National Coordination of Pandemic Response Collaborative

Synthesis of Shared Learning

January 2022

Acknowledgments and Project Background

Project

The National Coordination of Pandemic Responses Collaborative (Collaborative) is an initiative of the Joint Learning Network for Universal Health Coverage (JLN) and the Health Systems Strengthening Accelerator (Accelerator) to foster experience sharing and collaborative learning around the challenges and successes with managing central coordination of a national response to the COVID-19 pandemic. The Accelerator is led by Results for Development (R4D) with support from Health Strategy and Delivery Foundation (HSDF) and ICF. The Accelerator, through a team led by Results for Development (R4D) with support from the Health Strategy and Delivery Foundation (HSDF), led the technical facilitation of this Collaborative with funding from the Bill & Melinda Gates Foundation (the Foundation).

About this brief

This brief synthesizes relevant evidence, participant country experiences, and lessons learned on national responses to the COVID-19 pandemic to highlight efficient and effective approaches that may be applied for health systems resiliency and improved pandemic preparedness. This brief may have the following applications:

- A guide to best and promising practices for countries managing an infectious disease pandemic
- A synthesis of early leadership and management actions countries can take to control the outbreak
- A summary of communication and engagement approaches leveraged by countries to increase the population reach of health and non-health measures

Acknowledgments

The authors acknowledge the many contributors across multiple countries, named in the next section of the report. We would like to thank the Foundation for funding the work of this Collaborative through its support to the Accelerator and the JLN. We also appreciate the contribution from the Exemplars in Global Health (EGH) program, which shared findings from the EGH in COVID-19 research sprints on the following topics: (1) Testing and surveillance (2) Essential health services (3) Vaccine readiness and implementation (4) Digital health tools. EGH research aims to capture key implementation nuances with near real-time documentation and analysis to provide public health decision-makers with actionable evidence and implementation strategies that can be contextualized to their settings.

Contributors

Bahrain
Jameela Al-Salman
Jaleela Jawad Sayed

Bangladesh
Syed Abdul Hamid
Atia Hossain
Md. Samiul Huda
Shahadt Hossain Mahmud
Subrata Paul
Fatema Zohara

Ethiopia
Melaku Abebe
Beza Aseffa
Wondwossen Eshetu
Abnet Zeleke

Kenya
Meboh Abuor
Isabel Maina
Stephen Muleshe
Samuel Nyingi
Nancy Njeru
Esther Wabuge

Mongolia
Uuganbayar Batmunkh
Munkhnasan Enkhtaivan
Tumurbaatar Luvsansambuu
Oyunkhand Ragchaa
Sodnomdarjaa Vaanchig-Arslan

Senegal
Cheikh Tidiane Athie
Aida Kanouté
Oumy Ndiaye
Aissatou Nomokho
Samba Cor Sarr

Exemplars in Global Health Program
Alice Namale
Steven Kabwama
Rhoda Wanyenze

Other contributors
Joseph Addo-Yobo (Ghana)
K. Madan Gopal (India)
Nneka Orji (Nigeria)

Technical Facilitation Team
Loriade Akin-Olugbade
Kaela Barna
Raquel Duarte Bessa De Melo
Camilla Ducker
Christine Ezenwafor
Amanda Folsom
Uchenna Gwacham
Agnes Munyua
Jongsu Ryu
Samba Sow

JLN Network Manager Team
Kamiar Khajavi
Sara Wilhelmsen

Contents

Executive Summary

The National Coordination of Pandemic Response Collaborative led by the Health Systems Strengthening Accelerator (Accelerator) and the Joint Learning Network for Universal Health Coverage (JLN) brought together multisectoral country teams for cross-country exchange and joint learning on coordination of COVID-19 pandemic responses between December 2020 and January 2022.

This document synthesizes the shared experience, lessons learned, and best practices from the collaborative's virtual learning engagements on strengthening leadership capabilities and functions for pandemic coordination and improved health system resilience to achieve universal health coverage (UHC). These lessons and best practices were supplemented by findings from parallel research conducted by the Exemplars in Global Health (EGH) on four thematic research sprints in the Democratic Republic of Congo (DRC), Nigeria, Senegal, and Uganda. Lessons and best practices coalesced around the following principles: (1) responsive leadership, (2) multisectoral collaboration, (3) deliberate community engagement and participation in the response, and (4) effective communication strategies. These principles are supported by robust data systems that provide high-quality data to inform evidence-based decision-making and adaptive approaches. The self-reflection and action planning tools (Annexes IV and V) developed for and used by collaborative members are shared in the annex as global public goods, along with highlights from the global knowledge base and gaps on national responses to pandemics.

The COVID-19 pandemic has continued to evolve and affect countries globally throughout 2021. The emergence of new strains, Delta and Omicron, has caused spikes in the number of infections and hospitalizations, and has forced countries previously on the path out of the pandemic to re-impose nonpharmaceutical interventions (NPIs). At the same time, countries also grappled with vaccine supply shortages, hesitancy, and misinformation which has prevented them from reaching their vaccination goals. These challenges and more were addressed through the Collaborative's events and activities, where six teams (Kingdom of Bahrain, Bangladesh, Ethiopia, Kenya, Mongolia, and Senegal) convened for joint learning and peer problem-solving. The teams each received tailored advice to address their most pressing pandemic-related challenges and developed action plans to navigate their countries out of the pandemic. The collaborative's work culminated in a final event in February 2022.

The primary audience of the brief is JLN members, members of national and subnational pandemic response teams and committees, policy makers and other government officials, non-government and civil society organizations, and private sector actors involved in national responses to pandemics. This document may interest other sectors managing the non-health COVID-19 pandemic response to learn more about multisectoral country approaches to managing the pandemic.

