This compendium showcases exemplary practices adopted by member states and partners in the WHO South-East Asia Region from the onset of the pandemic until the end of 2022, which were implemented to respond to COVID-19 and maintain essential health services. This document highlights 18 practices as best cases and refers to 58 good practices adopted by the countries and partners. The document follows the response pillars of the COVID-19 Strategic Preparedness and Response Plan issued by WHO in 2021.

These practices provide adequate insight into how scarce resources and capacities can be better utilized during large-scale emergencies. This document offers numerous valuable references and can be a solid foundation for learning from each other and further strengthening national and sub-national pandemic preparedness and response capacities.
Compendium of good practices in response to COVID-19 in the SE Asia Region
Compendium of good practices in response to COVID-19 in the SE Asia Region

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Printed in India
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Foreword

I am pleased to introduce this compendium of some good practices related to the pandemic that were evidenced in the South-East Asia Region. The unprecedented COVID-19 pandemic severely disrupted health systems and societies. The “pandemic of the century” tested public health systems, communication and supply networks, and even the very spirit of humankind. In these trying times, communities and institutions came together, developed partnerships and support systems, and responded collectively to the pandemic. With limited available resources and countermeasures, all nations in the SE Asia Region tackled this pandemic to the best of their abilities. It was impressive how countries developed and implemented many strategic, innovative and contextualized interventions based on evidence from national and international sources.

The Regional Office tried to capture the maximum number of good practices implemented by Member States from the onset of the pandemic until the end of 2022 using a standard set of criteria. This is a first-of-its-kind effort in the Region to acknowledge and appreciate these practices and help other countries and organizations to adapt these to strengthen their pandemic preparedness and response capacity. The team received an overwhelming number of good practices from all countries. After a rigorous review process, certain noteworthy practices were identified as case studies. Professionals, experts and implementing entities further verified and vetted these practices.

I am confident that this compendium will serve as an inspiration and provide valuable insights into how scarce resources and capacities can be better utilized during such a largescale pandemic to respond to the emergency and ensure the continuity of essential health services. I urge all countries, partners and stakeholders to use this compendium as a reference and make concerted efforts to accelerate progress towards achieving our regional Flagship Priorities.

Dr Poonam Khetrapal Singh
Regional Director
WHO South-East Asia
Acknowledgments

This compendium was prepared by the World Health Emergencies (WHE) Programme at the WHO Regional Office with support from PATH South Asia and country offices in the South-East Asia Region. The team conducted the desk review and collected information from various sources, including focal points from programme implementing agencies, government offices, professional organizations and WHO country offices, to prepare a detailed list of potential good practices. The team reviewed more than 182 interventions received from various sources using standard criteria. The case studies were thoroughly reviewed by PATH and WHO colleagues and experts, with valuable comments and feedback provided.

This compendium could not have been possible without the committed participation of individuals and organizations who shared their rich knowledge and experiences with the WHE team. We would like to thank informants from governments, WHO country offices, implementing partners, key stakeholders, health experts and advisers from all Member States for their review, comments and support.

This document has been edited and designed by the Reports and Documentation team in the WHO Regional Office.
## Acronyms and abbreviations

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<th>Acronym</th>
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<tr>
<td>ASHA</td>
<td>Accredited Social Health Activist(s)</td>
</tr>
<tr>
<td>BMC</td>
<td>Brihanmumbai Municipal Corporation</td>
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<tr>
<td>CHW</td>
<td>community health worker(s)</td>
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<tr>
<td>CoWIN</td>
<td>Covid Vaccine intelligence Network</td>
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<tr>
<td>CSO</td>
<td>civil society organization(s)</td>
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<tr>
<td>DHIS 2</td>
<td>District Health Information Software 2</td>
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<tr>
<td>eLMIS</td>
<td>electronic logistics management information system</td>
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<tr>
<td>eVIN</td>
<td>Electronic Vaccine Intelligence Network</td>
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<tr>
<td>GNH</td>
<td>Gross National Happiness</td>
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<tr>
<td>HISP</td>
<td>Health Information Systems Programme</td>
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<tr>
<td>IAR</td>
<td>intra-action review(s)</td>
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<tr>
<td>ICMR</td>
<td>Indian Council of Medical Research</td>
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<tr>
<td>IEDCR</td>
<td>Institute of Epidemiology, Disease Control, and Research</td>
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<tr>
<td>INSACOG</td>
<td>Indian SARS-CoV-2 Genomics Consortium</td>
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<tr>
<td>IOM</td>
<td>International Organization for Migration</td>
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<td>IPC</td>
<td>infection prevention and control</td>
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<td>LMO</td>
<td>liquid medical oxygen</td>
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<td>MoHFW</td>
<td>Ministry of Health and Family Welfare</td>
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<td>MoHP</td>
<td>Ministry of Health and Population</td>
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<td>MoPH</td>
<td>Ministry of Public Health</td>
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<td>NCD</td>
<td>noncommunicable disease(s)</td>
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<td>NFDN</td>
<td>National Federation of the Disabled – Nepal</td>
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<td>NHL</td>
<td>National Health Laboratory</td>
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<tr>
<td>OPD</td>
<td>outpatient department</td>
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<tr>
<td>PATH</td>
<td>Program for Appropriate Technology in Health</td>
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<tr>
<td>PoE</td>
<td>point(s) of entry</td>
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<tr>
<td>PPE</td>
<td>personal protective equipment</td>
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<tr>
<td>PSA</td>
<td>pressure swing absorption</td>
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<td>PWD</td>
<td>persons with disabilities</td>
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<td>R&amp;D</td>
<td>research and development</td>
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<tr>
<td>RT-PCR</td>
<td>reverse transcriptase-polymerase chain reaction</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>SARI</td>
<td>severe acute respiratory illness</td>
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<tr>
<td>SDG</td>
<td>Sustainable Development Goal(s)</td>
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<td>SE</td>
<td>South-East</td>
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<td>SII</td>
<td>Serum Institute of India</td>
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<td>SPRP</td>
<td>Strategic Preparedness and Response Plan</td>
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<td>TB</td>
<td>tuberculosis</td>
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<td>UHC</td>
<td>universal health coverage</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>UNPRPD</td>
<td>United Nations Partnership on the Rights of Persons with Disabilities</td>
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<tr>
<td>VOC</td>
<td>variants of concern</td>
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<tr>
<td>WASH</td>
<td>water, sanitation and hygiene</td>
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<td>WHE</td>
<td>WHO Health Emergencies (Programme)</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Background

The COVID-19 pandemic led to a global health emergency unprecedented in human history. Within three years, the COVID-19 disease had impacted every country worldwide. The economic, social and environmental impacts of COVID-19 have been enormous and have greatly affected the ability of developing countries to invest in the implementation of the Sustainable Development Goals (SDG) (1). During the pandemic period, countries reported disruptions of essential health services in all major health areas (2). The pandemic overstretched the capacity of health facilities and healthcare systems worldwide. There was tremendous pressure to meet the increased demand for hospital beds, health workers, medicines, testing kits, oxygen and many other essential logistics and equipment (3).

Countries worldwide responded to the pandemic in substantially different ways. Many factors were responsible for this, including system capabilities, economic conditions, social behaviour patterns and preferred approaches to the policy-making processes. Member States of the Region made considerable efforts to respond to COVID-19 and ensure the continuity of essential health services. Governments at national and subnational levels and nongovernment entities in the Region adopted several innovative and impactful interventions to respond to the pandemic. Each Member State’s response was unique, as they adopted strategies and approaches best suited to their countries and local needs. However, the COVID-19 pandemic revealed that the efforts and practices were not optimum in all cases. These were further exacerbated when we examine subnational level responses.

The World Health Organization (WHO) Health Emergencies (WHE) Team of WHO Regional Office for South-East (SE) Asia has attempted to review the initiatives taken by the 11 Member States in each pillar of the COVID-19 response plan.

The selected interventions were reviewed against criteria jointly agreed upon by PATH and WHO to assess their appropriateness for inclusion in this compendium (Annex 1). The interventions included in the document are not limited to practices implemented by governments, but also include practices by nongovernment entities, communities, partners and beneficiaries, among others.

This compendium is expected to serve as a resource to help Member States and stakeholders to learn from each other’s experiences in responding to the pandemic and ensuring the continuity of essential health services. Such documentation, learning and sharing will help all stakeholders to be better prepared for future pandemics and other health emergencies. It is also equally important to remember that each country has distinct circumstances, mechanisms and systems. Hence, applying any of these solutions would require careful consideration.
Organization of the good practices

This compendium organizes the good practices in the COVID-19 Strategic Preparedness and Response Plan (SPRP) 2021, which was widely known and used by key stakeholders, under the following heads:

- coordination, planning, financing and monitoring;
- risk communication, community engagement and infodemic management;
- surveillance, epidemiological investigation, contact tracing and adjustment of public health and social measures;
- points of entry, international travel and transport and mass gatherings;
- laboratories and diagnostics;
- Infection prevention and control and protection of the health workforce;
- case management, clinical operations and therapeutics;
- operational support, logistics and supply chains;
- maintaining essential health services and systems; and
- vaccination.

Practices that fall into more than one category were placed in the category where they best fit. The regional office understands there are many more good practices in this field than those listed here. The practices included here should be taken as illustrative, rather than exhaustive, of the many innovative and exemplary efforts made to respond to COVID-19 and ensure the continuity of essential health services. Further efforts by Member States, WHO and partners would be required to institutionalize, document and share such practices during the pandemic and post-pandemic period.

References


Methodology

In developing this compendium, a three-phased approach was followed to identify and document best/good practices during the COVID-19 pandemic response in the Region.

- In the first phase, the team collected a comprehensive list of 182 interventions from all Member States that could be potential good practices. The team also undertook a secondary literature review using online resources and collated information from WHO SE Asia country offices to prepare a full list of interventions.

- In the second phase, all shortlisted interventions were screened using a screening tool with four major criteria – relevance, innovation, impact and replicability or scalability. The criteria also included parameters such as the whole-of-government and whole-of-society approach, targeted strategies to reach vulnerable and high-risk populations, gender inclusiveness, safety measures, etc. The team shortlisted 87 interventions to assess further for inclusion in this compendium.

- In the third and final phase, the team collected detailed information for profiling good practices. Further information, including key strategies, implementation processes, results, outcomes and lessons learnt were collected, evaluated and documented. The drafts of these best/good practices were shared with the focal points and experts to seek their feedback and fill information gaps wherever possible. After considering the feedback, the group decided to highlight 18 good practices as case studies and refer to 58 interventions in this compendium.

Definition

“Good practices” here refer to health interventions that have been proven reliable to lead to the desired result and are evident through experience and research. They include health policies, strategies, interventions, projects, actions and so forth.

Limitations

Throughout the exploring and documentation process, the team faced several challenges, which limited the inclusion of many practices. One major challenge was the systematic documentation of interventions and their outcomes. When the team attempted to collect information from programme focal points, many of them had retired or moved to other roles and the team could not get the required information. Among the information required to assess an intervention for inclusion, accurate data on coverage and impact was inconsistent and difficult to find. Likewise, information from systematic assessment of new interventions was also not available. This may have been due to the absence of systematic operational research design, which implementing agencies were not able to plan as they had limited time to respond to the pandemic. Most of the information was obtained from the programme focal points, online published documents and
programme dashboards. Moreover, for some interventions, the subject matter experts only had information limited to the sphere of work, which resulted in insufficient data to assess the intervention comprehensively and contextually. Considering the above facts and challenges, the team also realized that the period of five months to capture all good practices of the Region was insufficient. Hence, the good practices provided in this document need to be interpreted cautiously and should not be misinterpreted as endorsed or recommended by WHO.
Good practices in coordination, planning, financing and monitoring

The pandemic necessitated a well-coordinated plan with detailed protocols and guidelines, effective implementation on the ground and regular adjustments in each country’s COVID-19 preparedness and response measures. To this end, most governments constituted national and subnational committees and task forces to prepare for a strategic response to the pandemic, which were revised and reconstituted as newer variants emerged. Additionally, multisectoral collaboration ensured that all sectors and industries, including public-private partnerships, academia and civil society utilized their experience and resources to respond as a whole-of-society response.

Planning and coordination

Member States of the SE Asia Region introduced early activation of coordination systems, established emergency management structures, public health and social measures, and were vigilant in detecting cases by a proactive workforce. Bhutan had limited healthcare resources, yet years of infectious disease preparedness activities conducted by the Government with technical and financial support from organizations like WHO had prepared it to rapidly detect and respond to COVID-19 (1).
Unleashing happiness in Bhutan

Gross National Happiness framework against COVID-19

Coverage

The Gross National Happiness (GNH) framework was implemented at the national level in Bhutan. The intervention covered all 20 districts.

Introduction

In Bhutan, happiness is more than just an abstract concept; it is a fundamental principle that guides governance and policymaking. First proposed by King Jigme Singye Wangchuck of Bhutan in 1972, the country embarked on a unique journey to prioritize the well-being of its citizens through the implementation of the GNH framework (1).

During the pandemic, Bhutan faced a multitude of interconnected problems, including economic losses, resource constraints and the psychological impacts of isolation. Altogether, these issues not only exacerbated the existing concerns but also contributed to a significant mental health crisis, as depicted in Fig. 1, by the rise in depression, anxiety and suicide rates in 2020 (2). Therefore, Bhutan’s utilization of GNH took on even greater significance. The GNH framework strengthened community resilience and vitality, showcasing a harmonious approach to development.

Fig. 1. Prevalence of commonly reported mental health disorders

Summary of the approach

During the COVID-19 pandemic, the four pillars of the GNH framework – good governance, sustainable socioeconomic development, preservation and promotion of culture and environmental conservation – guided the policy formulation for Bhutan’s pandemic preparedness and mitigation strategies (3). Thus, Bhutan’s Ministry of Health, in collaboration with WHO and the United Nations Development Programme (UNDP), integrated the GNH principles and developed the following response strategies:

- **Using GNH Index to evaluate the COVID-19 response.** This index measures national levels of well-being, providing the foundation for Bhutan’s approach, incorporating nine domains and 33 indicators. This index was used to evaluate the COVID-19 response strategies and guide policy reform in the country (3).

- **Establishing a mental health services taskforce**
  - The taskforce used the WHO Psychological First Aid: Guide for Field Workers handbook to train over 20,000 workers, including health professionals, counsellors and community volunteers on recognizing suicide risk factors, delivering basic psychosocial support to those in need and calling for referrals whenever needed. Several hotline numbers were used, including Bhutan’s Health Line (112), to provide aid related to mental health during the pandemic. Additionally, the response team created “Media Guidelines for Responsible Reporting of Mental Health and Suicide” for all media representatives (4,5).
  - Bhutan also launched the “OnMyMind” campaign, in collaboration with the Ministry of Education, the Government of Bhutan and the United Nations Children’s Fund (UNICEF), to destigmatize mental health and encourage support-seeking behaviour, particularly among the youth. A “Youth in Action” initiative was started to reduce the prevailing problems associated with substance abuse, sexual orientation and increasing suicide rates, among others. The construction of the Pema Centre, a hospital for mental health and well-being, further emphasised the priority of mental health (4).

- **Creating open channels of communication.** The Government initiated an “our gyenkhu” (our responsibility) campaign to engage communities and improve communication (5). To combat the spread of misinformation and initiate community engagement, Bhutan identified local champions such as village health workers, community and religious leaders and government officials in each cluster, which mapped communities based on their risk profile and established communication channels using social media, television networks, etc. (6). These channels facilitated the timely and accurate flow of information, even in remote areas (7).

- **Community engagement.** The already existing cadre of citizen volunteers or De-Suungs (Guardians of Peace) were trained as paramedics to support the nursing staff in the country who were handling the COVID-19 patients (8). Action plans
were developed and shared accordingly to create a shared sense of ownership among the community members (6). Further, production and distribution of goods like hand sanitizers and face masks was localized.

- **Prioritising welfare.** Bhutan launched the Druk Gyalpo’s Relief Kidu welfare scheme that granted monthly income support to 54,783 individuals who lost their livelihoods due to the pandemic between April 2020 and March 2022. It included employees who were laid off or were paid a reduced salary due to COVID-19, people who had returned home from abroad due to loss of employment and individuals engaged in self-operated business in the tourism and tourism-dependent sectors (9). The Government also provided insurance coverage for healthcare workers. Moreover, the Government decided that the Bhutanese abroad who wished to return home could do so, regardless of whether or not they were infected with COVID-19. Despite the accompanying risks, this humanitarian decision was made in line with the GNH (7).

### Results

By implementing these strategies, Bhutan could involve the communities to protect its population’s physical and mental well-being while addressing the challenges posed by the pandemic. As of February 2022, under the Druk Gyalpo’s Relief Kidu relief fund, around 51 million US dollars had been disbursed under this scheme (12). This intervention helped alleviate financial concerns during already stressful times.

The GNH index increased from 0.743 in 2010 to 0.781 in 2022, which depicts the country’s long-term commitment to prioritizing happiness among its population (11). The proactive measures taken by the country, coupled with its focus on well-being, led to an effective response to the pandemic.

By empowering individuals through community consultations, protecting livelihoods, supporting vulnerable communities and providing equitable access to essential services, Bhutan fostered a sense of shared responsibility and active engagement, eliminating fear among the population (2, 12). Overall, the GNH framework implemented over the past few decades helped build resilient communities.

### Lessons learnt

The lesson derived from the GNH intervention underscores the significance of cultural relevance and inclusivity in ensuring the successful implementation of measures. Bhutan encouraged collective responsibility, volunteerism and interdependence by incorporating cultural and traditional values into interventions, enhancing effectiveness and a sense of community identity and ownership. Despite limited material resources and the pandemic’s economic impact, charitable donations were made by citizens, organizations and parliamentarians, exemplifying the tradition of *dana* (giving). This
demonstrates exemplary planning and coordination along the lines of health, happiness and community well-being by using a whole-of-society approach and ensuring timely efforts and resources to combat the pandemic.

References


In yet another planning and coordination effort, Timor-Leste developed an Integrated Crisis Management Centre (CIGC), which was initiated by the Prime Minister's Office as an emergency response to COVID-19. CIGC was set up as a Situation Room for emergency response. It had three territorial units, and the purpose of these territorial units was to implement the guidelines of the Situation Room at the administrative district level. The Prime Minister was appointed the Operational Commander and was responsible for directing the operations, coordinating all units and linking the Situation Room with individual government bodies (2).

