Centre (NARTC), Kirtipur. Friends and neighbours used to try to keep distance and some even explicitly asked him to stay away. There was general unease among his family about Joshi's employment at NARTC.

Every staff of the Ayurveda training centre, which had been designated a COVID-19 quarantine and isolation centre by the government, be it medical personnel, administration or cleaning workers, faced this "pressure" as Joshi called it. It weighed heavier on some than others and a few employees panicked and tried to leave. They often made excuses to avoid their duty, which often entailed tending to coronavirus patients.

However, Joshi does not blame anyone for their reluctance to work. "Such was the environment at the time. Everyone was afraid," he said, adding, "There was a general lack of support from the community which dispirited and demotivated many healthcare workers."

Joshi himself avoided going home for the first three months of the lockdown (imposed nationwide from March 24 after the detection of the second case to curb the spread of the coronavirus) and stayed at the training centre.

After a while though, the initial fright and hesitancy subsided and the employees began working willingly and happily. "Everyone understood their responsibility," Joshi said.

"Such was the environment at the time. Everyone was afraid," he said, adding, "There was a general lack of support from the community which dispirited and demotivated many healthcare workers."

A scene outside of the National Ayurveda Research & Training Centre, Kirtipur, which functioned as an isolation facility for patients diagnosed with COVID-19.

One of the factors that encouraged people to work was the providing of Personal Protective Equipment or PPE. The Ministry of Health and Population (MoHP) provided NARTC with PPE sets, which included gowns, boots and masks, among others, for their frontline workers which was a huge boost to morale. "We did not have to wander around looking for PPE nor did we have to make our own. The Ministry provided us with what we needed," Joshi said, expressing gratitude to the MoHP.

Dr Joshi also informed that all the staff at the hospitals had received the COVID-19 incentive allowance as declared by the government. This, coupled with the decline in the number of cases, has allowed the medical and non-medical workers of the National Ayurveda Research and Training Centre to take a breath. "Things have improved now but the first few days, weeks and months were undeniably tough," he emphasised.

After the government declared NARTC a quarantine and isolation centre, the centre and particularly its research division that Dr Joshi is a part of, moved towards studying and developing Ayurvedic drugs to boost the immune system. It made various medicines to treat the young, the old and those with pre-existing chronic illnesses. News of its Ayurvedic treatment was also published in the Gorkhapatra national daily. The centre was capable enough to handle mild to moderate cases of corona infections.

However, the centre referred serious cases to other better-equipped hospitals, namely the Nepal Armed Police Force Hospital in Balambu, Sukraraj Tropical and Infectious Disease Hospital in Teku and Patan Hospital in Lagankhel. "This was to ensure that the patients received the best care possible," Joshi shared.

As per the government's decision, NARTC did not charge anything for the services it provided.

Now that the vaccination campaign has begun and the average number of daily cases is less than 100, Dr Joshi feels relieved. However, he cautions against recklessness and strongly advises everyone to continue with the health precautions.

How hospitals responded to the COVID crisis

Back in early May, when the coronavirus was slowly gripping the nation, the air inside Teaching Hospital was sombre. Patients were anxious, afraid. Tending to them were hospital staff and doctors, who too were afraid but remained on duty for days on end. Among them was Santa Kumar Das, chest infection specialist at the hospital in Kathmandu.

"Times were very difficult. All I wanted to do was be with my aging mother, and spend time with her, but I couldn't risk going back home. There was a constant fear that I would carry home the virus," says Dr Das.

With the novel coronavirus, everything was uncertain in the initial days of the spread of the virus. A year into the pandemic, the science community is still learning new things about the virus. Yet, amidst all the uncertainty, doctors and hospitals responded with their very best efforts to curb the spread of the disease—often putting everything at risk.

"We were dealing with COVID-19 patients first-hand but we didn't know much about what we were actually dealing with, and that caused a lot of panic," says Das. "Initially, it also caused a lot of people to step away from their duties. It was tough to educate people when everyone was afraid of contracting the virus."

Despite such difficulty, in the third week of March itself, the then director of the hospital, Dr Prem Singh Khadka, along with Dr Das, put together a Covid Response Team to tackle the virus head-on. During this time, orders to establish a completely separate and isolated COVID-19 building was passed, thus the Ganesh Man Bhawan, with its 110 beds, was established in another wing of the hospital. It also included 15 ICUs and six ventilators.

Soon, quarantine centres and temporary hospitals were set up across the country under the directives of the MoHP. Laboratory facilities were upgraded and expanded and hospitals were setting up ICU units and isolation beds. The Epidemiology and Disease Control Division devised the national treatment protocol, based on the one developed by the WHO, and directed all private hospitals to strictly follow the guidelines.

The MoHP designated 111 hospitals to run Covid clinics and 28 hospitals to treat COVID-19 cases. And more than 2,000 hospital beds across the country were allocated for isolation of suspected and confirmed cases. Just when things were looking strong, on May 11 (Baisakh 29), Dr Das received a phone call saying a COVID patient had been confirmed in the hospital—it was a patient in the In-Patient ward in the main building. Fear spread across the hospital but Dr Das's COVID team handled the situation calmly and eventually after a month the patient recovered. This incident made the doctors and nurses realise that the disease could be fought—together.

Meanwhile, in Biratnagar, Dr Sangita Mishra and her team at Koshi Zonal Hospital were overcoming their own battle with COVID-19. In the early days of the pandemic, when cases were just starting to pick up, some COVID-19 patients were from the Muslim community. Because of that, the religious

"We were dealing with COVID-19 patients first-hand but we didn't know much about what we were actually dealing with, and that caused a lot of panic."

minority was singled out for contact tracing especially in Nepalganj, Birganj, Rautahat and Udaypur where the cases were detected.

"The Muslim community was subjected to a lot of communal ostracisation," says Mishra, medical superintendent at the hospital. "It was already a very difficult time for all of us. But it was particularly harrowing for the Muslim community." Seeing the stigma, she spoke out against it and opened the hospital's doors to Muslim patients, offering them psychological help as well.

In addition, the hospital, under Mishra's leadership, defied government orders to shut down all services—except for essential services. Dr Mishra instead decided to keep the hospital open for all patients, making Koshi Zonal Hospital one of the few hospitals that provided its services to people throughout the pandemic. "Our hospital is for everyone, particularly those who cannot afford services at other hospitals. We would be going against our own principles if we turned away patients who needed us," says Mishra.

The hospital's decision to stay open to serve all patients proved to be crucial to the thousands who came to the hospital for treatment. But the hospital's effective response was possible only because even before the virus made its way into Nepal, Mishra's COVID Treatment Team was prepared with screening, quarantine and isolation facilities.

"A hospital's only priority is to tend to patients. We should always be ready to serve," says Mishra.

Response by a local body: Yasodhara Rural Municipality

Yasodhara Rural Municipality in Kapilvastu district, which borders India, had been greatly affected by COVID-19 during the peak of the pandemic period (July-September 2020). At the end of September, there were 171 confirmed cases reported, of which 168 recovered. According to current updates, the total cumulative cases remained the same with a 100 percent recovery and no reported deaths.

At the beginning of the pandemic, the influx of returnee migrant workers pushed Yasodhara Rural Municipality's health system to its limit. The nationwide lockdown and restrictions on public transport further worsened the situation with many migrants being stranded in the area. Adding to the municipality's woes was the inadequate number of quarantine sites and health workers, which proved to be a massive challenge for the health desks. As a result, cross-border international health regulation practices were not followed as per protocol, and triaging and screening were not in accordance with guidelines.

Local authorities therefore had to step up to the challenge. In coordination with the District COVID-19 Control and Management Committee (DCCMC), the local government started screening returnees with rapid diagnostic test kits; symptomatic cases were quarantined while others were transported to their respective districts. A major challenge at this time was managing the quarantine and isolation services with the existing resources. Additionally, five Case Investigation and Contact Tracing Team (CICTs) were formed by mobilising

the existing health workforce for CICT and case management (isolation and treatment). Severe cases were referred to district-based hospitals. A weekly consultation service took place for patients at local isolation centres; this was carried out by doctors from the district hospital.

A resource-limited setting like Yasodhara Rural Municipality had to face a number of unprecedented challenges during the peak period of the pandemic, but the local government managed to contribute to the overall national response despite the situation.
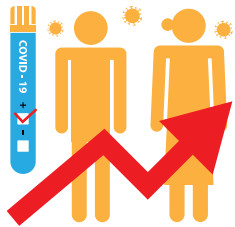
A weekly consultation service took place for patients at local isolation centres; this was carried out by doctors from the district hospital.

▲ *A health worker conducting a Rapid Diagnostic Test at the municipal level.*

17

MILESTONES IN RT - PCR TESTING

34.8%
HIGHEST POSITIVITY RATE
5,006 TESTS
WITH 1,741 POSITIVE CASES
10 KARTIK (OCT 26)

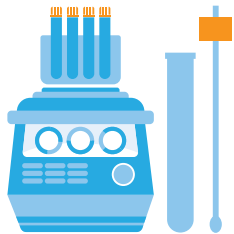## 28.6%
2nd HIGHEST POSITIVITY RATE
10,153 TESTS
WITH 2,909 POSITIVE CASES
21 KARTIK (NOV 6)

28.5%
3rd HIGHEST POSITIVITY RATE
20,118 TESTS
WITH 5,743 POSITIVE CASES
5 KARTIK (OCT 21)

20,118
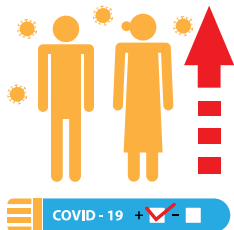**HIGHEST NUMBER OF RT-PCR TEST**
5,743 POSITIVE CASES
WITH 28.5 % POSITIVITY RATE
5 KARTIK (OCT 21)

19,320
2nd HIGHEST NUMBER OF RT-PCR TEST
5,008 POSITIVE CASES
WITH 25.9% POSITIVITY RATE
24 ASHOJ (OCT 10)

5,743
HIGHEST NUMBER OF POSITIVE CASES
20,118 TESTS
WITH 28.5% POSITIVITY RATE
5 KARTIK (OCT 21)

5,008
2nd HIGHEST NUMBER OF POSITIVE CASES
19,320 TESTS
WITH 25.9% POSITIVITY RATE
24 ASHOJ (OCT 10)

71
HIGHEST NUMBER OF DISTRICTS REPORTING NEW CASES
92.2% DISTRICTS
24 ASHOJ & 17 KARTIK
(OCT 10 & NOV 2)

6706
NEW RT- PCR TESTS
409 POSITIVE CASES
WITH 6.1% POSITIVITY RATE
22 POUSH (JAN 6)

1964160
TOTAL RT- PCR TESTS
263193 POSITIVE CASES
WITH 13.4% POSITIVITY RATE
AS OF 22 POUSH (TILL JAN 6, 2021)

13.4%
CUMULATIVE -POSITIVITY RATE
1964160 TESTS
WITH 263193 POSITIVE CASES
AS OF 22 POUSH (TILL JAN 6, 2021)

67310
RT-PCR TESTS
PER MILLION POPULATION
AS OF 22 POUSH (TILL JAN 6, 2021)

82
TOTAL RT-PCR TESTING LABORATORIES
47 PUBLIC 57.3%
35 PRIVATE 42.7%
AS OF 22 POUSH (TILL JAN 6, 2021)

RESPONDING TO THE VIRUS

Preparing for an emergency

This chapter covers the range of responses from the MoHP including the formulation of laws, planning, and multi-sector engagement among others for effective management of the pandemic.

Legislation and policy issues

In the years between 2006, when the conflict era effectively came to a close, and 2015, when a new constitution was promulgated, political shifts in Nepal have been dramatic. This was the decade, for instance, that witnessed the country make the transition into a federal state, including successfully holding local elections after a two-decade gap and taking a major step forward in delegating and decentralizing authority to the provincial and local levels.

This changed federalised context means that the onus to run many public health programme now lies with the local government and provincial governments along with few of its management by Central Level. The progressive constitution guaranties that no person shall be barred from receiving emergency services at any healthcare institution. For any epidemic, the Constitution has a clear mandate that the President can impose Emergency should there be any grave impact by "epidemic".

▼ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli and other cabinet ministers and PM advisors attend "Video Conference of SAARC Leaders on combating COVID-19" held on 15 March 2020.*

This provision was however not used because Nepal already had an Act in place that was effective enough to deal with the virus.

The government activated the Infectious Disease Act 2020 (1964) to fight the pandemic. Section 2(1) of the Act enables the Government of Nepal (ie the federal executive) to take 'necessary action' and 'issue necessary orders applicable to the general public or a group of any persons' to 'root out or prevent' the development or spread of an infectious disease. Section 2(1) can, in theory, provide legal foundation for any government action taken to tackle COVID-19—both moderate and extraordinary. In order to make necessary arrangements for the implementation of this order issued in accordance with sub clause (2) of clause 2 of the Act, designate all Chief District Officers of Nepal. For this purpose, the CDOs may exercise the authority as per the Local Administration Act, 2028 (1971) as required. Any person defying or obstructing the implementation of this order issued under the Contagious Diseases Act, 2020 (1964) shall be subject to punishment in according with that Act.

This became the basis for stringent measures that were put in place by the local, provincial and federal government. As the coronavirus began to spread in Nepal, local governments took the lead in prohibiting public gatherings, establishing information centres, setting up hand-washing systems, allocating isolation beds, and instituting quarantine procedures at public and private hospitals.

Similarly, the pandemic also called for the formulation of multiple directives, SoPs and other required policies to strengthen the pandemic response. Few of them have been described in the following chapters.

After the declaration of COVID-19 as a pandemic, the Council of Ministers formed the COVID-19 Crisis Management Centre-Operation (CCMC-Ops). The main objective of the CCMC-Ops was to carry out responses in an integrated manner through a unified group of representatives from the central, provincial, and local levels of government, as well as the security department and all other stakeholders.

Later, in May 2020, three different committees were formed for a quick and coordinated response for COVID-19 prevention, control, and treatment activities. These were:

1. The Direction Committee led by the Deputy Prime Minister/Defence Minister, with membership of the Minister of Foreign Affairs, Minister of Federal Affairs and General Administration, Minister of Health and Population, Minister of Commerce and Supplies, and the Minister of Finance.
2. The Facilitation Committee led by the Chief Secretary, Government of Nepal with membership from security authorities, such as the Chief of Army Staff, Secretary (Ministry of Home Affairs), Inspector General of Police, Inspector General of the Armed Police, and Chief Investigation Director.
3. The COVID-19 Crisis Management Centre (CCMC) led by the Secretary, Office of the Prime Minister and Council of Ministers (OPMCM), with membership of the 11/12th levels of the Ministry of Health and Population (MoHP).

The mechanism runs from the Direction Committee on to the Facilitation Committee, and then to the CCMC. The CCMC working areas and terms of reference is listed below:

For COVID-19 prevention, control, and treatment

1. Tracking, tracing, and testing of those suspected/ needed and kept in quarantine and/or isolation; management of the deceased.
2. Mobilising health professionals, including doctors, nurses, and technicians under the federal, provincial, and local levels and under security agencies. Where needed, mobilisation of health professionals under private and community hospitals.
3. Monitoring changes in stages of infection and providing suggestions to the Direction Committee about changes in protocol. There are four stages: imported, local transmission, community spread, and beyond control.
4. Directing the provincial and local level committees and monitoring implementation.
5. Coordinating and collaborating with expert groups, NGOs, and other domestic organisations as required.
6. Informing the public about the activities and responses to COVID-19 on a regular and periodic basis.
7. Documenting best practices and lessons learned and preserving as historical documents.

For supplying medical equipment and health materials as well as other essential items and services

1. Ensuring the supply of medical equipment and health materials.
2. Ensuring the supply of essential products and services, including food items.
3. Mobilising the acquired and available resources and equipment for prevention, control, and treatment.
4. Formulating and enforcing protocol/TOR for treatment, supply, and security.

5. Maintaining the inventory, distribution priority, and mode of distribution of received materials.

For monitoring peace and security

1. Enforcing lockdowns, access control, quarantine, isolation, treatment, mortuary and supply measures in line with the Government of Nepal's decisions.
2. Monitoring peace and security.
3. Establishing, maintaining, and updating the central database for planning and immediate decision making in response to the relevant areas.

CCMC operation

The Coordination/Plan/Control Group is in the centre of CCMC operations, with membership of the Secretary, OPMCM; Major General, Nepal Army; and the 11th/12th levels of the MoHP. A similar committee called the Advisors and Expert Group also exists, and includes the CEO, National Disaster Management Authority; representative of the High-Level Health Coordination Committee; IT experts; and the OPMCM. There is a two-way coordination mechanism between the former and the latter groups. The Coordination/Plan/Control Group directly coordinates with the OPS Duty Room, Help Desk, which is a one-way mechanism.

The Coordination/Plan/Control Group further guides four individual groups with their own respective responsibilities.

1. **Medical Operations Group, which includes the membership of:**
   - 11/12th levels, MoHP
   - Brigadier General, Nepal Army (Medical)
   - Joint Secretary, Ministry of Federal Affairs and General Administration
   - Representative, Nepal Police
   - Representative, Armed Police Force

▲ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli and other cabinet ministers attend a meeting of the COVID-19 Crisis Management Centre.*

*Note: The medical and logistical operations coordinate with one another with regards to the operation of medicines, otherwise they are groups with their own individual mechanisms.

3. **Security Operations Group with membership of:**
   - Joint Secretary, Ministry of Home Affairs
   - Joint Secretary, Ministry of Defence
   - Head of War Operations, Nepal Army
   - Representative, Nepal Police
   - Representative, Armed Police Force
   - Representative, National Investigation Department

Responsibilities

- Tracking, tracing, and testing
- Quarantine
- Isolation and treatment
- Mortuary

2. **Logistical Operations Group, which includes the membership of:**
   - Director General, Department of Health Service/MoHP
   - Joint Secretary, Ministry of Commerce and Supplies
   - Joint Secretary, Ministry of Culture, Tourism and Civil Aviation
   - Brigadier General, Nepal Army (Supply and Transport)
   - Representative, Nepal Police
   - Representative, Armed Police Force

Responsibilities

- Planning and database
- Operation of medicines
- Operation of food and essential services

Responsibilities

- Law and order
- Mobilisation

4. **Media and IT operations with membership of:**
   - Spokesperson, MoHP
   - Joint Secretary, Ministry of Communications and Information Technology
   - Spokesperson, Nepal Army
   - Representative, Nepal Police
   - Representative, Armed Police Force

Responsibilities

- Social media
- Print and broadcast

Incident Command System

The Incident Command System (ICS) is run under the Ministry of Health and Population (MoHP), and led by the incident commander (Secretary, MoHP). Three different section work under the incident commander:

- Coordination and monitoring
- Operation, led by the operation officer and ICS coordinator and secretariat, HEOC, under the officer
- Information/data

Under the operation officer are the planning/budget officer, supply management officer, finance officer/administrator, communication officer, and research officer.