Context

The COVID-19 outbreak was first recorded in Wuhan, Hubei Province, China, in December 2019 and declared a pandemic in March 2020. Many health systems globally were unprepared and grappled with unprecedented challenges posed by this virus. Countries rapidly established or re-activated pandemic response teams to manage the crisis and coordinate their COVID-19 response. As a novel pathogen, guidelines and information emerged rapidly, with many countries seeking to learn from other countries' best practices and/or mistakes. The COVID-19 pandemic has reemphasized that globalization facilitates the spread of diseases across borders. As such, success in managing a global scale infectious disease requires collective effort and collaboration across health systems. Before the COVID-19 outbreak, country health security and related capability indices were largely drawn from assessments such as the Global Health Security Index and the Joint External Evaluations. In the wake of the pandemic, it became evident that these assessments are not sufficient predictors of success. Resources cataloged by the technical facilitation team of the collaborative on national coordination of pandemic responses are included in Annex 5.1.

Through various scoping exercises and country engagements during the first year of the pandemic, the technical facilitation team identified demand for cross-country collaborative learning and problem solving around the COVID-19 pandemic response, with a focus on the role of multisectoral teams in coordinating an effective response. Teams from six countries (Bahrain, Bangladesh, Ethiopia, Kenya, Mongolia, and Senegal) participated in the first Phase of learning activities between December 2020 and April 2021. The experiences are synthesized in this brief. In the second Phase between July 2021 and February 2022, the Kenya, Bangladesh, and Ethiopia teams reconvened to engage in action-oriented joint learning and collaborative problem-solving. In this Phase, implementation teams exchanged experience and lessons with their peers and a larger “community of learners” through three key events: a virtual event where they articulated their key challenges, problem statement, and vision statement, a peer learning session where they received targeted feedback on their challenges from the community, and a final culminating event to reflect on their learnings and journeys in the collaborative. This methodology facilitated participants’ ability to adapt and apply Phase I lessons to address specific challenges. The participating teams also received guidance from the technical facilitation team. They worked jointly with the facilitators to develop case studies on their experience and contribute to this final Synthesis of Shared Learning.

Throughout the second Phase of the collaborative, countries grappled with the emergence of new COVID-19 variants, Delta and Omicron. These variants, each more infectious than the last, added to the challenges the participating countries faced and elevated the need for quick and adaptive learning for an effective pandemic response. The swift and continued spread of the new strains was a sobering reality for countries worldwide, as the chances of overcoming the COVID-19 pandemic by year-end

vanished. These strains significantly altered the dynamic of the pandemic and further challenged countries to adapt their pandemic response strategies for the long term.

At the same time, as new variants were emerging, countries were working diligently to develop vaccine distribution plans, procure and deploy vaccines, and reach their vaccination coverage goals. Many countries faced vaccine supply shortages and delays in vaccine distribution. They increasingly found vaccine hesitancy to be a challenge, as their populations were plagued by misinformation and politicized media coverage. Challenges such as these were important points of discussion throughout the second Phase of the collaborative.

Institutional arrangements for coordinating COVID-19 responses

The COVID-19 pandemic met different countries at varying levels of preparedness. However, a common feature in most countries' responses was instituting a **national-level coordination mechanism** to facilitate the pandemic response. Collaborative members' national coordination mechanisms have four main core functions: (1) **policy-setting and decision-making** through the established command centers, (2) **operational coordination** of the response, (3) **information gathering/monitoring and evaluation,** and (4) **external communication**. Vertical and horizontal coordination across sectors and levels of Government is critical for the success of the pandemic response. This is exemplified in the countries' COVID-19 coordination structures detailed in Annex III. Similarities and differences in the country coordination mechanisms are summarized below.

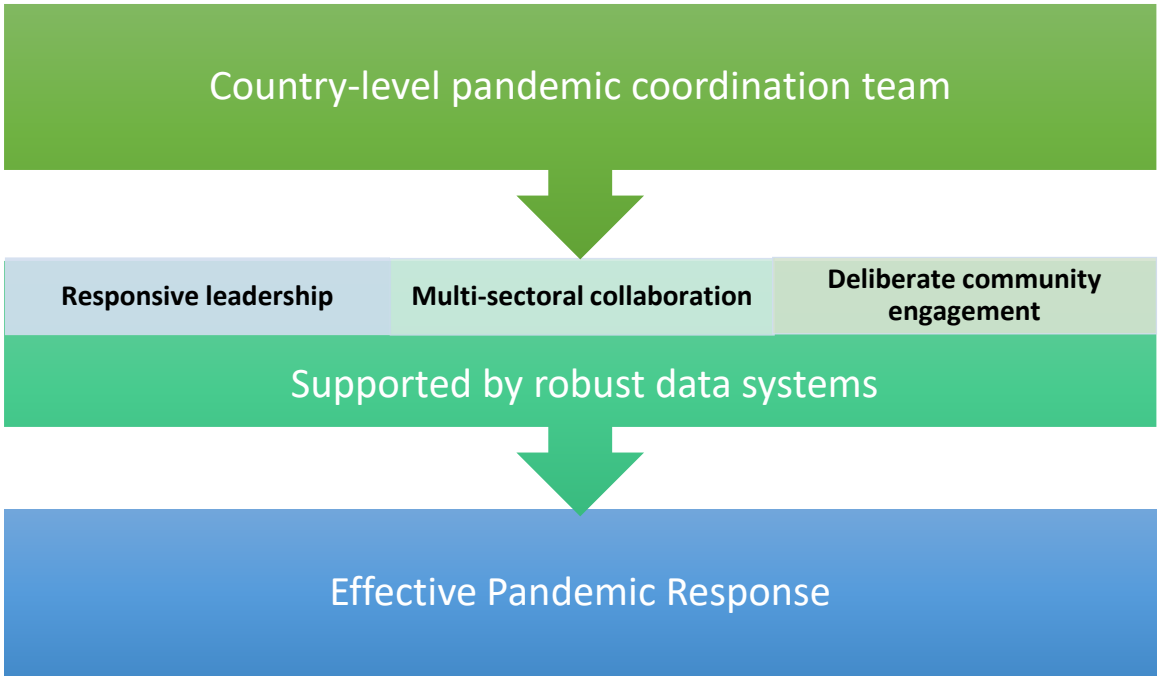
Table 1: Key Features of Collaborative Member Countries' COVID-19 Coordination Mechanisms (Similarities and Differences)

Similarities	Differences
Responsive Leadership and Political Will	
Across all countries, the coordinating mechanism had a **direct reporting line to the country's President or Prime Minister** or was established in the leader's office.	In **unitary systems of Government** (Bahrain, Bangladesh, and Mongolia), the coordinating mechanism provides the policy direction and oversees implementation in the chosen strategic priority areas. In **devolved systems of Government** (Ethiopia, Kenya and Nigeria), the national coordination mechanism provides overall policy direction while state/regional coordination mechanisms, which mirror the national coordination structure, have the autonomy to implement national policies at the local level.