Likewise, in Nepal, the overall response was coordinated by the High-level Coordination Committee for the Prevention and Control of COVID-19. The committee was led by the Deputy Prime Minister and guided sectoral responses. The country also established an Incident Command System (ICS) within the Ministry of Health and Population (MoHP) to accelerate evidence-informed decision-making and improve the overall effectiveness of the COVID-19 response. Daily data analyses were conducted and shared with higher authorities for decision-making. The MoHP was able to align the support from partners in priority areas identified in the early phase of the pandemic, which were regularly updated, reviewed and shared in cluster meetings (3).
An all-inclusive health emergency response in Nepal

Taking care of people living with disabilities

**Coverage**

The intervention for inclusive COVID-19 care spanned across all districts of Nepal. The target beneficiaries of this intervention were individuals with disabilities, particularly those who are often marginalized and excluded in emergency response efforts (1).

**Background**

Persons with disabilities (PWD) have often been vulnerable to numerous other diseases due to a pre-existing health condition, lack of knowledge, barriers to accessing health and hygiene measures and their reliance on personal carers. The pandemic affected them in more ways than one, including their economic status, access to resources and services and mental health (2–5).

PWD are especially susceptible during health emergencies, such as the COVID-19 pandemic or any natural catastrophe, due to the many infrastructure barriers and disability prejudices. Hence, the goal of this intervention was to provide guidance and support activities that would guarantee that PWD were included in the Nepal Government’s health emergency response activities, including prevention, identification and treatment.

**Summary of the approach**

A whole-of-government and whole-of-society approach was employed to achieve this goal. The planning to develop a comprehensive disability-inclusive emergency response was done at the highest administrative level, involving key government machinery. The Government involved the National Federation of the Disabled – Nepal (NFDN) as one of the key organizations that supported this intervention. In March 2021, NFDN collaborated with WHO to advance disability-inclusive preparedness and response to the COVID-19 pandemic.

The following are some of the key activities undertaken by Nepal as part of its disability-inclusive response:

- Conducting a situational analysis to assess the needs and vulnerabilities of individuals with disabilities in emergencies. With the support of the United Nations Partnership on the Rights of Persons with Disabilities (UNPRPD), the Government of Nepal conducted a situational analysis between March 2021 and December 2021 to assess the needs and vulnerabilities of PWD in the country. The findings were used to guide the disability-inclusive COVID-19 response strategies (7).

- Developing national guidelines for disability-inclusive emergency response planning and implementation. On 31 March 2020, NFDN developed the General Guidelines for Persons with Disabilities and all stakeholders on disability-inclusive response against the COVID-19 pandemic and shared them with all stakeholders through different electronic media (8). With the help of WHO and NFDN, Nepal also developed guidance on managing children with disabilities in COVID-19 facilities.

- Information dissemination and awareness generation among PWD about COVID-19. NFDN, along with other stakeholders, made mass awareness materials on COVID-19 prevention accessible to all, including PWD (Fig 2). Communication products were developed by NFDN in accessible designs and formats, such as informative videos about the COVID-19 pandemic with sign language interpretation. NFDN and NIDWAN also produced and disseminated COVID-19 pandemic videos with sign language interpretations (6,9).

- Ensuring disabled-friendly health facilities and capacity-strengthening of healthcare workers to attend to persons with disabilities infected with COVID-19. The NFDN trained nurses and paramedics to provide healthcare services to PWD. The skills and capacities of health resources and hospitals, such as COVID-19 Unified Central Hospital

Fig 2. A sample mass awareness material on COVID-19 prevention.
and Bir Hospital (a reference facility for COVID-19) were assessed by a team of people with disabilities. Further, WHO and partners advocated for and supported the hospitals in addressing gaps to ensure disability-inclusive COVID-19 services.

- Facilitating COVID-19 vaccination of people with disabilities. Initially, PWD were not considered a priority group for COVID-19 vaccines. However, with consistent advocacy efforts, they were recognized as a priority group and provided with vaccines nationwide. Transportation to vaccination facilities was arranged by municipalities and local entrepreneurs.

- Training and capacity strengthening of counsellors for providing psychosocial support to people with disabilities. As the pandemic had a huge impact on the psychosocial well-being of women and girls with disabilities, especially those facing domestic and gender-based violence, the NFDN also trained women as peer counsellors to help manage the sensitive issue of gender-based violence. These women worked as key facilitators and intervened in a timely manner in the cases of gender-based violence involving PWD and their families. Also, organizations like KOSHISH (a national self-help organization focused on the rights of people with psychosocial disabilities) provided free online psychosocial services (10).

## Results

The Nepal Government, with support from key stakeholders, delivered some key results through these interventions:

- The General Guidelines for Persons with Disabilities and All Stakeholders on Disability-inclusive Response Against COVID-19 was developed. These guidelines were helpful in implementing health emergency responses for PWD.

- Provisions for sign language interpretations were made to ensure that COVID-19-related messages reached PWD and were understood by them.

- Information collected from 21 COVID-19 facilities to assess whether their infrastructure and basic amenities were accessible for PWD was shared with the authorities to prioritize planning of such facilities. Likewise, data on almost 1500 households of PWD not suitable for home quarantine or isolation were shared with the municipal authorities. Members of such households were prioritized for institutional quarantine or isolation.

- The recommendations of disability-inclusive “access audit” conducted at COVID-19 Unified Central Hospital (Bir Hospital) were implemented, which included: (i) dedicated parking spaces for PWD in the hospital basement with epoxy paints (durable ground markings); (ii) installation of luminance contrast signage floors of the hospital to aid patient mobility; (iii) construction of a ramp at the basement parking area to the elevator; (iv) laying cement-based tactile pavement,
facilitating the entry of PWD into the surgical building; (v) step-down information desk counter to make it accessible for wheelchair users; and (vi) installing digital display boards to provide information and enhance patient mobility.

- The intervention assisted more than 90,000 persons with severe disabilities to receive COVID-19 vaccine, which was 43% of the registered persons with severe disabilities in the country.
- The key outcome of this initiative was enhanced coordination and collaboration between stakeholders that led to effective emergency response. This was made possible by establishing a network of disability organizations and technical assistance provided by the Government by integrating the disability-inclusive guidelines into national emergency response plans.

Lessons learnt

- The country’s strong commitment and already existing policy frameworks were critical factors for the effective implementation of Nepal’s disability-inclusive approach during the pandemic.
- A multisectoral collaborative approach ensured policy-level changes for persons with disabilities and their representative organizations in COVID-19 response efforts.
- As illustrated by this intervention, the availability of disaggregated data for vulnerable groups was a prerequisite for designing, implementing and monitoring emergency response.

References

In another example of partnerships and coordination to mitigate the COVID-19 crisis, Timor-Leste channelled its efforts toward ensuring health security for its people. As a collaborative approach, the partners provided support to strengthen diagnostic and case management capacity, vaccination, logistics and infrastructures. (4,5).

**Financing**

Ensuring adequate funds to combat the impact of the COVID-19 pandemic has been one of the biggest challenges for countries across the world. With limited economic resources, most Member States of the Region tried to streamline their finances towards the COVID-19 response, along with seeking assistance from partners. For example, Thailand worked toward providing universal access to COVID-19 services to everyone in the country and ensured adequate funds for it (6). Member States also established dedicated COVID-19 emergency funds, such as India’s PMCARES and Bhutan’s Druk Gyalpo’s Relief Kidu, with the primary objective of dealing with the pandemic and providing economic support to people adversely affected by it.
Pandemic-inclusive universal health coverage in Thailand

A comprehensive health policy for all

Coverage
The intervention to ensure universal health coverage (UHC) in Thailand covered the entire population, including non-citizens.

Introduction
Thailand has made significant progress in advancing UHC since its inception in 2002 through three main public health insurance schemes: the public sector employees and dependents are covered by the tax-financed Civil Servant Medical Benefit Scheme (CSMBS); the private sector employees are covered by the payroll tax-financed Social Health Insurance (SHI) Scheme; and the remaining majority are covered by the tax-financed Universal Coverage Scheme (UCS) (1,2).

Due to its strategic location in SE Asia, Thailand has long been the most sought-after destination for migrant workers. According to the 2019 Thailand Migration Report, there were around 4.9 million migrants in the country, most of them from Cambodia, Lao People’s Democratic Republic, Myanmar and Vietnam. Many migrants were unauthorized; and as such up to 49% of them lacked health insurance. Hence, when COVID-19 hit the country, the national Government initiated a high-level, multisectoral and whole-of-society approach to provide access to COVID-19-related healthcare services to the entire population, including migrants and other vulnerable groups.

Summary of the approach
Thailand considers access to health care as a fundamental human right. An effective response to the pandemic required universal access to services by everyone, regardless of their nationalities. Hence, it laid out an inclusive and coordinated COVID-19 preparedness and response strategy for mitigating the impact of the pandemic for all residents. The key strategic activities undertaken as part of this intervention included the following:

- Multistakeholder collaboration for planning and coordination

  The intervention, although planned and implemented by the national Government, involved government agencies across various levels (3). Support
from all policy actors in the Government, along with the three public health insurance schemes, was sought in implementing the comprehensive benefits package and harmonizing the fee schedules for everyone living in Thailand affected by COVID-19.

- Ensuring adequate financial resources to cover COVID-19-related health services
  As per the existing UHC programme, COVID-19-related services were not listed and lacked an earmarked budget. As a result, the Government took policy decisions to fully fund a comprehensive benefit package for COVID-19. The cabinet approved 6352.5 million Baht (206.4 million US dollars) in the first half of the fiscal year 2021 for COVID-19 screening and vaccines in addition to the country’s regular budget for health services. Subsequently, in the second half of 2021, the cabinet approved a budget of 10 569.8 million Baht (343.2 million US dollars) to finance COVID-19 health services. An additional budget for non-Thais was also allotted directly to the Ministry of Public Health (MoPH) to manage the payment of services at the same rate as for Thai citizens. The cabinet approved two additional tranches of 99.9 million and 959.3 million Baht for all migrant workers not insured by any scheme, thereby ensuring their access to COVID-19 services.

- Providing comprehensive benefit packages with high financial risk protection
  On 2 April 2020, the Royal Gazette published a comprehensive benefit package that included a range of COVID-19-related services (1). The package included laboratory tests, contact tracing, active case findings, 14-day quarantine measures, ambulance services for referral, clinical services and vaccination costs.

- Ensuring health services by strengthening system capacities
  Along with policy interventions, supply-side capacity strengthening of health systems was also done to make services accessible to all. Additional hospital beds, intensive care units and ventilators were arranged in all provinces to accommodate rising COVID-19 cases. From April 2020 to June 2021, reverse transcriptase-polymerase chain reaction (RT-PCR) laboratories were expanded from 80 to 317 nationwide. The MoPH also stockpiled favipiravir and remdesivir for the treatment of COVID-19 patients and prevention of any potential shortages. Personal protective equipment (PPE) such as surgical masks, polypropylene and alcohol-based hand sanitizers were also made available to the population by scaling-up local production (1). In addition to makeshift hospitals (with hotels repurposed as hospitals), field hospitals were rapidly built within days in heavily affected provinces, especially during the second and third waves. At the peak of the third wave in July 2021, the number of field hospital beds had increased from 8243 to 12 822.
Results

- As of 30 September 2021, the statistics showed that the Centre had treated 12,696 patients, of whom 3,246 were migrant workers (4).
- To ensure that everyone could access COVID-19 services, additional funds were released for individuals who suffered from adverse events or death following the COVID-19 vaccination. These measures drastically reduced out-of-pocket expenditures, thereby increasing the number of people accessing health services and contributing to an effective pandemic response (5, 6).
- Data released by the MoPH Department of Disease Control (DDC) on 25 April 2022 reported that a total of 5,043,816 doses of COVID-19 vaccine had been administered to foreign nationals residing in Thailand (7).

Lessons learnt

The existing health insurance programme could be extended as a sustainable mechanism to provide better social protection from pandemics. Further, it was necessary to include both citizens and non-citizens in health programmes, since no one can be safe till everyone is safe during health emergencies like the COVID-19 pandemic.

References


**Review and monitoring**

Recognizing the requirement of continuous review and monitoring of COVID-19 responses, WHO provided guidance for conducting country-based COVID-19 intra-action reviews (IAR) and related resources. COVID-19 IAR was a country-led and guided process that allowed stakeholders in the COVID-19 response to examine the functional capacity of national and subnational public health and emergency response systems to identify best practices, gaps and lessons learnt, and propose corrective measures and actions for immediate remediation or sustained improvement of the COVID-19 outbreak response (7). Bangladesh, Bhutan, India, Indonesia, Maldives, Nepal, Sri Lanka and Thailand conducted IAR during the pandemic period. Bangladesh, Nepal, Sri Lanka and Thailand conducted assessments using the Strategic Tool for Assessing Risks (STAR) using multihazard and whole-of-government approach to inform the preparedness and response efforts by generating a comprehensive risk profile. Thailand conducted a universal health preparedness review and became one of the first countries to pilot this new tool (8). Furthermore, Thailand organized national bridging workshop to review current collaboration among key stakeholders from public health, animal health, food safety, environment and to develop a joint roadmap to improve the animal-human interface in the detection, prevention and control of zoonotic diseases (9).
Intra-action COVID-19 response review in Indonesia

Evaluating and enhancing pandemic strategies

Coverage

Indonesia's Intra-action COVID-19 response review covered the entire country. Indonesia conducted a series of IAR and monitoring sessions between August 2020 and November 2022 to identify gaps, learning opportunities and areas in need of improvement in the country's national-level response to the COVID-19 outbreak (1).

Introduction

WHO highlighted the importance of continuous collective learning by bringing together relevant stakeholders to critically and systematically analyse actions undertaken in an emergency response. Following this, comprehensive guidance and tools to facilitate the implementation of IAR were developed, focussing on conducting the COVID-19 IAR within the country either in person or virtually (1,2). Embracing the guidelines set by WHO on IAR, Indonesia’s Ministry of Health (MoH), in collaboration with WHO, embarked on a journey of self-assessment and improvement in its COVID-19 response efforts.

Summary of the approach

Indonesia conducted its inaugural IAR from 11 to 14 August 2020, marking it one of the first countries globally to undertake this process. The Indonesian series of IAR aimed to foster a collaborative environment where all key national and subnational stakeholders involved in public health response came together and critically evaluated their response actions. Through facilitated discussions, successes and challenges were identified and practical recommendations were formulated to strengthen the response and health systems capabilities.

The preparation for this IAR commenced in July 2020, followed by a series of well-defined steps, as illustrated in the timeline below.

- Preparatory phase: laying the groundwork. The preparation for Indonesia’s first IAR commenced in July 2020, laying the groundwork for a comprehensive assessment of the country’s COVID-19 response. A core team was formed, which conducted an extensive desk review, examining standard operating procedures (SOP), guidelines, policies, reports and a timeline of COVID-19 response milestones. The findings from this review were presented to key stakeholders between 15 and 17
July 2020, followed by an orientation session on 28 July 2020, which familiarized stakeholders with the scope and process of the IAR.

To ensure the effective facilitation of the IAR, the team provided training with the specific techniques and tools outlined in WHO IAR guidelines (3).

Furthermore, all IAR participants were asked to complete questionnaires to capture their inputs on the successes and opportunities for improvement in the ongoing COVID-19 response. These questionnaires, combined with the information gathered from the desk review, complemented the interactive qualitative discussions held during the IAR, enriching the assessment process.

○ Implementation phase: comprehensively evaluating Indonesia’s response. The first IAR took place in a virtual format and focused on studying the Indonesian response plan and reporting systems, and implementing various activities to identify practical areas for sustained improvement in the ongoing COVID-19 response. The recommendations from the IAR were documented and shared with key stakeholders.

Following the inaugural IAR, Indonesia conducted a series of reviews between November 2020 and November 2022 to monitor the implementation of the recommendations (4-8) (Fig. 3).

Fig. 3. Monitoring of COVID-19 response plan and IAR action plan recommendations

The subsequent reviews assessed the progress and identified areas where further improvement was required. These recommendations played a crucial role in enhancing Indonesia’s COVID-19 response and addressing the challenges posed by the pandemic.

Results

These periodic and comprehensive assessments, utilizing qualitative methodologies, played a pivotal role in identifying gaps, learning opportunities and potential areas
some of improvement within Indonesia’s national response to the pandemic. These IAR significantly contributed to improving the COVID-19 response in the country.

Some of the key improvements consolidated from all the IAR and monitoring meetings were as follows (1,4-9):

- Multisectoral stakeholder coordination helped to strengthen monitoring of the COVID-19 response. The engagement with professional organizations, field epidemiology training programme and academic experts to support data analysis was strengthened and various reporting systems were harmonized.

- There was significant expansion in the laboratory network and enhanced testing capacity. This reached 65,000 testings per day in May 2021 with an improved average turnaround time of laboratory results of less than 48 hours.

- Periodic assessment, development of hospital pandemic preparedness plans and exercises and training strengthened hospital readiness, including infection prevention control, case management, human resources, medical supplies and equipment for surge capacity.

- The IAR further helped to increase COVID-19 vaccination coverage and improve real-time vaccine stock reporting through refresher training and modelling for effective modelling planning.

Lessons learnt

As demonstrated by Indonesia, institutionalizing IAR using globally recommended tools could help improve response and make effective course corrections. Health emergency response guided by a multisectoral review and integrated plan can go a long way in efficient mitigation.

References


References


Good practices in risk communication, community engagement and infodemic management

The lack of understanding and awareness of preventive measures raised the danger of infection and hampered response efforts. It was particularly important to undertake active risk communication using credible and evidence-based information from the government with appropriate use of local languages to generate awareness about the evolving science of a new disease. It was critical to build community trust in health systems by enhancing regular communication, providing quality health services and maintaining the government’s ability to safeguard public health during health emergencies. Moreover, the extensive spread of disinformation and rumours induced public uncertainty and panic. It led to the circulation of inaccurate information regarding treatments, preventive measures and the virus itself. This resulted in misguided actions, ultimately impeding the efficacy of control measures (1).

Engaging communities for leveraging collective strengths

Responsive, empathic, transparent and consistent messaging in local languages through trusted communication channels using community-based networks is crucial during pandemics. Thus, adopting a community engagement approach, Member States of the Region not only engaged communities in designing an inclusive emergency response, but also leveraged their collective strength in implementing the initiatives against the COVID-19 pandemic (2).