1. Protocol for influenza like illness (ILI) clinics (COVID-19 Screening Fever Clinics)

On March 27, 2020, three days after the government imposed the nationwide lockdown, the MoHP issued a protocol to facilitate the management of people with symptoms of influenza. It was developed to isolate possible COVID-19 cases from those with common flu.

As per the protocol, COVID-19 Screening Fever Clinics would classify people with ILI into four categories: probable non-COVID-19 cases; possible COVID-19 cases; suspected COVID-19 cases; and cases with moderate to high symptoms of the infection. The protocol helped streamline the treatment process, thereby making the COVID-19 service delivery more effective.

Based on the protocol, the screening clinics recommended general treatment of influenza for people in the first category, while those from the second category were sent for home isolation after swab collection with prescriptions to use facemasks, to follow proper sanitation, and to use personal transportation. Those from the third category were admitted into the isolation facilities run by the government after swab collection and, lastly, people in the fourth category were admitted for COVID-19 treatment as per government protocol.

2. Criteria for the operation and management of COVID-19 quarantine centres

The need for quarantine centres increased when Nepalis started returning from different countries, mainly India. These centres needed proper operations and management to ensure they did not turn into COVID-19 breeding grounds. Therefore, on March 29, 2020, the Office of the Prime Minister and Council of Ministers enforced the criteria for operating and managing COVID-19 quarantine centres.

As specified by the criteria, a person who had come in contact with an infected person, or had returned from a country severely affected by COVID-19, or had been in transit in such a country would be quarantined for at least 14 days. The quarantine site would preferably be located away from settlements and would be equipped with communication, health service, road, electricity, and water supply facilities.

The criteria made it mandatory to allocate an area of at least 75 square feet for an individual, with a maximum of three people in a room and beds placed 3.5 feet apart. The criteria also set a standard of hygiene and health facilities, and the provision of four meals a day.

Those from the third category were admitted into the isolation facilities run by the government after swab collection and, lastly, people in the fourth category were admitted for COVID-19 treatment as per government protocol.

The management and operations of the quarantine sites as prescribed by the criteria largely contributed in controlling the spread of the coronavirus.

3. Interim Clinical Guidelines for Care of Patients with COVID-19 in Healthcare Settings

On April 5, the National Medical Council, under the MoHP, issued the Interim Clinical Guidelines for Care of Patients with COVID-19 in Healthcare Settings, which provided a clear way for health workers to manage infected persons. These recommendations were of utmost importance since COVID-19 was a new disease and, hence, had no prior handling procedures.

The guideline stated that screening would be considered according to symptoms, travel history, and exposure of individuals to COVID-19. In order to streamline the treatment process, it also developed a criterion to segregate the cases into three categories: suspected, probable, and confirmed. Furthermore, since there was a low number of testing facilities at the beginning of the pandemic, the guideline set a priority list for testing.

A framework was also provided for specimen collection and transportation to testing laboratories, and a modality was set for treatment based on risk group and severity of infection.

The guideline was largely based on the WHO standard, and over time was updated with new findings and procedures for treatment.

4. Directive to manage risk allowance to human resources involved in the treatment of COVID-19

Dealing with contagious diseases comes with a multitude of risks. Therefore, to increase motivation during trying times, the MoHP issued a directive to provide risk allowance to frontline workers, in line with the cabinet decision taken on March 22. Those who qualified for risk allowance were nurses, paramedics, laboratory workers, ambulance drivers and assistants, electricians and plumbers, security forces, cleaning and administrative staff, and helpers involved in the treatment, screening, and management of suspected cases. Other personnel who qualified for risk allowance were medical and non-medical staff at Tribhuvan International Airport and other border points, and those deployed to quarantine centres and rescue operations.

As per the directive, human resources involved in the treatment and swab collection of confirmed COVID-19 cases, as well as those working directly in the testing process in laboratories, would receive allowances equivalent to their total salaries.

Meanwhile, personnel involved indirectly in the treatment of suspected COVID-19 cases, and paramedics deployed to imaging facilities, would receive allowances worth 75 percent of their salaries. Similarly, medical and non-medical staff mobilised at the health desks at Tribhuvan International Airport and in the border points with India and China, and those involved in packing and transporting test samples, would get 50 percent of their salaries as risk allowance.

The decision to provide risk allowance has proven necessary to motivate the medical and non-medical staff to work effectively in the fight against COVID-19.

5. Directive to provide grants to hospitals involved in COVID-19 treatment

At the start of the pandemic, only government hospitals were authorised to handle COVID-19

Incident Command system

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                    ┌─────────────────────────────────┐
                    │      Incident Commander          │
                    │ (Ministry of Health and Population)│
                    └─────────────────────────────────┘
                                   │
        ┌──────────────────┬───────┴────────────┬──────────────────┐
┌───────────────┐  ┌──────────────────┐  ┌──────────────────┐
│ Coordination  │  │ Operation Officer │  │ Information/Data  │
│ and Monitoring│  │                   │  │                   │
└───────────────┘  └──────────────────┘  └──────────────────┘
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| Planning/ Budget officer | Supply Management Officer | Finance/ Administrator Officer | Communication Officer | Research Officer |
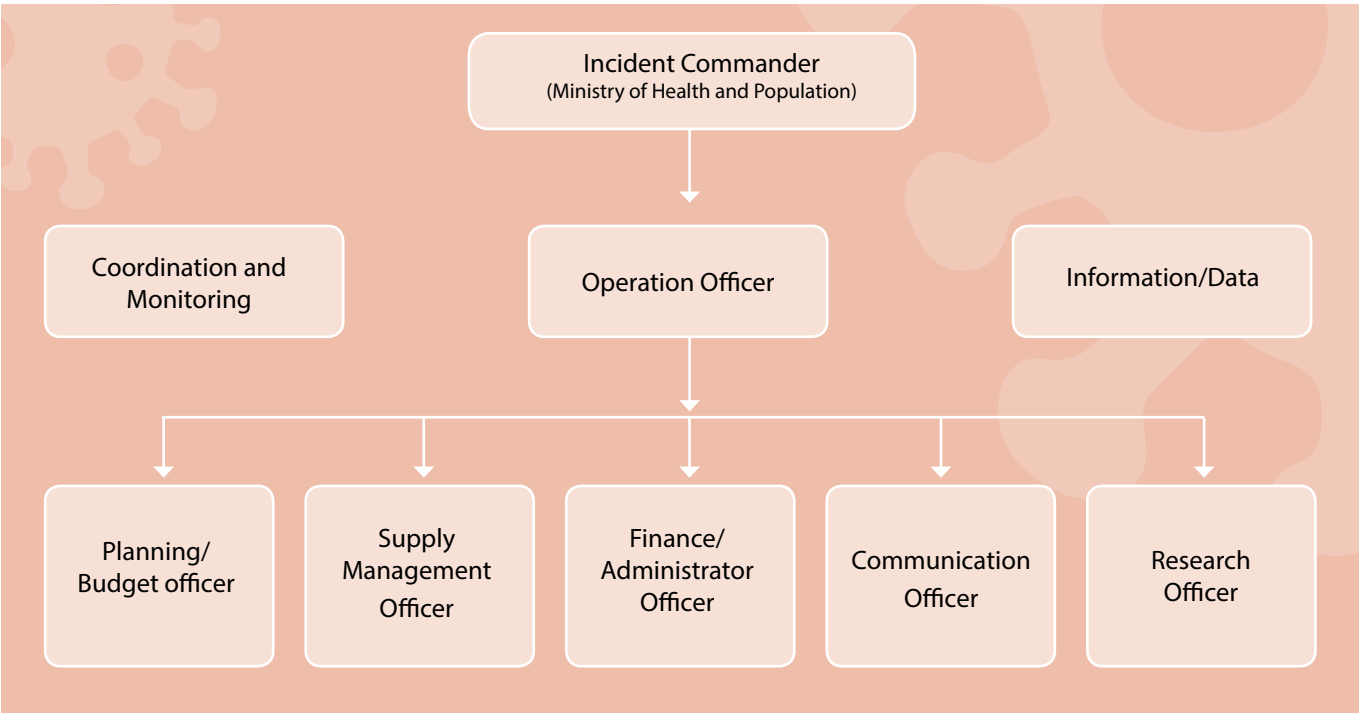
cases. However, the swift rise in the number of infections overwhelmed the government facilities, and this prompted the government to involve private, non-government, cooperative, and community hospitals in the treatment process.

In this backdrop, on May 6, the MoHP issued a directive to provide grants to all hospitals (other than those government funded) involved in the treatment of COVID-19. The rationale behind this decision was to ensure all infected patients would receive free treatment.

The MoHP chose the hospitals for COVID-19 treatment in the federal capital, Kathmandu, according to infrastructure, human resources, and other facilities. The social development ministries did

the same at the provincial level. As per the directive, upon completion of COVID-19 treatment, any private, non-government, cooperative, and community hospital could demand grants from the government.

The government's decision to provide the grants had a two-way benefit. While hundreds of people who could not afford private hospitals still received treatment, dozens of hospitals were provided with a good source of income.

6. Working procedure for the operation of COVID-19 clinics

On April 26, in order to widen service delivery due to the increasing number of coronavirus cases, the MoHP issued a working procedure to

However, the swift rise in the number of infections overwhelmed the government facilities, and this prompted the government to involve private, non-government, cooperative, and community hospitals in the treatment process.

set up COVID-19 clinics in different levels of hospitals. The procedure made it mandatory for all federal government hub hospitals, provincial-level COVID-19 hospitals, provincial hospitals, medical colleges and academies, and selected private hospitals to operate COVID-19 clinics.

As per the procedure, the prescribed hospitals had to examine, collect samples, and provide isolation treatment facilities to all suspected service seekers. The procedure also prescribed duties according to the levels of the hospitals. Level one hospitals would deal with mild cases, level two would provide treatment to moderate to severe cases, and level three hospitals would have multi-specialty care.

▼ Hon. Deputy Prime Minister Mr. Ishwar Pokharel leads a meeting of the COVID-19 Crisis Management Centre.

The procedure made it mandatory to consult the Health Emergency Operation Centre (HEOC) while referring patients from level one to level two and level two to level three hospitals. Similarly, it also asked all the hospitals to provide a report about its services to the HEOC.

7. COVID-19 Patient Transport Team Guideline
While containing the spread of the coronavirus was a challenge, the safe relocation of COVID-19 patients or suspects to hospitals or isolation centres was not far behind in terms of complexity.

The MoHP's COVID-19 Patient Transport Team Guideline systematised the relocation process

thereby minimising the risk of transmission from the infected or suspected. In accordance with the guideline, a call centre was established from where a medical officer would respond to queries from patients, those who had risks of infection, or those who were exposed to risky environments. Similarly, a separate dispatch centre too came into operation, as envisioned by the guideline. In addition, a patient transport team was mobilised based on information from the call centre and the HEOC under the MoHP.

The call centre reported to the dispatch centre after evaluating the condition, location, and categorisation of patients, while the HEOC provided updates about the availability of beds in the nearest designated hospital. Then, based on this information, the dispatch centre transported patients to the designated hospitals. Finally, the transport teams had the responsibility of transferring positive cases to the allocated hospitals and then reporting to the HEOC.

The guideline also tasked district health offices with preparing updated data regarding the availability and condition of ambulances. Also under the purview of the district health offices was assigning paramedics and health workers (one of each) for every ambulance, keeping records and updates about isolation centres and hospitals, and managing logistics.

As per the guideline, the district health offices had the responsibility of preparing detailed reports about the numbers of patients and the availability of beds in isolation centres and hospitals, in coordination with the local, provincial, and federal governments. Furthermore, each ambulance would have to be equipped with a medical team (nurse or paramedics), full set of PPE, masks, gloves, waste disposal bags, emergency medical kits, hand sanitiser, and disinfectant.

While the dispatch centre operated under the command of the MoHP, the Nepal Police took charge of security and use of ambulances. As stated by the guideline, the effective handling of patients would be possible through a close partnership between the Ministry of Health and Population and the Ministry of Home Affairs.

8. Health Sector Emergency Response Plan
On May 6, the MoHP issued the Health Sector Emergency Response Plan. Its objective was to deliver a clear policy guidance and framework for timely health system preparedness and readiness to respond to the pandemic.

Along with providing an official guidance to prepare and implement specific interventions applicable at all spheres of governments and levels of health care delivery, the plan supported policy makers and managers in exploring options and making decisions for resource allocation and management.

Based on the number of infections and availability of infrastructure, the plan categorised the pandemic situation in the country into four categories: level one, when positive cases reach a maximum of 2,000; level two, when the cases are between 2,000 and 5,000; level three, when the cases are between 5,000 and 10,000; and level four for 10,000 and above.

Considering the capacity of the country's health system to manage active cases, the Health Sector Emergency Response Plan envisioned the four situations to guide the response to COVID-19. As per the plan, the first and second levels could

While the dispatch centre operated under the command of the MoHP, the Nepal Police took charge of security and use of ambulances.

▲ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli and Hon. Mr. Hridayesh Tripathi, Minister for Health and Population, observe the vaccination drive of COVID-19 in Paropakar Maternity and Womens' Hospital, Thapathali.*

be managed by the existing health system capacity. However, it forecasted that the health system would be over stretched from the third level. Beyond that, the country would need international humanitarian assistance to manage COVID-19 cases.

The emergency response plan estimated the need for equipment, human resources, medicines, and other logistics depending upon the level of the pandemic. It also developed a plan for mass screening, contact tracing, preparation, and mobilisation of rapid response teams, human resource management, and capacity building. In addition, the plan envisioned collaborations between the public, non-governmental, and private sectors, as well as

development partners, academia and professional societies, to fight the pandemic at the domestic and international levels.

Based on the forecast of the cases, the plan estimated that around Rs 6.9 billion would be spent in responding to the pandemic. With the plan in place, authorities could act swiftly even when cases increased tremendously. However, although the need for international support was predicted for when cases exceeded 10,000, this did not happen and it was only domestic intervention that came into play even though the number far surpassed the projected figure especially since less than 10 percent of the cases were symptomatic and required treatment.

9. Directive on the Mobilisation of the Case Investigation and Contact Tracing Team

Contact tracing is an effective way of controlling the spread of infection. In order to systematise and carry out contact tracing effectively, the government decided to form Case Investigation and Contact Tracing Teams in each local government. On May 12, the MoHP issued the Directive on the Mobilisation of the Case Investigation and Contact Tracing Team to regulate and streamline the entire contact tracing process.

As per the directive, each team would comprise of three members. It would be led by a public health officer and accompanied by a nurse or paramedic and a lab technician or a lab assistant. It envisioned forming one team at the rural municipality level, two at the municipality level, and three and five at the sub-metropolitan city level respectively.

A total of 1,065 such teams had to be formed according to the directive. They were mobilised in close coordination with the respective local governments along with the Provincial Case Investigation and Contact Tracing Team and the Health Emergency Operation Centre under the MoHP.

The teams were authorised to investigate cases and trace people who had come in contact with the infected, collect swabs, and facilitate prompt investigations. If necessary, they would provide situation reports to higher authorities and arrange isolation centres.

10. COVID-19 Emergency Medical Deployment Teams Mobilisation guideline

Due to the continuous upsurge of COVID-19 cases, the government felt the need to form and mobilise mobile teams to train human resource to respond to the pandemic and, if necessary, also attend to positive cases. On May 28, a guideline on the COVID-19 Emergency Medical Deployment Teams Mobilisation came into effect. This would provide guidance for sending mobile teams to hospitals that lacked medical personnel for dealing with COVID-19 cases.

The medical teams would step in during situations when staff would be inadequate due to an increase in positive cases, when medical personnel would need to stay on leave after serving COVID-19 patients, or when they needed to be quarantined due to exposure to positive cases.

Each team would consist of a physician, a doctor, six nurses and three attendants, and would be led by the senior most doctor in the group. The major tasks envisioned for the teams were providing treatment and other necessary care to patients, training the existing hospital staff in the various aspects of COVID-19 care, and supporting the hospital administration in keeping proper patient records.

Such mobile teams were extremely beneficial in the districts bordering India that witnessed a huge rise in COVID-19 cases.

11. COVID-19 Isolation Management Guideline

During the early days of the pandemic when the government enforced the nationwide lockdown, non-COVID medical services were impacted with people hesitating to visit hospitals and health facilities; the medical institutions, in term, were reluctant to provide services. As it was necessary to continue non-COVID services while strengthening COVID-19 treatment, on June 2, the MoHP enforced a guideline to manage isolation centres

> The medical teams would step in during situations when staff would be inadequate due to an increase in positive cases, when medical personnel would need to stay on leave after serving COVID-19 patients, or when they needed to be quarantined due to exposure to positive cases.

in hospitals. This guideline was necessary for segregating COVID and non-COVID patients.

According to the COVID-19 Isolation Management Guideline, every hospital had to establish screening points at their entrances, and categorise service seekers into green and yellow groups after measuring their temperatures and inquiring about their health and travel history.

Those who were listed in the green category could seek regular health services while those categorised in the yellow group were sent to pre-isolation wards for COVID-19 screening. If they were suspected positive, their swabs were collected for testing. If the suspects tested positive, they were grouped under asymptomatic, mild, moderate, severe, and critical categories.

Individuals who were asymptomatic and those with mild symptoms would be sent for home isolation. If home isolation was not possible, they were prescribed isolation centres within the hospital. The guideline specified those with moderate, severe, and critical symptoms to get treatment as per their requirements.

The COVID-19 Isolation Management Guideline proved to be useful for streamlining services and attending to the requirements of patients.

12. Directive to grant permission for molecular (PCR) testing of COVID-19 at private laboratories

For the first few months of the pandemic, the government adopted a policy of conducting polymerase chain reaction (PCR) tests only at government laboratories. This was done so that the service could be free and authentic. However, with a significant number of people returning to Nepal, the numbers of samples started exceeding the testing capacity of the government laboratories. Therefore, on June 22, the MoHP endorsed a directive allowing the private sector to conduct PCR tests.

The directive allowed testing at private laboratories that had acquired permission from the government and had maintained set standards. The directives also specified the qualifications that personnel needed to have to operate laboratories, conduct extractions, and master mix and verify reports.

In order to ensure that the private laboratories met standards and gave accurate reports, the directive made it mandatory to send a prefixed proportion of samples to the National Public Health Laboratory so that they could be cross-checked when required as part of a national quality assurance programme that was established.

The directive by the MoHP allowed private laboratories to conduct tests of samples collected by their government counterparts; for each test, they were provided Rs. 5,500. Later, the private labs were allowed to collect samples on their own, for which they could charge a certain fee. This amount was reduced over time.

Opening doors to the private sector was a significant step towards expanding testing facilities in order to reach out to a larger mass.

13. Quarantine protocol for citizens repatriated from China

On February 15, 2020, the Nepal government repatriated 175 citizens from Wuhan in China, the city where COVID-19 was first detected. The

> Individuals who were asymptomatic and those with mild symptoms would be sent for home isolation. If home isolation was not possible, they were prescribed isolation centres within the hospital.

repatriation plan was executed after the MoHP developed a separate protocol, which was one of the first policy documents issued by the government to combat the novel coronavirus.