Multisectoral and Multi-level Coordination	
Coordination mechanisms had **sub-groups, sub-committees, or task forces** leading the four main core functions of policy setting, operational coordination, information gathering, and external communication.	Bangladesh, Ethiopia, Kenya, Nigeria and Senegal constituted **regional coordination mechanisms** mirroring the national coordination structure to implement national policies at the local level. **Clear roles and responsibilities** for each of these units prevent overlaps in functions, minimize conflicts on responsibilities and provide a clear mechanism to cascade decisions from the national to the sub-national level. Coordination mechanisms should be set in place at **regional, district, and local levels,** for effective collection of information and dissemination of guidelines, policies, and resources.
Coordination mechanisms had **representation from different ministries and government agencies** representing other sectors	**Multisectoral coordination structures** in Bangladesh and Kenya included representation from the private sector and the devolved level of Government.
All countries set up a new coordination mechanism **linked to existing government agencies for disease surveillance and epidemic control**.	In Senegal, **coordination structures were inherited** from the 2014 Ebola outbreak and was already assimilated into the National Committee for Epidemic Management.
Deliberate Community Engagement	
Countries incorporate **community-level data** into their policy decision-making to enhance responsiveness to changes in the pandemic.	Some countries such as Bahrain have more significant **information technology** systems in place to aid in the collection of community-level data

Best practices and lessons learned on the coordination of pandemic responses

Collaborative members' experiences revealed that a successful pandemic response involves **well-synchronized multidisciplinary efforts** combined with **effective leadership, communication, evidence-based, collective decision-making, and a mechanism for continuous learning and adaption** of approaches and pathways to accommodate the dynamic nature of the COVID-19 pandemic. Insights from country experience coalesced around three key success factors for the effective coordination of pandemic response: (1) responsive leadership and strong political will, (2) multisectoral collaboration, (3) deliberate community engagement and participation in the response, and effective communication strategies. These principles are supported by robust data systems that provide high-quality data to inform evidence-based decision-making and adaptive approaches.



Responsive leadership and strong political will

Across many countries, including those participating in this collaborative, the coordination of the COVID-19 response was led by the Head of Government's office, elevated in line with the perceived significant threat of the virus to both public health and other sectors of the economy. A common factor for countries that mounted a well-coordinated response, such as Germany, Israel, and New Zealand, is the **commitment of the highest level of leadership** leading the response, the coordination of sectors, and leading the communication for the effort, including daily press briefings for the public. This leadership was necessary to cut across silos and barriers created across different sectors of Government to develop and implement a coordinated response. For example in the Kingdom of Bahrain, the COVID-19 response in Bahrain is spear-headed by His Royal Highness (HRH), the Crown Prince. The response is coordinated through the National Team for Combating COVID-19 (NTCC-19), headed by

the chairman of the Supreme Council of Health, and includes representation from all health agencies in Bahrain. The NTCC-19 works with both public and private stakeholders.

In South Korea, an exemplar of the COVID-19 pandemic response, the national response unit includes representation from the President's office, the Ministries of Health, Education, and Foreign Affairs, and the Korea Disease Control and Prevention Agency (KDCA) (Kim , An, Oh , Oh , & Lee , 2021). In Vietnam, the Government quickly developed a strategy to respond to the pandemic before the country recorded the first case. Vietnam's health system managers and other associated ministries developed and widely disseminated the national COVID-19 Response Plan and Technical Treatment and Care Guidelines. A clear strategic response structure was overlaid on the foundation of a one-party government, and the major response strategies and policies were made at the central level and executed through a top-down process (Nguyen , Tran, & Phan, 2021). While the Ministry of Health was primarily responsible for case management and quarantine, military personnel were responsible for quarantine at the borders. In Taiwan, the Central Epidemic Command Centre coordinates the response by various ministries, including the ministries of transportation, economics, labor, and education, and the Environmental Protection Administration, among others, to address the crisis (Wang , Ng , & Brook, 2020). The leaders of Bahrain, Taiwan, Vietnam, and South Korea all made bold, sometimes unpopular, nonpharmacological interventions (NPIs) such as mandatory quarantine, lockdowns, curfews, business and school closures, tracking financial data and individuals' movements. These measures limited personal freedoms, but resulted in halting the spread of COVID-19 and saving lives.

Responsive leadership of the COVID-19 response also facilitates effective monitoring of the implementation of measures, reviews of the response, and incorporation of lessons learned for an adaptive response to the pandemic. In Kenya, halfway through the first year of the pandemic, the Government held a conference to review the country's pandemic response and take corrective measures. The conference, led by the President, had representation from multiple sectors and county governments. Recommendations from the conference have been applied to improve Kenya's pandemic response.

Multisectoral engagement and collaboration

The COVID-19 pandemic is a health crisis that has impacted multiple sectors as borders closed, businesses were disrupted, and livelihoods dramatically altered. A multisectoral response with well-aligned objectives across sectors is vital for an effective pandemic response in which all stakeholders are aligned around a shared vision and collaborate to implement health and non-health measures. In Bahrain, the NTCC-19 helps harmonize the response by bringing together multiple government institutions, including the office of HRH, The Crown Prince, Ministry of Health, Ministry of Interior, Royal Medical Services of the Ministry of Defense, Salmaniya Medical

Complex, King Hamad University Hospital, primary care services, the National Health Regulatory Authority (NHRA), Public Health and the Center for Operations and Medical Equipment Directorate. The NTCC-19 leadership team ensures the implementation of a coherent strategy to fight COVID-19 across sectors.