For example, Sri Lanka had several active community-based organizations (CBO) and civil society organizations (CSO) which were leveraged for community mobilization and creating awareness regarding COVID-19 and its prevention. During the first wave, a community-level prevention model was established in June 2020 by the Health Promotion Bureau (HPB), which also incorporated the mobilization of religious leaders. This multisectoral model included many stakeholders at national and subnational levels. The country developed the Community Engagement and Social Mobilisation Strategy as a component of its National COVID-19 Vaccine Communication Strategy. This strategy
of developing an extensive community engagement network at the national and regional levels helped to engage a large section of society and ensure better outreach of interventions and information dissemination (3,4).

**Implementing focused interventions through community radio stations and digital media**

The countries in the Region involved vulnerable sections of communities in developing and implementing interventions for an equitable and sustainable impact. Focusing on the vulnerable populations in the country, Bangladesh started community radios to increase the spread of correct information and prevent misinformation, especially in Rohingya refugee camps in Cox’s Bazar. In a similar effort to increase the reach and scope of COVID-19 information covering all sections of society, Nepal undertook a disability-inclusive emergency response strategy (5).

Besides, many governments used digital technologies to develop multiple platforms for information dissemination to ensure that information about the latest epidemiological situation and important government decisions could be shared with most of the population. Some examples of use of technology in spreading awareness included the COVID-19 situation dashboard, regular press briefings, dedicated COVID-19 information webpages, video messages and public service announcements.

**Tackling misinformation and managing the infodemic**

The Epidemiology and Disease Control Division (EDCD) under the MoHP in Nepal set up a call centre with a hotline number (1115) to capture the prevailing rumours and address the general public’s queries, concerns and complaints. Along with addressing rumours and misinformation, representatives were also involved in supporting case management and contact tracing (6).

Likewise, another initiative by Bangladesh included the engagement of the community through CSO to address the misconceptions prevailing around COVID-19 transmission. Communities were made aware of the proper use of masks and other recommended behavioural changes. This reduced the spread of COVID-19 infections in such areas. Religious places were also used as platforms for public awareness campaigns, along with leveraging social media. Sensitization sessions were held where community, opinion and faith leaders participated to discuss the necessary public health and social measures to contain COVID-19 transmission (7).
Curbing infodemic in Cox’s Bazar, Bangladesh

The power of community radios in Rohingya refugee camps

Coverage
The intervention targeted approximately one million Rohingya refugees hosted in 33 highly congested camps in Ukhiya and Teknaf Upazilas of Cox’s Bazar district (1).

Background
Restricted access to telecommunications and the internet within the Rohingya refugee camps since September 2019 had impeded the flow of information to the refugee population in Cox’s Bazar, making it challenging to effectively address and combat misinformation (2). The lack of communication also created an environment conducive to the proliferation of fear, stigma and stereotypes surrounding COVID-19.

Several studies showed prevailing misconceptions about the COVID-19 disease, spread, transmission routes, vaccine contents, preventive measures and care, which were creating obstacles to effective response (3–6). The limited access to healthcare facilities and low literacy rates among the refugee population compounded the difficulties in spreading accurate information. Traditional communication channels, such as television and print media, which were accessible to the general population, were largely inaccessible to the Rohingya community (7). This further exacerbated the difficulty in reaching the community with essential health messages and preventive measures. Moreover, the absence of a written script in the Rohingya language posed an additional barrier, making it difficult for Rohingya refugees to access accurate COVID-19 information (3).

Summary of the approach
Community radio stations are typically small-scale, locally focused and operated by and for the community. This makes them well-positioned to deliver targeted messages about hygiene and behaviour change specific to the local context. In Cox’s Bazar, Radio Naf (a community radio station) and BBC Media Action-operated Bangladesh Betar (part of the state broadcaster) broadcasted programmes that reached the camps. These radio stations swiftly evolved into crucial contributors by offering lifeline programmes broadcast to Rohingya audiences four times a week. Community engagement and
awareness were augmented through a massive force of community health workers (CHW) during regular door-to-door visits. The collective efforts of community radio broadcasts and health workers ensured the dissemination of accurate information and empowered refugees to combat COVID-19.

- **Multi-stakeholder partnership**
  The Government of Bangladesh led the intervention by extending logistical and administrative support to the community radio stations. A host of organizations, such as Communications with Communities Working Group (CwCWG) agencies, BBC Media Action, UNICEF, United Nations High Commissioner for Refugees (UNHCR) and WHO worked collaboratively with representatives from Community Health Working Group and the water, sanitation and hygiene (WASH) sector to implement the community outreach activities (8–11).

- **Amplifying awareness through community radios**
  The community radio stations developed, distributed, disseminated and broadcasted information related to the COVID-19 outbreak situation, awareness and prevention messages, which were reviewed and concurred by several health sector partners such as WHO, UNICEF, BBC Media Action, Translators without Borders (TWB), International Organization for Migration (IOM) and others.

- **Leveraged other communication channels and means**
  Furthermore, other measures including public service announcements, talk shows with health experts and door-to-door visits by CHW were used to disseminate information, dispel misinformation, and ensure the well-being of the refugee community. In addition, they also created audiovisual content, continuously tracked rumours in the camps and communicated community needs and priorities (9).

  - Production and dissemination of radio programmes on COVID-19 prevention, hygiene and related topics. BBC Media Action produced *Soiyi hota* (correct information) in the Rohingya language. In this weekly audio podcast, people could phone in during the live programme and ask questions with answers provided by subject matter experts (8). These programmes were played by local radio stations, at food distribution centres and mosques. Audio songs and audio dramas were developed in the Rohingya language about masks and other infection control measures, handwashing, hygiene and general awareness and were played routinely on community radios (9).

  - Talk shows and discussions with health experts and community leaders to address concerns and dispel misinformation. Radio Naf’s *Shishur hashi* (children’s smile), a radio magazine programme, provided information every week about coronavirus and the role of the community (10). Audio packages with advice from religious leaders on getting correct information on coronavirus
Compendium of good practices in response to COVID-19 in the SE Asia Region

and the need to observe safety measures were produced by BBC Media Action and United Nations High Commissioner for Refugees (UNHCR) (9). See Fig. 4.

Directives issued by the Ministry of Religious Affairs of the Bangladesh Government on prayers in mosques were translated by TWB and made available in audio format for Rohingyas. Additionally, the audio drama series Aarar Hal’Hobor was broadcast to combat the misinformation surrounding COVID-19. A Bangla version of the rumour-tracking tool and guidance was developed and shared with all sectors (9).

**Fig. 4.** Radio shows providing crucial information to Bangladeshis and displaced communities amid the COVID-19 pandemic

![Radio shows providing crucial information to Bangladeshis and displaced communities amid the COVID-19 pandemic](image)

**Source:** ICRC Bangladesh, Twitter. 2020

**Results**

The active participation of multiple sectors in risk communication and community engagement (RCCE) contributed to mitigating the infodemic within the camp, as evidenced by improvements in outpatient attendance and the health-seeking behaviour of the population (12). A report from Communication with Communities Working Group (CwCWG) Information Management Data documented and highlighted the various audiovisual mediums employed, including audio podcast programmes, public service announcements, audio drama series, talk shows and door-to-door visits, and their results. The following are some of the outcomes of the initiative:

- A total of 51,142 people were reached through 79,162 house-to-house interpersonal communication sessions with key COVID-19 messages being disseminated through audio podcast programmes aired on community radio channels (11).
A group of 253 community people was mobilized and engaged in 16 advocacy meetings in the camps, made possible through community radio’s support in reinforcing key messages delivered through door-to-door visits and distributing audiovisual materials and shared information (11).

A total of 28 875 people were consulted on COVID-19 key messages in around 4000 community awareness sessions where public service announcements produced and broadcasted through community radio channels played a significant role (11).

In 225 listener group sessions, 8048 community people participated actively, and 13 218 individuals were reached through 514 sessions conducted by religious leaders who used audio drama series and talk shows aired on community radio to engage and educate the refugee community (11).

A total of 79 information service centres and 25 help desks operated to receive feedback and complaints from the community (11).

In January 2021, a total of 53 565 children, adolescents and youth received remote guidance on COVID-19 prevention through small groups and door-to-door sessions. These sessions were conducted by 812 facilitators, caregivers, community volunteers and Burmese Language Instructors (BLI) (11).

As many as 89 070 individuals actively participated in 11 641 group listening sessions focused on raising awareness about COVID-19, hygiene practices, nutrition, safe water and the importance of immunization, among other topics (11).

Lesson learnt

In resource-constrained settings like Cox's Bazar, which faces unique challenges in terms of communication and access to information, community radio stations proved to be an essential tool in bridging these gaps and ensuring that important information and preventive measures regarding the pandemic reach the local communities.

The engagement of CHW, religious leaders and community leaders in adopting messages in the Rohingya community’s language and leveraging their existing relationships and credibility within the community contributed to effective communication.

Community radio also played a key role in reducing the digital divide among marginalized communities and individuals living in refugee camps.

References


References


Good practices in surveillance, epidemiological investigation, contact tracing and adjustment of public health and social measures

The limited capacity for surveillance and data sharing among Member States posed challenges in tracking and monitoring the virus effectively. Additionally, the variability in surveillance infrastructure across different states hindered data comparison and harmonization, thereby impeding the Region’s ability to manage the pandemic efficiently. Member States demonstrated various experiences that leveraged existing public health surveillance infrastructure and response measures, such as contact tracing, isolation and quarantine. They were also involved in developing new structures to support public health and social measures as an integral component of their pandemic response (1).

**Essential surveillance for COVID-19**

Surveillance systems were critical in tracking COVID-19’s spread, identifying new variants and guiding effective public health measures and interventions. They provided essential data on the disease’s transmission, risk factors, impact on populations, severity and transmission patterns. Surveillance systems collected and analysed data on cases, testing, hospitalizations and mortality. These shaped strategies for effective public health responses (2).

Bangladesh mobilized surveillance networks to detect and respond to respiratory threats, including both SARS-CoV-2 and influenza. Bangladesh demonstrated resilience by effectively managing an unexpected influenza A(H3N2) outbreak from 2021 to 2022. Utilizing information and analysis from its laboratory and surveillance network, it rapidly detected the potential surge, allowing the Government to implement measures to combat the outbreak and save lives (3).

Similarly, Timor-Leste strengthened its ability to detect and respond to respiratory threats by implementing a system that detects, monitors and responds to respiratory infections, encompassing both SARS-CoV-2 and influenza. The approach allowed to enhance overall respiratory disease surveillance capabilities and respond more effectively to COVID-19 and other respiratory infections during the pandemic (4).
**Strengthening COVID-19 testing in Timor-Leste**

**Strategic use of existing resources and partners’ support**

**Coverage**

This intervention covered the whole country with a gradual expansion of laboratory capacity at hospitals and community health centres.

**Background**

Prior to the COVID-19 pandemic, Timor-Leste had only the National Health Laboratory performing molecular tests for other infectious diseases as part of the influenza control programme. The laboratory had limited human resources, diagnostic platforms, reagents and consumables. The pandemic posed additional challenges, such as procuring molecular diagnostic artifacts due to border closures, disruptions in supply chains and global demands for reagents, consumables and testing equipment, among others. Realizing the importance of diagnostic testing for individual care and surveillance purposes, Timor-Leste strategically utilized available resources and the strengths of partnerships to achieve adequate testing capacity.

**Summary of the approach**

Immediately after the declaration of the pandemic, the country assessed the current capacity and identified a strategic approach to fill the gap by utilizing existing capacity on molecular tests from the Influenza Control Programme and GeneXpert from the Tuberculosis Control Programme. Building on the existing laboratory network, the country mobilized international partners to get adequate equipment and reagents.

- **Assessment and plan.** The National Health Laboratory (NHL) assessed the capacity of the existing laboratories and identified the gaps and challenges in performing molecular tests for COVID-19. The findings from this assessment helped the Ministry to develop a strategic approach and inform the COVID-19 strategic plan.
- **Building on existing infrastructure, resources and capacity.** The molecular diagnostic testing facility was established in 2011 as part of the National Pandemic Influenza Preparedness (PIP) programme, mainly testing influenza-like illness (ILI) and severe acute respiratory illness (SARI) samples, which were utilized immediately and further strengthened to perform RT-PCR testing for SARS-CoV-2 in collaboration with the Menzies School of Health Research and WHO.
GeneXpert platforms have been available in Timor-Leste since 2012 and were primarily utilized for tuberculosis (TB) testing. The Xpert Xpress SARS-CoV-2 assay received emergency use authorization (EUA) in March 2020 but was only available in Timor-Leste in late 2020 due to procurement challenges resulting from high global demand. As of November 2022, all municipalities had at least one working GeneXpert platform, which could be used for COVID-19 and other viral respiratory testing, as well as increasing testing coverage for TB (Fig. 5).

**Fig. 5.** Distribution of GeneXpert platforms in Timor-Leste

NHL recruited, trained and mobilized 28 new staff to support this intervention. The intervention also strengthened laboratory infrastructure by adding new buildings and refurbishing existing ones (2).

- **Quality assurance mechanisms.** The quality of molecular testing performed by national and subnational laboratories was ensured by performing confirmatory testing at the Royal Darwin Hospital, Australia. The concordance results ensured result integrity and gave full confidence to process COVID-19 tests independently.

- **Leveraging partnerships to strengthen capacity.** The country mobilized support from WHO, Department of Foreign Affairs and Trade (DFAT), Fleming Fund, Korea International Cooperation Agency (KOICA), USAID, EU, International Organization for Migration (IOM) and UN agencies to strengthen laboratory capacity. WHO and Menzies School of Health Research provided hands-on support to the laboratory staff. WHO, DFAT and other partners provided an adequate number of diagnostics systems and reagents. The country received PCR machines, GeneXpert machines and other supplies from international partners to strengthen its testing capacity. A total of 20 additional testing machines were added during this period. All municipalities ultimately had at least one working GeneXpert platform, which could be used for TB, COVID-19 and other diseases.
Results

By December 2022, the country had successfully established a laboratory network in the 13 municipalities, bolstering their testing infrastructure and capacity. The country was able to conduct up to 2500 molecular tests per day in 2021, a substantial increase from the 100 or so PCR tests conducted in 2020. As of December 2022, the country had conducted more than 285,578 molecular tests (3). The availability of testing facilities helped to identify cases, contact tracing and management of confirmed cases, which helped the country to manage COVID-19.

Lessons learnt

- The capacity developed by other similar programmes can be swiftly utilized to meet urgent demands, and gradual expansion then becomes smoother. Systematic assessment of the situation, identification of strategic approaches to meet the gaps and development of a plan helps to utilize available resources and exploit other potential sources.

- High-level political commitment and effective use of available domestic and foreign resources from health development partners can help low-resource countries to enhance their testing capacity.

References


Investing in genomic surveillance, collaborative networks and integrated data enhanced the countries’ responses to emerging infectious diseases. India’s successful implementation of the Indian SARS-CoV-2 Genomics Consortium (INSACOG) served as a blueprint for future outbreaks. This concerted effort significantly contributed to understanding the pandemic and informed targeted public health interventions (5,6).
Indian SARS-CoV-2 Genomics Consortium (INSACOG)

Building national capacity for genomic surveillance

Coverage
The intervention spanned across the entire nation, including all states and union territories, with the gradual expansion of participating laboratories and hospitals strategically spread across the country based on population size and geography. The consortium members extended technical support to other Member States of the Region, which include Maldives, Nepal, Bhutan and the Democratic People’s Republic of Korea (1).

Background
- By mid-2020, new variants were being reported by many countries. At that time, India had varied levels of sequencing capacity that existed beyond the public health laboratories, especially in educational and research institutions, which had the potential to be leveraged for studying SARS CoV-2 genomics. This created the need for a coordinated, unified and decentralized system for genome sequencing and analysis. Catering to this need, the INSACOG was established in December 2020 as a joint initiative of the Ministry of Health and Family Welfare (MoHFW), Department of Biotechnology (DBT), Council for Scientific and Industrial Research (CSIR), Indian Council of Medical Research (ICMR), National Centre for Disease Control (NCDC) and Central Surveillance Unit (CSU) under the Integrated Disease Surveillance Programme (IDSP) (2).
- The main objective of establishing the INSACOG was to monitor SARS-CoV-2 evolution and correlate whole genomics sequencing (WGS) data with clinical and epidemiological information to assess the potential public health risks and advise the stakeholders to take timely and appropriate public health measures. These included formulation of scientific and evidence-based policies, expansion of health infrastructures, ensuring the provision of adequate logistics to cope with a surge of cases and to facilitate research and development (R&D) of vaccines.

Summary of the approach
- The initiative started with establishing a network of genomic sequencing laboratories through a hub and spoke model. This gradually expanded its scope and analysis by including clinical data from hospitals and epidemiological data from the community,
environmental surveillance and international travellers to better understand transmission patterns and dynamics of SARS-CoV-2 variants. The consortium had 64 laboratories and 318 sentinel sites from across the states. Later, data from vaccinated people was also used to understand the immunity of vaccines against variants (3). The initiative received funding from the Government of India and was supplemented by the India COVID-19 Emergency Response and Health System Preparedness Package (ICERHSP). Additional funds from respective organizations were mobilized to meet the financial needs.

- **Surveillance strategy.** The overall surveillance strategy was to collect samples and information from sentinel sites; event-based surveillance; clinical and epidemiological data from laboratories and hospitals; community outbreaks; environment (sewage); and international travellers to monitor the variants and assess their public health implications.

- **Events-based surveillance.** The consortium also collected samples from the communities where the district surveillance officers observed special or unusual transmissions. Such epidemiological data helped to understand whether these events were attributed to a certain variant. This strategy was added to ensure that the system captured information early and did not miss any variant spreading at the community level (4).

- **Sentinel sites (laboratories and hospitals).** As many as 64 laboratories were performing genomic sequencing samples from among the 318 laboratories and hospitals across the country. The population and geographic size of the states determined the number of sentinel sites. Only RT-PCR samples with CT value less than 30 were accepted and analysed to obtain good results and ensure that the quality of results were consistent with global standards. Most laboratories were public laboratories as they had wider coverage and provided sufficient data to have nationally representative findings (5).

- **Environmental (sewage) surveillance.** The consortium started environmental surveillance from four metropolitan cities and gradually expanded this to 25 cities across country to assess the prevalent variants in the community and inform decision-makers to take timely public health actions. In the absence of a standard environmental sampling strategy, when this initiative started, the consortium adopted an environmental surveillance strategy from the Polio programme (6).