The protocol, which came into effect on February 3, had detailed rules that passengers, cabin crew, medical teams, and quarantine managers needed to follow during evacuation. Face masks, gloves, and sanitation facilities were to be made available to all evacuees, who were allowed to board the government-managed planes only after screening and providing a declaration that they had not been exposed to the coronavirus.

As specified in the protocol, the last four rows of the aircraft were reserved for infected or suspected patients. The protocol also made it mandatory to set up a screening desk at Tribhuvan International Airport, along with arrangements of separate vehicles for individuals suspected of having COVID-19.

A quarantine centre that could host 200 people was set up at Kharipati, Bhaktapur. As prescribed by the protocol, 12 clinical staff were deployed to the quarantine centre. These personnel included medical officers, nurses, and paramedics.

The quarantine site had safety gear and separate beds with proper social distancing. Throat swabs

However, with an increasing number of people returning each day and a growing demand for home quarantine, the Ministry of Health and Population on July 17 issued the criteria to be followed while quarantining at home.

▲ *Hon. Mr. Hridayesh Tripathi, Minister for Health and Population, leads a meeting on COVID-19 response.*

were carried out twice—on the first and then on the fourteenth day of quarantine. Meals and insurance facilities were also arranged according to the protocol. The total cost of the evacuation and 14-day quarantine, as forecasted, stood at NRs. 34,488,400.

14. Criteria for home quarantine

The federal government, in coordination with local and provincial governments, arranged quarantine facilities for all returnees. However, with an increasing number of people returning each day and a growing demand for home quarantine, the

Ministry of Health and Population on July 17 issued the criteria to be followed while quarantining at home.

As per the criteria, home quarantine would require a well-ventilated and sunlit room, preferably with a separate toilet. For 14 days, quarantined individuals would have to don proper masks and maintain a minimum distance of two meters while interacting with others in the house. They could not leave quarantine for two weeks, and sanitisers and gloves would have to be kept available at all times.

▲ *Dr. Jos Vandelaer, Former WHO Representative to Nepal, Dr Reuben Samuel, Team Lead, WHO Health Emergencies Programme and Nepali Army personnel discuss during their visit at COVID-19 Crisis Management Center in Kathmandu, Province Bagmati Pradesh, to observe a prototype health facility. Such health facilities will be set up at various Points of Entry to screen people entering as well as exiting Nepal for a possible COVID-19 infection.*

The criteria also set a standard for the disposal or cleaning of items used by suspected cases. Those in home quarantine needed regular reporting from their personal doctors or the nearest hospital or health centres. The criteria suggested providing immediate information to the local government or health centres when the quarantined individual contracted fever or faced difficulties in breathing, or developed cough, pain in the chest or other complexities.

In the case of people who could not follow the home quarantine criteria, the responsibility of arranging public quarantine fell on the respective local governments.

15. Guidelines for dead body management

Though the first COVID-19 case was reported on January 23, 2020, the first death due to the coronavirus took place only on May 16. The MoHP had already prepared a brief guideline for the management of dead bodies by then, on April 7 to be precise. A detailed guideline was prepared on June 3. This was based on the brief guideline, and was revised twice—once in the end of June and again on October 11.

As per the guideline, if a person died while displaying the clinical symptoms of COVID-19, the death would be considered due to the infection. The guideline gave detailed prescriptions regarding the handling of dead bodies, their transportation for last rites, and the performance of last rite rituals. It ensured that cultural and religious values would be adopted during the rituals.

The responsibility of the management of dead bodies was given to a trained squad of the Nepal Army who, in the presence of the relatives of the deceased, would either cremate or bury the bodies. Prior to being taken for last rites, the dead body would have to be disinfected and placed in a body bag. According to the guideline, relatives of the deceased could look at the dead body and participate in rituals by donning the necessary safety gear and maintaining social distancing.

16. Guideline on Environmental Cleaning and Disinfection

Apart from being transmitted through direct contact, COVID-19 can also possibly be spread through environments where infected persons reside or are present. The guideline on Environmental Cleaning and Disinfection sets the criteria for disinfecting isolation centres, quarantine sites, public places, and personal residences where infected or suspected COVID-19 cases have resided or entered.

As specified by the guideline, triage areas have to be disinfected twice a day, while daily cleaning is needed in cohort occupied and inpatient rooms. It also prescribes daily cleaning in areas where the infected or suspects are mobile. The guideline has also given a similar prescription for quarantine centres and the personal residences of infected and suspected cases.

The guideline states that isopropyl alcohol and ethanol can be used for sanitization, while sodium or calcium hypochlorite, sodium dichloroisocyanurate, chlorine dioxide, alkyl dimethyl benzyl ammonium chloride, dimethyl

The antigen testing protocol authorised provincial public health laboratories to lead the testing process, while closely coordinating with provincial health directorates, district health offices, and the local level.

ammonium bromide, cetylpyridinium chloride, and peracetic or peroxyacetic acid can be used for disinfection purposes.

It also provides a prescription on the quantity of the chemicals that can be used, depending upon the purpose of their use. The disinfection process contributed majorly in controlling the spread of the coronavirus.

17. Public health criteria to be followed while marking festivals

The Dashain-Tihar-Chhath festival season began during the pandemic, and with it brought high risks of coronavirus transmission. Concerned about this possible danger, on August 1, the MoHP issued the criteria to be followed by every individual nationally to avoid the possible spread of COVID-19.

▲ *Health Secretary Mr. Laxman Aryal leads a meeting on variants of COVID-19 at MoHP attended by ministry officials and experts.*

The criteria suggested avoiding travel and limiting celebrations to within families living together. If travel could not be avoided, people were asked to put on masks and use sanitisers.

The maximum number of people who could gather at social functions was limited to 25, ensuring a distance of at least three feet between individuals. The criteria prescribed a complete travel ban on people with symptoms resembling COVID-19, those over 60 years and below 12 years of age, pregnant and new mothers, those with serious illnesses, and those with a low immunity, among others.

As per the criteria, gatherings should take place only after properly disinfecting the area; handwashing and sanitizing facilities would have to be present as well. It also advised letting people enter only after measuring their temperatures and ensuring they did not have COVID-19 symptoms.

The criteria warned that those not following public health safety rules could face action, as per the Infectious Disease Act 1964.

18. Protocol for antigen testing

In December, after a decline in new COVID-19 cases through real time PCR tests, the government decided to opt for antigen tests. The Ministry of Health and Population thus prepared a protocol to systematise the testing process.

The antigen testing protocol authorised provincial public health laboratories to lead the testing process, while closely coordinating with provincial health directorates, district health offices, and the local level. Six different teams were formed by the ministry for coordinating with provincial health offices to conduct antigen testing.

The protocol recommended training the medical teams that were to be deployed for the testing process. Prior to the tests, the respective local governments had to identify possible hotspots, and the provincial government had the responsibility of providing antigen test kits and other necessary equipment. Those who had tested positive through rapid diagnostic tests or PCR, or were awaiting reports, could not be involved in antigen tests.

The protocol stated that those who tested positive through antigen would not need to go through PCR tests. According to the MoHP, antigen tests confirm whether the infection rate has indeed declined or whether it has gone down due to a fewer number of tests.

▲ *National Public Health Laboratory (NPHL)*
staff showing the sample received in collection desk.

Multi-partner engagement

The Ministry of Health and Population has long been engaging with UN Agencies, donors and other partner for multiple public health responses. It has a long history of working with these partners during emergencies include the Koshi flood in 2008 and Nepal Earthquake 2015 among other disasters. As COVID-19 began to wreak havoc across the globe and as cases began to be diagnosed inside the country, this coordination mechanism was swiftly activated.

On April 9, 2020, Health Cluster for COVID-19 was activated that was led by MoHP and Co-led from WHO representing the partners. Since its activation, the cluster meetings were carried out every Thursdays of the week and attended by all the high-level officials of the Ministry including advisors, chief specialist, Director General, Joint Secretaries and Chief of HEOC, more than 52 agencies and 200 partners and all 7 provincial leads and co-leads of the health clusters. As the epidemic escalated, from June 9, the chair and co-chair had split the provincial health cluster and partners coordination meetings, every Tuesdays and Thursdays respectively to ensure investment of more time on discussions, identification of issues and challenges and response by Chair on behalf of MOHP.

A major task of the Health Cluster meetings that were organised was to discuss on the needs of the health sector and the support required by the government in areas that they have identified as important. Since the activation of health cluster in April, the partners have been addressing the needs of MoHP in multiple areas.

The multiple meetings with the MoHP have led to identification of 11 key areas and tasks where the partners have been extending their support. The areas include:

1. **Integration:** Integration of efforts in planning, supplies, infrastructure, information, communications, assessments and progress reporting - all log tracked at the IIMS of health cluster lead in a data base that will be used for the required decision making and future references.
2. **Testing capacity:** The health cluster partners have been working to increase, expand and improve in areas including test commodities while also helping to build capacity and Human Resources where necessary.
3. **Procurement of supplies:** All support on supplies with quality assured, integrated in one log system so that this data base can be seen at one place, tracked and distributed with no duplication
4. **Supply chain:** Partners have been supporting in transportation and mobilities in the provincial and local levels with supplies, transportation and mobilities of health workers and essential service workers (accommodation, food, logistics support and sanitation)
5. **Support in quarantine places** construction where necessary, sanitation, report system, food and logistics where possible so basic sanitation and other quarantine requirements are fulfilled
6. **Management of cases**: Knowledge, standards, capacity building of staff, Infrastructure support where necessary and essential commodity

A major task of the Health Cluster meetings that were organised was to discuss on the needs of the health sector and the support required by the government in areas that they have identified as important.

supplies for those management and isolation facilities (such as skill development in case management, essential medicines, oxygen, ventilators, tubes, etc) to ensure that those centres are functional

7. **Prevention of community transmission:** Support in community engagement and risk communication

8. **Coordination and support at the provincial levels at HEOC**: Each partner can help in a coherent manner to support those HEOCs

9. **Support in continuing basic health services** which are critical in this situation, essential supplies of medicines and other commodities to ensure the uninterrupted provision of basic health services

10. **Information and research:** A complete proposal with implementation plan to be shared before study/ assessment, findings presented back to health cluster so that the evidence can be used for response and planning

11. **Information integration:** All the support in collated analysed and distributed form one place under the IIMS of health cluster for now and for later in a systematic manner.

Challenges

- Streamlining communications between the government and partner was a major challenge. It was necessary to ensure that all partners understood the need of the government and acted accordingly. For this the weekly health cluster meeting proved pivotal—ensuring everyone was on the same page.
- It was essential that the needs of the government are met by the partners.
- Identifying the clear gap in the response was another challenge. Sometimes, the partners are also reluctant to share their information that made hard for the ministry to prioritize intervention areas.
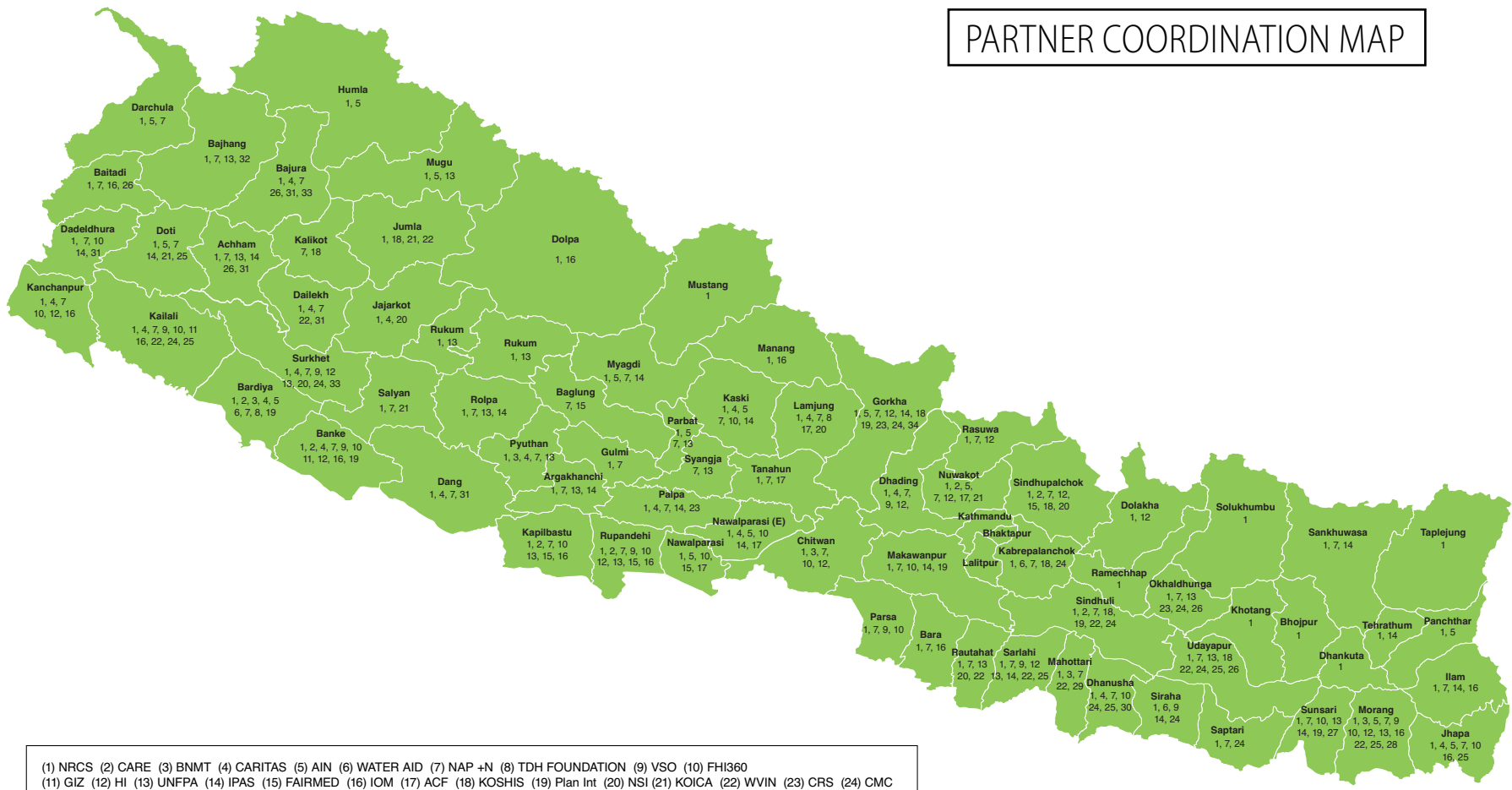
Lessons learnt

- The health cluster meeting was proved to be an effective means to communicate with the partners.
- Partners can work together to strengthen the health system.

▶ A glimpse of Health Cluster meeting.

PARTNER COORDINATION MAP

Darchula 1, 5, 7

Humla 1, 5

Bajhang 1, 7, 13, 32

Baitadi 1, 7, 16, 26

Bajura 1, 4, 7 26, 31, 33

Mugu 1, 5, 13

Dadeldhura 1, 7, 10 14, 31

Doti 1, 5, 7 14, 21, 25

Achham 1, 7, 13, 14 26, 31

Kalikot 7, 18

Jumla 1, 18, 21, 22

Dolpa 1, 16

Kanchanpur 1, 4, 7 10, 12, 16

Dailekh 1, 4, 7 22, 31

Mustang 1

Kailali 1, 4, 7, 9, 10, 11 16, 22, 24, 25

Jajarkot 1, 4, 20

Rukum 1, 13

Rukum 1, 13

Manang 1, 16

Surkhet 1, 4, 7, 9, 12 13, 20, 24, 33

Myagdi 1, 5, 7, 14

Bardiya 1, 2, 3, 4, 5 6, 7, 8, 19

Salyan 1, 7, 21

Rolpa 1, 7, 13, 14

Baglung 7, 15

Kaski 1, 4, 5 7, 10, 14

Lamjung 1, 4, 7, 8 17, 20

Gorkha 1, 5, 7, 12, 14, 18 19, 23, 24, 34

Rasuwa 1, 7, 12

Banke 1, 2, 4, 7, 9, 10 11, 12, 16, 19

Pyuthan 1, 3, 4, 7, 13

Parbat 1, 5 7, 13

Gulmi 1, 7

Syangja 7, 13

Tanahun 1, 7, 17

Dhading 1, 4, 7, 9, 12,

Nuwakot 1, 2, 5, 7, 12, 17, 21

Sindhupalchok 1, 2, 7, 12, 15, 18, 20

Dolakha 1, 12

Solukhumbu 1

Sankhuwasa 1, 7, 14

Taplejung 1

Dang 1, 4, 7, 31

Argakhanchi 1, 7, 13, 14

Palpa 1, 4, 7, 14, 23

Nawalparasi (E) 1, 4, 5, 10 14, 17

Kathmandu

Bhaktapur

Chitwan 1, 3, 7, 10, 12,

Makawanpur 1, 7, 10, 14, 19

Lalitpur

Kabrepalanchok 1, 6, 7, 18, 24

Ramechhap 1

Okhaldhunga 1, 7, 13 23, 24, 26

Khotang 1

Bhojpur 1

Tehrathum 1, 14

Panchthar 1, 5

Kapilbastu 1, 2, 7, 10 13, 15, 16

Rupandehi 1, 2, 7, 9, 10 12, 13, 15, 16

Nawalparasi 1, 5, 10, 15, 17

Sindhuli 1, 2, 7, 18, 19, 22, 24

Udayapur 1, 7, 13, 18 22, 24, 25, 26

Dhankuta 1

Ilam 1, 7, 14, 16

Parsa 1, 7, 9, 10

Bara 1, 7, 16

Rautahat 1, 7, 13 20, 22

Sarlahi 1, 7, 9, 12 13, 14, 22, 25

Mahottari 1, 3, 7 22, 29

Dhanusha 1, 4, 7, 10 24, 25, 30

Siraha 1, 6, 9 14, 24

Sunsari 1, 7, 10, 13 14, 19, 27

Morang 1, 3, 5, 7, 9 10, 12, 13, 16 22, 25, 28

Jhapa 1, 4, 5, 7, 10 16, 25

Saptari 1, 7, 24

(1) NRCS (2) CARE (3) BNMT (4) CARITAS (5) AIN (6) WATER AID (7) NAP +N (8) TDH FOUNDATION (9) VSO (10) FHI360
(11) GIZ (12) HI (13) UNFPA (14) IPAS (15) FAIRMED (16) IOM (17) ACF (18) KOSHIS (19) Plan Int (20) NSI (21) KOICA (22) WVIN (23) CRS (24) CMC
(25) DFAT (26) JHPIEGD (27) PACT inc (28) SDC (29) Save the Children (30) TPO Nepal (31) USAID (32) WFN (33) UNDP (34) Community Action Nepal

▶ *WHO Nepal personal while interviewing the local at Lele during the COVID-19 Pandemic.*

Communicating timely, actionable, reliable information about COVID-19

In the early days of the pandemic, government officials realised that raising general awareness about the novel coronavirus would be instrumental in keeping COVID-19 cases under control. Thus, right off the bat, along with issuing strict lockdown measures, the government primarily focused on relaying effective information to the public to increase risk communication and community engagement.