In some countries, the COVID-19 coordination structure at the national level includes representation from entities at the sub-national level. This approach is particularly important in countries with devolved levels of Government where sub-national agencies have the autonomy to decide which measures to implement and how these measures will be implemented. In this case, the national-level coordination structure may be duplicated at the sub-national level with representation from all sectors and stakeholders at the regional/sub-national level. This situation adds a layer of complexity that requires more intentional coordination to align the visions at the national and sub-national levels, ensure consensus on measures, and streamline communication across levels of Government and the interface to the public.

In the Democratic Republic of Congo, a Multisectoral Response Committee led by the Prime Minister and with representatives across relevant ministries provides oversight of the response. The Ministry of Health is responsible for coordination with support from the Technical Secretariat, with members from academic partners, and an Advisory Committee, with members from private, non-government organizations, and academic sectors. Multisectoral engagement across levels of Government and partnerships, especially with donors, the private sector, academic institutions, and non-governmental organizations (NGOs), support funding, and critical supplies (EGH, 2021). Partnerships across sectors have contributed to the provision of test kits and supplies, lab personnel and healthcare workers training, COVID-19 surveillance personnel, and support for the emergency operations centre (EOC) at the central level (EGH, 2021).

In Ethiopia, the COVID-19 pandemic response is led by a multi-sectorial national task force chaired by the Vice Prime Minister and is directly accountable to the Prime Minister. The task force comprises the Ministry of Peace, Federal Attorney General, Ministry of Defense, Ministry of Foreign Affairs, Ministry of Health, and Ministry of Innovation and Technology. The group has sub-committees - communication, technology, diplomacy, security, and legal affairs - involving other relevant sectors. Similar coordination structures exist at the regional and sub-regional levels led by the regional presidents and sub-regional leadership, respectively.

In Kenya, the President established a National Emergency Response Committee (NERC) to develop responses and mobilize resources for combating COVID-19. Government ministries and the Council of Governors, which represents the sub-national level (counties) in Kenya, are part of NERC. County representation within the NERC ensures their voices are elevated to the national level, the diverse range of counties' concerns are addressed, and there is ownership and buy-in of NERC directives. The NERC is supported by technical task forces, including academics, development partners, line ministries, and county representation. These technical task forces review the available

evidence and provide recommendations to the NERC on appropriate responses to the pandemic. The counties also have Response Committees with stakeholders to implement measures or directives from the NERC. Clear roles and responsibilities for each of these units prevent overlaps in functions, minimize conflicts on responsibilities and provide a clear mechanism to cascade decisions from the national to the sub-national level.

Similarly, there were a clear delineation of the federal level task force and the state level organs in Nigeria. The President established the Presidential Task Force in March 2020 to coordinate the national COVID-19 response and transitioned to the Presidential Steering Committee (PSC) in April of 2020. The mandate of the PSC was to provide overall policy direction, guidance, coordination, and continuous support to the Public Health Emergency Operations Centre (PHEOC) and other ministries and government agencies involved in the response (EGH, 2021). Meanwhile, State Task Forces established in all 36 states (including the Federal Capital Territory) were set up when an index case was confirmed. These State Taskforces had the mandate to develop strategies and implement and mobilize stakeholders to ensure a multisectoral response to the pandemic at the state level (EGH, 2021).

Uganda activated the Public Health Emergency Operations Center (PHEOC) and National Task Force (NTF) in January 2020. The NTF is supported by a Scientific Advisory Committee with scientists from local universities. In late March 2020, after cases were identified in Uganda, the NTF entered emergency mode, and analogous groups were activated at the district level to guide the local response. At the national and district levels, committees were established to coordinate and provide guidance on service maintenance across pillars, including essential health services. For example, District Task Force sub-committees established on maintenance of essential health services worked with civil society organizations and bus companies to facilitate transportation of passengers and health workers to facilities and made decisions on how to effectively allocate health workers between frontline COVID-19 support and routine medical services (EGH, 2021).

Deliberate community engagement

Communities must be well informed and involved in the response to ensure their full cooperation and adherence to public health measures. Multi-medium, high frequency, proactive communication with communities helps check misinformation and creates a sense of partnership in combating the pandemic. Most countries adopted a multi-faceted communications approach involving print, audio-visual, digital, and social media. Helplines, websites, chatbots, and mental health telephone services were created for greater citizens' outreach and support. Bahrain's communication strategy, #Commit4Bahrain, aimed to engage citizens as partners in the response and give them a sense of ownership and responsibility to comply with measures. Bahrain was quick to implement a communication strategy with a dedicated site for citizens to access information on health and non-health measures, a toll-free line to access a health

provider in case of symptoms, a mobile application to book vaccination appointments, and regular media briefings.
Some governments leveraged existing social and religious structures to sensitize citizens, promote behavior change, and encourage adherence to public health measures to address this challenge.

In **Bangladesh** and **Senegal**, both predominantly Muslim countries, religious leaders were called upon as trusted voices and influencers when there was non-compliance to protective measures such as wearing face masks, use of hand sanitizers, and adherence to social distancing measures among most rural dwellers. They helped their communities understand the need to abide by public health measures and motivated significant attitude and behavior changes. More recently, in Bangladesh, the leaders have been influential in motivating the uptake of the COVID-19 vaccine.
In **Kenya**, the Government engaged households through trained community volunteers who were deployed to visit homes and educate people on topics like proper hand washing, cough etiquette, social distance, amongst others. This approach was deployed concurrently with mainstream and social media to ensure wide reach. Community volunteers reached 67% of households in Kenya with public health prevention messages. One of the key challenges the community volunteer approach encountered was the resource-intensive nature of the strategy, which required a large amount of funding and trained human resources.
To aid response against new strains, governments also need a robust community-level response strategy. **Governments must prioritize the decentralization of COVID-19 taskforces to the community level, where they are better equipped to collect information, and work with the local population.** This is specifically important for vaccine-related initiatives and enhancing vaccination campaign success. To support the development of these community-level multisectoral taskforces, Government can proactively put together tool kits for local authorities to support their efforts to engage with communities and open the conversation about vaccination. These resources should be tailored to the community, visually appealing, and available in multiple languages. Additionally, government can proactively source contact persons from different agencies and sectors for local leaders to connect with and encourage network building and communication between them.