- **International travellers.** Genomic sequencing was done from RT-PCR tests of international travellers. Two per cent of the total arrivals were selected randomly to test and perform genomic sequencing. This strategy was added to monitor the importation of new variants and their transmission pattern (7).

- **Sample transportation, testing and quality assurance.** The laboratories with sequencing capacity followed standard protocols to sequence and analyse the samples within their facility. Others transferred samples to the hub laboratories using
existing courier systems and networks. Initially, it took more days to perform tests and provide results, as machines were designed to perform analysis of large-scale samples. However, this issue was gradually addressed by purchasing and providing small-scale equipment to the laboratories performing genomic sequencing. To ensure the quality of the sequencing results, the consortium adopted a double verification strategy at the hub laboratories.

- **Linking surveillance data with clinical and epidemiological data.** In addition to information from genomic sequencing, the consortium used clinical data from hospitals on admission rates, severe cases receiving ICU care and mortality cases. Furthermore, data from specific events at the community level and environmental surveillance were used to assess the prevalent variants and gauge their associated public health implications.

- **Governance and expert committees.** Genomic Expert Consortium (GEC) meetings were held on a regular basis, in which each laboratory presented their findings and discussed the public health risks of variants. Only cases with public health significance were presented to the Clinical and Scientific Advisory Group, which was composed of public health and laboratory experts. The teams assessed their public health risks and informed governments (union and states) about the nature of variants and possible public health actions (8).

  The findings were immediately shared with respective states and the MoHFW in case new variants with public health significance were found. More detailed information was made available to the interested stakeholders using a public dashboard, which allowed government agencies and other general users to get real-time updates (9).

- **Future plans/sustainability.** The consortium continues to perform genomic surveillance of SARS-CoV-2 variants. The Government is considering a plan to extend the scope of this consortium to support other countries and add other high-risk pathogens like hepatitis, influenza and other respiratory diseases.

### Results

- By the end of December 2022, the consortium had performed 261,966 genomic sequencings, and 166,589 samples were identified as variants of concern. More than 25 lineage variants were observed across India. The data was shared with the Global Initiative on Sharing All Influenza Data (GISAID) platform on a timely basis to ensure availability of the genomic data to the global community.

- The findings from these analyses informed government decisions, which included issuance of public health advisories, travel advisories and provision of hospital infrastructure, human resources and logistics. The information that was used to predict and anticipate surges in cases helped Government to decide on when to scale up or step down certain temporary establishments and facilities. It was observed that
environmental surveillance informed a potential surge of cases 15 days before the peak stage. Such information helped governments to adjust public health measures and strengthen laboratory and hospital services.

- The variants of concern (VOC) were tested for their ability to escape neutralization in the vaccinated individuals. In vitro neutralization assays were carried out which provided a scientific assessment to the public health policy maker of the possibility of spread of the VOC in vaccinated population.

**Lessons learnt**

- Establishing a national consortium with coordinated resource sharing, communication and reporting ensures optimizing existing capacities and helped policymakers, managers and stakeholders in responding to the pandemic.

- The intervention showed that multi-source surveillance helps in timely detection and monitoring of variants and assesses their implications and risks to inform public health actions. Strengthening laboratory capacities and promoting such collaboration helps to build resilient health systems to respond to current and future emergencies.

**References**


Utilizing digital technologies for surveillance and contact tracing

Member States leveraged information and communication technology (ICT) solutions such as mobile apps, digital platforms and data analytics to enhance surveillance and contact tracing capabilities during the COVID-19 pandemic (7). These digital tools played a vital role in facilitating timely and efficient surveillance, enabling authorities to track the virus’s spread, identify high-risk areas and allocate resources effectively. For instance, Sri Lanka’s Health System Response Monitor gathered and organized up-to-date data on countries’ COVID-19 responses, capturing a comprehensive view of public health initiatives. This exchange of information proved crucial for decision-makers, refining strategies to combat the pandemic effectively.

The utilization of digital technologies not only improved surveillance capacities, but also enhanced the speed and scalability of contact tracing, addressing data privacy and technology access barriers. App-based contact tracing projects, such as Myanmar’s Saw Saw Shar and India’s Arogya Setu demonstrated the significance of such solutions in responding to the pandemic. Another example is Sri Lanka’s SelfShield app, which was instrumental in managing COVID-19. It provided real-time alerts of confirmed cases and information about nearby testing centres and hospitals and played a crucial role in isolating contacts and preventing further transmission.
Use of routine DHIS 2 platform for COVID-19 surveillance in Sri Lanka

Leveraging digital public goods for building a sustainable system

Coverage

The customized COVID-19 surveillance system using District Health Information Software 2 (DHIS 2) platform was used throughout the country with separate access and dashboards at the national, province, district and medical officer of health levels. (1).

Background

In early 2020, Sri Lanka started institutionalizing and implementing a system of stringent screening protocols for travellers at ports of entry and conducting active surveillance throughout the incubation period (1,2). For such a mechanism, Sri Lanka required a comprehensive information system capable of efficiently registering individual traveller data and enabling follow up using existing health infrastructure. Sri Lanka found their solution in DHIS 2. This customized COVID-19 surveillance system became instrumental in collecting data on travellers from high-risk areas, primarily at multiple ports of entry scattered throughout the country.

Summary of the approach

Sri Lanka’s Ministry of Health collaborated with the Health Information Systems Programme (HISP) of Sri Lanka to develop a national COVID-19 surveillance system based on the DHIS 2 platform within two days of the first registered case in January 2020 (1,2).

The DHIS 2 system (Fig. 6) collected an individual’s required information at the port of entry and allowed maintaining of active disease surveillance and arranging customizable follow-ups for individual cases (1). The web application facilitated the visualization of disease spread among a cohort of cases and their contacts, providing valuable insights for public health strategies and surveillance efforts (1,3).
Expanding the DHIS 2 Capabilities for Data Management of COVID-19 Diagnostics, Case Management, and Resource Monitoring

The Laboratory Reporting module in DHIS 2 enabled the COVID-19 laboratories around the country to collect and report on RT-PCR tests and their results through the integration of the Suparksha app with the DHIS 2 system. The app digitized the entire process of COVID-19 RT-related PCR testing, sample collection and report generation (3,4).

DHIS 2

In January 2021, DHIS 2 was expanded to encompass a comprehensive electronic immunization registry specifically designed for COVID-19. Working with WHO and HISP Sri Lanka, the Ministry of Health integrated the COVID-19 immunization tracker and COVID-19 Smart Vaccine Certificate and Citizen Portal to DHIS 2 to track vaccines administration and supply across the country (3).
Building capacities and troubleshooting assistance

The Sri Lankan Government built institutional capacities by offering training sessions, creating SOP and providing user guides. Initially, the training was conducted in person on-site during the last week of January and the first few weeks of February 2020 (3).

Collaboration and leveraging additional resources to enhance DHIS 2 capabilities

Sri Lanka’s experience demonstrates the collaborative efforts of multiple stakeholders, which led to the development of a DHIS 2-based system for active surveillance of COVID-19. Besides HISP Sri Lanka and WHO, Sri Lanka’s Information and Communication Technology Agency (ICTA) organized a hackathon to successfully recruit 25 volunteer developers to contribute to module development. Furthermore, the University of Oslo, through the Norwegian Agency for Development Cooperation, provided its DHIS 2 core developer to support the Sri Lankan development team in creating generic applications and functionalities that could be utilized in various countries, besides assisting in capacity-building of the HISP Sri Lanka team (3,5).
Results

- The customisation of DHIS 2 for COVID-19 case-based surveillance permitted the operational system to manage a large scale of records and assist public health decision-makers. By December 2021, nearly 19.15 million individuals were registered in Sri Lanka’s DHIS 2-based electronic immunization registry (5).

- Furthermore, this strategic approach also spurred the development of a global DHIS 2 COVID-19 surveillance package. HISP Sri Lanka took the initiative to release a version of its application for global adoption, sharing its details and source code through the community of practice. This allowed other countries utilizing DHIS 2 for COVID-19 surveillance to benefit from its work. By September 2020, more than 50 countries had either implemented or were in the process of implementing various digital tools using DHIS 2 as a platform for COVID-19 surveillance (3).

- In addition to laying the foundation for the global package, the HISP Sri Lanka team provided direct support to Timor-Leste, Solomon Islands and Vanuatu in configuring their DHIS 2 for COVID-19 immunization registries. Furthermore, it assisted Guinea in utilizing the contact mapping application for the latest Ebola outbreak, demonstrating its ongoing commitment to assisting other countries in leveraging DHIS 2 for public health initiatives (3).

Lessons learnt

- The strong community of practice, long-term investment made by the country and collaboration among partners enabled Sri Lanka to adapt, develop and integrate their surveillance system for pandemic response (3).

References


References


Good practices in points of entry, international travel and transport and mass gatherings

During the COVID-19 pandemic, almost all nations amplified various risk-mitigation measures, such as surveillance and case management at the points of entry (PoE) and across borders, targeted testing of international travellers and their quarantining, strengthening capacities and procedures for international contact tracing, environmental controls and public health, and social measures at the PoE and across borders (1).

Despite the stringent screening systems implemented at PoE, the porous nature of ground crossings and the sociocultural ties across borders continued to pose significant challenges in managing imported and exported cases. This highlighted the need for international and national policies and interventions at PoE to protect the refugee and migrant populations.

**Strengthening points of entry**

Controlling the transmission of the virus at entry sites, such as airports, seaports and land border crossings posed substantial challenges for Member States. Countries established health desks at entry points to screen passengers, perform temperature checks and enforce health protocols. They collaborated to ensure coordinated efforts, aligning the health, immigration and transport sectors to implement preventive measures effectively and minimize the risk of transmission. Additionally, countries established referral mechanisms at the PoE for the travellers who required quarantine, isolation and care.

**Managing international travel and transport**

Member States worked together to establish consistent communication channels, share information on high-risk areas, and harmonize international travel policies. Adopting risk-based approaches to travel restrictions, quarantine measures, testing protocols and enhanced surveillance enabled the monitoring of travellers, timely detection of potential cases and efficient implementation of interventions and contact tracing.
Mitigating risks of mass gatherings

All countries in the Region encouraged people to follow physical distancing and issued guidance on public health and social measures. Furthermore, they mobilized sectors and communities for crowd control measures, enhancing ventilation systems and enforcing the use of face masks. Public communication campaigns were tailored to raise awareness about the risks associated with mass gatherings and encourage responsible behaviour.
Boosting COVID-19 screening at points of entry in Bangladesh

Investing in risk management measures to safeguard public health

Coverage

Implemented across various locations in Bangladesh, the intervention to strengthen health screening capacity focused on key entry points, such as airports, land crossings, and railway check posts, critical to the country’s travel infrastructure.

Background

Risk mitigation at points of entry is the first line of defence in preventing, delaying and limiting a pandemic virus from entering a new country. With the onset of the COVID-19 pandemic, Bangladesh recognized the urgent need to strengthen its health screening capacity at the points of entry as the coronavirus continued to spread globally. The primary points of entry in Bangladesh include three international airports: Hazrat Shahjalal International Airport (HSIA) in Dhaka, Shah Amanat International Airport in Chattogram and Osmani International Airport in Sylhet; three seaports in Chittagong, Mongla and Payra, and many ground crossings.

Fig. 8. Health screening desks at Dhaka Hazrat Shahjalal International Airport (HSIA)

Source: WHO Bangladesh/C. Bercaru
Summary of the approach

By concentrating efforts at the points of entry, Bangladesh aimed to strengthen its overall surveillance and response system, enabling the authorities to promptly identify and effectively manage potential COVID-19 cases and contacts. To address this critical requirement, the Government collaborated with multiple stakeholders and organizations to launch a comprehensive intervention in December 2020 (1,2).

Bangladesh’s initiative to strengthen health screening capacity at its points of entry involved a series of carefully orchestrated steps to effectively detect potential COVID-19 cases among travellers entering the country.

- Regular assessment of surveillance readiness at points of entry. In assessing its preparedness to address international epidemics, Bangladesh had been regularly testing the readiness of its points of entry in the past. A noteworthy example is the exercise conducted by WHO in 2019, in collaboration with airport authorities, in response to the new Ebola outbreak originating from Africa. The valuable insights gained from that exercise played a pivotal role in developing a robust response when the COVID-19 pandemic emerged, both globally and within Bangladesh (1).

- Collaboration with international organizations for capacity strengthening and information communication. The Government of Bangladesh partnered with national agencies, including civil aviation, home/internal affairs, defence and animal health to enhance capacity and respond effectively to COVID-19. International organizations such as WHO, IOM and International Civil Aviation Organization (ICAO) played vital roles in developing national training guidelines and SOP for preventing and treating COVID-19 infections.

- Ensuring provision of infrastructure and resources. In addition to the screening measures, the Government and private sector in Bangladesh also established quarantine centres at points of entry to ensure the containment of cases. Adequate infrastructure and resources were provided to support the implementation of these enhanced health screening measures. Medical personnel and support staff were deployed to ensure smooth operations and provide guidance to travellers.

- Monitoring for effective implementation. Continuous monitoring and evaluation played a vital role in ensuring effective implementation of the measures at points of entry in Bangladesh. This process involved assessing the effectiveness of the interventions, identifying any shortcomings and making necessary adjustments. Feedback from travellers was actively sought and taken into consideration to enhance the overall experience and effectiveness of the health screening process. Data analysis and regular reviews were conducted to track identified cases and response times and identify trends for future decision-making. To facilitate a better understanding of how the COVID-19 pandemic affected global mobility, the IOM developed an online tool and database to register points of entry, exit and transit (3,4).
Results

- Starting on 22 January 2020, HSIA in Dhaka initiated health screening for travellers using thermal scanners to detect COVID-19 symptoms. Approximately 800 000 individuals underwent screening at airports throughout the pandemic, with HSIA being the primary location.
- Additionally, a total of 1.3 million people were screened at various international entry points, including land, water and air routes (1,2,4,5).

Lessons learnt

The intervention, achieved through strong collaboration and partnership among various stakeholders, highlighted the critical role of early detection in preventing the spread of infectious diseases. This also emphasises the need for robust surveillance systems and rapid response mechanisms to detect and respond to emerging health threats. The implementation of digital tools proved to be instrumental in the intervention by providing a centralized dashboard for monitoring, facilitating data-driven decision-making and strengthening surveillance (6).

References


References

Good practices in laboratories and diagnostics

Despite the accelerated progress towards strengthening laboratory systems and diagnostic capacity in the WHO SE Asia Region, Member States experienced major systemic gaps and challenges that contributed to delays in the COVID-19 response (1). The shortage of trained personnel, lack of laboratory infrastructure and insufficient and fragmented funding, among others, posed further challenges to the functioning of laboratory systems and diagnostic capacities in many Member States (2). In response, all Member States expanded laboratory capacities to maintain and expand molecular testing capacities, strengthened existing laboratory networks and identified SARS-CoV-2 variants as part of their laboratory strategies to combat the pandemic and enhance resilience and preparedness.

National and regional laboratory networks

Several Member States took the initiative to establish a coordinated national laboratory network and regional reference laboratory network, in addition to strengthening laboratory linkages to clinical services This was a critical step for sharing early alerts and enhancing diagnostic stewardship. They identified key interventions to enhance laboratory capacities in various areas such as communication, testing, specimen referral and transport and quality management (3,4). For example, India established the INSACOG as a national laboratory network for genome sequencing to guide public health actions and inform vaccine R&D (5,6).

Strengthening testing capacity at subnational and national levels

The laboratory networks gradually expanded to undertake tests on a large scale to meet the growing demands of timely detection, treatment and active and sentinel surveillance.

For instance, the National Public Health Laboratory (NPHL) in Nepal received COVID-19 RT-PCR primers and probes in March 2020 through WHO to enable quick COVID-19 testing. The Government of Nepal worked collaboratively with various stakeholders to build its laboratory capacities. The NPHL, in collaboration with WHO and partners, further expanded COVID-19 testing laboratories. By March 2022, Nepal had 105 public and private laboratories that could conduct over 5.5 million molecular diagnostic assays for SARS-CoV-2 (7,8).
In another example, Thailand established a laboratory network across its 77 provinces, such that by the end of July 2020, nearly 80% of the Thai population could be tested and diagnosed for COVID-19 through RT-PCR. Institutions such as the Thai Red Cross Emerging Infectious Diseases-Health Science Centre at Chulalongkorn University and the Ministry of Public Health’s National Institute of Health reference laboratory played critical roles in building diagnostic mechanisms to accelerate the detection and reporting of COVID-19 cases (9).

Timor-Leste, with the support of international organizations, also increased its testing and diagnostic capacities. Between March 2020 and February 2022, it established laboratories in all 13 municipalities, trained its scientists and technicians, and staffed its laboratories. These steps aimed to achieve self-sufficiency with sustainable laboratory systems capable of molecular diagnostic testing for COVID-19 and other viral respiratory testing (10).

**Sustainable laboratory supply chains**

Many Member States collaborated with various international development partners to address supply chain shortages and procurement delays. For instance, Timor-Leste, which had difficulty in procuring laboratory reagents and consumables during the early stages of the pandemic, procured essential diagnostic commodities through WHO and other international agencies to supplement its capacities and assure a continuous and uninterrupted supply of testing supplies (10). Likewise, Nepal procured reagents, panels for quality control and a sequencing machine with the assistance of WHO and other development partners (7).

Acknowledging that dependence on imported diagnostic kits was not a viable long-term option, India started manufacturing RT-PCR kits in May 2020. India’s Central Drugs Standard Control Organization granted manufacturing licences for RT-PCR kits to around 30 companies, expanding the country’s capacity by September 2020 to manufacture around 34.8 million RT-PCR combo kits per month. By the time India experienced its second wave of the pandemic, it was producing enough RT-PCR combo kits indigenously to meet 100% of its needs, bringing the price of the COVID-19 test to under Rs 300 per kit (US$ 3.75) from Rs 1300 (US$ 28.50) per kit. With over 50 firms permitted to manufacture RT-PCR kits, India enhanced its capacity to not only keep itself self-reliant even in post-pandemic times but also export the kits to countries in SE Asia, the Middle East and African regions (11).