But ensuring the dissemination of correct information was not easy. A proper mechanism—created and endorsed by health experts and technical and communication experts—had to be employed, which is why the National Health Education Information and Communication Centre (NHEICC) took the helm, in association with HEOC, WHO, UNICEF, and other stakeholders.

More importantly, the Ministry of Health and Population (MoHP) immediately began issuing press briefings and daily situation briefs to ensure uniformity in the information that was passed on to the press and the public.

Alongside, as the MoHP activated the Incident Command System, a 'Communication Pillar' was established. Following that, in August, a communication strategy in service of the Health Sector Response plan was developed; this was supported technically by the WHO and was endorsed by the MoHP.

The MoHP employed various mediums, such as mobile applications (like Hamro Swasthya), hotlines, and social media platforms like Facebook and Viber, among others.

◄ Hon. Mr. Bhanu Bhakta Dhakal, former Minister for Health and Population speaks during a COVID-19 press briefing.

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To ensure the general public remained updated on news related to the virus, the MoHP employed various mediums, such as mobile applications (like Hamro Swasthya), hotlines, and social media platforms like Facebook and Viber, among others. It also made use of specialised COVID-19 programming on TV and radio (supported by UNICEF), direct outreach through social influencers and celebrities, interviews and public/media appearances by MoHP/DoHS officials on national and local media, and daily media briefings.

The public was the focus of all the briefings, and messages were carefully determined according to the evolving situation and also accounting for the rumours and concerns that were captured through the many call centres under the MoHP and other platforms such as Facebook and Viber. The process was also made scientific as research on the different facets of behavioural changes—commissioned by the MoHP, WHO, UNICEF, and other partner organisations—were used to inform the design

▼ Dr Bikash Devkota, former spokesperson of MoHP, speaks during a Facebook live interaction programme with the general public on information regarding COVID-19.

of the communication products and choices of communication channels.

To ensure that risk communication was effective, the mechanisms were thoroughly monitored throughout the past year with the help of health coordination clusters, UN RCCE groups, and other pillars of the ICS at the MoHP and partners through the NHSSP network.

The communication targets were set according to the socio-ecological model and epidemiology of the disease.It was also important for the messaging mechanisms to reach as wide an audience as possible. Therefore, numerous tools were initiated and contextualized for this purpose; the messages were developed in multiple languages and covered areas including COVID-19 prevention, protection, home isolation, public health safety measures, festival celebrations, stigma and discrimination, among others. In addition, television public service announcements were developed in sign language, and COVID-19 prevention flyers were printed in braille for the visually impaired. Almost all television programmes, including media briefs, were made in sign language as well.

Misinformation: Rapid refutation

Despite its efforts, the government had to face a number of challenges, the biggest being the spread of false information regarding COVID-19. To limit such misinformation, the authorities established informal online and offline rumour monitoring systems. The government also employed call centres to collect, log, and address rumours, misleading information, and other concerns. The responses to these were backed by scientific evidence, and any misinformation was addressed through daily media

briefings, hotlines, radio and television programmes like Corona Care and Corona Capsules, explainer videos, and social media posts.

Corona Capsule and Corona Care, shows that were made in collaboration with NHEICC, were timely and effective in reaching out to a wider audience. With almost half of the country's population listening to the shows, they were able to fulfil the information needs of the public. According to the Child and Family Tracker telephone survey, conducted by UNICEF in June, 98 percent of the population were aware of COVID-19 and more than 90 percent knew about its preventive measures (such as hand-washing, mask use, and social distancing).

Was the goal achieved?

For effective communication, the government required good communicators. Thus, trained female community health volunteers, Nepal scouts, religious leaders, child clubs, and youth were engaged and mobilised to reach communities and families. As a majority of the country's population still depends on the radio for information, a huge network of community and commercial radio stations were mobilised to disseminate standard messages from the beginning of the pandemic. Audio, visual, print, and social media platforms were also utilised to reach out to people. Owing to the restrictions on movement that had been mandated, virtual platforms were used for capacity building.

The successful dissemination of information would not have been possible without support from the private sector. Contributions from private media (television, radio, online, and print news),

telecommunication companies, and the transport sector have been immense. With support from telecommunication companies, the government was able to circulate COVID-19 messages to more than 90 percent of telephone subscribers in Nepal. The Caller Ring Back Tone, which still informs the public about COVID-19 precaution measures, has been another immense contribution from the country's telecom companies—more importantly, they have been doing it voluntarily. With Nepal having procured vaccines, the communication team is now developing messages around vaccine availability.

Unlike how earlier governments struggled to create proper communication protocols during earlier health crises, this time around, the MoHP was proactive in sharing information through social media and other communication channels such as Viber, where a separate group has been created for the HEOC and MoHP. It shares daily updates and has over half a million subscribers.

▲ Prof. Dr Jageshwor Gautam, spokesperson of MoHP, speaks during a Facebook live interaction programme with the general public on information regarding COVID-19.

Monitoring efficacy

Risk communication interventions were monitored through various surveys (citizen pulse and child and family tracker surveys conducted by UNICEF in collaboration with NHEICC). Perception surveys, accounting for different periods during the pandemic, were also conducted by various organisations.

Community feedback was gathered by Nepal Scouts and NRCS volunteers, and addressed by the volunteers themselves, as well as through television and radio programmes and daily media briefs.

Apart from community feedback, community interaction in the form of telephone counselling was conducted with religious minorities to understand the stigma and discrimination they had been facing during the pandemic. A qualitative study was also conducted to understand their issues.

Overall strengths and weaknesses

The major strength of risk communication and community engagement was the quick mobilisation of radio, television, telecommunication companies, and social media to reach the wider population.

The measures put in place as part of the COVID-19 response also took into consideration gender, equity, and human rights. The Communication Strategy of the MoHP on COVID-19 was committed to inclusion: most visual products included sign language, and megaphone announcements were made in local languages. Local language radio programmes and public service announcements were also implemented to communicate with previously unreachable populations.

▲ A snapshot of the daily situation update made public by Health Emergency Operation Centre of MoHP.

However, there were several shortcomings as well. Weak inter-ministerial coordination, inadequate engagement with political and elected leaders in conveying standard messages, lack of proper internet connectivity, among others, are areas that need improvement.

In addition, due to insufficient human resources, as well as the imposition of the lockdown, public communication and community engagement activities could not be monitored and evaluated in a proper manner so as to understand their compliance with COVID-19 public health measures.

Lessons learnt

- Even during crisis situations, it was possible to bring the mass media together for a common cause—to disseminate correct information regarding COVID-19 protective measures.
- There is a great need to promote health education and educators in the country. Further assistance to strengthen the NHEICC is also a necessity.
- While the government was able to disseminate information to the public effectively, as many surveys showed, making people translate knowledge into action was daunting. Therefore, extensive Behaviour Change Communication packages should be developed alongside message dissemination.
- A one-door channel for disseminating information to the press and public remains the most effective way of dealing with the pandemic.
- To prevent warning fatigue, the government will need to periodically change the messaging in the Caller Ring Back Tone. The message will also need to be recalibrated to reflect the need of the hour (vaccination information, for example).

Points of entry

The porous points of entry from neighbouring countries, especially India, aggravated Nepal's vulnerability towards the virus. After the first case was detected in the country on January 23, 2020, the government spent all its energy on implementing preventive measures, which included the formation of the High-Level Coordination Committee under the chairmanship of the Prime Minister and the Minister of Defence. The country had to make provisions in terms of health infrastructure and resources as well. Following the case detection, thermal scanners were installed at Nepal's only international airport, Tribhuvan International Airport, to monitor the temperatures of people coming into the country.

On March 11, those arriving from countries where community transmission had manifested were mandated to stay in self-quarantine. Furthermore, in all 43 border connecting areas of the country, health screening mechanisms, consisting of questionnaires for symptoms and temperature screening, were instituted. Then, on March 14, all entry visas were suspended and the ground crossing points of entry were shut down.

After the second case was detected on March 23, Nepal had to increase surveillance and containment efforts. In this regard, a nationwide lockdown was imposed from March 24, and only essential services, including pharmacies and grocery stores, were allowed to open, while the movement of citizens was

In all 43 border areas of the country, health screening mechanisms, consisting of questionnaires for symptoms and temperature screening, were instituted.

▲ *A Point of Entry in Pasupatinagar, Ilam.*

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restricted to designated time periods. Furthermore, all international flights were halted.

The lockdowns in Nepal and India were imposed at almost the same time, and the impact of the lockdown in the neighbouring country greatly impacted labour migrants. So, in order to assist stranded migrants and to facilitate the entry and exit of travellers, the Government of Nepal identified 20 ground crossing points initially from June 3 to August 10. Health desks were established for disease surveillance at these points of entry. Holding sites as well as quarantine and isolation spaces were set up alongside in order to prevent and control infection. People who entered Nepal via these porous borders were put into mandatory quarantine for 14 days and were tested accordingly. Those with positive results were kept in isolation centres. Additionally,

▼ Dr. Jos Vandelaer, Former WHO Representative to Nepal; Prahlad Dahal, Operations Support and Logistics, WHO Nepal; and Nepali Army personnel; applying hand sanitizers during their visit at COVID-19 Crisis Management Center in Kathmandu, Province Bagmati Pradesh to observe a prototype health facility. Such health facilities will be set up at various Points of Entry to screen people entering as well as exiting Nepal for a possible COVID-19 infection.

some entry points had also developed holding sites where probable cases were first kept before they were sent to their respective municipalities or rural municipality-based quarantine facilities.

Later, on August 19, the designated ground crossing points were reduced to 10 due to the increasing number of infected cases in the country. However, on September 14, after substantial infection control, the government decided to add three more ground crossing points: Pashupatinagar in Illam, Rasuwagadhi in Rasuwa, and Khalangapulghat naka in Darchula. At this stage, there were 13 ground crossing points (GoN, 2077). On October 8, Jhulghat in Baitadi was opened, thereby making the total 14. However, all other informal and formal ground crossing points were to remain closed until December 15 (GoN, 2077). To mitigate the spread of the disease, the Ministry of Health and Population also published a safety guideline, which was adopted by the designated points of entry, especially customs personnel.

After the government allowed the resumption of international flights from September 1 onwards, with preconditions such as mandatory PCR negative tests in the last 72 hours, Tribhuvan International Airport has witnessed an increased flow of passengers. However, foreigners were still required to stay in 14-day hotel quarantine.

As of January 25, 2021, the government has been setting up health desks in a majority of the ground crossing points in its bid to strengthen the points of entry. This will ensure that people coming into Nepal will first get screened and then, based on need, be sent to quarantine and isolation facilities.

WEEKLY NEW & CUMULATIVE CASES

(Before January 28 2020 to January 30 2021)
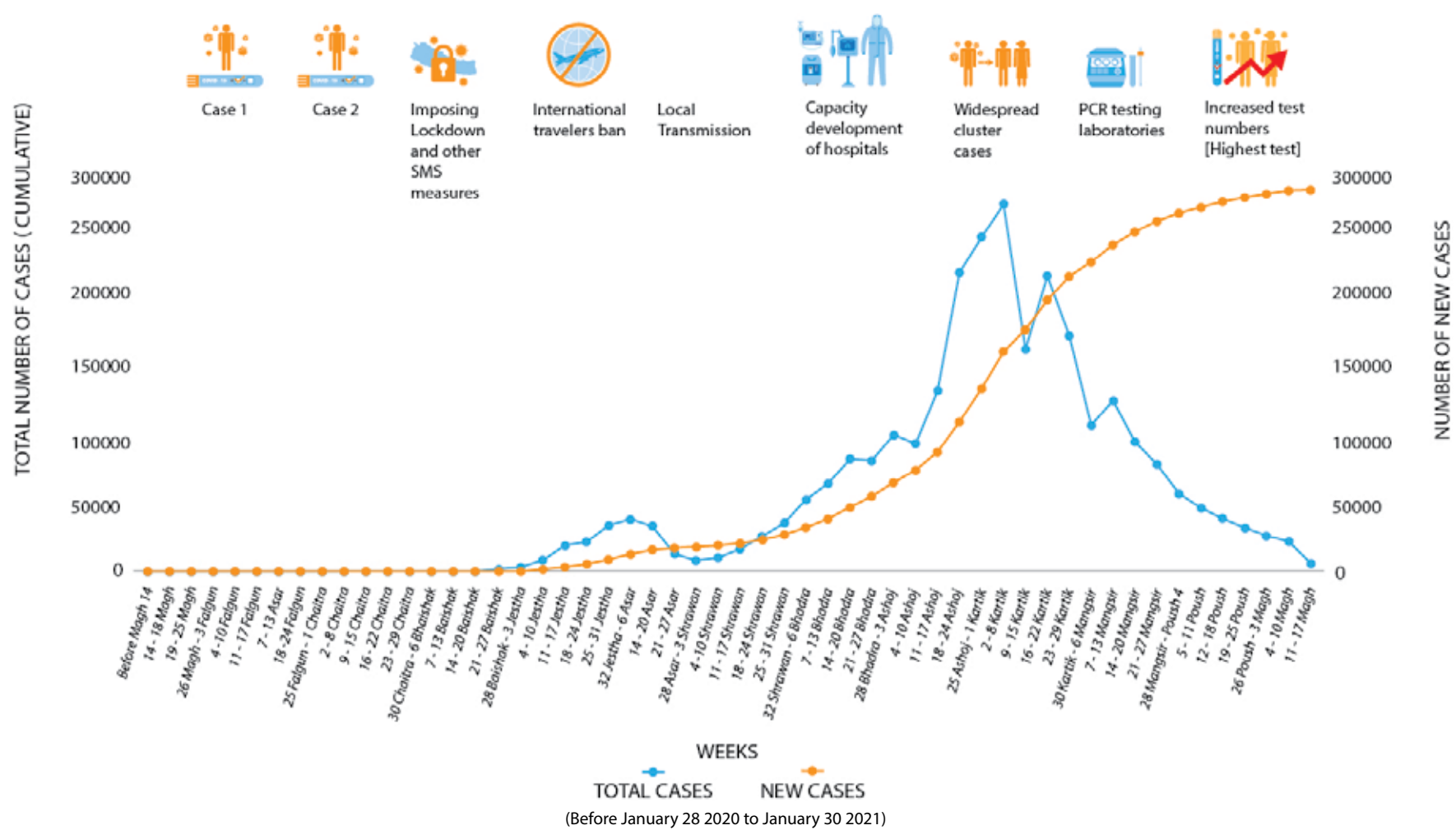
▲ *Glimpse of Nepal's first consignment arrival of COVID-19 vaccine doses via COVAX at Tribhuvan International Airport in Kathmandu, Bagmati Province on 7th of March, 2021.*

PILLARS OF RESPONSE TO THE CORONA VIRUS DISEASE

From few to many

Nepal had very few cases of laboratory-confirmed COVID-19 till about the middle of April, which is when the Nepali New Year is celebrated. Over a period of four months—ending in the middle of July—cases increased, peaked and went down during the first wave of the pandemic. These cases consisted of expats returning home by air or through land crossings; during this time, PCR tests were undertaken at less than 20 laboratories across the country.

The middle of July witnessed the next wave. This time, cases were much higher than projected: the health care infrastructure was overwhelmed, with a huge burden being placed on the public health system. The total number of laboratories in the country had reached 70 by then, a large chunk of it in the private sector, mostly located in and around Kathmandu. There were more symptomatic cases in the second wave and the load on hospitals was heavier; distinctions between normal and designated COVID-19 hospitals were removed, and there was major dependency on intensive care infrastructure and ventilator support.

Bagmati was the first province in the country to detect a case of COVID-19 in Nepal, back in early January 2020. The first case developed symptoms on

January 3 in China, was in transit and screened at the Tribhuvan International Airport, and confirmed on January 23. February brought in no new cases. March had two and April had four cases—all in Kathmandu Valley. Since May, 12 of the 13 districts started reporting cases regularly, with a monthly total of 38. June and July saw cases in the hundreds, and all districts were reporting by then. Cases jumped to 6,721 in August, trebled to more than 21,000 the next month, and reached over 60,000 in October. November witnessed a drop in cases, with a total of 38,476.

Towards the end of March, there were five positive cases in individuals who had arrived from China, Europe, and the UAE. They were placed in isolation in COVID-19-designated hospitals in Kathmandu. Trained personnel under the Epidemiology and Disease Control Division (EDCD) were mobilised to conduct extensive contact tracing based on their flight details and movement history to identify individuals with potential infection.

By April 4, six additional cases had been recorded in people who had recently returned from abroad. The same day, a 34-year-old woman from Kailali district tested positive for SARS-CoV-2; she did not have any prior travel history. This marked Nepal to be at the second stage of infection.

Bagmati was the first province in the country to detect a case of COVID-19 in Nepal, back in early January 2020.

During this time, Nepal tried its best to increase the number of isolation and quarantine facilities, along with the provision of essential PPE. By April 2, 26,587 beds had been allocated for quarantine facilities throughout the country, while only 3,113 beds had been assigned for isolation.

Provincial overview

In Province 1, COVID-19 cases started being detected early during the pandemic. The case load was 31 in April, affecting three districts. The number jumped to 135 the next month, affecting eight districts. By June, 13 of the province's 14 districts were affected and the monthly total reached 428. This incremental slow spread continued till mid-July. It was only in August that each of the districts consistently reported cases. August also witnessed a substantive increase in cases to 2,341 from 460 in July. In October, it crossed the 10,000 mark to a monthly high of 12,305.

The total number of deaths in Province 1 is 194 with an overall case fatality of 0.6 percent. There is a substantive difference in the fatality rates across the districts. Morang, where the maximum cases in the province have emerged, had 65 deaths out of 12,014 cases with a fatality rate of 0.5 percent; Sunsari had 72 deaths and 8,348 cases with a fatality rate of 0.9 percent, whereas, with only 29 deaths out of 4236 cases, Jhapa had a fatality rate of 0.7 percent.

Similarly, in Province 2, COVID-19 cases started being detected early in April when it had a total of 12 cases spread across four districts, with the number jumping to 617 the next month. May onwards, all the districts consistently reported cases and the monthly total reached 3,172 in June. There

were sharp ups and downs in the cases detected in the province. There was a slow spread with 1,360 cases in the month of July. August witnessed a substantive increase in cases and a monthly high of 5,904. The monthly cases started to drop from September with 4,007 cases and in October, it fell to 3,124. November had only 1,869 cases.