Robust information technology systems to inform the public and generate high-quality data for evidence-based decision-making

A **well-integrated information technology system for evidence-based decision-making and accurate, timely data** is critical for coordinating the pandemic response effectively. To coordinate the flow of information between the two government levels and overcome silos, **Kenya** harmonized data collection by creating a clear standard operating procedure on the indicators to be collected and reported daily. A dashboard was developed through which counties can upload this information. The dashboard is also accessible to national and county-level stakeholders. With this dashboard, decision-makers had timely access to national and county-level data on the pandemic

that is useful to the NERC and county response committees. This data was also available to the public and disseminated through media briefings on the status of the pandemic. **In the DRC, Nigeria, Senegal, and Uganda, the Integrated Disease and Surveillance Response (IDSR) system was used to report on multiple diseases of interest,** providing information to decision-makers weekly. The IDSR system was specifically leveraged as a foundation for COVID-19 surveillance in these countries. In Senegal, electronic versions of the tools are in use at the community level, which aggregates at the district, regional, and national levels (EGH, 2021).

The global literature confirms that **leaders need high-quality, reliable, and timely data and must practice evidence-based decision-making**. After the SARS and MERS outbreaks in **Taiwan and South Korea**, both countries instituted changes to boost their public health emergency and preparedness. The national health insurance databases were integrated with immigration and customs databases to enable big data analytics. By integrating these systems, the governments generated real-time alerts during clinical visits based on travel history and clinical symptoms to aid case identification (Wang , Ng , & Brook, 2020) (Kim , An, Oh , Oh , & Lee , 2021).

Mobile phone applications were used to communicate with the public, facilitate contact tracing, and track quarantined individuals. Taiwan used QR code scanning and online reporting of travel history and health symptoms to classify travelers' infectious risk level based on flight origin and travel history in the past 14 days. Similarly, credit card history, CCTV recordings, and mobile GPRS data were leveraged for contact tracing in South Korea (Kannan, Park, & Cho Hyunjin, 2021). The Government also proactively identified sources of misinformation through the Korea Communications Standards Commission with cooperation from major websites like Google and Facebook (Kim , An, Oh , Oh , & Lee , 2021) to ensure the public had access to timely and accurate information.

The Kingdom of Bahrain prioritized establishing an integrated system to gather all data on positive COVID-19 cases. The system allows the Government to prepare daily reports and analysis for data-driven decisions. The National Taskforce manages the information system to Combat COVID-19. This task force established a "war room" where multiple stakeholders are brought together to coordinate the pandemic response. Moreover, the Kingdom of Bahrain utilizes an app (BeAware) to track vaccination statuses, relay daily reports, and inform the public of resumption or suspension of activities.

Kenya utilizes geographic information systems (GIS) to gather, analyze, and visualize spatial data on COVID-19 for better decision-making. The Ministry of Health uses GIS to create online dashboards of COVID-19 cases, map distances for residents to reach health facilities, and estimate travel times to hospitals.[i] This information is vital for the Multisectoral National COVID Task Force to make informed decisions. Information is then cascaded to multiple subcommittees that manage the disbursement of the central pandemic response fund.

Additional insights from participating countries

Governments must help populations balance economic pressures

The COVID-19 pandemic has been both deadly and costly. It slowed productivity, decreased spending, increased unemployment, heightened debt, and bankrupted many businesses. In low-and-middle-income countries (LMIC), the pandemic began reversing important poverty reduction and development achievements. As the spread of the virus and its variants put a strain on fragile health systems, citizens experienced malnutrition and food insecurity; governments implemented public health measures with high economic costs such as lockdowns; the closure of schools and universities created an education crisis; inequality rose. Populations faced high financial stress, and it became a challenge to comply with public health measures. **Some governments recognized the economic challenge and adopted policies to support their citizens financially to mitigate the impact of the pandemic on their economies.**

In **Bangladesh**, the Government responded to the economic and social crisis by approving over 20 stimulus packages to increase public expenditure, widen the social safety net, and increase monetary supply in a year. The Government prioritized support to small business owners, banks, low-income families, informal sector workers, healthcare personnel, and workers in the manufacturing sector. The stimulus packages included loans and cash payments as well as free healthcare, food, medicine, and books for students. The Government subsidized some businesses and encouraged collaboration between sectors to maximize available resources. For instance, university students whose classes were canceled were redeployed to support the agriculture sector. The Government of Bangladesh demonstrated the importance of good governance, resourcefulness, and responsiveness to new information and priorities in different phases of the pandemic. As the health crisis became an economic crisis, the Bangladeshi Government adopted an approach to protect citizens from financial ruin and ensure continued economic activity.

Building on existing systems helps accelerate the deployment of the vaccine

The Pfizer-BioNTech vaccine was the first vaccine approved for emergency use in December 2020, nine months after the World Health Organization declared COVID-19 a pandemic. Bahrain was the second country to approve it for local use. As of April 2021, at least six other vaccines have been approved for emergency or regular use in different countries. Despite an increase in vaccine options, **vaccine deployment has been challenging due to production, cost, transport, storage, and quality control issues** that have hindered efforts to ensure equitable distribution of vaccines across and within countries. These issues need to be addressed to make greater progress toward ending the pandemic, particularly in LMIC.

In **Bahrain**, the Government had the leadership, organizational, technical, and logistical capacities to coordinate an effective vaccine deployment strategy. A vaccination campaign was launched early to encourage a large portion of the population to get

vaccinated in a clinical trial. HRH The Crown Prince participated in the vaccine clinical trial and was vaccinated publicly. Several high-profile figures followed suit. The National Health Regulatory Authority quickly approved five vaccines to give citizens and residents many choices. Citizens and residents can book vaccine appointments on the Ministry of Health's website or the "BeAware" mobile app, which was developed to facilitate contact tracing and improve communication between the population and the Government. The Government of Bahrain also maintains a hotline to keep the population informed and address vaccine acceptance, misinformation, and access issues. As a result, Bahrain has achieved a high rate of COVID-19 vaccination.