**Genome sequencing for active and sentinel surveillance**

Many Member States conducted genome sequencing to detect new cases and variants for surveillance and to inform appropriate public health responses, often through collaboration and technology-sharing arrangements with global institutions and experts within the Region. For example, the Microbiological Diagnostic Unit of the Public
Health Laboratory, Timor-Leste, collaborated with the Doherty Institute in Melbourne, Australia to conduct whole genome sequencing from positive COVID-19 samples that the National Health Laboratory had collected (10).

In Thailand, for example, scientists detected a new variant of SARS-CoV-2 in the community using genomic sequencing of positive samples, which helped the country refocus its surveillance strategies to identify and eliminate transmission cohorts and chains (12). Likewise, in Sri Lanka, comprehensive genomic sequencing was carried out during various waves of the pandemic, enabling the identification of the variant of concern within outbreak clusters, which played a crucial role in shaping its risk communication and community engagement strategies (13). Similarly, Myanmar conducted epidemiological investigations during the first two waves of the pandemic to analyse the genetic composition of various SARS-CoV-2 strains present in the community. This genomic information, combined with other epidemiological data, guided preventive measures and helped monitor virus transmission patterns, ultimately adjusting public health social measures to reduce the disease burden (14).

**Improving diagnostic access to the marginalized and vulnerable groups**

Low- and middle-income countries faced significant challenges in enhancing access to healthcare services, including diagnostics for marginalized and at-risk communities, chiefly due to a shortage of infrastructure or human resources (15). Some Member States took exemplary actions to enhance laboratory and diagnostic service access among marginalized and difficult-to-reach population sub-groups. Bangladesh, for instance, recognized the vulnerability of the Rohingya refugee population to COVID-19 outbreaks and thus set up a field laboratory in Cox’s Bazar which enhanced COVID-19 testing capabilities and offered training and capacity-building to laboratory personnel for accurate and efficient diagnostic testing (16). In a similar initiative, Kerala state in south India identified specific vulnerable groups within its community, including migrant communities and healthcare workers. When implementing its testing services, it specifically targeted these high-risk communities to address their increased susceptibility to infection.
Strengthening COVID-19 laboratory capacity in Cox’s Bazar, Bangladesh

Addressing testing needs and enhancing diagnostic services in a refugee setting

Coverage
The Government and humanitarian aid agencies provided an integrated laboratory for testing and surveillance systems for the emerging COVID-19 disease to approximately one million Rohingya refugees staying in 33 highly congested camps in Ukhiya and Teknaf Upazilas of Cox’s Bazar district (1).

Background
The onset of the COVID-19 pandemic introduced additional hardships for the Rohingya refugees who had sought refuge in Bangladesh since August 2017 (2,3).

COVID-19 testing for refugees was critical to detect cases and investigating clusters of cases so that public health actions could be rapidly taken to isolate those infected, quarantine contacts and break chains of transmission. However, these testing facilities were confined to a single laboratory in Dhaka, the national capital, which was around 400 km away from Cox’s Bazar. The lack of quality laboratory services in Cox’s Bazar resulted in delayed testing and diagnosis, further hindering disease outbreak response and compromising treatment and management.

The only molecular lab that had a serological setup in Cox’s Bazar was the Institute of Epidemiology, Disease Control, and Research (IEDCR) field lab that was setup during the massive diphtheria outbreak in 2017–2018.

Summary of the approach
As the Government of Bangladesh scaled up COVID-19 testing capacities, Cox’s Bazar became one of the initial districts outside of Dhaka to initiate laboratory diagnosis of COVID-19. The Directorate General of Health Services, with the help of WHO, established a field lab at IEDCR for COVID-19 testing.

The Ministry of Health and Family Welfare (MoHFW), along with the Refugee Relief and Repatriation Commissioner Office (RRRC), provided leadership, coordination, supportive supervision and collaborative support to all health partners and sectors responding to the Rohingya refugee crisis and the COVID-19 pandemic. The Government
of Bangladesh and WHO helped set up treatment facilities in Cox’s Bazar district in collaboration with organizations like the World Bank and the United Nations (4). Implemented over three years, the field laboratory intervention employed diverse strategies, including staff training, infrastructure development and equipment and supply procurement to strengthen the emergency/strategic response to the COVID-19 pandemic in the refugee settlement.

- **Strengthening existing health facilities during COVID-19.** In early April 2018, the regional office took the initiative to establish a public health laboratory in Cox’s Bazar Medical College to provide essential healthcare services for Rohingyas. The laboratory was set up within 60 days, involving procuring necessary equipment, renovating the laboratory space and recruiting and training staff members. The on-site laboratory provided a wide range of diagnostic services for COVID-19, diphtheria, influenza, chikungunya, zika, hepatitis, dengue, leptospira, scrub typhus and other microbiology tests for rapid detection of diseases.

  In May 2020, the IEDCR Field Laboratory made a crucial decision to strategically expand its scope and technical capabilities. Along with ensuring high-quality laboratory testing with the support of WHO, the laboratory opted to enhance its infrastructure to accommodate increased storage, processing and analysis of samples. With WHO’s assistance, additional laboratory staff, including a microbiologist, medical technologists and a data manager were recruited to meet the requirements for COVID-19 testing.

- **Sample collection and testing.** To ensure uninterrupted COVID-19 testing and diagnosis testing, patients’ samples from all parts of Cox’s Bazar and surrounding districts, including the Rohingya refugee camps, were delivered to the IEDCR field laboratory which had a testing capacity of 1500/day RT-PCR tests.

  In May 2020, facility-based sentinel testing was introduced to monitor the prevalence of COVID-19 among the Rohingya population. WHO played a crucial role in supporting the expansion of sentinel sites to enhance sample collection and transportation from 45 locations near the camps. With support from domestic and international organizations, the laboratory successfully installed three RT-PCR machines, which
significantly increased the laboratory’s testing capacity, enabling prompt delivery of results within 24–48 hours.

- **Enhancing diagnostic supply chain.** The establishment of a robust sample collection and transportation network was a crucial step in the response efforts. To ensure seamless operations, WHO played a key role by providing dedicated vehicles and essential supplies to all sentinel sites. Rapid investigation and response teams (RIRT) were formed in the camps to promptly respond to COVID-19 alerts within 24 hours of a patient referral to a SARI infection and treatment centre (ITC). With the assistance of donors, the facilities were equipped with oxygen generators and concentrators, ensuring access to vital oxygen therapy for those in need. The roles of WHO field network surveillance and immunisation officers (SIMO) were repurposed to provide crucial support for strengthening infection prevention and control (IPC) measures, facilitating efficient transportation of laboratory samples and conducting surveillance activities.

- **Training and capacity-building for laboratory professionals.** During the reporting period July to September 2021, the Government of Bangladesh, with the support of WHO, delivered training sessions to enhance the skills of more than 300 laboratory staff and 390 health workers at the newly established sentinel sites in the Rohingya camps, focusing on COVID-19 sample collection and transportation. The training empowered laboratory personnel to play a pivotal role in appropriately collecting the samples, safely transporting them to the testing site and ensuring efficient and accurate diagnosis.

**Results**

- The expansion of the field laboratory for COVID-19 testing within a humanitarian crisis context has proven to be instrumental in increasing access to testing and effectively identifying and isolating infected individuals.

- By December 2021, the establishment of seven additional sites increased the total number of COVID-19 sentinel sites within the 33 Rohingya refugee camps to 43 (5).

**Fig. 10.** Number of tests conducted per million among the host population and the Rohingya refugees.

Source: WHO Global Situation Report, 2021
As of December 2022, 118,162 COVID-19 samples from the Rohingya refugees had been analysed, with 6,588 positive cases, while among the host community, 227,174 COVID-19 samples had been analysed, with 24,643 positive cases. The laboratory continues to test COVID-19 samples in addition to diphtheria to date (6).

Lessons learnt

As demonstrated by Bangladesh, including vulnerable communities like the displaced population by extending essential services (such as diagnostics in this case) helped in responding better to the pandemic. Expansion of such essential services could be helpful for the future integration of testing of respiratory diseases in the post-COVID-19 pandemic phase. Overcoming resource constraints by utilizing existing resources maximised the efficiency of resource allocation and facilitated capacity-building within the local healthcare system. Moreover, timely detection and efficient reporting mechanisms played a crucial role in containing the infection by allowing prompt isolation and treatment of infected individuals.

References
References


Good practices in infection prevention and control and protection of the health workforce

Since the onset of the COVID-19 pandemic, widespread adoption of IPC measures, not only in health-care institutions but also in the community has become critical to limiting the spread and protecting healthcare workers and hospitalized patients. The measures include surveillance for health-care associated infections, COVID-19 infection prevention from one patient to another, administrative and engineering controls, triage, PPE training, safe WASH practices and health-care waste management at health-care facilities to prevent and contain transmission of diseases while safeguarding both carers and affected individuals. Member States in the Region adopted, developed and implemented IPC guidelines and activities based on guidance from WHO and several other in-country and global expert institutions.

Infection prevention and control guidelines

At the initial stages of the pandemic, Member States were at different levels of preparedness regarding their IPC plans. Some countries had existing national IPC plans, while others had to develop their own and adapt them to the evolving epidemiological situation or emerging scientific evidence on COVID-19. Developing and adapting the national IPC plan required a coordinated and comprehensive approach consisting of engaging IPC committees comprising experts from various fields to review and adapt the existing legal frameworks and customize the national IPC strategic plan to the pandemic context.

In June 2020, Nepal published an Interim Guidance for Infection Prevention and Control, in collaboration with partners, which was developed to help physicians, nurses and other health-care workers to apply appropriate principles of IPC when providing care to COVID-19 patients (1). Later, in July 2022, the Government of Nepal organized a two-day national symposium with key stakeholders from academia, the health sector and the Government to identify challenges in implementing IPC measures and the best practices that could be adopted into the proposed national action plan to improve IPC during the pandemic. This led to the development of Nepal’s first National Guideline
on Infection Prevention and Control to bring uniformity and improve the standards of
IPC practises across all health facilities (2). Furthermore, the Government introduced
the “National Health Care Waste Management Standards and Operating Procedure”,
providing clear guidelines for biomedical waste management.

Implementation of IPC measures using a multimodal
strategic approach

Member States created an enabling environment to ensure that health-care staff and
communities were aware of the risks, preventive measures and tools they should be
aware of to protect themselves against COVID-19. This was done by establishing WASH
facilities, including safe water, hand-washing stations, hand sanitizers and toilets in public
spaces, employing and prioritizing environmental cleaning and disinfection practices
at health-care and public spaces, communicating regularly and clearly to health-care
workers on hand hygiene, proper use of PPE kits, disinfection of common spaces, waste
disposal to minimise cross-contamination and separating high-risk waste from regular
waste at health care and quarantine facilities.

For example, the Ministry of Education in Indonesia collaborated with partners to
develop appropriate and scalable models for pandemic preparedness and response
measures in schools. As part of this initiative, the programme compiled management
support tools and IEC materials on COVID-19 IPC in schools into clear, actionable formats
(3). Additionally, the Indonesian Epidemiological Association, in partnership with the
Government, conducted training and provided technical support to the epidemiological
workforce in eight selected districts across four provinces in Indonesia in 2020. By the
end of this five-month project, the number of health-care workers trained in IPC had
increased from 25% to 86%. The number of hospitals with standard procedures for
monitoring health-care workers’ COVID-19 status increased from 58% to 83%, and the
number that provided staff with regular COVID-19 testing increased to 100% (4).

Maldives provided key equipment and personal protective gear, including masks,
sanitizers, disposable gloves and disinfecting spray to people who were in detention.
This initiative was part of the Maldives’ multipronged strategy for an equal and equitable
public health response to COVID-19 (5).

To improve health-care waste management, the Government of Nepal, with the
UNDP and with financial support from China’s South–South Cooperation Assistance
Fund, implemented the Promoting Green Recovery Project to strengthen the capacities
of seven COVID-19 designated hospitals. The project provided training to all levels of
hospital staff in proper waste management and technical and logistical support to the
selected hospitals. The uniqueness of this programme was its promotion of sustainable
non-burn technologies for treating health-care discouraging incineration and open
burning (6).
Monitoring and providing feedback on IPC measures

Member States conducted regular monitoring, risk assessment and evaluations to develop a tailored approach to promote adherence to IPC standards by both private and public health facilities. For example, the Ministry of Health, Bangladesh, in collaboration with WHO, developed assessment tools and checklists to monitor IPC standards using monthly scorecards. It established IPC committees both at the district and at the facility levels to oversee IPC performance in all the health-care facilities across the district. The monthly scorecards were displayed in the facilities to promote accountability and track progress on IPC measures. The monthly scorecards were also used to identify gaps and train and retrain health-care workers’ adherence to IPC guidelines. First piloted in Cox’s Bazar, this programme led to improvements in 120 health-care facilities (7).

References


Good practices in case management, clinical operations and therapeutics

As COVID-19 was a novel disease and minimal clinical data were available, health-care workers required access to multidisciplinary guidelines, tools, training and an additional workforce to treat patients and combat the disease effectively. There was a need to review care pathways and systems suitable for each local setting, which included effective triage and referral mechanisms for patients seeking care. To guide health-care workers, Member States in collaboration with WHO, prepared national case management guidelines and SOP. Furthermore, these guidelines were continually reviewed and updated based on the latest evidence. Member States adapted existing infrastructure and built newer systems to ensure efficient triage, safe transfer and clinical management of patients.

Triage of COVID-19 cases

As WHO published and updated the guidance for clinical management of COVID-19, Member States and their health institutions adopted it in their specific contexts to cope with the overwhelming number of COVID-19 cases and the strain on health-care staff. For example, the Ministry of Health, Sri Lanka, in collaboration with the Ceylon College of Physicians, released the Provisional Clinical Practice Guidelines on COVID-19 for suspected and confirmed patients as early as March 2020, which provided clear guidance on actions for those who were screened and found to have no symptoms and those who were confirmed based on the test results and laboratory diagnostics. On the other hand, in Bangladesh, patients with COVID-19 were classified into four categories based on their symptoms: mild, moderate, severe and critical. This classification enabled health workers to take appropriate measures while catering to patients with different levels of severity. Severe cases were prescribed hospitalization, while mild to moderate cases were advised home care. In Thailand, people who tested positive for COVID-19 through laboratory diagnosis were admitted to the hospital and placed in single isolation wards and those showing severity were placed in the knock-down airborne infection isolation rooms (AIIR) (1). Classifying patients in such a manner helped institutions to better manage cases and make effective use of limited resources.
Management of mild and moderate cases

Several Member States recommended and practised home-based care for individuals with mild or moderate COVID-19 as part of their COVID-19 management guidelines. In India, for example, patients under home isolation were provided medical and psychosocial care through the community frontline workers (such as Accredited Social Health Activists [ASHA] or Anganwadi Workers) and doctors. These frontline workers visited to check patients’ oxygen saturation levels, inquire about other signs and symptoms for early identification and refer them to the appropriate care pathways based on the severity of their symptoms. They were also responsible for educating communities on COVID-19 management through multiple awareness-raising strategies, methods and tools, including job aids, posters, banners and videos (2).

In Bhutan, health-care workers received assistance from De-Suung Plus volunteers, who served as front-line workers during the pandemic. Their multifaceted assistance in controlling the spread of the infection and facilitating community access to health-care services, including vaccination, significantly contributed to responding to COVID-19.
Unleashing collective strength for pandemic management in Bhutan

The story of De-Suung Plus: The Guardians of Peace

Coverage
The intervention targeted the whole country to provide better health care to its population of 777,486 (1).

Background
Bhutan has 376 doctors for a population of over 700,000, making its doctor-to-population ratio stand at 0.5 to 1,000. The ratio of 18.4 nurses to 10,000 Bhutanese is one of the lowest in the South Asian region (2). Thus, when the COVID-19 pandemic hit the country, it did not have the required number of health-care facilities or trained health workers. The limited resources inspired Bhutan to focus on harnessing the collective strength of its citizens, acknowledging the interdependence of communities and embracing the spirit of volunteerism. Bhutan’s leadership made efforts toward reforming one of its long-standing volunteer training programmes, known as De-Suung or De-Suung Plus, to tackle the impact of the pandemic (3).

Summary of the approach
Derived from its strong value system, Bhutan launched a De-Suung (Guardians of Peace) programme in 2011. The trainees, known as De-Suups, were volunteers from all walks of life, from graduates to the executives of the country. The De-Suung Integrated Training Programme was instituted as a value-based personal development programme with the main objective of encouraging active citizenry in Bhutan and encouraging all citizens to play a greater role in nation building. Any citizen who underwent this training programme was expected to actively volunteer during disaster operations and participate in charitable activities and services (4).

Various approaches were undertaken to leverage this cadre of volunteers for pandemic management.

- **Selection of volunteers for De-Suup Plus cadre**
  The De-Suup Plus programme received an overwhelming response from people, with almost 9000 applications for 3000 positions, demonstrating the willingness of the Bhutanese people to support each other in times of crisis (5). The selection
of participants for the De-Suup Plus training was made based on certain criteria. The volunteers were chosen from the age group 20 to 40 years who were free from any chronic health conditions (6).

- **Conducting training of De-Suup Plus for pandemic management**

  The selected De-Suup volunteers received a six-day basic front-line training before they trained as front-line responders (De-Suup Plus) for COVID-19. The training was designed to build the competencies of De-Suups on the basic health care and management of asymptomatic and symptomatic COVID-19 patients in facility isolation. It included knowledge of COVID-19 and infection transmission, management of the deceased, administration of oxygen, monitoring of vital signs, infection prevention and handling of laboratory-confirmed COVID-19 patients and other essential hands-on skills (6).

- **Deployment of De-Suup Plus for providing COVID-19-related services**

  After finishing their training, these trained volunteers were deployed all over the country as per the need indicated by the MoH. The responsibilities of these volunteers included supporting nursing staff in monitoring of worsening of signs and symptoms of COVID-19 patients, reporting any deviation from the findings to the nurses and assisting them in the overall management and supervision of COVID-19 patients. They also worked to prevent infection by ensuring that all occupants followed the dos and don’ts of isolation facilities. They also helped manage the bodies of the deceased as per COVID-19 guidelines and facilitated counselling services whenever required.

**Results**

- A total of 770 De-Suung Plus volunteers were trained between 18 May 2021 and 28 March 2022 (6). They performed a range of duties, such as monitoring border movement, helping the medical staff with sample collection, policing the quarantine centres, delivering essential items to people and ensuring social distancing was maintained, among others. They also actively contributed to the timely delivery of essential medicines during the lockdown and supported in contact tracing of primary and secondary COVID-19-positive cases, working hand in hand with health-care professionals to ensure effective and efficient results.