The total number of deaths in Province 2 so far is 193 with an overall case fatality of 0.96 percent. There is a substantive difference in the fatality rates across the districts. Parsa, the Province 2 district with the highest number of cases, had 54 deaths out of 3,354 cases with a fatality rate of 1.61 percent; Bara had 28 deaths and 2,070 cases with a fatality rate of 1.35 percent, whereas, with only 16 deaths out of 2,778 cases, Sarlahi had a fatality rate of 0.6 percent.
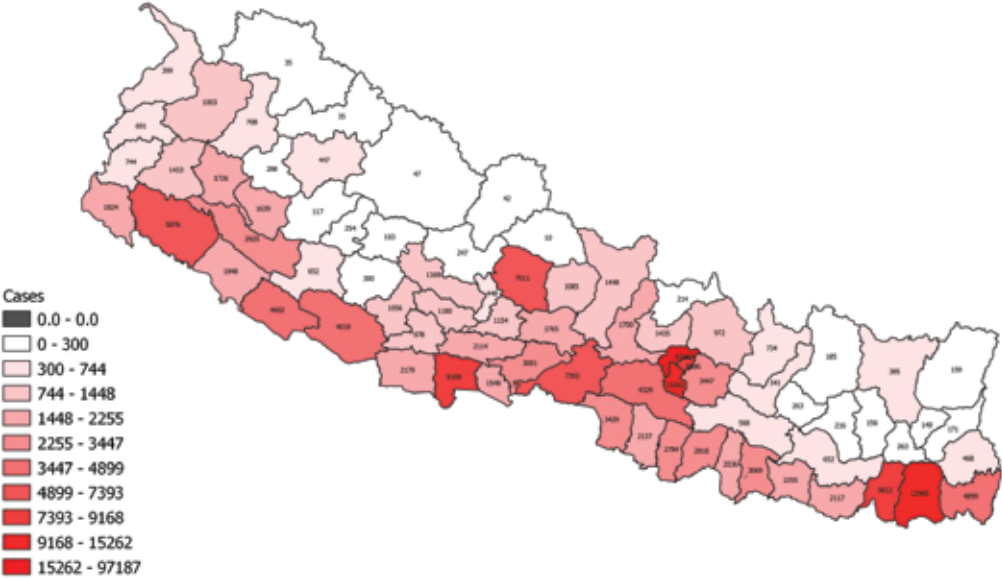
The total number of deaths in Bagmati Province are 760 with an overall case fatality of 0.59 percent. There is a substantive difference in the fatality rates across the districts. Kathmandu had 377 deaths out of 87,890 cases with a fatality rate of 0.42 percent; Lalitpur had 113 deaths and 13,275 cases with a fatality rate of 0.85 percent; Bhaktapur had 92 deaths and 7,968 cases with a fatality rate of 1.15 percent, and Chitwan with 57 deaths out of 6,670 cases had a fatality rate of 0.85 percent.

Gandaki Province detected its first COVID-19 case in Baglung district back in March 2020. The case load was 23 as of May, affecting three districts. The number of cases jumped to 1,005 in June, affecting all of its 11 districts. Cases decreased during the following months, but by September, the monthly case incidence had doubled to 2,076. There was

DISTRICT WISE CUMULATIVE MONTHLY INCIDENCE OF COVID IN NEPAL - AUGUST 2020
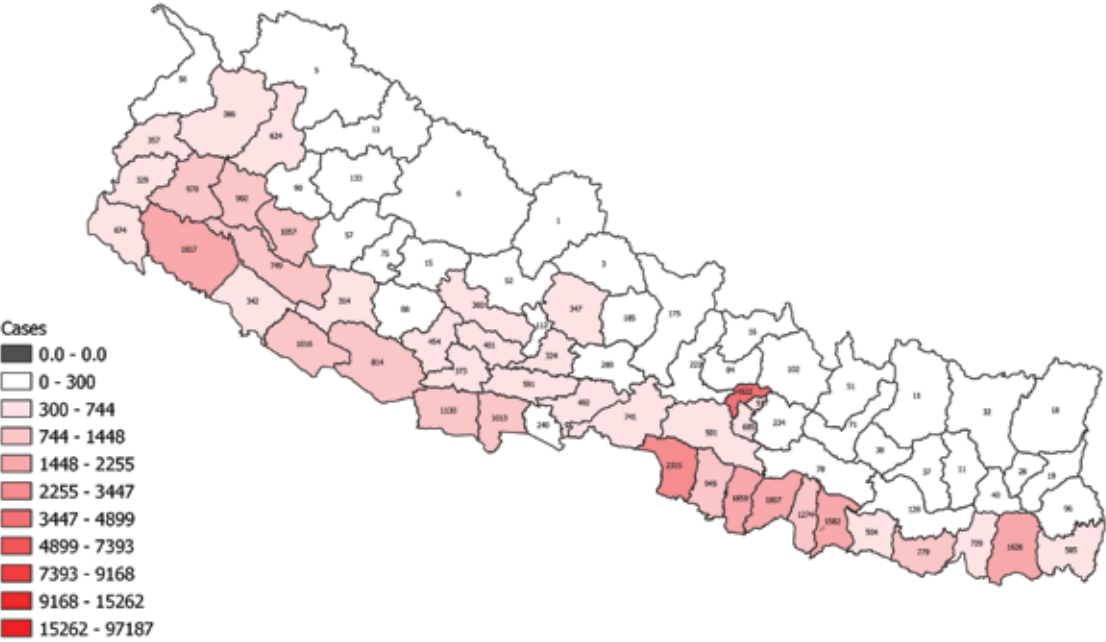
DISTRICT WISE CUMULATIVE MONTHLY INCIDENCE OF COVID IN NEPAL - DECEMBER 2020

a surge in the monthly reported cases to 5,533 in November. Kaski district reported the highest number of cases in the province with a total of 5,310.

The total number of deaths in Gandaki Province is 111 with an overall case fatality of 0.8 percent and has huge differentials. Kaski had a fatality rate of 0.9 percent with 50 deaths of 5,310 cases, Tanahu had 1.0 percent with 15 deaths of 1,510 cases, Gorkha had 0.9 percent with 11 deaths of 1,288 cases followed closely by Syangja at 0.9 percent with nine deaths of 988 cases, while Nawalparasi east had only 0.5 percent with 14 deaths of 2,758 cases.

In Lumbini Province, COVID-19 cases started being detected in May, when a total of 555 cases were discovered from nine districts. The number jumped to 3,796 in June, affecting all 12 districts. With a decrease in case detection (to 557) in July, a second surge was observed from August with 2,124 cases, which continued unabated till October with 8,403 cases that month. The number then slumped in November with 6,382 cases. Currently, the number of cases in the province is 25,749.

The total number of deaths in Lumbini Province is 190 with an overall case fatality of 0.7 percent and has huge differentials. Rupandehi had a fatality rate of 0.8 percent with 69 deaths of 8,155 cases, and Banke had 0.9 percent with 36 deaths of 3,985 cases, while Dang had 0.7 percent with 25 deaths of 3,549 cases, followed closely by Kapilvastu at 0.7 percent with 14 deaths of 2033 cases. Bardiya had only 0.6 percent with 10 deaths of 1,605 cases, and Palpa had the lowest fatality rate of 0.2 percent with four deaths of 1,829 cases.

In Karnali Province, COVID-19 cases started being detected in May. A total of 120 cases were detected that month, distributed across the districts of Dailekh, Surkhet, Salyan, and Kalikot. The number of cases jumped to 1,463 in June, affecting all 10 districts. It came down in the following months with a rise in September with 1,017 cases and in October with 2,095 cases. The number took a slump in November with only 494 cases. The total number of cases in the province is 6,105.

The total number of deaths in Karnali Province is 22 with an overall case fatality of 0.4 percent and has huge differentials. Surkhet had a fatality rate of 0.4 percent with 12 deaths of 2,765 cases, and Dailekh had 0.2 percent with four deaths of 1,606 cases.

COVID-19 cases in Sudurpaschim Province started being detected in March. By May, there were 27 cases detected and distributed across eight out of the province's nine districts. The number jumped to 2,457 in June, affecting all nine districts. The cases came down the following months with 1,417 cases in August and then rose in October with 2,438 cases. The number took a dip in November with 2,041 cases. The total number of cases in the province is 11,869.

The total number of deaths in Sudurpaschim Province is 37 with an overall case fatality of 0.3 percent and has huge differentials. Kailali had a fatality rate of 0.5 percent with 22 deaths of 4,843 cases, and Kanchanpur had 0.4 percent with five deaths of 1,364 cases.

Gandaki Province detected its first COVID-19 case in Baglung district in March 2020. The case load was 23 as of May, affecting three districts.

Category	Definition : Countries/territories/areas with
No (active) cases	No new cases detected for at least 28 days (two times the maximum incubation period), in the presence of a robust surveillance system (where COVID-19 surveillance is not robust, a lack of identified cases should not be interpreted as an absence of transmission). This implies a near-zero risk of infection for the general population.
Imported / Sporadic cases	Cases detected in the past 14 days are all imported, sporadic (e.g. laboratory acquired or zoonotic) or are all linked to imported/sporadic cases, and there are no clear signals of further locally acquired transmission. This implies minimal risk of infection for the general population.
Clusters of cases	Cases detected in the past 14 days are predominantly limited to well- defined clusters that are not directly linked to imported cases, but which are all linked by time, geographic location, and common exposures. It is assumed that there are a number of unidentified cases in the area. This implies a low risk of infection to others in the wider community if exposure to these clusters is avoided.
Community transmission – level 1 (CT1)	Low incidence of locally acquired, widely dispersed cases detected in the past 14 days, with many of the cases not linked to specific clusters; transmission may be focused in certain population sub-groups. Low risk of infection for the general population.
Community transmission – level 2 (CT2)	Moderate incidence of locally acquired, widely dispersed cases detected in the past 14 days; transmission less focused in certain population sub- groups. Moderate risk of infection for the general population.
Community transmission – level 3 (CT3)	High incidence of locally acquired, widely dispersed cases in the past 14 days; transmission widespread and not focused in population sub-groups. High risk of infection for the general population.
Community transmission – level 4 (CT4)	Very high incidence of locally acquired, widely dispersed cases in the past 14 days. Very high risk of infection for the general population.

New transmission classification

While the world battled the COVID-19 pandemic for a year, there were no specific antidotes or vaccines available for the virus. Of course, things are looking up now but for the past 12 months, the emphasis lay on non-pharmaceutical interventions, such as Public Health and Social Measures (PHSM), to prevent the spread of the disease. This called for regular reviews of the efficacy and impacts of the PHSM so that they could be adapted and their effectiveness in controlling SARS-CoV-2 transmission evaluated. This required agile decision-making based on ongoing situational assessments at the lowest local administrative levels. Decisions to tighten, loosen, or introduce PHSM to control COVID-19 were weighed against the impacts these measures have on societies and individuals.

PHSM include personal protective measures (hand hygiene, respiratory etiquette, mask wearing); environmental measures (environmental hygiene and cleanliness practices, disinfection, ventilation -air change); surveillance and response measures (including contact tracing, isolation and quarantine of cases, asymptomatic laboratory positives and their close contacts); physical distancing measures

(limiting the size of gatherings, maintaining distance in public or workplaces, domestic movement restrictions); and international travel-related measures. PHSM acts in sync with several measures taken together. Therefore, the measures were tailored to the lowest administrative levels at which situational assessment was possible and could be enacted practically.

Much of the response to the COVID-19 situation depends on the precise assessment of the transmission level in the community. Thus, the WHO recently upgraded its transmission classification for COVID-19. The revised transmission classification is given below.

Essentially, the earlier classification has been changed and sub-divided into four levels to reflect low, medium, high, and very-high levels of community transmission. A matrix has also been added to quantify the same with specific data for increased precision of assessment.

In order to help determine the levels of transmission, the community transmission matrix has four indicators: hospitalisation rate, mortality, case incidence, and testing.

▲ *Dr Dipendra Gautam from WHO Nepal presenting his content on Science Behind COVID-19 at Pan Nepal Briefing of Parliamentarians on the importance of Risk Communication, Community Engagement and COVID-19 at Sudurpaschim Province.*

Case investigation and contact tracing, testing and case management

I t was during the onset of the pandemic that the government realised the importance of contact tracing—the process of locating people who have come in contact with infected cases. This move would prevent further transmission if the individuals were immediately traced and tested to discern their infection statuses. Additionally, Realising the stress of the frozen economy on livelihoods, in the last week of July 2020, the Government of Nepal loosened the restrictions it had imposed across the country. However, as soon as the restrictions were lifted and mobility returned to normal, the number of COVID-19 cases grew exponentially. This pushed the government to jumpstart contact tracing mechanisms in an effort to flatten the curve. By leveraging technology and information, contact tracing assisted the government in tracking the

people a COVID-19 Confirmed Person (CCP) had come in contact with, and notifying possibly exposed individuals at the earliest stage.

It soon became evident that contact tracing was the single most important activity to interrupt the COVID-19 chain of transmission.

This led to the formation of Case Investigation and Contact Tracing (CICT) teams—with the coordination of the Epidemiology and Disease Control Division (EDCD), the district health office team, and local level authorities and WHO field personnel—in Kathmandu Valley, as it had the most concentrated number of cases in the country. The first among the three districts in Kathmandu Valley to implement contact tracing was Lalitpur, on July

▼ *Dr Basudev Pandey, former EDCD Director, speaks with trainees on the importance of Case Investigation and Contact Tracing.*

26, 2020, which was followed by Bhaktapur and then Kathmandu on August 3 and 8 respectively.

In August, meetings were held with the High-Level Coordination Committee for the Prevention and Control of COVID-19 and the mayor forum. In an effort to run contact tracing systematically, measures were micro planned in meetings with mayors, deputy mayors, health office chiefs, district COVID-19 focal persons, health coordinators, and EDCD officials.

It was clear that the situation demanded more personnel. Accordingly, the process for the recruitment of volunteers and additional human resources in all 32 wards of Kathmandu metropolitan (with at least three public health professionals in each ward) was immediately rolled out. Fourteen new volunteers, all final year students from IOM-TU, were trained on CICT activities and deployed to Kathmandu and Lalitpur.

Additionally, after rigorous training, 18 focal personnel (public health experts) were positioned in the municipalities of Kathmandu Valley in August.

Furthermore, Case Investigation and Contact Identification (CICI) and Contact Tracing and Contact Follow-up (CTCF) teams were formed at the local levels to support focal persons, and then deployed by the Department of Health Services (DoHS). In total, Kathmandu had 86 CICI and 63 CTCF teams, Lalitpur had 14 CICI and 44 CTCF teams, and Bhaktapur had 10 CICI and 31 CTCF teams.

The staff—as frontliners in the fight against COVID-19—were also given security by the state. For instance, local governments assured insurance coverage to CICT teams, including female community health volunteers (frontline health workers), and provided risk allowances to CICT and volunteer teams. CICT activities were monitored using standardized CICT supervision and monitoring checklists (provided by the EDCD/DoHS/MoHP).

Alongside, a digital recording and reporting platform Information Management Unit was also developed in joint coordination between the Ministry of Health and Population, the EDCD, and the DoHS with support from WHO.

▲ *Dr Amrit Pokhrel of EDCD advocating for CICT at municipality level.*

Dealing with deaths

In March, the government had given the responsibility of managing the bodies of those who died of COVID-19 or suspected to the Army. Hence, Nepal's army is responsible for managing the bodies of coronavirus victims across the nation.

When a COVID-19 patient dies in hospital or at home, the hospital management or the local unit informs the CCMC, and then a team of Nepal Army is mobilised to manage the dead body. The Nepal Army verifies COVID-19 positive reports and death certificates to manage the dead body. The Army has detailed records of each body it has managed for their funerals. There is the discrepancy in the data produced by Nepal army and the deaths reported by MOHP. One of the reasons why the Health Ministry undercounts deaths is that the Ministry demands coronavirus positive reports with death certificates to include in its list. Reporting is also the other reason since after the country adopted the federal system with three tiers of governments at the federal, provincial and local levels, the reporting system of the Health Ministry has been disrupted.

Amending the 'Dead Body Management of COVID-19 Cases Guideline' in October 2020 the government revised the guideline to manage the funerals of the people dying of COVID-19 in home isolation. As per the new rule, the family members need to inform the local administration and the police if the infected individuals die at home. The funeral rites have to be carried out by maintaining physical distance while people aged above 60 years and children are barred from participating in the rituals.

The family members themselves have to manage a vehicle to carry the dead body. The persons carrying the dead body need to wear gloves, surgical masks, boots, spectacles and full-sleeve dress. The family members have to wrap the body in cloth and transfer it as soon as possible to the mortuary area.

A Nepal Army personnel managing the body of a deceased COVID-19 patient.

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Information management: A vital tool

Proper management of information is vital for assessing and responding appropriately to health emergencies, particularly in ensuring the effective delivery of health services. During the COVID-19 pandemic, the fragmented information management system in the country, along with the duplication in reporting of cases, tests and deaths, made it increasingly clear that an integrated information management system was required to make informed decisions.

Initially, when there were only a few cases being reported, the National Public Health Laboratory would send the information to the Epidemiology and Disease Control Division (EDCD), where the details were maintained in an Excel sheet. However, as cases began to surge and as multiple laboratories began reporting COVID-19 cases, handling the data in that format proved to be challenging. Therefore, other platforms such as GoData were then put to use.

In April, when cases began to surge, COVID-19-designated hospitals, laboratories, health directorates, Provincial Health Emergency Operations Centres (PHEOCs), and the Ministry of Social Development all began to report their own cases. This called for the development of a uniform reporting template, which was immediately shared with the stakeholders. However, challenges emerged due to the low compliance to the reporting template and the sharing of data in multiple forms—scanned copies, Excel sheets, or directly via email, among others.

The collection and collation of information was essential for the central HEOC since it had to disseminate information to the public and the media through daily situation reports, which depended on accurate information from laboratories across the country.

Lately, following the introduction of the coronavirus vaccine, the government has developed the Information Management Unit (IMU), which was established at the HEOC under the Incident Command System (ICS)/Ministry of Health and Population (MoHP). The IMU will assist ICS operations and other ICS teams and entities of the MoHP by providing regular analysed information to help them in informed decision making to control the pandemic.

The IMU proved to be a vital tool during the identification of priority groups for vaccination. Frontliners had to be registered under the IMU before they were eligible to be vaccinated. The IMU application was supported by WHO.

Challenges

- There were mismatches in data due to multiple reporting from different agencies to the Corona Crisis Management Committee, HEOC. The lack of data uniformity was also a serious challenge.
- The failure to comply with the template developed by the ministry also forced the MoHP officials to invest more time on data cleaning

and segregation before its dissemination to the public.

- Many missing demographic variables, such as age and place, in positive cases and deaths also posed a challenge in contact tracing and crematory procedures.

- Delays in sending data to the centre affected the dissemination and planning of resources.

- The lack of an integrated system forced agencies to report to multiple stakeholders within the government.

Lessons learnt

- A one-door policy for data collection and dissemination should be immediately practiced to avoid duplication of work and to ensure uniformity in data dissemination.