The COVID-19 Vaccines Global Access (COVAX) initiative and the Africa Centers for Disease Control and Prevention provided the first vaccines in Kenya. The National COVID-19 Vaccine Deployment and Vaccination Steering Committee and National COVID-19 Deployment and Vaccination Task Force are coordinating the local vaccine roll-out. They intend to vaccinate 30% of the population by June 2023. The Government is using a phased approach due to the limited availability of vaccines. In Phase 1, which ended in June of 2021, healthcare worker vaccination was prioritized over other population groups. Healthcare workers registered for the vaccine online, and data collected from this site fed into a national dashboard to track national vaccination rates and vaccine stocks. In Phase 2, other vulnerable populations (the elderly and others at risk of developing a severe illness) received the vaccines. In phase 3, hospitality and the tourism industry staff will be prioritized to allow the country to open its tourism industry, which is critical for the economy. The tourism and hospitality sector is a large source of employment and the country's largest non-agricultural foreign exchange earner.

In Ethiopia, the Ministry of Health has partnered with stakeholder organizations to enhance the Government's capacity to reach, educate, and open dialogue with the public on vaccination. For example, the Government is working with the Interreligious Council of Ethiopia to enhance its effort to address vaccine hesitancy. Cross-sectoral partnerships such as this allow the Government to tap into the benefits of other sectors. Religious organizations can meaningfully connect with their consumers, making them a logical partner for governments looking to convince their populations of vaccine safety and efficacy. Religious organizations can also play a significant role in vaccination campaigns by developing their own marketing materials or elevating the Government's communications efforts. Collaboration with different sectors is also necessary to distribute vaccines. By having existing partnerships in place, the Government of Ethiopia can more easily develop plans and initiatives in the future.

Countries are better prepared to respond to new COVID-19 variants

Countries can utilize their COVID-19 response structures to combat the emergence of new COVID-19 variants. The Delta variant was first detected in India in December 2020 and quickly spread around the globe. Delta was twice as virulent and more likely to hospitalize infected individuals than the previous strain (Katella, 2021). The Omicron strain was later detected in November 2021 in Botswana with a virulence two to three

times that of Delta but with a lower percentage of infected individuals needing to be hospitalized.[ii] The spread of new strains increases the number of infections, strains healthcare resources and creates political and social unrest. Governments must be able to quickly identify and track the spread of new strains, coordinate their taskforces to establish updated protocols, manage public concern, and notify the public of policy changes. This requires extensive coordination and management from the Government which is supported by established coordination structures and policies.

In October 2021, Implementation Teams from Kenya, Bangladesh, and Ethiopia convened to discuss their responses to the Delta strain of COVID-19, their vaccination plans, and finalize their Phase II action plans. The teams all identified increasing their vaccination rate as a key strategy to combat the continued development of COVID-19. However, they have struggled to overcome vaccine hesitancy and operational challenges. In Ethiopia's action plan development session, participants learned about South Korea's National Health Insurance Center that collects individual vaccination status, date, and injection time. This allows Korea to measure vaccination rate progress carefully, inform policy decision-making, and help hasten response time to changes in the COVID-19 virus. This is an example of why countries need sufficient data collection mechanisms for data-driven decision-making. Moreover, robust data collection mechanisms are also required to identify new strains. South Africa's significant virus sample testing allowed them to identify the new COVID-19 strain, Omicron, quickly. This allowed them to swiftly initiate a scientific response and alert the global community about the new strain.

To effectively respond to new COVID-19 variants, countries must be able to enforce NPIs such as quarantining, social distancing, and mask-wearing. In the Collaborative's October virtual event, the community of learners discussed the need for Government to have sufficient capacity to rapidly modify policies related to NPI, implement them, and inform the public about changes. Ministries of Health and their agency equivalents are typically key stakeholders in developing NPI policy changes and leading their implementation. However, these agencies do not typically have the legal authority or capacity to enforce changes. Ministries must have strong coordination with law enforcement agencies such as the Attorney General Office, the Police, and other security-related agencies. Close coordination between these stakeholders will maximize NPI interventions to reduce COVID-19 infections.

This pandemic response can help build resilience for the next crisis

Governments need adaptive approaches because pandemics can evolve in unexpected and unpredictable ways. Taiwan and South Korea have demonstrated how to build resilience over time by creating institutions and systems that prepare them to respond to the next epidemic. After the SARS outbreak in 2004, the Taiwan government established the National Health Command Center (NHCC). This disaster management center focuses on large-outbreak response and acts as the operational command for direct communications among central, regional, and local authorities. The NHCC

unified a central command system that includes other allied disease control agencies (Wang , Ng , & Brook, 2020).

Israel leveraged adaptive approaches to quickly roll out their vaccination program and attain herd immunity, allowing them to safely re-open their economy. Israel used its well-developed information systems and adapted its comprehensive population-based childhood web-based immunization registry to support the COVID-19 vaccine campaign. They took advantage of the single unique identifier for each Israeli resident that is used in all health care facilities. The registry allows follow-up and assessment of post-vaccination adverse events and provides real-time vaccine effectiveness data (McKee & Rajan, 2021).

In the Democratic Republic of Congo (DRC), COVID-19 emerged when an Ebola Viral Disease (EVD) epidemic was ongoing in the Eastern part of the country. DRC repurposed the EVD incident management structure to form a Multisectoral Response Committee headed by the Prime Minister and with representatives across relevant ministries (EGH, 2021).

Leveraging learning and infrastructure from previous outbreaks (Lassa fever, Ebola, cholera, and monkeypox), Nigeria's Centre for Disease Control established a multisectoral National Coronavirus Preparedness Group in January 2020 with representatives from the Nigeria Centre for Disease Control, Port Health Services, and Federal Ministry of Health, among others before the first case was reported in Nigeria. The PHEOC structure and operations built on the Incidence Management System (IMS) used in the 2014 Ebola outbreak was activated across seven major pillars: laboratory, case management, risk communication, logistics, point of entry, and coordination (EGH, 2021). This was also a multi-stakeholder effort involving UNICEF, the Clinton Health Access Initiative, and the WHO.