- Apart from other activities, trained De-Suups Plus were deployed to assist in vaccine delivery and ensure that citizens reported for vaccination during the historic nationwide vaccination programme in March 2021 (4). With their help, as of 29 October 2022, more than 2 million vaccine doses had been administered (2).

- They continue to provide invaluable support at the national referral hospital in Thimphu. They serve as friendly guides, assisting people in navigating the hospital and lending a helping hand to health-care workers during staff shortages. Their selfless
contributions play a crucial role in ensuring the smooth management of patients and maintaining essential health services.

**Lessons learnt**

- The intervention showed that volunteer mobilization can be an extremely helpful crisis management strategy when responding to such large-scale pandemics. As they were members of the community, their acceptability and trust amongst citizens was higher. This intervention highlighted the importance of collective strength and how to proficiently deal with a crisis by leveraging human resources in an organized and efficient manner.

**References**

Management of severe or critical cases

Several Member States implemented measures to ensure the safe transfer of suspected and confirmed COVID-19 cases to health-care facilities. For example, in India, Ziqitza Healthcare Limited, a private emergency medical service provider, utilized its extensive network of 3300 ambulances to offer emergency transportation. It collaborated with state governments and the National Health Mission to deploy additional ambulances in regions facing difficulties. Furthermore, it established a centralized system dedicated to an ambulance helpline, equipped with call centres capable of providing ambulance services and COVID-19-related information (2).

Indonesia responded to the need for additional health-care capacity by establishing specialised facilities known as “Oxygen Houses” to cater to patients with mild and moderate COVID-19 symptoms who required oxygen support. Oxygen Houses were temporary structures accommodating up to 500 beds equipped with oxygen supplies, treatment beds, cylinders, masks and cannulas to aid individuals experiencing breathing difficulties (3).

Planning for surge response

Many Member States reallocated medical staff to hot spots and involved and trained medical residents, students, private health-care providers and volunteers to increase human resource capacity. Additionally, auxiliary health workers were engaged to manage mild cases, while community management systems and private health-care facilities were mobilized to share the burden (4).

Amid the pandemic, Member States rapidly expanded and modified their health-care infrastructure to accommodate the influx of COVID-19 cases to not only enhance response outcomes but also prevent the possible collapse of the health-care systems. Efforts were made to construct new facilities and repurpose existing ones, enabling effective triage, safe patient transfers and optimal clinical management. Mumbai established makeshift hospitals, also known as Jumbo COVID-19 Centres.
The Jumbo COVID-19 Centres in Mumbai, India

From crisis to capacity

Coverage

The intervention was implemented in Mumbai, widely known as India’s financial centre and one of the most populated cities in the world.

Background

During the first two waves of the pandemic, all public and private hospitals were overburdened with COVID-19 patients. The increasing caseloads led to an acute shortage of medical supplies and human resources. The civic authorities set up separate Jumbo COVID-19 centres to cater to patient hospitalization (1–4).

Summary of the approach

During the first wave of the pandemic in 2020, the Brihanmumbai Municipal Corporation (BMC), the civic body of Mumbai, took proactive measures to address the shortage of hospital beds and reduce the burden on the existing health-care system by setting up five COVID-19 care centres, also known as Jumbo COVID-19 Centres. These were makeshift centres set up as emergency COVID-19 care centres (3,5). The primary goal of the BMC’s initiative was to alleviate the strain on the existing health-care system and meet the urgent need for sufficient bed capacity. These Jumbo COVID Centres were not dismantled even when cases declined at the end of 2020. As the cases began increasing from November 2021, these COVID-19 care centres were reactivated in a phased manner (2). Besides, following the launch of the COVID-19 vaccination drive on 16 January 2021, a part of these facilities was turned into vaccination centres (3).

- **Collaboration with partners to set up the COVID-19 care centres**

  In collaboration with the City and Industrial Development Corporation (CIDCO), the BMC established nine Jumbo COVID-19 centres across different administrative wards of Mumbai. The centres were constructed using advanced German tent technology (6). The centres were well-equipped with essential medical resources, including ventilator machines, dialysis machines, intensive critical care unit (ICCU) beds, CT scan machines, a portable X-ray machine, etc.
Compendium of good practices in response to COVID-19 in the SE Asia Region

- **Allocation of beds in jumbo centres through decentralised war rooms**
  As part of managing the pandemic strategy, BMC set up decentralised COVID-19 response war rooms with a central control room for disaster management in Mumbai at the onset of the pandemic in 2020. These war rooms were used to monitor the available beds in the jumbo centres and navigate the patients through the dedicated war room helplines (7–8).

- **Leveraging bed capacities of private hospitals in Mumbai**
  During the second wave of the pandemic, when the influx of incoming patients increased exponentially, the BMC leveraged hospital beds from private health facilities. The number of beds in private hospitals increased to 3100 from 2560 in the first wave. Additionally, the costs of providing COVID-19 treatment were capped at approximately US$ 110. Thus, by involving private hospitals, the health-care system’s capacity was expanded, enabling more patients to receive necessary medical care (8,9).

- **Setting up real-time dashboards to track the occupancy of beds in the jumbo centres**
  BMC created a dashboard collating information from 172 public and private hospitals and Jumbo centres to monitor the occupancy of beds and navigate the patients. The system combined data from multiple sources, enabling real-time updates and predictive analysis of hospital capacity and medical supplies at the ward level. These insights empowered proactive decision-making in managing the pandemic (10).

**Results**

- The initiative established nine jumbo COVID-19 centres, offering a combined total of 15,627 beds. These centres treated more than 89,000 cases who required hospitalization and care.
- The centres were also used to administer the COVID-19 vaccines. By the end of January

**Fig. 11. Inside a jumbo COVID–19 Centre in Mumbai**

2021, more than 600,000 vaccine doses had been administered at the 55 session sites (3).

Lessons learnt

- Planning, coordination and adaptability to the evolving situation were the key in responding to such large-scale health emergencies. These centres helped to effectively accommodate the surge in cases and provide hospital care to the needy patients. The intervention highlighted that accounting for potential surges in cases and assessing bed capacity, medical resources, staffing requirements and infrastructure needs in advance can enable a more effective and timely response to crises. The success of such an intervention relied on multisectoral collaboration, resources and expertise from various stakeholders.

References

Bhutan, for example, created four regionalized national COVID-19 centres. By using clustering COVID-19 case management, it was able to effectively utilize its health-care workers (and medical supplies) without exhausting either, while reducing the risk of other patients’ exposure to COVID-19 (5).

**Use of digital and novel technology**

As access to health care was hampered during the COVID-19 response, innovative mechanisms to maintain health services and access were adopted through digital technologies. This was particularly beneficial for individuals with mild or moderate COVID-19 symptoms in home isolation. Virtual health services and supports, provided through digital platforms, focused on symptom monitoring, risk identification, vital sign monitoring, health advice, patient education, medication reconciliation, psychosocial support and access to community resources (6).

Digital platforms were employed during the pandemic to effectively handle COVID-19 cases and deliver crucial health-care services. In India, two notable telemedicine platforms were established: StepOne and eSanjeevani. StepOne, a non-profit platform, offered free telemedical support and mental health counselling through a cloud-based voice calling system. It was integrated into health-care settings in 21 Indian states, reducing the burden on hospitals (7). eSanjeevani was implemented under the Ayushman Bharat Scheme. eSanjeevani outpatient department (OPD) provided COVID-19-specific care and reduced the physical burden of patients on health systems by shifting OPD consultations to online consultations. eSanjeevani achieved around 80 million teleconsultations till December 2022 (8).

In Sri Lanka, when a surge in COVID-19 cases overwhelmed its health care system, it deployed a virtual triage telemedicine system. This system integrated SMS and call services to triage patients, provided advice and coordinated with ambulance services. Existing services, including the 24x7 Doc Call Service and Suwaseriya ambulance service, were expanded and integrated, and a new SMS gateway was established (9).
References


Good practices in operational support, logistics and supply chains

The COVID-19 pandemic caused substantial disruptions and increased demand for essential health commodities. Customs clearance and other administrative processes added to the delay in the arrival of crucial equipment and supplies. The exacerbated successive waves and the duration of the pandemic exhausted all stakeholders. Moreover, the insufficient number of trained health-care workers and other front-line responders was one of the significant challenges during the operational response to COVID-19. Many Member States boosted their supply chains, logistics systems and operational capacity by promoting local manufacturing, leveraging technology and mobilizing additional surge capacity.

Faster and sufficient procurement of COVID-19 supplies

Member States tackled the shortage of critical medical supplies by promoting local manufacturing units and leveraging technology for efficient supply processes. Digital platforms were implemented to monitor stocks in real-time and enhance inventory management. For example, Indonesia used its existing e-Katalog system, an online procurement platform that facilitated the purchase of medical devices and supplies by government institutions and public hospitals. This system underwent significant improvements, resulting in faster and more adequate procurement of COVID-19-related medical supplies throughout the country. Simplified documentation processes and prioritizing local products on the platform contributed to its success (1,2).

In 2021, when the Delta variant of COVID-19 created a massive demand for medical oxygen, Member States adopted various collaborative approaches to increase medical oxygen availability across the health facilities in their respective countries. An example of such a collaborative effort was witnessed between Indonesia and Singapore, known as the “Oxygen Shuttle” programme. Singapore provided 500 tonnes of liquid oxygen to Indonesia, along with additional support in the form of oxygen cylinders, concentrators and ventilators. This partnership alleviated the oxygen shortage in Indonesia and bolstered its emergency response to COVID-19 (3,4).

Similarly, humanitarian organizations, such as the Hemkunt Foundation in India, played a crucial role in addressing the shortage of medical oxygen in regions facing scarcity. The Hemkunt Foundation established an oxygen bank and online portal for hospitals to request oxygen concentrators. It collaborated with various organizations to set up oxygen plants and provide free oxygen concentrators to hospitals in need. Its interventions ensured a consistent supply of medical oxygen, saving numerous lives (5,6).
Achieving oxygen self-sufficiency in Mumbai, India

Efforts in bridging the demand–supply chasm

Coverage

The intervention was to address a severe shortage of oxygen in Mumbai city during the peaks of the first and second waves of the pandemic.

Background

In 2020, amidst the first and second waves of COVID-19, the daily oxygen requirement in Mumbai averaged around 210 tonnes and 270 tonnes, respectively (1). This resulted in a significant gap between demand and supply. Due to the limited availability of medical oxygen in tertiary or large private hospitals, which were already overwhelmed with the regular influx of patients, many patients had to be relocated from one hospital to another.

Despite a surge in bed occupancy rates and a severe shortage of medical oxygen, the officials of Mumbai managed to control the situation in only a few days, and soon the city became self-sufficient in terms of meeting and sustaining its medical oxygen demand (1).

Summary of Intervention

The intervention was implemented in May 2020 to guarantee an uninterrupted supply of oxygen by following a combination of strategies, including enhancing oxygen supply, efficient resource management, technology-enabled information distribution and real-time monitoring. The stakeholders involved in the intervention were Mumbai’s administrative agencies, such as the Brihanmumbai Municipal Corporation (BMC), Central Purchases Department, State COVID-19 Task Force, and Food and Drug Administration Office (FDA), among others (2).

- Enhancing the supply of oxygen

BMC, Mumbai’s civic body, enhanced the medical oxygen storage infrastructure by installing liquid medical oxygen (LMO) tanks in different parts of the city during May and June 2020. More than 1.9 million US dollars were invested in installing LMO tanks and upgrading facilities (3). These tanks were strategically placed in the city’s six government-assisted hospitals and six Jumbo COVID-19 centres. Incorporating these supplementary tanks played a crucial role in enabling the city
to manage the challenges of medical oxygen supply posed during the second wave (1). Instead of relying on a cylinder-based model, the BMC upgraded the facilities in the hospitals with LMO tanks. In May 2021, BMC announced the installation of 16 pressure swing absorption (PSA) oxygen-generation plants in 12 hospitals across the city, with each plant having the capacity to generate approximately 43 tonnes of oxygen (3).

- **Real-time monitoring of oxygen demand and supply**
  To prevent avoidable deaths of COVID-19 patients stemming from oxygen shortages, the BMC took the initiative to closely monitor the supply and inventory of oxygen across both private and BMC-run hospitals in the city. A comprehensive resource inventory of oxygen utilization and infrastructure at hospitals proved valuable in this process. A dashboard provided updated information on a regular basis on the number of available and occupied oxygen-supported beds, intensive care unit (ICU) beds and ventilators. BMC teams were appointed to monitor the transportation of oxygen cylinders from the production sites and their distribution to all COVID-19 hospitals and health centres (4).

- **Efficient resource management and quick response vehicles**
  To address the supply-demand gap, surplus stock was relocated from one location to another, and efforts were made to acquire additional oxygen from Gujarat (1). The city administration focused on the prudent use of oxygen and the preservation of resources. All hospitals were instructed to address any leakages and allocate oxygen beds in a careful and strict manner and were mandated to have oxygen cylinders available as a backup system. When the crisis unfolded, BMC dispatched six rapid response vehicles to transport cylinders and concentrators to hospitals experiencing shortages. It also appointed six officials who were entrusted with the task of coordinating with oxygen suppliers, assistant municipal commissioners from the 24 civic wards, and the FDA Office. Teams at the ward level were established to facilitate the coordination and transfer of excess oxygen between different sites (1). Their collective responsibility was to ensure the optimal management of existing oxygen reserves and promote their judicious utilization (3).

**Results**

- Mumbai was able to provide an uninterrupted supply of oxygen owing to a concerted effort. During May and June 2020, BMC bolstered the medical oxygen storage infrastructure by installing 15 LMO tanks, each with a capacity of 13 kilolitres, in addition to 11 smaller tanks capable of holding up to 6 kilolitres of liquid oxygen (3).

- Apart from the 16 PSA plants, the BMC introduced additional oxygen generation facilities based on PSA technology. Together, they had a combined capacity of producing 6.93 tonnes of oxygen per minute (5).
Lessons learnt

- Having a strategic approach to oxygen management by networking with hospitals and diligently monitoring their oxygen needs through dashboards in real-time reduced wastage and ensured sufficient oxygen supply and effective case management.

- The intervention also highlighted the significance of networking and coordination between health-care institutions and government bodies in times of emergencies, enabling a more coordinated and effective response to critical healthcare needs (3).

References


Monitoring COVID-19 commodities across the supply chain

In addition to efficient procurement and safe storage of essential supplies, the monitoring and tracking of COVID-19 commodities throughout the supply chains became crucial during the pandemic. To address this challenge, Member States of the SE Asia Region collaborated with partners to develop robust monitoring and tracking systems.

Nepal, in collaboration with the US Agency for International Development (USAID) and the World Food Programme through the Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM), aimed to streamline the supply of COVID-19 commodities and strengthen the country's health supply chain systems through using electronic logistics management information system (eLMIS) dashboard to track and manage COVID-19-related medical essentials. The system tracked shipment arrivals, supply and demand across regions, and the movement of commodities along the supply chain (7,8).
Ensuring continuous medical supplies in Nepal

Leveraging existing supply chain network for COVID-19 management

Coverage

This intervention targeted all public health facilities in Nepal that received medical supplies from the national logistics management systems.

Background

The second wave of COVID-19 in April 2021 had a severe impact on Nepal. With a population of 29 million (according to the Census 2021), Nepal had a shortage of laboratory supplies, medical oxygen and other essential logistics. Hence, the Government of Nepal collaborated with its development partners and leveraged COVID-19-related medical supplies through the US Agency for International Development (USAID)’s GHSC-PSM, WHO and World Food Programme (WFP) to strengthen the procurement and medical supply systems for COVID-19 products (1, 2).

Summary of the approach

To prevent disruptions of the healthcare supply chain during the pandemic, the Government of Nepal decided to build on one of its existing supply chain programmes. The GHSC-PSM was assisting Government by purchasing and delivering health commodities, strengthening national supply chain systems and providing global supply chain leadership to ensure that lifesaving health supplies reach those in need (3). To maintain the supply of COVID-19-related medical provisions in Nepal, GHSC-PSM included medical supplies into its ambit, along with strengthening the country’s supply chain systems.

- Seeking collaboration from partners for improving logistics and supply. As part of its COVID-19 emergency response strategy, Nepal collaborated with development partners to assist in strengthening its response operations and logistic systems. The programme, which earlier included HIV/AIDS and family planning products, was expanded to include COVID-19-related medical products.
- Development of a new COVID-19 module within the electronic logistics management information system (eLMIS) system to track and monitor COVID-19-related medical commodities. The programme developed an eLMIS dashboard.
to track and manage COVID-19-related medical essentials, facilitating timely decision-making. It generated and communicated daily stock status data of COVID-19 commodities to the Government’s senior-level decision-makers to prevent and reduce stockouts and improve the availability of commodities (4).

- Demand forecasting and planning for the distribution of COVID-19 commodities. The country, with the assistance of partners, developed technical specifications of commodities, a procurement plan based on forecasting and quantification and a distribution and operations management plan.
- Training and capacity-building of system users. The Government conducted training on supply chain management and use of the eLMIS (5). The training also covered skills on a new inventory management system.

Results

- The project helped in the effective distribution of commodities for pandemic management. Commodities were received at the central stores and distributed to the local health facilities by following the distribution plan. Recording of all such transactions was subsequently done in the eLMIS.
- The team generated and communicated daily stock status data on COVID-19 commodities to government partners for making timely decisions to ensure a reliable supply at all levels of the supply chain.
- The development of the COVID-19 module within the eLMIS system enabled better tracking and management of supplies, leading to minimize stockouts and overstocks. Specifically, the system was able to help identify and address shortages in critical supplies such as oxygen cylinders and PPE, which were crucial in the fight against COVID-19.
- Training health workers and government officials on using the eLMIS system and other supply chain management tools helped improve their capacity to manage the supply chain system effectively.