- All stakeholders at the three tiers of government and non-government sectors should be sensitive about the proper use of the reporting template.

- There is a need to develop a robust integrated reporting system and information platform that facilitates operational decision support.

▲ *Nepal Scouts Volunteers reaching out general public with public health safety practices (SMS) as a part of SMS behavior reinforcement campaign.*

DISTRIBUTION OF LABORATORIES

COVID-19 Testing Laboratory
Karnali Academy of Health Science
Chaurjahari Municipality PCR laboratory
Provincial Hospital Surkhet/Vetenary Lab Research Center

Pokhara Academy of Health Science Hospital
Provincial Tuberculosis Center
Life Care Lab, Pokhara

BP Koirala Memorial Cancer Hospital Laboratory
Bharatpur COVID-19 Diagnostic Lab
Chitwan Medical College
Vector Borne Disease Research and Training Center (VBORTC)
Trisuli Hospital
Provincial Public Health Laboratory-3
Kathmandu University School of Medical Sciences

KATHMANDU

LALITPUR

Baitadi Hospital Laboratory
Bajhang Hospital Laboratory
Dadeldhura Hospital Laboratory
Doti Hospital
Kamalbazar Municipality PCR Lab
Seti Provincial Hospital

Bheri Hospital
Nepalgunj medical College
Bageshwori Path Lab
Rapti Academy of Medical Science
Palpa Hospital COVID-19 Testing Laboratory
Lumbini Medical College and Teaching Hospital
National Path Lab Butwal
Lumbini Provincial Hospital
Gulmi COVID-19 Laboratory
Universal College of Medical Science
Provincial Public Health Laboratory

Narayani Hospital
National Medical College
Gaur Hospital PCR Laboratory
Sindhuli Lab
Bardibas COVID-19 Laboratory
Provincial Public health Laboratory-2
Siraha Laboratory
Gajendra Narayan Singh Hospital

Birsure Path Lab
Mechi Hospital
Provincial Public Health Laboratory
BP Koirala Institute of Health Science
Koshi Hospital
Nobel Medical College Teaching Hospital
Neuro COVID Hospital
Birat Medical College

LEGEND

- Public
- Private
- Provincial Public Health Laboratory (PPHL)
- National Public Health Laboratory (NPHL)

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Responding to a novel disease

On January 9, 2020, when the World Health Organization (WHO) announced that the pneumonia outbreak in Wuhan, China, was caused by a novel coronavirus, the National Influenza Centre (NIC) at the National Public Health Laboratory (NPHL) was the only diagnostic virology laboratory in Nepal. The Ministry of Health and Population (MoHP) thus had to brace itself for the worst possible scenario.

And just as preparations were underway, on January 13, 2020, a young male who had recently returned from Wuhan visited the Outpatient Department of Sukraraj Tropical and Infectious Disease Hospital, Teku, with flu-like symptoms. Throat swabs were immediately collected and submitted to the NPHL via Virus Transport Mediums (VTM). But as the NPHL lacked the required reagents, the sample was shipped for testing to the WHO Collaborating Centre in Hong Kong. On January 23, the sample was declared positive for SARS-COV-2.

Nepal had its first COVID-19 patient.

The NPHL jumped into action. A collaboration—facilitated by the WHO-CO, between NIC at NPHL and a private research organisation, the Centre for Molecular Dynamics (CMDN), in Kathmandu—was forged to share COVID19 rRT-PCR primers, and probes were sent to the NPHL to enable quick COVID-19 testing. Subsequently, the WHO-CO facilitated the supply of COVID-19 rRT-PCR reagents to the NPHL.

While the lab was being set up, the second and third cases were detected in Nepalis who had returned from France via Qatar and the United Arab Emirates on March 17 and 19, respectively. Soon, the virus was spreading across the country.

Test, test, test

Early on, the NPHL knew that increasing its testing capacity would not only help curb the spread of the disease, but also help the government take stock of the real situation of the virus spread, which would aid in planning mitigation measures. But it had little experience in dealing with a crisis of this scale.

As the only reference laboratory in the country, the NPHL required high-level technical support in

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While the lab was being set up, the second and third cases were detected in Nepalis who had returned from France via Qatar and the United Arab Emirates on March 17 and 19, respectively. Soon, the virus was spreading across the country.

molecular diagnostics—which it lacked. This void was filled by an international expert from the Public Health Response Support Team, UK through the WHO GOARN, who developed over 20 Standard Operating Procedures (SOPs) for COVID-19 testing in the country and provided hands-on training to the NPHL staff. With the training and SOPs in place, the NPHL started to formulate surge testing plans. During this time, it was also certified that the quality of testing procedures and the reports generated thereafter by the NPHL remained of the highest standards, and that assured the public the government facility was capable of handling the situation. The NPHL also passed the WHO External Quality Assessment Programme (EQAP) for the Detection of Influenza Viruses conducted by an RT-PCR proficiency-test panel.

In the meantime, as cases increased dramatically (owing to infrastructural limitations, the PCR technology was inadequate to detect all cases rapidly), the Rapid Diagnostic Test (RDT) was introduced. This, however, was met with major challenges mainly due to the results that were generated and the variety of kits that were employed. The RDT kits were used for the sake of getting early results and to allow for mass testing. However, observations showed a variation of results, indicating that RDT might have missed many positive cases despite its ease of use. Later, RDT-based testing was brought to a halt and rtPCR-based diagnosis was solely promoted.

Expedited shipping and distribution of test kits

In the initial phase, PCR tests for the detection of SARS-COV-2 were performed only at the NPHL, with samples from all over the country having to be brought to Kathmandu. This proved to be immensely challenging, so local courier agencies were identified in different areas to handle sample shipments.

Round the clock vigilance

During the early days of the pandemic, other laboratories in the country were not equipped for COVID-19 testing. The sole responsibility was on the NPHL; it had to test as many samples as possible with limited staff, following all the proper safety measures. The NPHL then made plans to immediately increase the testing capacity and personnel within the laboratory. Initially, COVID-19 tests started in three places within the NPHL premises: the Bacteriology Unit, the NIC Unit, and the JE/Measles and HIV Unit, where staff were available 24/7. As the lockdown continued, transportation, food, and accommodation for the staff was provided by the centre. Over time, more personnel and laboratories across the country were mobilised.

Scaling up testing

The time between the detection of the first and the second cases spanned a month, but Nepal expected a surge in cases mainly due to the influx of people returning from areas severely affected by the coronavirus—in particular, through the porous border with India.

Laboratory capacity had to be increased across the country; the NPHL did not have the capacity to handle all the samples alone. The MoHP then began expanding its capacity for laboratory testing of the disease. Over the course of a year, starting with one public sector COVID-19 diagnostic laboratory in the country, the MoHP has now enabled a network of 83 COVID-19 laboratories—in both

◄ A glimpse of seroprevalence survey conducted by MoHP.

the public and private sector. While many existing health institutions were repurposed for COVID-19 diagnosis, many new laboratories were established and covered all seven provinces. At present, there are 47 laboratories in the public sector and 35 in the private sector, with more in the process of approval. These 82 laboratories are capable of confirming COVID-19 through molecular testing. This rapid expansion of laboratories has increased access for testing and intern-contributed early case identification and contact tracing to contain the spread of the virus.

In the meantime, the MoHP also developed and issued the 'Interim Guidelines for SARS-CoV-2 PCR laboratories in National Public Health Laboratory Network Nepal'.

The new laboratory network was facilitated by the federal MoHP with the active participation and contribution of provincial and local governments and the private sector. Its strong performance has been secured through a combination of in-person and online training by the NPHL and WHO, as well as a comprehensive five-point quality assurance programme that comprises:

1. Initial validation: Every laboratory in the network was validated before approval by having 10 samples each of its negative and positive results tested at the NPHL.

2. Online assessment: All laboratories were assessed remotely using an online laboratory quality assessment tool jointly developed by WHO and the NPHL.

3. Re-testing: Five samples each of negative and positive results from all approved laboratories are re-tested at the NPHL every month.

4. In-house proficiency panels: All approved laboratories periodically participated in an in-house SARS-COV-2 rRT-PCR proficiency testing system developed at the NPHL with WHO support.

5. On-site review: All network laboratories are subject to regular on-site inspections by a joint team of reviewers from the NPHL, the MoHP, and WHO.

A year into the crisis, Nepal has successfully incorporated SARS-CoV-2 surveillance into its influenza surveillance system, and is also piloting the integration of Respiratory Syncytial Virus (RSV) surveillance. At the same time, the government is identifying select COVID-19 laboratories with optimal assets and performance to significantly expand the national laboratory network for surveillance of influenza and other respiratory pathogens.

With representative laboratories in all provinces, including in secondary and tertiary care hospitals both in the public and private sector, Nepal's enhanced laboratory capacity for molecular testing is expected to be a critical asset in strengthening the country's preparedness and response towards influenza and other high-threat infectious hazards.

Challenges

Despite the various strategies, there were plenty of challenges for the laboratories:

- The lack of an integrated data management system meant that the NPHL had to report to multiple agencies, which was an added burden for the already overwhelmed laboratory.
- Laboratories are disproportionately distributed and mostly clustered in one area or district, resulting in inequity of access to testing across districts.
- There is no clear plan for sustaining the laboratory or extending the services for other infectious diseases.
- Interpreting borderline results was a challenge for many laboratories since the current national guidelines allow results to be reported as only positive or negative. Therefore, borderline results are interpreted subjectively and often reported as positive. This has resulted in false positive reports.

- Frequent change of PCR reagents and compatibility of reagents with PCR machines is a concern for laboratory quality.
- A variety of equipment and reagents are used in the provinces. Equipment calibration and maintenance plans are missing in almost all laboratories.
- Establishing more laboratories within limited means proved to be the biggest test.
- Collecting and shipping samples, particularly in the initial days, was a major challenge.
- Reagents and testing machines too were unavailable in the initial days.
- The establishment of quarantine and isolation centres was another big challenge.
- Testing and contact tracing patients using proper methods turned out to be demanding as well.
- Lack of in-country external quality assured gene sequencing facilities to detect variants of the virus.

Lessons learnt

- There is a need to develop an integrated database management system for the laboratories to not have to report to multiple agencies. A one-door communication channel is essential.
- There is a need for a quality monitoring mechanism for uniformity in donated and purchased laboratory items. A guideline should be in place so that the monitoring mechanism does not prove to be a challenge.
- Sustainable molecular diagnostic network and pathogen gene sequencing consortium as part of a nationwide public health laboratory network needs to go forward.

Health services management and clinical management

Equitable distribution of COVID-19 commodities

At the beginning of the pandemic, the Emergency Procurement Supply Team was formed under the Incident Management System, which oversaw procurement and supply-related issues. This was especially critical because hospitals would soon run out of essential supplies, personal protective equipment included.

It was during this time that the Ministry of Health and Population (MoHP) worked on the quantification of COVID-19 supplies and commodities, based on the estimated number of cases that might be admitted to hospitals. A joint project with the COVID-19 Crisis Management Centre sought to identify potential hospitalisations of patients and the required hospital items.

During this process, it was agreed that 50 percent of the commodities would remain in stock, while the remaining would be distributed according to the needs of Level 1, Level 2 and Level 3 hospitals.

Meanwhile, it was important for purchased and distributed items to be regularly monitored and to be planned accordingly. For this, the MoHP directed all its units to integrate the information on pandemic commodities within the e-Logistics Management Information System. This would provide an integrated platform to track the items and also identify procurement needs.

Similarly, to ensure the quality of the purchased goods, the MoHP developed technical specifications for COVID-19 commodities, based on the WHO Disease Commodity Package. This helped ensure the quality of materials while also maintaining uniformity of the items.

It is important to note that the warehouses across the country were capable of managing the supplied commodities, while the existing transportation system within the Logistics Management Division was pivotal in delivering goods.

As the demand for COVID-19 commodities surged, the MoHP developed the Emergency Procurement Plan, which facilitated the timely procurement of essential items.

During this time, the Provincial Health Emergency Operation Centre (PHEOC) was also expanded. Currently, the country has active PHEOCs in all provinces supported by WHO.

Strengths

- There were no funding issues for purchasing goods.
- All seven provinces had existing warehouse capacity and could easily house the supplied and purchased goods.
- The materials that were purchased or donated had to go through a one-door mechanism, which proved vital in the management of goods.

It is important to note that the warehouses across the country were capable of managing the supplied commodities, while the existing transportation system within the Logistics Management Division was pivotal in delivering goods.

Challenges

- Repeated cancellations of bids impacted the timely purchase and distribution of COVID-19 commodities.
- The lack of quality assurance mechanisms within the MoHP structure makes it hard to tally the claims of suppliers regarding purchased goods.
- While there has been extensive coverage of e-LMIS inside the country, all entities have not reported to it. The impact of this is visibly felt on the forecasting, replenishing, and distribution of COVID-19 commodities.
- The lack of Infection Prevention and Control mechanisms in health facilities makes it hard to provide quality services to patients and also puts frontliners at risk.
- The overuse of commodities and the absence of mechanisms to check their use disrupts the rational use of the products, while also drying up stocks faster than expected.
- The lack of demarcation in procurement guidelines resulted in all levels of government purchasing the same items.

▲ *Nepalese Army personnel carrying tent to demonstrate the process of setting up a tent - part of a health check-up facility - on the premises of the COVID-19 Crisis Management Center, Kathmandu, Province Bagmati Pradesh. Such facilities will be set up at various Points of Entry to screen people entering as well as exiting Nepal for a possible COVID-19 infection.*

BIOMEDICAL EQUIPMENT
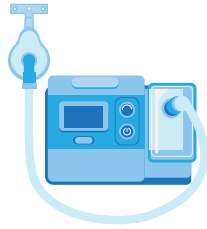
BIPAP MACHINE
DONATED   20
PURCHASED 2

OXYGEN CONCENTRATOR
DONATED   140

OXYGEN CYLINDER
PURCHASED 966

VENTILATORS
DONATED   151

PULSE OXYMETER FINGER TIP
DONATED 200
PURCHASED 11

PERSONAL PROTECTIVE EQUIPMENT

FACE SHIELD
DONATED   42,100
PURCHASED 8,440

GOWN SET
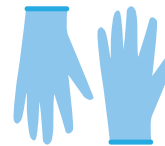DONATED   86,973
PURCHASED 190,900

MEDICAL MASK
DONATED   3,160,080
PURCHASED 1,352,280

N95 MASK
DONATED   289,510
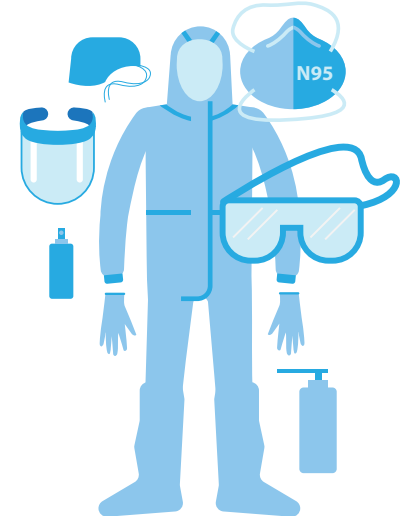PURCHASED 37,500

SAFETY GOGGLES
DONATED   63,910
PURCHASED 13,150

SURGICAL GLOVES
DONATED   557,750
PURCHASED 241,620
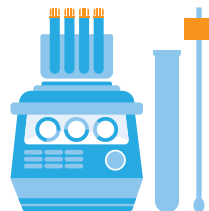
FULL PPE SET
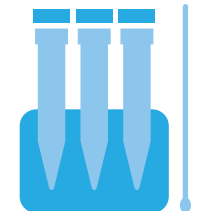DONATED   9,720

LABORATORY ITEMS

ANTIGEN KIT
DONATED   166,700

RT-PCR KIT
DONATED   224,740
PURCHASED 525,000

RNA EXTRACTION KIT
DONATED   190,544
PURCHASED 498,944

VIRAL TRANSPORT MEDIUM (VTM)
DONATED   109,324
PURCHASED 848,992

From person to community

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The materials—mostly in the form of infographics and other images—were broadcast on television, print, and radio, or published on social media and the MoHP's official sites.

Personal interventions

Along with many policy-level interventions, the Government of Nepal devised a number of timely initiatives to curb the spread of the coronavirus.

Under the Ministry of Health and Population (MoHP), various information, education and communication (IEC) materials were created with the motive of spreading awareness about social distancing, hand hygiene, cough etiquette, movement restrictions, as well as for identifying the symptoms of the disease and for staying alert. These messages were particularly directed towards the most vulnerable populations.

The materials—mostly in the form of infographics and other images—were broadcast on television,

print, and radio, or published on social media and the MoHP's official sites. Information boards about COVID-19 preventive measures were also placed at major public junctions. Such initiatives helped raise public awareness about COVID-19; this turned out to be of vital importance in combating the virus, and in reducing fatality rates. As of January 2021, Nepal's fatality rate is 0.72 percent.

Besides the dissemination of educational materials, public engagement programmes were also organised. A major focus of these programmes was to teach people to make use of quarantine facilities. This was successfully done by providing them incentives for self-registration and home quarantining for those returning from abroad.

Another major focus of the educational materials was stigma mitigation. As cases rose significantly, stigma related to COVID-19 positive patients increased, particularly in quarantine camps against people from the lower class and caste strata. The purpose of the educational materials was to eradicate that stigma.

To ensure the information reached a wide audience, the messages were developed to appeal to the public imagination. They were also produced in multiple languages that covered various areas, including COVID-19 prevention, protection, home isolation, and public health safety measures, among others.

Videos were also hosted on official portals under the MoHP. They included topics such as hand hygiene, making of masks at home, and the appropriate methods of donning and removing them. For wider

dissemination, the government also posted guidance on preventive measures (dos and don'ts) on official web portals and in print and social media.

Community interventions

Meanwhile, the government also initiated contingency planning and preparedness interventions, including the dissemination of communication materials to raise community-level awareness across the country.

In terms of community interventions, the first step the government took was to effectively shut down operations of public places that hosted more than 25 people. These included offices, schools, malls, and others.

The first nationwide lockdown began on March 24, right after the confirmation of the country's second COVID-19 positive case. Though damaging to the economy, the move was crucial in building the capacity of the nation's response efforts. The complete lockdown, which included the closure of everything except essential services, stopped any kind of movement in the country. This gave the MoHP enough time to control cases while training their personnel, in terms of handling the novel virus and in dealing with the mental pressures that came with it.

The government also encouraged all offices to issue work-from-home and shelter-in-place orders. It ordered the release of prisoners to less congested jails, waived off school examinations, and made mask wearing mandatory during outings; it even started fining those who refused to wear masks and did not follow social distancing rules. The government also made it mandatory for services that were open, like supermarkets, to mark their floors for social distancing in queues, and to provide hand sanitisers and thermal scanners at all entrances.

As part of community intervention plans, the government conducted initial capacity assessment and risk analysis, including mapping of vulnerable populations and migrant populations—particularly from India and other labour-destination countries. Also established were metrics and monitoring and evaluation systems to assess the effectiveness and impact of planned measures.