In Senegal, the coordination structures were inherited from the 2014 Ebola outbreak and included the National Committee for Epidemic Management (CGNE) (EGH, 2021). CGNE is parallel to the presidential task forces set up in other countries, and it coordinates across sectors, including NGOs, academic institutes, and private companies. Senegal also activated its Public Health Emergency Operations Center (COUS) in March 2020. Incident Management Systems (IMS) were set up in all 14 regions in addition to the national IMS. Further, coordination structures were set in place at regional, district, and local levels (EGH, 2021).

Conclusion

The Collaborative presented an opportunity for knowledge exchange and learning as countries managed different stages of their pandemic response. Participants in the Collaborative valued the opportunity to share experiential knowledge and receive peer feedback and problem-solving support while coordinating a rapidly changing COVID-19 outbreak response.

Three countries in particular – Bangladesh, Ethiopia, and Kenya – received tailored feedback and engaged in action-oriented learning to address their most pressing COVID-19 coordination challenges, with support from the collaborative's technical facilitation team and Community of Learners. The three implementation teams participated in a series of virtual peer-learning sessions that demonstrated the value of joint learning and enhanced the countries' ability to respond to future pandemics. The collaborative's work culminated in a final event in February 2022 where participating country implementation teams and the Community of Learners gathered to share their key learnings and reflect on their learning journies. All collaborative products are available on the JLN and Accelerator websites to support ongoing COVID-19 and future pandemic response efforts.

Bibliography

EGH. (2021). *Exemplars in COVID-19 response.* Exemplars in Global Health. https://www.exemplars.health/emerging-topics/ecr

Hosany, A. F., Ganesan , S., Al Memari, S., Al Mazrouei , S., Ahamed, F., Koshy, A., & Zaher, W. (2021). Response to COVID-19 pandemic in the UAE: A public health perspective. *J Glbo Health, 11*(0305). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8005306/pdf/jogh-11-03050.pdf

Kannan, N., Park, H., & Cho Hyunjin. (2021, March 25). *Primary Health Care Financing and Payment: Lessons and Best Practices from the COVID-19 Pandemic.* Retrieved from Joint Learning Network: https://www.jointlearningnetwork.org/wp-content/uploads/2021/03/RepublicofKorea-JLNPHCFinancingandPaymentCaseStudies.pdf

Kim , J.-H., An, J. A.-R., Oh , S. J., Oh , J., & Lee , J.-K. (2021, March 5). *Emerging COVID-19 success story: South Korea learned the lessons of MERS.* Retrieved from Exemplars in Global Health: https://www.exemplars.health/

McKee , M., & Rajan, S. (2021). What can we learn from Israel's rapid roll out of COVID 19 vaccination? *Isr J Health Policy Res, 10*(5).

Nguyen , T. V., Tran, Q. D., & Phan, L. T. (2021). In the interest of public safety: rapid response to the COVID-19 epidemic in Vietnam. *BMJ Global Health*, 6:e004100. doi:doi:10.1136/ bmjgh-2020-004100

Wang , C. J., Ng , C. Y., & Brook, R. H. (2020). Response to COVID-19 in Taiwan: Big Data Analytics, New Technology, and Proactive Testing. *JAMA, 323*(14), 1341–1342. doi:doi:10.1001/jama.2020.3151

Annexes

Annex I: Summary from the review of literature on the global knowledge base

Our literature review in September 2020 highlighted challenges countries faced coordinating COVID-19 testing, containment, and treatment. Assessments such as the Global Health Security Index and the Joint External Evaluations had limited predictive value for how this novel pathogen may impact their health system[ii].

While it was too early to rank country performance in responding to the pandemic at this point, countries sought tested solutions and emerging insights to guide their response to this new pathogen. The World Health Organization played a critical role in providing useful guidelines and frameworks to aid country preparedness and initial response to the pandemic. Having country-level coordination as the first of nine pillars of the WHO COVID-19 strategic Preparedness and Response plan[iii] underscores the importance of an effective coordination in shaping the overall country response to the outbreak. The inadequate outcomes of the 2015 South Korean response to the Middle East respiratory syndrome (MERS)[iv] among others serve as eaxamples of how poor coordination could lead to ineffective responses.

Due to proximity to China, countries in Asia were among the first countries to experience the COVID-19 pandemic and demonstrated several lessons for other countries as they prepared for their response. South Korea mounted an impressive response which relied heavily on the learning and epidemic response structures strengthened by the MERS outbreak. South Korea was able to quickly flatten the epidemic curve without closing businesses or shutting down their economy like other high-income countries. By leveraging public-private partnerships, developing diagnostic kits even before the first recorded case and ensuring accessibility of testing South Korea maintained a high testing rate. They also leveraged several innovative strategies including GPS tracking, integrated data systems, and severity risk assessment system to aid containment and treatment[v]. Similarly, in Vietnam the insights from the severe acute respiratory syndrome (SARS) outbreak in 2003 and the subsequent outbreaks of avian influenza (2004 – 2010) shaped their approach to testing, containment, and treatment in the early days of the pandemic[vi]. To achieve the quick containment of the initial outbreak, Vietnam deployed a targeted approach to testing, and had a proactive comprehensive contact tracing mechanism targeting an impressive three degrees of contact[vii].

Prior to the initial convening of the collaborative, several countries globally were still bracing for impact while others were working to execute their country strategic plan in the first few months of their country outbreak. Countries sought to learn lessons from settings which appear to have done better by indices such as mortality rate, number of tests per population, rate of spread etc. Due to the complex nature of the pandemic, it was difficult for experts to assess country performance at this point and available assessment frameworks utilized different yardsticks.

The Fischer et al., (2020) framework suggested seven domains for assessing national performance in responding to the pandemic, all of which require an effective coordination of multiple stakeholder groups and actors. These domains include:

1. Ability to detect and break transmission chains.
2. Ability to minimize deaths and severe complications.
3. Minimize hospital-acquired COVID-19.
4. Fiscal support for individuals and companies.
5. Maintenance of food and medicine supply chains
6. Protection and support for vulnerable and neglected populations in the community
7. Maintenance of usual health services

To identify emerging success stories in the fight against the pandemic, Exemplars in Global Health (EGH) utilized indicators within three domains: Ability to detect, contain and treat infected patients (see table 1). They also explored strategies and qualitative insights emerging from three countries considered to be successful in responding to the early Phase of the pandemic in their respective countries.