Lessons learnt

- The project demonstrated a collaborative approach involving multiple stakeholders including participation of subnational and local health organizations that helped to improve availability of essential supplies.
- Use of real-time data from the entire supply chain to identify where supplies were needed well in advance that could prevent acute shortages.
- The procurement of equipment and supplies meeting technical specifications helped in efficient operation and uninterrupted service delivery.
References


References


Good practices in maintaining essential health services and systems

WHO SE Asia Region is home to over a quarter of the world’s population and has a huge burden of communicable and noncommunicable diseases (NCD). The onset of COVID-19 in 2020 further exacerbated the fragile health system, causing significant disruptions in managing essential health services (1). According to the findings of the global pulse survey, essential health services experienced disruptions in approximately 90% of the surveyed countries (2,3). This disruption on the supply side was further exacerbated by misinformation on the demand side, which influenced perceptions of healthcare facilities and changes in health-seeking behaviour, leading to a decline in demand for essential health services (4). As these disruptions undermined the hard-won progress achieved, Member States began exploring alternative approaches to ensure the continuity of health services.

Ensuring continuity of care by modifying service delivery approaches

Member states implemented various approaches, including scheduling different service hours for the different health services and following appointment-based system to prevent overcrowding and ensure a more organized process. Additionally, most of them utilized social media platforms and modified service hours to reach a wider population and accommodate various schedules. Immunization services were strategically made available in locations such as marketplaces, pharmacies and social or cultural centres, ensuring convenient access for the public.

In Nepal, the Family Planning Association of Nepal, a key provider of sexual and reproductive health services for marginalized groups, made available pre-prepared packages containing condoms, lubricants, HIV self-testing kits and information, education, and communication materials at strategic pick-up points in the community to address accessibility of contraceptive products (5). In India, a non-profit organization called Advancing Reduction in Mortality and Morbidity of Mothers, Children, and Neonates (ARMMAN) launched a nationwide virtual outpatient clinic for pregnant women and mothers with the help of volunteer obstetrician and paediatrician doctors across the country, which was made free of charge for low-income women in rural and urban areas to improve their access to health care (6,7,8).
Likewise, Bangladesh established a network of local community clinics to deliver primary healthcare services to the people. The clinics were staffed with dedicated health-care providers, and managed by community leaders and members. These clinics offered essential health services (9). In Myanmar, the Joint United Nations Programme on HIV and AIDS (UNAIDS), WHO, and other partners, in collaboration with the Ministry of Health and Sports, established a rapid response team to identify alternate service delivery options to ensure continuity of HIV services during the first wave of COVID-19, which initiated actions including ensuring a multi-month supply and guaranteeing uninterrupted supply of life-saving antiretroviral therapy (10).

The Maldives, with the help of WHO, adopted a scenario-based approach where it implemented measles and rubella intensification activities at local health centres, focusing on community-based immunization rather than mass campaigns to avoid large crowds and maintain social distancing (10). Additionally, the programme recruited international and local experts to overcome the high turnover of healthcare staff and ensure a reliable and thorough investigation of suspected rubella cases (11). In another example, the health workers in Sri Lanka established a rigorous schedule in April 2020 to cover the immunization backlog created by a nationwide lockdown during the early days of pandemic. As the services at the immunisation centres in Sri Lanka resumed by the end of April, the backlog was cleared by mid-May 2020 (12).
Joining hands, saving lives during the pandemic in Myanmar

Addressing health needs of communities

Coverage

The Kale township of Sagaing Region of Myanmar served as the focal point for the intervention “Joining hands, saving lives during the pandemic in Myanmar”. This intervention extended its reach to encompass five townships in the Chin region, namely Ganggaw, Tamu, Kalewa, Homalin and Khamti.

Background

With the onset of COVID-19 and as witnessed globally, Myanmar also experienced significant disruptions in the supply chain network for essential healthcare services. Due to the ongoing unrest in Myanmar’s Sagaing and Chin regions, most public health-care centres the conflict-affected areas could not provide essential health-care services, which led to the communities’ considerable reliance on private health-care providers. Moreover, the inflation rate significantly impacted the prices of medicines and commodities required for health-care services, resulting in limited availability and affordability of services.

Summary of the approach

This intervention was implemented with the primary objective of ensuring access to lifesaving essential healthcare services for the vulnerable populations of the region. The project activities were carried out from 1 August 2021 to 31 December 2022 (first phase) and from 30 May 2022 to 31 December 2022 (second phase). Key implementers and collaborators of the project included the Partner Hospital and its CSO, working in close coordination with local authorities and community leaders. WHO provided support for service provision costs to the community and human resources.

- During the COVID-19 pandemic, most of the essential lifesaving services were provided through hospital-based services. In collaboration with Kale township hospital, the project partners established a joint COVID-19 treatment centre. COVID-19 care and treatment were also provided through both outpatient care and inpatient care services.

- By constituting mobile teams, the intervention also initiated outreach services to reach out to communities. Mobile teams visited conflict-affected villages and
internally displaced persons (IDP) camps to provide essential health services, including services under the COVID-19 treatment protocols. Additionally, the partner organizations engaged in consultations with the parties involved in the conflict areas to ensure the safe and continuous provision of essential healthcare services during mobile visits to the affected population.

- To measure the effectiveness of the intervention, several key indicators were established. These included the number of individuals who received COVID-19 testing and home-based care kits, the number of patients with trauma treated at different severity levels, antenatal and postnatal care visits, delivery methods, post-abortion care, family planning services, neonatal and childcare services, treatment of hypertensive and diabetic patients and screening for hypertension and diabetes. These indicators served as critical measures to evaluate the project’s impact in addressing the urgent health needs of the vulnerable population and guiding future interventions in similar contexts.

**Results**

The intervention achieved significant outcomes in delivering essential health services to the vulnerable populations. Partner hospitals played a crucial role in providing a range of services, yielding notable results.

- A total of 4869 cases related to reproductive, maternal, newborn, child and adolescent health (RMNCAH), 2784 cases of common health problems, 1014 cases of NCD and 56 trauma cases benefitted from the project. Furthermore, the project provided critical care to 140 severe and 98 very severe COVID-19 patients.

- Recognizing the importance of comprehensive health care, the project also facilitated 141 HIV testing and counselling sessions, and one HIV referral was made to ensure appropriate follow-up care. Three lifesaving referral supports were provided via facility-based and mobile visits, ensuring timely access to critical care.

**Lessons learnt**

- Collaboration with local authorities and CSO facilitated the smooth movement of essential healthcare services to the communities needing them the most.

- Innovative approaches such as outreach initiatives through mobile teams have ensured timely access to critical care.

**Reference**

Capitalizing on teleconsultation and digital solutions

Many Member States established call centres and telemedicine facilities to provide COVID-19 and essential health services which could be accessed using various methods like dedicated hotlines, phone or mobile calls to service providers, online consultation using web and mobile based platforms, interactive voice response systems, etc. For example, a ride-hailing platform in Bangladesh, Pathao, collaborated with several digital health startups, such as Digital Solutions, Praava Health and Maya to launch Pathao Health, where its subscribers could not only get their COVID-19 symptoms checked online but also receive one-on-one medical services through phone and video consultations, obtain prescriptions and get medicines delivered at their doorstep (13).

In another example from Thailand, a self-screening application, which was available in multiple languages, assisted individuals in conducting a self-assessment by inputting their signs, symptoms and COVID-19 risk exposure. The system provided advisories on preventive measures against the disease and guided any case of suspected COVID-19 to seek further help from designated health authorities. Thailand also introduced an e-prescription system, enabling patients to collect prescriptions from local pharmacies or receive them through postal delivery or village health volunteers (14).

References


Good practices in COVID-19 vaccination

Almost a year after the outbreak of COVID-19, WHO listed the Pfizer/BioNTech-manufactured Comirnaty COVID-19 mRNA vaccine as the first to receive its emergency use listing (EUL) (1). Since then, 11 vaccines have been listed by WHO that received emergency use authorization. National regulatory authorities (NRA) across the world have granted full or emergency use authorizations for 40 COVID-19 vaccines (2).

However, despite the scientific breakthrough and the number of doses of vaccines administered, Member States faced various challenges in vaccinating their population such as maintaining R&D incentives, running clinical trials, authorizations, post-market surveillance, manufacturing and supply, global dissemination, allocation, uptake and clinical system adaptation, in addition to financial and ethical concerns (3).

Yet, amidst the ever-changing landscape of viral transmission and the complexity of the vaccination initiatives during the COVID-19 pandemic, various Member States demonstrated exemplary initiatives that were innovative, impactful, effective and inclusive in developing, distributing and delivering COVID-19 vaccines.

Vaccine research, development and production

In the initial days of the pandemic, very few Member States had capacities for vaccine R&D or rapid scale-up of vaccine production. For example, Thailand undertook vaccine R&D through its National Vaccine Institute with the support of international experts. The country also invested in increasing production capacity, establishing sustainable long-term vaccine manufacturing capacity and promoting self-sufficiency (4). In September 2020, Indonesia approved its first domestically produced COVID-19 vaccine, IndoVac, which was jointly developed by Indonesia’s state-owned pharmaceutical company Biofarma and the Texas Children’s Hospital Centre for Vaccine Development at Baylor College of Medicine (5,6).

Delivering vaccination at the facility and community levels

Addressing vaccine hesitancy

Vaccine hesitancy emerged as a significant challenge to the successful implementation of vaccination campaigns, which were further fuelled by misinformation and rumours.
circulating on social media platforms. Member States developed various approaches for addressing vaccine-related concerns and actively engaging with communities to build trust and confidence. In Bangladesh, health workers went door-to-door to provide registration assistance, address information gaps and encourage people to get vaccinated, with a focus on the vulnerable. By actively engaging with the community, as of 31 December 2022, 74.5% of the Bangladeshi population had received the second dose of the COVID-19 vaccine.

**Innovative approaches to ensure “no one is left behind”**

As the COVID-19 vaccines started arriving to vaccinate the population, the urgency to rapidly vaccinate the vulnerable population, coupled with the unprecedented scale at which the vaccines were to be administered to effectively combat the virus, led several Member States to adopt innovative approaches and customize their existing vaccination strategies. The Indian state of Uttar Pradesh, which has over 106,000 villages, adopted a cluster vaccination approach to reach the entire eligible population of 136 million people. It was implemented with the support of UNICEF and WHO and the active involvement of village leaders, healthcare workers, and ASHA (7).

As the vaccination strategies in many Member States of the SE Asia Region focused on population groups that were the most vulnerable and most affected by COVID-19, they prioritized their vaccination programmes based on the guidelines provided by WHO’s Strategic Advisory Group of Experts on Immunization (WHO SAGE) and tailored them to meet their specific needs (8). For example, in Nepal, the National Immunisation Technical Advisory Committee (NITAC) and the Ministry of Health and Population, tailoring WHO SAGE’s guidelines to its country context, prioritized vaccination of vulnerable groups, including the elderly, frontline workers and individuals with comorbidities. After vaccinating vulnerable populations, Nepal expanded its vaccination programme to include individuals living in hard-to-reach communities, refugees and migrants (8). In another example, the Maldives national vaccination programme, COVID-19 Dhifaau (COVID-19 Defence), provided free vaccination to all residents and those living in the Maldives, including undocumented migrant workers (7).

**Data monitoring and evaluation**

Many Member States in the Region used technology to collect and analyse vaccination data for informed decision-making and effective allocation of resources. India launched its COVID-19 Vaccine Intelligence Network, popularly called CoWIN, a web portal and application to expedite vaccine delivery across the country. CoWIN became a laudable force with its role in the administration of over 2.2 billion vaccinations, over multiple doses, to over 1 billion Indians. The application provided support for registration, verification of identity, booking of appointments and issuance of vaccination certificates. The portal was hailed for its simple user interface, which holistically made access easy for all sections of India’s diverse society (9).
In another instance, Sri Lanka developed and implemented a range of digital health initiatives, including the COVID-19 Immunisation Tracker (CIT), the Smart Vaccination Certificate (SVC) and the National COVID-19 Health Information System (NCHIS). The CIT captured individual-level data on COVID-19 vaccinations, enabling real-time monitoring of vaccine distribution and administration. The SVC, developed collaboratively by WHO Country office for Sri Lanka and the Ministry of Health, utilised QR codes to ensure the authenticity of vaccine certificates. The NCHIS generated decision support dashboards with real-time data on cases, facilities, management outcomes and vaccination, enabling data-driven decision-making. Integrated with one another, the digital platforms improved the efficiency of the vaccination programme (10).
The Indian COVID-19 vaccine story
A public good for each and everyone

Coverage
The intervention initially targeted individuals over 18 years, but it later expanded to include all those over 12 years. India’s vaccine production helped more than 100 countries and territories worldwide (1).

Background
On the vaccination front, India encountered three significant challenges. First, the epidemiological characteristics and structure of the virus were not well understood, posing uncertainties. Second, there was a time constraint for vaccine development and manufacturers had to take risks in producing the vaccine. Third, executing a massive-scale vaccination programme presented a formidable public health challenge. To vaccinate approximately 68.91% of the eligible Indian population, an estimated 1.9 billion vaccine doses were required (2).

Despite numerous obstacles and challenges, countries persevered tirelessly to develop and produce vaccines and achieve wider vaccination coverage to combat the global pandemic. As the demand for COVID-19 vaccines surged worldwide, India as a major global player, with 62% of global vaccines being manufactured in the country, had to fulfil a dual responsibility – to meet domestic demand and contribute to international efforts (3). Leveraging its low-cost production capability from home-grown companies, India played a pivotal role in large-scale vaccine production, overcoming all these obstacles and successfully delivering vaccines to its population and the rest of the world.

Summary of the approach
The objectives of the Indian vaccination development and implementation journey encompassed rapid vaccine R&D, increased manufacturing capacity, efficient procurement and supply chain management, vaccine equity and global solidarity.

- Expert groups and task forces for planning and spontaneous decision-making
  - Established on 14 April 2020, the Vaccine Task Force brought together expertise from the Government, academia, national laboratories, industry, regulators and other experts. This collaborative effort primarily focused on conducting research related to COVID-19 vaccines. To address the challenges posed by vaccine development during the early stages of the pandemic, the
Task Force pooled knowledge from various fields to pave the way for effective vaccine solutions.

- Formed on 7 August 2020, the National Expert Group on Vaccine Administration for COVID-19 (NEGVAC) played a distinct role from the Vaccine Task Force. Comprising experienced professionals, its core responsibility was to ensure a smooth and efficient vaccination process once vaccines became available. NEGVAC defined clinical criteria for vaccination, identified high-risk populations and closely monitored vaccine effectiveness and coverage. It also formulated strategies to ensure equitable and transparent vaccine delivery. As a result, NEGVAC played a vital role in planning and executing India’s ambitious vaccination drive.

- Additionally, in May 2021, India established 11 empowered groups, two of which specifically contributed to coordinating vaccine production, administration and communication.

**Leveraging India’s pre-existing capacity for R&D and production**

- India’s vaccine development efforts were bolstered by the pre-existing capacity and strategic investments of key pharmaceutical companies and institutions. The Serum Institute of India (SII), a Pune-based pharmaceutical company, played a crucial role in consistently expanding its production capacity through strategic investments \(^4\).

- In addition to SII, the Indian Council of Medical Research (ICMR), National Institute of Virology (NIV), Bharat Biotech and various other pharmaceutical companies collaborated in public-private partnerships for vaccine research. These collaborations involved over 20 Indian institutions, both public and private, that contributed their expertise to the development of cost-effective, safe and efficient vaccines \(^5\). The Department of Biotechnology (DBT), which promotes the development and application of biotechnology in various sectors including health care, played a significant role in supporting vaccine R&D. One such initiative was the establishment of the DBT-Biotechnology Industry Research Assistance Council (BIRAC) COVID-19 Research Consortium, which aimed to encourage collaborative research efforts between India and global leaders in the field. This consortium facilitated knowledge-sharing, resource mobilization and expertise exchange to accelerate vaccine research.

- Moreover, the “Mission COVID Suraksha” was a major vaccine development initiative led by the DBT. With a budget of approximately 110 million US dollars for 12 months, this mission provided essential financial support in the form of grants to various research projects and companies involved in vaccine development. The funding was instrumental in augmenting existing infrastructure and expediting vaccine research and the development process.
In collaboration with the ICMR and NIV, Bharat Biotech successfully developed Covaxin, India’s first indigenous COVID-19 vaccine candidate. By July 2020, the vaccine was ready for human trials (8). Concurrently, the SII partnered with Oxford University and AstraZeneca to develop Covishield. Both vaccines underwent rigorous clinical trials at over 53 locations across the country and received emergency use authorization (EUA). Following the authorization, India launched its vaccination drive, administering both Covishield and Covaxin to the public from 16 January 2021.

• **Creating a conducive policy environment**
  
  - The Government made detailed purchase plans and released 100% advance payments of 211 million US dollars to SII for 110 million doses of Covishield and 96 million US dollars to Bharat Biotech for 50 million Covaxin doses for the months of May, June and July 2021. This initiative ensured timely access to vaccines and accelerated the vaccination process nationwide.
  
  - Apart from facilitating vaccine development, the Indian Government invested significant efforts in creating favourable conditions for policy, legal and financing aspects. Various measures were undertaken to ensure a smooth vaccination rollout and encourage both domestic and international vaccine production. One key initiative was establishing a conducive regulatory environment to expedite vaccine authorization while maintaining rigorous safety standards. The Government collaborated closely with vaccine manufacturers and research institutions to streamline the approval process and provide timely support. The Government proactively engaged in diplomatic efforts to secure vaccine supplies from various sources globally. Negotiations and partnerships with vaccine developers and manufacturers helped ensure a steady supply of vaccines to meet the demand within the country.

• **Easing the regulatory ecosystem during the pandemic**
  
  In May 2020, the Vaccine Task Force conceptualised the regulatory pathways, adapting them to meet the urgent need for vaccines.
  
  - Researchers implemented measures such as accelerated trial cycles, limited participant numbers and parallel phases to expedite evaluation while maintaining safety standards. The Government provided regulatory recommendations specific to COVID-19 vaccines and established rapid review processes (6,7).
  
  - As part of India’s COVID-19 vaccination strategy, domestic vaccine manufacturers were granted the authority to directly supply vaccine doses to private hospitals. To streamline the vaccination process, the requirement for local clinical trials was waived if the drug had received approval from recognized...
regulatory authorities. Initially, and later as per the revised guidelines, 25% of the manufactured doses were allocated for private hospitals, while the remaining 75% was provided to the Government of India for nationwide distribution. Subsequently, under the Liberalised Pricing and Accelerated National COVID-19 Vaccination Strategy, the private sector could directly procure 50% of the vaccine doses. This strategic approach aimed to expedite vaccine distribution and administration, fostering collaboration between private healthcare facilities and the Government in achieving widespread immunization across the country (2,9).