In addition, the MoHP worked with multiple partners to mobilise Nepal Scouts volunteers for SMS campaigns. This was implemented inside Kathmandu Valley where over 100 volunteers reinforced messages regarding COVID-19 transmission and preventive measures. It is estimated that more than 1.2 million people were reached directly or indirectly through face-to-face discussions and mega-phone announcements. Various IEC materials, masks, and sanitisers were distributed as well. In the second round, volunteers were mobilised in additional cities, including Pokhara and Biratnagar. More than 200 Nepal Scouts volunteers were oriented and deployed to crowded and public spaces to convince the general public to comply with preventative measures. Text messages with key public health safety information were also sent out to the public during the Dashain, Tihar and Chhath festivals. These texts reached more than 2 million people.

Furthermore, the Nepal Red Cross Society worked closely with the MoHP to form Unit Action Teams in various districts in order to discuss personal safety during the COVID-19 pandemic.

These and many other ground level initiatives helped curb the spread of the disease.

Maintaining essential services

Essential service continuity

In the last few decades, Nepal has made significant progress in improving the health statuses of mothers and children. The country has witnessed a sharp decline in maternal and child mortality, an improvement that has led to awards and recognition across the globe. Between 2000 and 2019, maternal mortality decreased by 76 percent, stillbirth rates came down by 58 percent, and newborn mortality dropped by 62 percent. In addition, as a result of social mobilisation and financial incentives, the numbers of institutional births increased by four times between 2001 and 2016.

The COVID-19 pandemic threatened to derail these triumphs. With the introduction of national lockdowns as part of the pandemic control strategy, concerns around the disruption of essential healthcare services, including child and maternal health, was anticipated. A decrease in the number of women visiting health centres was observed during this time. This occurred due to various reasons, such as stigma associated with the virus, travel restrictions, fear of contracting COVID-19, and poor care and management in hospitals.

Various sectoral responses were implemented by the government in order to tackle these issues. The main aim was to maintain primary sexual, reproductive, maternal, newborn, child and adolescent health (SRMNCAH) services and keep achievements intact.

Prioritising vaccination

Under the National Immunisation Programme, the government provides 12 vaccines for free to children under five years of age.
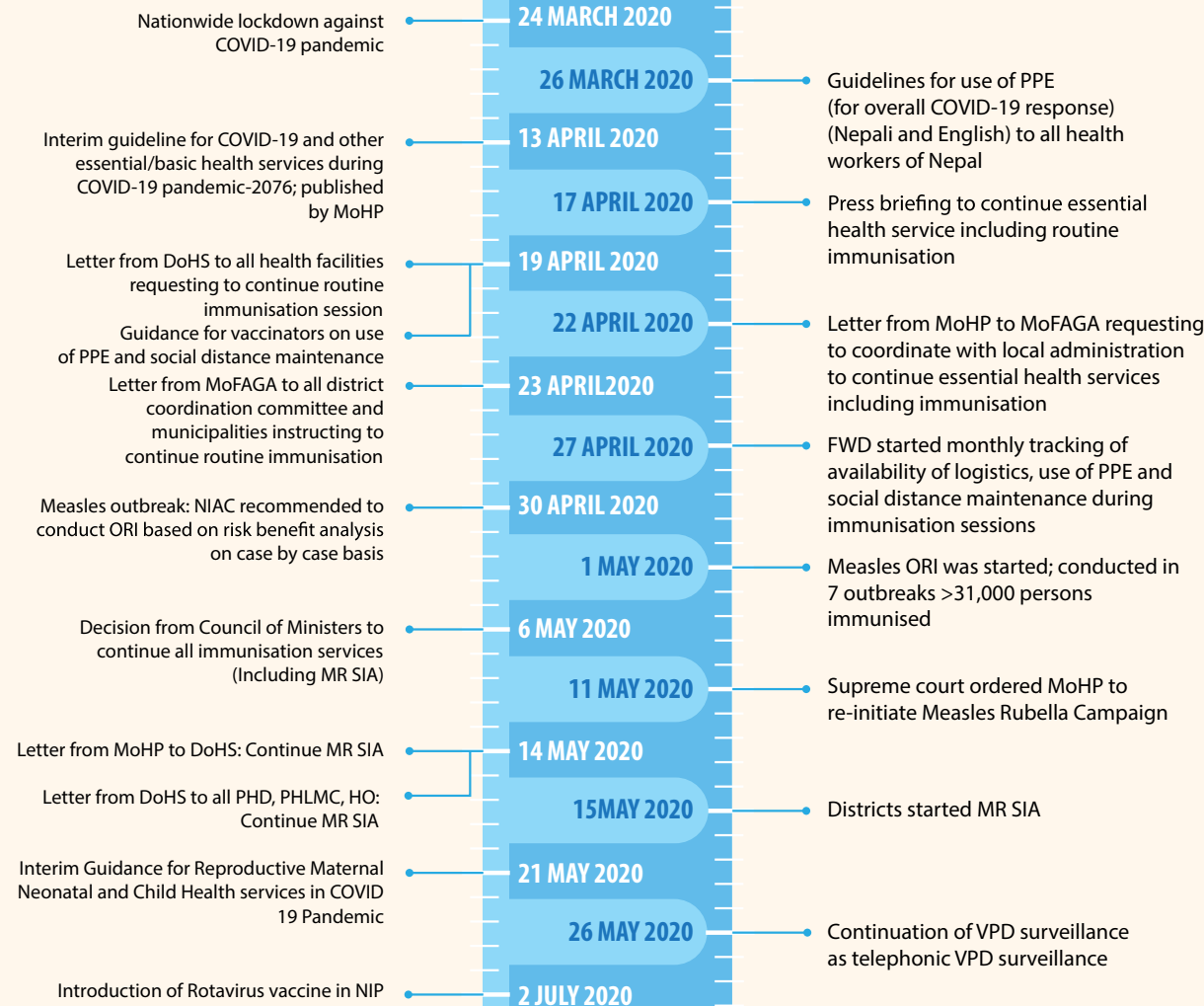
On March 23, 2020, following the COVID-19 outbreak, the government decided to suspend the Measles-Rubella vaccination campaign. However, stopping it for a long period would mean a surge in cases. Thus, after a month, the MoHP requested all units to continue the vaccination programme by following adequate precaution measures. More importantly, a cabinet decision on May 6 asked all government entities to not stop the immunisation programme as it could derail the public health gains achieved over the years.

Despite the pandemic, the government successfully launched the Rotavirus vaccine under its routine immunisation. Since then, health facilities have been administering the required immunisation to children.

Keeping essential SRMNCAH services afloat

March 5, 2020, saw the formal activation of the Reproductive Health Sub-clusters meetings. The interim MoHP circular for the continuation of COVID-19 and essential non-COVID-19 services was implemented in mid-April. The SRMNCAH was formally included as part of the Country Preparedness and Response Plan strategy to combat the consequences brought about by the coronavirus, and the interim guidelines for these SRMNCAH services were endorsed. Two rounds of rapid assessment also took place to check maternal and neonatal health and sexual and reproductive health service readiness and functionality. Furthermore, SRMNCAH services were monitored for maximum utilisation and availability, along with mapping for partners involved in SRMNCAH services. Also initiated was a separate department for C-section

KEY ACTIONS FROM GOVERNMENT DURING COVID-19 PANDEMIC IN RELATION TO IMMUNIZATION

23 MARCH 2020 — Press release from MoHP: Suspend MR campaign

Nationwide lockdown against COVID-19 pandemic — **24 MARCH 2020**

26 MARCH 2020 — Guidelines for use of PPE (for overall COVID-19 response) (Nepali and English) to all health workers of Nepal

Interim guideline for COVID-19 and other essential/basic health services during COVID-19 pandemic-2076; published by MoHP — **13 APRIL 2020**

17 APRIL 2020 — Press briefing to continue essential health service including routine immunisation

Letter from DoHS to all health facilities requesting to continue routine immunisation session
Guidance for vaccinators on use of PPE and social distance maintenance — **19 APRIL 2020**

22 APRIL 2020 — Letter from MoHP to MoFAGA requesting to coordinate with local administration to continue essential health services including immunisation

Letter from MoFAGA to all district coordination committee and municipalities instructing to continue routine immunisation — **23 APRIL2020**

27 APRIL 2020 — FWD started monthly tracking of availability of logistics, use of PPE and social distance maintenance during immunisation sessions

Measles outbreak: NIAC recommended to conduct ORI based on risk benefit analysis on case by case basis — **30 APRIL 2020**

1 MAY 2020 — Measles ORI was started; conducted in 7 outbreaks >31,000 persons immunised

Decision from Council of Ministers to continue all immunisation services (Including MR SIA) — **6 MAY 2020**

11 MAY 2020 — Supreme court ordered MoHP to re-initiate Measles Rubella Campaign

Letter from MoHP to DoHS: Continue MR SIA — **14 MAY 2020**

Letter from DoHS to all PHD, PHLMC, HO: Continue MR SIA — **15MAY 2020** — Districts started MR SIA

Interim Guidance for Reproductive Maternal Neonatal and Child Health services in COVID 19 Pandemic — **21 MAY 2020**

26 MAY 2020 — Continuation of VPD surveillance as telephonic VPD surveillance

Introduction of Rotavirus vaccine in NIP — **2 JULY 2020**

delivery. Additionally, a facilitators guide was developed, and more than 60 facilitators at the national and sub-national levels in all 77 districts were trained through orientation programs via online mediums.

Alongside sectoral responses, various innovative approaches to reach target populations were introduced and put into use. For instance, helplines were established to ensure accessibility to RMNCAH services. Tele-consultation facilities were promoted, particularly for antenatal and postnatal care services. Additionally, visiting service providers were mobilised for long acting reversible contraception services. Reproductive health and COVID-19 communication materials, such as flyers, radio PSAs, FAQs, and television PSAs were developed and adapted in order to educate and reach a wider audience.

HIV/AIDS

COVID-19 impacted the country's HIV/AIDS programme as well. Data on antiretroviral therapy (ART) key indicators until June 2020 showed that 34,822 people enrolled for ART services. Currently, there are only 19,085 enrolled. Among them, 8,458 transferred while 17 stopped treatment. Similarly, 3,956 deaths were reported. An additional 3,132 did not come for follow-ups and 174 were missing.

On further analysis, there was a slight increase concerning the percentage of people who enrolled for ART for the first time and people who are currently enrolled (from December 2019 to June 2020), accounting to three per cent and 2.5 per cent respectively.

Similarly, the number of people living with HIV (PLHIV) on ART reached to 19,020 in March

2020, which was an almost two percent increase from December 2019. This gradually increasing trend slightly decreased during the initial phase of the COVID-19 lockdown but then went up again marginally during its latter phase. The change observed between March to June 2020 was 0.3 percent.

However, new PLHIV on ART decreased significantly between December 2019 and June 2020—an almost 40 percent declination. While the change in trends of new PLHIV had been slightly decreasing from January to March 2020 (the period before the COVID-19 lockdown) accounting to almost four percent, a drastic decline was observed between March and June 2020 (during the COVID-19 lockdown), amounting to almost 40 percent.

Prevention of Mother-to-Child Transmission (PMTCT)

Between July to December 2019, 0.015 percent of PMTCT tests were found to be positive. The number decreased to 0.013 percent from January to June 2020. A drastic decline can be observed when comparing the PMTCT testing trends before and during the COVID-19 lockdown. During January to March 2020, the total number of PMTCT tests was 107,189 which declined to 81,814 between April and June 2020.

To put it briefly, the data analysis shows that the COVID-19 pandemic and the response to it in the form of lockdowns impacted PLHIV, HIV testing, PMTCT, as well as EID.

Tasks performed

In order to mitigate the burden of the disease, several HIV programmes were conducted during the COVID-19 pandemic. On March 20, 2020, an urgent meeting was carried out with the Ministry of Home Affairs in order to get approval for takeaway doses for opioid substitution therapy. Following this, on March 27, the interim guidance for managing PLHIV and harm reduction programme for people who inject drugs was developed and then further updated on August 2. Also endorsed were various other guidelines, such as the National HIV Testing and Treatment Guideline, National Guidelines for Screening, care and treatment of Hepatitis C infection in Nepal, and the Standard Service Package for Key Populations. Apart from these, several other programs and activities were also carried out:

- Thematic review of National HIV Strategy Plan 2016-2021
- Consultation with provincial and other stakeholders for Global Fund HIV, submission of the grant for GF HIV
- Vehicle passes for in-reach workers for continuing harm reduction programmes; this was supported by the National Centre for AIDS and STD Control
- Stakeholder meeting for improving service delivery quality
- Joint monitoring with stakeholders of service delivery points at Province 1, 2 and Bagmati as well as all opioid substitution therapy sites

Apart from the aforementioned activities, various trainings were also provided to healthcare workers during the COVID-19 lockdown. In May 2020, a virtual orientation was provided to all provinces

regarding new guidelines and the transition to a new antiretroviral regimen. Other trainings included sessions on continuous medical training and opiate substitution therapy, early warning indicators, and logistics. When it came to logistics, service delivery points were provided emergency supplies either regularly or on a bimonthly basis.

Challenges

- There was a decrease in overall immunisation coverage compared to the previous year. For instance, 86 municipalities were not declared fully immunised; there were also children who missed vaccination due to COVID-19.
- Immunisation programmes were impacted by the lack of immunisation supervisors at the federal and district levels.
- Health workers were initially diverted to COVID-19 response, a move that increased the number of COVID-19 cases among them.
- Services were poorly utilised, a result of restricted mobility and fear of transmission.
- There was a shortage of essential maternal and newborn health supplies; this included personal protective equipment.
- An additional demand for emergency RMNCAH services was created due to the monsoon rains; this stretched the existing fragile health system.

Tuberculosis amidst COVID-19

Nepal is a country where TB still remains a major public health challenge. The pandemic has put the TB patients; both diagnosed as well as undiagnosed under jeopardy. With regards to prevalence of TB in Nepal, it has been estimated that yearly 69,000 cases are diagnosed each year and more than 50 per cent of

them are actually estimated absent. The government of Nepal like many other countries had to impose public health response activities such as country-wise lockdown to minimize the transmission of the new virus. This further hindered health sector like it did to other sectors. Its impact affected TB to a great extent since there was restricted mobility of people and hinderance in seeking health services. For positive outcome of TB treatment, timely diagnosis and enrollment in treatment is intrinsic. However, the pandemic situation manifested significant impact upon presumptive TB cases, diagnostic services, treatment services and follow-up service in Nepal.

A study shows that the mean number of sputum collection for diagnosis of TB reduced by 67.3 per cent. Similarly, TB case enrollments reduced by 45.5 per cent out of which, the highest declination was seen at Medical colleges (70.0 per cent) and lowest at PHCCs (5.0 per cent) while the case-follow up reduced to 41.7 per cent (MoHP, 2020). Moreover, the recording and online reporting of TB information from the treatment centre to the IHIMS were also disrupted due to the lockdown.

Nevertheless, an interim guidance for management of essential TB services during the COVID-19 pandemic was endorsed by government of Nepal. The key considerations for TB care service under this guidance was to ensure essential services and operations to protect lives of people with TB, to assist national TB programmes, health personnel and TB patients for continuity of essential services for people affected with TB during the pandemic and measures to be applied to provide quality service and to prevent any stigmatization or discrimination of people affected by either TB or COVID-19.

Likewise, the guidance included protocols for prevention, early diagnosis and treatment and care as well as administrative and environmental controls for managing TB during the period of COVID-19 responses. There measures were mostly surrounded the front-line health workers in DOTs with proper information. For instance, preventive measures included activities like applying standard precautions for all patients including PPE use and physical distancing, hand hygiene and respiratory hygiene, ensuring triage, early recognition, and source control such as isolation of patients with suspected COVID-19. Similarly, diagnosis and treatment and care modalities were changed. For instance, for diagnosis, laboratory focal persons were assigned who had to communicate weekly with the provincial teams about the status on the functionality and stock situation of microscopic and gene Xpert centre. The treatment and care were patient-centreed DOTS, where in the Daily DOTs has been shifted to household from health facilities till the pandemic situation comes under control. On the same line, there was a focus on educating patients' caregivers was also much focused upon which included providing counselling to patients as well as the family members about drug compliance and side effect (MoHP, 2020).

Research and development

The Nepal Health Research Council (NHRC) is the national autonomous apical body responsible for conducting and supporting health research with the highest level of ethical standards within the Republic of Nepal. The objectives of the NHRC are to perform studies and researches on issues that have been appearing or may appear in the future in the field of health; operate programmes on consultancy services and information in order to make health-related study and research programs more useful; and obtain information on the studies and researches carried out on health-related issues around the world and provide information thereof to the Government of Nepal. The Council has been conducting research activities within the objectives and jurisdictions specified by the NHRC Act 1991 and the National Health Policy of the Government of Nepal.

The progress details of the programmes conducted by the NHRC related to COVID-19 in 2020 are as follows:

1. According to a letter received by the NHRC from the Government of Nepal, Ministry of Health and Population, dated 2077/12/15 (March 28, 2021), the Member Secretary (Executive Chief) of the council was appointed the Communication Officer with TOR by the Incident Command System under the command of the Health Secretary, by a decision dated 2076/12/14 (March 27, 2020). Based on the TOR provided, the NHRC formed seven sub-committees: the Information Technology Sub-committee, Guideline and Learning Material committee, Guideline and Learning Material Sub-committee, Epidemiology Contact Tracing Sub-committee, Social Action and Networking Sub-committee, Logistic Management Sub-Committee, Daily Reporting, and Public Relations and Media Surveillance. The tasks of each of the sub-committees were accomplished.

2. In a letter received by the NHRC from the Government of Nepal, Ministry of Health and Population, dated 2077/1/15 (April 27, 2020), a five-member committee was appointed and the council was instructed to prepare the National COVID-19 Research Guidelines, as per the TOR. The protocol was prepared accordingly and approved by the 188th executive committee meeting of the NHRC on 2077/02/23 (June 5, 2020), and then submitted to the Government of Nepal, Ministry of Health and Population, for approval on 2077/03/01 (June 15, 2020). It was approved by the Government of Nepal (Secretary level) on 2077/3/15 (June 29, 2020) after detailed discussions in the PCC meeting on 2077/3/11 (June 25, 2020). Research studies into COVID-19 were conducted in accordance with the guidelines.

3. A webinar on the feasibility of COVID-19 vaccine trials in the context of Nepal was organised by the NHRC on 2077/5/12 (August 28, 2020). It included experts and related stakeholders from Nepal and abroad.

4. From January 1 to December 31, 2020, 453 research proposals related to COVID-19 were submitted to the NHRC's Ethical Review Board for approval; 320 were approved.

5. The NHRC formed a panel of experts for the proposals put forward for approval and provided expert opinions on the following submissions:
   - Automatic Sanitization Tunnel
   - Use of RDT / RT-PCR for COVID-19 diagnosis
6. Of the eight research projects proposed to the NHRC by the Government of Nepal, Ministry of Health and Population, seven have been completed and one is in the implementation phase.