- **Powerful public digital infrastructure using tracking and monitoring platforms**

  India developed the CoWIN platform (Winning over COVID-19) and strengthened the existing Electronic Vaccine Intelligence Network (eVIN) as part of its initiative to establish a powerful public digital infrastructure to be used as a tracking and monitoring platform.

  - eVIN, initially developed in 2015, was utilized to provide real-time information about the COVID-19 vaccine stock and storage temperatures across all cold-chain points. It also facilitated data-driven decision-making and consumption-based planning. This further helped in maintaining optimum stocks of vaccines leading to cost savings.

  - While eVIN served as the supply side platform, CoWIN became the citizen-facing platform, allowing users to book appointments, verify their identity, provide digital vaccination certificates, access real-time data on vaccination centres, track administered and due doses and grievance redressal. Robust back-end platforms and application programming interfaces were utilized to ensure seamless connectivity and handle high user volumes. It also served as a supporting tool for the programme managers in vaccination session planning at the vaccination centre level, inventory management, tracking of every unique vaccination event, line listing of due beneficiaries, coverage analysis, etc. thus ensuring effective monitoring.

- **Supply chain management**

  The cold storage supply chain infrastructure developed under Universal Immunization Programme was augmented and used for supply chain management. The vast scale of the existing programme was supported by more than 29,000 functional cold-chain points, 3% of which were located at the district level and above. The remaining were located below the district level, thus ensuring last-mile access.
Further, eVIN connected the four levels of vaccine tracking – vaccine cold-chain endpoint, district- and regional-level centres, state-level centres and national-level centres – and gave real-time temperature information and other updates.

In addition to conventional supply models, drones were also used to supply vaccine doses to inaccessible, snow-bound areas such as the northeastern states.

Vaccine Maitri (Friendship): India’s global vaccine diplomacy

The Vaccine Maitri initiative, launched just four days after the commencement of its domestic vaccination programme in January 2021, aimed to extend access to low-cost COVID-19 vaccines to other countries, showcased India’s commitment to global vaccine equity by simultaneously addressing the needs of both its own population and other countries in need.

During the first wave of COVID-19 itself, India sent medical teams to neighbouring countries and, under the Vaccine Maitri initiative, exported more than 301 million doses of COVID-19 vaccines to over 100 countries worldwide. India supported countries with a grant of 15 million doses, facilitated exports of more than 234 million doses to countries under commercial contracts and more than 52 million doses under Gavi’s COVID-19 Vaccines Global Access Facility (COVAX) agreements.

India demonstrated its commitment to global vaccine access by supporting the COVAX programme. COVAX aimed to ensure equitable distribution of vaccines worldwide, particularly to low-income countries.

India integrated vaccines into its foreign policy. It partnered with African countries by deploying rapid response teams, supplying vaccines, and organising capacity-building programmes for healthcare workers in African nations. SII signed a deal with South Africa’s Aspen Pharmacare to manufacture and sell four Aspen-branded vaccines for Africa.

Results

India successfully launched Covaxin within 12 months of the pandemic’s onset.

India’s capacity for COVID-19 vaccine production surpassed five billion doses annually. All types of vaccines were being supplied to the Government at an affordable cost, with each dose priced under US$ 3.

During the first year of vaccination, India administered over 1.56 billion doses of Covishield and Covaxin. By July 2022, India had achieved a remarkable milestone by successfully administering more than 2 billion doses of COVID-19 vaccines.

India supplied over 301.246 million vaccine doses to more than 100 countries.
Lessons learnt

- The continuous investments in healthcare research, development and manufacturing infrastructure by India over the years had laid a solid foundation for the rapid development and scaling up of COVID-19 vaccines. The adaptation of regulatory processes during the pandemic allowed for expedited vaccine development and approval while ensuring safety and quality standards. This flexibility enabled a swift response to the evolving situation and facilitated the availability of vaccines to the population in a timely manner. Further, the initiative demonstrates that fostering global solidarity in times of adversity plays a vital role in restoring and reviving socioeconomic activities in all countries and sectors.

References


Equity as a defence strategy in the Maldives

COVID-19 Dhifaau campaign for all

Coverage
This intervention aimed to vaccinate the entire population of the Maldives against the COVID-19 pandemic within 6 months. The scope of this effort was extended across the total eligible population (aged 12 years or older) of 452,798 individuals as of 2021 (1-3).

Background
In the Maldives, COVID-19 not only impacted the health of the population but also had wide-ranging social, economic and psychological consequences. The country launched an initiative at the national level, known as the ‘COVID-19 Dhifaau’ (COVID-19 Defence) campaign on 1 February 2021 (2). The sudden halt in tourism and economic activities during the COVID-19 pandemic affected their livelihoods, leading to job losses, wage reductions and increased financial strain. The Maldives had the largest proportion of foreign migrant labourers in South Asia, roughly one-third of the resident population, with an estimated 182,666 migrant workers in 2020, of whom an estimated 63,000 were undocumented and had to cope with economic hardship due to interrupted economic activities and lack of provision of social protection (4,5,6,7).

Summary of the approach
Maldives played a crucial role in protecting migrants and vulnerable communities from the pandemic by making efforts to provide equitable access to healthcare services, ensuring that the migrants received the same level of care as nationals. The Maldives implemented an inclusive approach to its vaccination campaign by focusing on vulnerable groups like elderly people, those who were immunocompromised, frontline workers, expatriates and undocumented migrants. The campaign’s success was attributed to the collaborations with the Maldives National Defence Force, Ministry of Education, WHO and UNICEF that helped in its implementation (1,2,8). Organizations such as the Maldivian Red Crescent (MRC) supported the Government by implementing the initiative of getting undocumented workers vaccinated (4).

- Accessible health care. Dedicated expat flu clinics and vaccination centres were established in several locations where migrants underwent testing, treatment and vaccination. A prioritization vaccination roadmap was developed in accordance with the WHO Strategic Advisory Group of Experts’ recommendations to first
provide vaccination to vulnerable communities. Vaccinations were provided free to everyone to increase coverage. Undocumented migrant workers were specifically targeted for vaccination registration (3,9).

- **Governance mechanisms.** The Maldives Government established a National COVID-19 Vaccination Steering Committee, Technical Advisory Group and logistics and data management clusters to centralize decision-making, streamline processes and foster collaboration among key stakeholders (8). Furthermore, a special committee, including civil organizations and migrant representation, was established to monitor and recommend policies targeted to migrant workers (6).

- **Overcoming language barriers.** To overcome linguistic barriers for migrant workers, a team of 23 healthcare professionals was mobilized from Bangladesh for a duration of two months. These professionals collaborated with local healthcare workers for the “COVID-19 Dhifaau” campaign. They enabled effective communication with migrant workers, especially those from Bangladesh, to facilitate vaccination (9).

- **Tourism promotion.** To reduce the financial strain on the locals and migrants working in the tourism and hospitality sector, the Ministry of Tourism implemented the “I’m Vaccinated” campaign to fully vaccinate the tourism industry workforce. The campaign, through social media activities and a dedicated microsite, provided the necessary information for vaccination, such as registration procedures and the latest health and safety guidelines, aiming to attract tourists by offering a safe travel destination (10,11).

**Fig. 12. ‘I’m Vaccinated’ campaign in resorts and tourist destinations**


- **Branding and communication.** The COVID-19 Dhifaau campaign used branding tools such as creating a strong and recognizable identity that instilled trust, confidence and a sense of unity among the population. Through multilingual
awareness strategies that utilized evidence-based targeted messaging across multiple communication channels, extensive monitoring of social media and the engagement of local influencers and healthcare professionals, consistent and accurate information was delivered about the vaccines (8). Social media campaigns were launched to reduce stigma, promote vaccine equity and acceptance and foster empathy through initiatives like the “Migrant Workers of Maldives” series, highlighting daily profiles of migrants (6). Moreover, health-care professionals conducted individual counselling sessions by providing a personalised approach to address vaccine hesitancy (8).

- **Strengthened healthcare infrastructure and training.** To respond to the demand for health-care services adequately, medical students were repatriated, retired health-care workers were returned to the workforce and volunteers were mobilized. All workers were trained in various aspects of vaccine administration to provide the staff with the necessary skills and knowledge to handle the campaign efficiently (8).

- **Effective data management systems.** The Maldives developed a specific COVID-19 vaccine database known as “Dhifaau”. This database was linked with the “Outbreak” system to ensure seamless data management for the vaccination campaign. Dhifaau served as a repository for tracking and monitoring the progress of the vaccination drive (8).

- **International support.** Finally, support from COVAX, UNICEF, WHO and countries such as Bangladesh, China and India played vital roles for the success of this campaign by providing technical support and vaccines (12).

**Results**

- By December 2022, around 88% of the eligible population had received the first dose and 85% had received the second dose, including migrant workers.

- By 28 April 2021, over 90% of the eligible tourism industry employees had also received the COVID-19 vaccine making the Maldives one of the first fully-vaccinated tourism sectors globally, aiding the resumption of tourism in the country (11).

**Fig. 13.** Vaccination update

<table>
<thead>
<tr>
<th>Vaccination Update (as of 31st December 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Dose</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>399 151</td>
</tr>
<tr>
<td>Total vaccinated</td>
</tr>
<tr>
<td>Percentage on chart among the vaccine-eligible population (≥12 years and above)</td>
</tr>
<tr>
<td>88.15%</td>
</tr>
</tbody>
</table>
Lessons learnt

- By addressing the specific concerns and challenges faced by undocumented migrants and tailoring the strategies and interventions to fit their circumstances, the campaign succeeded, leaving no one behind. Collaborations and partnerships with internal partners enhanced the efficiency, reach and impact of the vaccination programme.

References


Trailblazing new heights in vaccination, Himachal Pradesh, India

Achieving 100% double-dose coverage

Coverage

The intervention in Himachal Pradesh in India targeted a population of 7.5 million inhabitants scattered across its mountainous terrain. The State targeted 100% double-dose vaccination rates for COVID-19 among its entire eligible population (individuals aged 18 years or older) by the end of 2021 (1). The state placed special emphasis on safeguarding vulnerable populations residing amidst its peaks, including the elderly, individuals with disabilities, industrial workers and daily wagers.

Background

As Himachal Pradesh has a mountainous terrain with harsh climatic conditions, access to health care is limited, and COVID-19 vaccination uptake was extremely low. This problem was particularly relevant for vulnerable populations, such as elderly people and people with disabilities. Additionally, due to low vaccination rates among the general population, tourists were reluctant to visit the State, resultantly impacting the economy and the overall well-being of the population. Thus, the Government of Himachal Pradesh developed a strategy to increase vaccination uptake in the State to mitigate the spread of the virus, reduce severe illness and mortality and safeguard the well-being of its population.

Summary of the approach

The key goals and objectives of the intervention were to administer the COVID-19 vaccination to the entire eligible population despite its harsh climate, remote and hard-to-reach areas due to the mountainous terrain, and the need to build trust among residents in embracing vaccination.

- Har Ghar Dastak (a knock at every door). This campaign was launched in September 2021 with the aim of bringing vaccines to every doorstep. This approach specifically targeted people with disabilities, the elderly and those living in remote areas who could not access vaccines. This campaign’s success later led to its adoption by the Government of India for implementation at the national level in October 2021. A three-pronged approach was adopted to accomplish the objectives of the Har Ghar Dastak campaign.
Near-to-home COVID-19 Vaccination Services (CVC). This approach established CVCs in easily accessible locations such as community centres, resident welfare association centres, old age homes, panchayat buildings and schools, among others. By bringing vaccines closer to the communities, the State ensured that even the most remote areas could conveniently access vaccination services.

District-wise mopping-up drive. To ensure that no individual was left unvaccinated, the Government initiated a district-wise mopping-up drive to reach those unable to commute to vaccination centres. This involved the use of mobile vaccination vans, including district vehicles that were converted for this purpose.

Involving activists. The grassroots healthcare workers in India, also known as ASHA, and women employed to provide supplementary health-care in rural areas, called Anganwadi workers, were trained and advised to encourage individuals to get vaccinated and deliver vaccines directly to the doorsteps of the vulnerable and isolated communities.

Revised vaccination strategy. To optimise vaccine distribution and minimise wastage, the National Health Mission in Himachal Pradesh implemented a revised vaccination strategy. According to the new approach, vaccination sessions did not cater to specific age groups; instead, all individuals could register on the nationally used CoWIN vaccination portal to any slot with a health facility on all working days. These State Government-initiated drives encouraged districts to adopt strategies such as monitoring vaccinations through voter lists, cohort mobilization and resident mapping with the help of ASHA. ASHA were trained by the CoWIN-designated state nodal officers appointed by the Government of India to use mobile applications to collect door-to-door data to track the vaccination status of individuals. Additionally, the eVIN portal helped track the availability of vaccine stock, forecasting requirements so that the State Government could respond adequately, preventing both shortages and wastage.

Ensuring logistics support to healthcare workers. As the terrain was rugged and inaccessible, the Government made transportation arrangements for the health-care providers to reach every individual in the State. Despite geographical difficulties, the state depicted unwavering commitment to vaccinating 100% of its eligible population by authorizing the use of helicopters to fly health workers, medical teams and district officials to reach challenging and remote areas and ensure that no individual was left behind. The cold-chain storage capacity was also enhanced to prevent vaccine wastage.
Awareness campaigns and community engagement. The State Government spearheaded extensive awareness campaigns, dispelling misconceptions while emphasizing the crucial role of vaccination. Panchayat help desks were established to address queries and concerns. Through meetings, information sessions sharing data and active involvement of community leaders, influencers, and healthcare workers, Himachal Pradesh created a platform for open dialogue, providing individuals with the opportunity to express concerns and seek clarifications. Additionally, by highlighting the benefits of vaccinations, including the resumption of tourism – a vital livelihood in the state – the Government tried to address initial vaccine hesitancy in regions where cultural factors played a significant role.

Results

- Himachal Pradesh became the first state in India to achieve 100% vaccination coverage of the first dose to its eligible population (4).
- On 4 December 2021, the state achieved its target of administering two doses of COVID-19 vaccination to the entire eligible population of 5,377,820 and administered vaccination to approximately 5.39 million individuals (1).

Lessons learnt

- The empowerment of the healthcare workforce by mobilizing additional numbers and providing adequate training, mapping of vaccination status of residents and ensuring logistics and accommodation facilities in the remote areas helped to make this campaign a grand success. The whole-of-society approach with the involvement of...
government organizations, community leaders, ASHA, and several other stakeholders all played a vital role in reaching the hard-to-reach communities. The localized vaccination strategies and approaches streamlined the vaccination process, ensured better visibility of sessions and minimised the risk of vaccine wastage.

References


References


Conclusion

This compendium highlights the efforts made by member states, subnational governments and partners in the Region in implementing innovative, strategic and contextual interventions which helped them in combating the unprecedented COVID-19 global health crisis. The interventions and measures followed multipronged whole-of-government and whole-of-society approaches to achieve better results, protect people and mitigate the impact of the pandemic. Throughout this challenging period, Member States strived to develop evidence-based policies, strategies and plans to protect their populations. It was encouraging to note that they regularly adjusted these based on emerging knowledge and evidence.

Member States, sectors, different levels of government and partners showed unity and commitment in developing appropriate response strategies and implementing them on the ground. The continuous investment in the health sector and primary health care have demonstrated the importance of resilient health systems in combating health emergencies and maintaining delivery of essential health services.

Additionally, effective communication campaigns, initiatives for public awareness and addressing infodemics in collaboration with local communities, civil society and faith-based organizations were instrumental in promoting adherence to effective public health and social measures. The practices underscore the critical role of community engagement and grassroots initiatives for effective response to the pandemic.

Use of accessible digital platforms and networks played a stellar role in all aspects of COVID-19 response and continuity of essential health services. Moreover, by leveraging digital technologies and integrating multiple surveillance systems, Member States further improved response capabilities. Mobile apps, data analytics and other digital tools enhanced surveillance capacities and helped to ensure continuity of essential health services and safeguard populations’ health and well-being.

Member States made significant strides in expanding their testing capabilities, establishing laboratory networks, improving the quality of tests and strengthening diagnostic systems using initiatives such as genomic surveillance systems. To ascertain that all their citizens were equally tested for the COVID-19 virus, special focus was provided to vulnerable groups.

Given the disruptive nature of a health emergency like the COVID-19 pandemic, it is imperative for health systems to not only reassess and adjust their priorities for patients, such as hospitalization and ICU requirements, but also maintain the safe and effective delivery of other essential health services and public health functions, so that decades of gain are not lost.
The innovative interventions used by the Member States of the SE Asia Region for vaccination not only displayed the importance of strengthening vaccine production, building local manufacturing capacity, ensuring efficient supply chain management and providing adequate logistical infrastructure for achieving vaccination targets, but also provided valuable insights for future emergencies.

Moreover, the collaborative efforts among countries in the Region demonstrated the importance of regional cooperation in responding/tackling such pandemics. Through the exchange of information, resources and best practices, nations in the Region have been able to support each other in their COVID-19 response, setting a positive example for global health solidarity.

This exercise encourages us to institutionalize systematic mechanisms to document knowledge and establish collective learning systems. Learning from others with local and contextual adjustments to best practices, Member States will be better equipped to face future pandemics and health emergencies. By working collaboratively and remaining committed to evidence-based practices, we can collectively overcome such global health challenges and build a healthier, more resilient future for all.
Annex: Major criteria used to review practices

- Relevance
- Innovation
- Results and impact
- Effectiveness
- Efficiency
- Replicability and scalability
- Safety
- Gender equity and human rights-based approach.

The review process also considered other important factors like ease of implementation, improvements, geographical coverage, adoption by other countries, organization and local offices.
This compendium showcases exemplary practices adopted by member states and partners in the WHO South-East Asia Region from the onset of the pandemic until the end of 2022, which were implemented to respond to COVID-19 and maintain essential health services. This document highlights 18 practices as best cases and refers to 58 good practices adopted by the countries and partners. The document follows the response pillars of the COVID-19 Strategic Preparedness and Response Plan issued by WHO in 2021.

These practices provide adequate insight into how scarce resources and capacities can be better utilized during large-scale emergencies. This document offers numerous valuable references and can be a solid foundation for learning from each other and further strengthening national and sub-national pandemic preparedness and response capacities.