Research projects that have been completed

- Assessment of Health Status of Home Isolated COVID-19 Patients in Nepal
- Assessment of Status of Post-Recovery Patients with COVID-19 Infections in Nepal
- Rapid Assessment of COVID-19 Diagnostic Laboratories in Nepal
- Rapid Epidemiological Audit of COVID-19 in Nepal
- Review and analysis of current responses to COVID-19 in Nepal
- Rapid Assessment of COVID-19 Related Policy Audit in Nepal
- Use of SMS measures against COVID-19 after lockdown in Nepal

Research project in the implementation phase

- To evaluate an efficacy of Favipiravir in the treatment of mild and moderate COVID-19 infection in Nepal: a multi-centre, randomized, open-labeled, phase III clinical trial

7. During the one-year period, the NHRC took the initiative to lead a total of 26 SARS-CoV-2/COVID-19 research projects, amongst which 15 have been completed, six are in the implementation phase, and five are being reviewed by the council's Ethical Review Board. The details are as follows:

Completed study research projects

- Assessment of Health-Related Country Preparedness and Readiness of Nepal for responding to COVID-19 pandemic
- Telephone based active surveillance of COVID-19 symptoms and adherence to home-quarantine
- An online survey on stress, anxiety, depression, and their associated factors among the health care workers during COVID-19 pandemic in Nepal
- Public understanding and their response about COVID -19 in Nepal
- Comparative Evaluation of Commercially Available Rapid Diagnostic Test Kits for the use of Screening of Suspected Cases of Novel Corona virus infection in Nepal
- Analysis of COVID-19 news on online media in Nepal
- Use of SMS measures against COVID-19 after lockdown in Nepal
- Review and analysis of current responses to COVID-19 in Nepal
- Rapid Epidemiological Audit of COVID-19 in Nepal
- Compassionate use of Remdesivir and Convalescent Plasma Therapy for the treatment of COVID-19 infection in Nepal: An Observational, Prospective Study
- Deciphering Whole Genomic Sequence of SARS-CoV-2 Isolated from COVID-19 Patients in Nepal

- Rapid Assessment of COVID-19 Diagnostic Laboratories in Nepal
- Rapid Assessment of COVID-19 Related Policy Audit in Nepal
- Assessment of Status of Post-Recovery Patients with COVID-19 Infections in Nepal
- Assessment of Health Status of Home Isolated COVID-19 Patients in Nepal

Study research projects in the implementation phase

- Collateral effects of COVID-19 on other health problems in Nepal

- Assessment on the psychological impact of quarantine in COVID-19 pandemic in Nepal
- Clinical evaluation of YASH-T decoction in management of mild to moderate COVID-19 cases: Open label controlled trial
- Perceptions on Ethics of Public Health Interventions during the Covid 19 Outbreak
- Sero-Epidemiology of COVID-19 in the Kathmandu Valley
- Evaluation of Favipiravir for treatment of mild to moderate COVID-19 infection in Nepal: a multi-centre (Nepal), randomised, open-labelled, phase III clinical trial

Proposed projects being reviewed by the NHRC's Ethical Review Board

- Randomized Evaluation of COVID-19 Therapy (RECOVERY) Trial
- A Phase 2/3, Randomized, Observer-Blind, Placebo-Controlled Study to Evaluate the Efficacy, Safety, and Immunogenicity of Covax-19 SARS-CoV-2 Vaccine in Adults Aged 18 Years and Older
- Protective role of Vitamin D in COVID-19 in Nepal (Randomized Controlled Trial Study)
- Assessment of epidemiology of COVID-19 and estimation of reproduction number in Nepal
- A randomized double-blind Placebo Controlled Treatment for the Use of Isoquercetin in the Treatment of Hospitalized Patients with Confirmed SARS-CoV-2 (Coronavirus 2) Infection and Mild to Moderate Symptoms of COVID-19.

Working with three tiers of government

The Government of Nepal (GoN) formed the High-level COVID-19 Coordination Committee (HLCCC), the COVID-19 Crisis Management Centre (CCCM), and activated the National Disaster Risk Reduction Management Authority (NDRRMA), along with their respective sub-national entities. Various guidelines and protocols were developed, and nationwide lockdown measures were enforced from March 24, 2020—national and international travel was brought to a halt; the tourism, industry, and educational sectors were shut down; and the Visit Nepal 2020 campaign was called off. Restrictions were imposed on all movement except emergency services. On July 22, the federal government lifted the lockdown partially, although restrictions on air travel and long-range transportation services still remained; educational institutions too remained closed. Some of these services resumed on 17 August, 2020.

Federal government initiatives

The federal government formulated various policies, guidelines, approaches, documents, and directives, and facilitated their implementation at the sub-national level to mainstream COVID-19 preparedness and response. It also built the capacity of various communities at the sub-national level through Incident Command Systems, district disaster risk management committees, rapid response teams, and Case Investigation and Contact Tracing Teams. In addition, the federal government provided provincial and local governments with supply chain management of diagnostic test kits, such as Real Time Polymerase Chain Reaction (RT-PCR) and Rapid Diagnostic Tests (RDT), as well as Personal Protective Equipment (PPE).

Similarly, the federal government established and mobilised monitoring teams that consisted of senior Ministry of Health and Population (MoHP) officials. The government also procured PCR/RDT kits, PPEs, and other infection prevention commodities required for frontline health workers. Furthermore, it established and managed isolation beds at federal and provincial-level hospitals and clinics, such as hub hospitals, COVID-19 temporary hospitals, designated hospitals, and COVID-19 clinics. It also coordinated with other GoN ministries for a multisectoral response to tackle COVID-19.

Provincial government initiatives

Aligned with the federal guidelines and directives, the respective provincial ministries of social development and provincial health directorates

▼ *Rt Honorable Chairman Mr Ganesh Prasad Timilsina giving his opening remark at Pan Nepal Briefing of Parliamentarians on the importance of Risk Communication, Community Engagement and COVID-19 at Sudurpaschim Province.*

executed various preparedness and response measures.

The provincial governments developed guidelines on COVID-19 preparedness and response activities. They carried out risk communication and community engagement for the dissemination of real-time information and updates through the Internet and regular press releases and media briefings. Additionally, the governments coordinated with designated and hub hospitals for the management of COVID-19 cases and referrals to higher centres. They also worked on the supply chain management of essential commodities, such as PCR kits and PPEs, to local governments.

Other major tasks carried out by the provincial governments were ensuring the collection of samples and testing at provincial laboratories and reporting to the federal MoHP, while also managing provincial reference and hospital laboratories to improve testing capacity.

Another major undertaking of the provincial governments was coordinating with the federal and local governments for a harmonised response.

Local government initiatives

Local governments implemented preparedness and response activities according to the federal and provincial government mandates.

They followed guidelines from the federal and provincial governments to develop and distribute Information, Education and Communication (IEC) materials, and mobilised community people, Female Community Health Volunteers in particular, to raise awareness about COVID-19 preventive measures. Local rapid response teams (RRTs) were also activated for this task. Additionally, municipal RRTs were made functional, and health desks were established at Points of Entry to screen returnee migrants.

▶ Prof Dr Jageshower Gautam, Spokesperson MoHP spoke at Pan Nepal Briefing of Parliamentarians on the importance of Risk Communication, Community Engagement and COVID-19 at Province no. 2.

More importantly, local governments were responsible for establishing and managing quarantine facilities. They also collected swabs for RT-PCR and RDT. A major bulk of the local government work was focused on the functioning of regular health service delivery mechanisms, and the resumption of national-level priority health programmes, such as those related to routine immunisation; Reproductive, Maternal, Newborn, Child and Adolescent Health; tuberculosis; Vitamin A; and deworming, among others.

Major issues and challenges

- Lack of clear roles and responsibilities of each of the three tiers of government.
- Unsatisfactory supply chain management, from the federal to the local levels. Major issues were the lack of adequate supplies for pandemic response, such as PPEs for frontline workers, and delayed and deferred procurement of medical commodities. This disruption was observed nationally and globally.
- Limited capacity for sample collection, referral, and PCR testing at the local and provincial levels.
- Operational issues in running quarantine sites, and insufficient sample collection and testing facilities.
- Short disruptions in routine health service delivery, as the focus of the health system was diverted to COVID-19. The dilemma around mobilising private health care providers created tension across the public health system, especially in the management of suspected and confirmed cases.

- Inadequate human resource management and their deployment at local levels.
- Unregulated relief packages or support, and unnecessary demand created by the public.
- Room for improvement in developing harmony and coordination among provincial, district, and municipal level authorities for synchronized responses; operational difficulties for the public in complying with lockdown measures; and regulation of essential livelihood supplies for the public, especially for the poor and daily wage workers.

Lessons learnt and the way forward

The COVID-19 pandemic has had huge impacts on the national and local health systems, which were already in dire need of capacity building.

- The clear roles and responsibilities of the health system framework in implementing operational guidelines and directives need considering. The pandemic has provided an opportunity to practice federalisation in the health system reform agenda.
- A key lesson learned was the importance of a harmonised and coordinated response from multiple sectors to tackle pandemics. The need for adequate preparedness and response should be a concern for all sectors, and a multisectoral response is essential.
- Routine health service delivery should not be disregarded while focusing on a pandemic.
- The economic impacts of pandemics need to be analysed, and a key way forward is to develop a strategic plan for economic recovery.

Health system financing

Ministry of Health and Population has disbursed funding in seventy two different institutions to execute activities for the prevention and control of COVID 19. The funds have been allocated for infrastructure development, human resources support, to procure medicines and instruments, capacity development and to run prevention and control programmes and other miscellaneous activites. The detail of the fund allocated is presented in the table below.

Fund disbursement for COVID-19

In thousand Rupees

NAME	BUDGET	EXPENSE
Mechi Hospital	1000	1000
Koshi Hospital, Biratnagar	17575	14560
Ministry of Social Development, Province 1	25000	12500
B.P Koirala Institute of Health Sceinces	38508	34000
B.P Koirala Institute of Health Sceinces	100000	100000
Gajendra Narayan Singh Hospital, Rajbiraj	22896	22813
Ministry of Social Development, Province 2	25000	0
Janakpur Hospital	1000	0
Narayani Hospital, Birgunj	18751	18530
Bharatpur Hospital, Chitwan	9000	8999
Vector Borne Disease Research and Training Centre	1000	183
Ministry of Social Development, Province Bagmati	25000	0
Bhaktapur Hospital	1000	1000
Patan Institute of Health Sciences	52341	52341
Patan Institute of Health Sciences	500	500
Patan Institute of Health Sciences	100000	100000
Ministry of Health and Population	300	0
Ministry of Health and Population	105498	26561
Ministry of Health and Population	12088	0
Ministry of Health and Population	42302	12345
Ministry of Health and Population	1000	52
Ministry of Health and Population	1000	863
Teaching Hospital	8490	7000
National Ayurved Research and Training Centre	500	496
Department of Health Services	9369	9366
Department of Health Services	8500	4959
Department of Health Services	250000	0
Department of Health Services	1239000	1011286

NAME	BUDGET	EXPENSE
Department of Health Services	352609	76470
Department of Health Services	79000	71369
National Public Health Laboratory	16800	16153
National Public Health Laboratory	600	600
National Public Health Laboratory	200	199
National Public Health Laboratory	600	600
National Public Health Laboratory	3607	0
National Public Health Laboratory	4968	1428
National Public Health Laboratory	12567	0
National Public Health Laboratory	600	600
National Public Health Laboratory	30000	19428
National Public Health Laboratory	200	195
National Public Health Laboratory	4190	0
National Public Health Laboratory	1000	952
National Public Health Laboratory	500	490
National Public Health Laboratory	7500	5036
Sukraraj Tropical and Infectious Disease Hospital	115304	114107
Sukraraj Tropical and Infectious Disease Hospital	170637	145859
Sukraraj Tropical and Infectious Disease Hospital	100000	81215
Sukraraj Tropical and Infectious Disease Hospital	2000	2000
Sukraraj Tropical and Infectious Disease Hospital	3000	2327
National Academy of Medical Sciences	35850	35850
National Academy of Medical Sciences	100000	100000
National Academy of Medical Sciences	11744	10395
National Academy of Medical Sciences	67050	4522
Dhaulagiri Hospital	1000	1000
Ministry of Social Development, Province 5	25000	0
Lumbini Hospital	1000	895
Rapti Academy of Health and Sciences, Dang	8490	8490
Rapti Hospital	1000	0
Sushil Koirala Prakhar Cancer Hospital	2000	676
Bheri Hospital, Nepalgunj	8000	8000
Karnali Academy of Health and Sciences	9960	9960
Ministry of Social Development, Province Karnali	25000	0
Surkhet Hospital	1000	0
Dadheldhura Hospital	20142	19520
Mahakali Hospital	1000	1000
Ministry of Social Development, Province Far-west	25000	0
Seti Hospital	1000	817

▲ *Rt. Hon. Prime Minister Mr. K. P. Sharma Oli receives the first jab of the COVID-19 vaccine at TU Teaching Hospital.*

LESSONS LEARNT AND KEY SUCCESS

Preparing for the epidemic

Although necessary preparations were made in the health system to cope with the COVID-19 pandemic, things did not go entirely as they should have. The establishment of laboratories and preparation of isolation and quarantine sites went at a slow pace. This revealed the limited intersectoral coordination and the lack of clarity in the roles of the three tiers of government. In order to bolster the public confidence in its health system, arrangement could have been done early on by establishing testing laboratories and quarantine and isolation sites, purchasing or producing essential items, and fulfilling the requirements of health workers and designating treatment facilities. Local-level budget and authority allocation in preparation for the pandemic could also have been carried out in advance, but this too took time.

Early detection and prompt action

The Ministry of Health and Population developed guidelines and standards to effectively implement its clinical, public health, and social interventions. However, a few issues soon arose. The first was ensuring there was strict compliance with the guidelines and standards. The second was the implementation of the guidelines, which was difficult as they were changed at regular intervals.

In order to address the pandemic, a test-trace-isolate strategy should be strictly and effectively implemented and conceived as a priority action. The testing capacity should be expanded to the vulnerable population, as well as to people presenting signs and symptoms and their contacts. Coping with the pandemic—from the local to the federal level—required proper training, a strong reporting and communication system, and strengthened capacity to increase testing services and contact tracing.

There is an acute need for a national centre of excellence for the control of diseases, which can facilitate new knowledge to save lives, and provide training and research opportunities using multidisciplinary integrated approaches for the surveillance of communicable diseases and the investigation and containment of outbreaks. It should be equipped with modern technology and specialised human resources, and should emphasise on multisectoral approaches including for information management and risk communication.

Health system capacity building and morale enrichment of health workers

The clinical management of cases needs to be effective, with a focus on hospital beds, ICU beds, ventilators, and other medical supplies especially medical oxygen. Proper planning with different stakeholders is required while preparing infrastructure to combat COVID-19. At the same time, non-COVID patients should not be ignored by the health system.

The people most at risk during the pandemic are frontline health workers—doctors, nurses, public health personnel, and laboratory staff, among others. There is therefore a need to enhance their capacity and establish a safe work environment.

Local level budget and authority allocation in preparation for the pandemic could also have been carried out in advance, but this took time.

Health workers should be provided proper protective equipment, and be given incentives to keep motivation levels high through appropriate risk mitigation and risk cover.

In order to better the health system, priority should be given to regulating supplies, producing PPE, motivating health workers, and supplying enough ventilators to all provinces. This can be boosted by involving the private sector and establishing a national IPC programme.

Joining hands with the private sector

The MoHP should collaborate with the private sector to produce PPE, masks, and medical equipment, among others items. Industries and businesses, who have been severely impacted by the pandemic, should be given financial recovery packages as well.

Risk communication and community engagement

Compliance—in terms of social distancing, mask wearing, and sanitiser use—needs to increase among the public. To engage the public and increase compliance, respected personalities should be brought in to build community trust.

International community support

The COVID-19 pandemic has shown the importance of international collaboration. International organisations should therefore be involved in training health workers and creating awareness about COVID-19 transmission. Diverting their regular programmes towards combating the coronavirus is the need of the hour.

Information management

A fast and strong health response is critical for containing any pandemic. In the wake of the COVID-19 outbreak, the authorities need to show commitment towards refining the national health system—by enhancing surveillance and warning systems for contagious diseases and enriching the capacity of health workers—which will prepare Nepal for possible future health emergencies. Consistency and transparency are vital in information sharing. The sharing of real-time information about pandemic updates via advanced mobile technology is of utmost importance.

The establishment of a robust and integrated information management platform for operational decision support that is based on real time situation and risk assessment is critical.

Effective logistics system

A functional logistics system needs to be a top priority for the timely delivery of medical supplies. It is absolutely essential to procure sufficient quantities (while certifying quality) of medical supplies, and ensure a secure supply chain. Stable supply chains are necessary to make sure that supplies are provided on time during crises.

An integrated logistics information management system that is effective during surge response is essential.

THE ROAD AHEAD

COVID-19 pandemic is a wakeup call to the world. This will, in all likelihood, not be the last pandemic that humanity will face, and so it is imperative to build a sustainable health emergency preparedness system to deal with the next one.

More importantly, Nepal needs to be better prepared for a re-emergence or probably another outbreak of the novel coronavirus.

An important lesson that came to the fore when responding to COVID-19 was the importance of personal behavioral changes, such as hand-washing and mask wearing, that helped stem the tide of infections. Meanwhile, careful surveillance by testing and isolating new cases, and tracing their contacts rapidly and extensively were quite effective as well. Mitigation efforts, such as social distancing, needs to continue for as long as possible to avert future outbreaks.

All of these experiences have brought forth the importance of investing in national health and research systems to enhance laboratory capacity as well as workforce, which are fundamental for a quick and effective national response to health emergencies and to global health security. Political commitment and community engagement guided by patience, discipline, and solidarity are the backbone of containment measures. To end the pandemic, the virus must either be eliminated worldwide—which most scientists agree is near-impossible—or people must build up sufficient immunity through infections or a vaccine. The pandemic's future course will depend greatly on the arrival of a vaccine, and on how long the immune system stays protected after vaccination or recovery from infection.

Furthermore, the pandemic has taught us the importance of integrated data and reporting systems to create uniformity in data reporting and its use.

In the battle with the coronavirus, we may come out ahead through the development of vaccines and medicines. However, in the long run, the country must be prepared for numerous threats associated with the pandemic, and actions should be established and implemented. There is still a lot that we do not know about this virus. There will be a lot of uncertainty before we have better data. This is not the last disease threat our world will face, and the past year has shown that we are all connected—until every country is safer, all of us are at risk. When the next pandemic strikes, the whole world needs to implement best practices to save lives and protect livelihoods. Now is our opportunity to improve global preparedness. If we do not apply the lessons of 2020 in 2021, we perhaps never will.

A glimpse of children wearing mask during COVID-19 Pandemic