Table 2: Exemplars in Global Health Assessment Domains

Prevention	Detection	Containment	Treatment
	Test per capita	Cases per capita	Case fatality rate
	Test per confirmed case	Deaths per capita	
	Test per confirmed deaths	Deaths doubling time	

In the earliest known multi-country assessment of the response to the Coronavirus pandemic in October 2020, Yicai Research Institute, Yicai Global and the Pan-Asia Research Institute of Digital Economy identified five distinguishing factors for the top performing of the 108 countries assessed for their national response to the pandemic[viii]. These factors include:

- A swift response and timely warning
- Established national-level special institutions to coordinate epidemic prevention and control efforts
- Effective implementation of complete quarantine measures to cut off the source of infection
- Effective supply of medical supplies and improving testing capacity and treatment levels
- Providing prompt, accurate and transparent disclosure of information.

Other factors associated with early success of COVID-19 response and economic recovery were:

- Effectiveness of COVID-19 containing (suppression) measures – lockdowns, social distancing, and quarantine.
- Timing of policy institution and level of public cooperation
- Leveraging digital technology in response and coordination
- Well-coordinated economic bailout plans (increased public spending, tax reliefs, liquidity support etc.)
- Viable economic recovery plan which weighs the trade-offs between health and economic policies.
- Effective international cooperation

The table below summarizes best practices on national coordination from DRC, Israel, South Korea, Taiwan, the United Arab Emirates (UAE) and Vietnam from available literature.

Country	Information of the effective coordination of the national COVID response	References
Democratic Republic of Congo (DRC)	DRC is plagued by chronic armed conflicts, and internally displaced persons. DRC has had 11 Ebola Virus Disease (EVD) outbreaks since 1976. Over time, DRC has developed institutional infrastructure to identify and respond to epidemics, with a public health surveillance system based on Integrated Disease Surveillance and Response (IDSR) framework which monitors reporting of over 20 diseases. COVID 19 emerged when EVD was ongoing in the Eastern part of the country. DRC repurposed the EVD incident management structure to form a Multisectoral Response Committee headed by the Prime Minister. Multisectoral engagement across levels of Government and partnerships, especially with donors and NGOs, supported funding and critical supplies. Partnerships across sectors contributed to provision of test kits and supplies; training of lab personnel and healthcare workers; training for COVID-19 surveillance personnel and support for the emergency operations centre (EOC) at the central level with regular publication of a COVID-19 Epidemiological Bulletin. Screening procedures were built on existing EVD screening infrastructure enabling a quicker roll out of the testing and surveillance for COVID 19.	DRC Overview. Research sprint: Exemplars in Global Health
Israel	"Additional factors that have helped Israel achieve relatively high rates of vaccination include early access to a steady supply of vaccines, a tradition of	"Lessons In COVID-19 Vaccination

	periodic emergency preparedness exercises that included well-trained community-based health care providers, and highly developed electronic health records systems capable of both identifying high-risk persons and reaching out to them in a seamless fashion." "On December 16, 2020, Israel's Ministry of Health decided that the initial target groups for vaccination would be people ages 60 and older, nursing home residents, other people at high risk due to serious medical conditions, and frontline health care workers. The responsibility for vaccinating each of these groups was also clearly defined at that time. Israel's four competing nonprofit health plans were assigned the primary responsibility for vaccinating the general population older than age 60 and people at risk due to preexisting medical conditions. Responsibility for vaccinating nursing home residents was assigned primarily to Israel's national medical emergency services organization—Magen David Adom. Responsibility for vaccinating frontline health workers was assigned to the hospitals and health plans with whom they work. Consequently, everyone in the target groups knew exactly who was responsible for vaccinating them." "One of the other takeaways is the importance of central planning and guidance in pandemic response. In Israel, the state has central authority on health care policy making (especially on vaccine policy and prioritization), and delivery and local authorities play only a limited role."	From Israel" by Bruce Rosen, Sarah Dine and Nadav Davidovitch published by Health Affairs (here)
Israel	"One obvious factor in Israel's success has been the presence of a mass vaccination plan. [...] While other countries focused initially on the acquisition of the stocks of vaccine, it is now apparent that many failed to understand the importance of putting in place all of the structures and processes necessary to move the vaccines from warehouses into people's arms. [...] Crucially, these elements of a complex system are not self-organising. Somebody needs to be in charge with a clear vision of what they want to achieve." "A second consideration is the high degree of preparedness, not just for a pandemic, but for other threats to health."	McKee, M., Rajan, S. What can we learn from Israel's rapid roll out of COVID 19 vaccination? Isr J Health Policy Res 10, 5 (2021). https://doi.org/10.1186/s13584-021-00441-5

	"Again, Israel has an advantage that is not available to some other countries, in that it has very well developed information systems, so that the different organisations involved in vaccination can identify those for whom they are responsible and follow them up as necessary. Notably, Israel is one of the few countries with a comprehensive population-based childhood web-based immunization registry. The platform of the national registry was rapidly adapted to the COVID19 vaccine campaign, taking advantage of the single unique identifier for each Israeli resident that is used in all health care facilities. The registry also allows follow up and assessment of post vaccination adverse events as well as providing real-world vaccine effectiveness data." "Again, Israel has the advantage of a cadre of well-trained community nurses with long experience in vaccination."	
South Korea	"Building on its experience handling Middle East respiratory syndrome (MERS), South Korea was able to flatten the epidemic curve quickly without closing businesses, issuing stay-at-home orders, or implementing many of the stricter measures adopted by other high-income countries until late 2020. It achieved this success by developing clear guidelines for the public, conducting comprehensive testing and contact tracing, and supporting people in quarantine to make compliance easier." "After its flawed response to a MERS outbreak in 2015, the Government made 48 reforms to boost public health emergency preparedness and response. In addition, a well-functioning national health insurance system, ample human resources and infrastructure, and constructive relationships between key institutions—such as the president's office, the Ministries of Health, Education, and Foreign Affairs, and the Korean Centers for Disease Control and Prevention, which was renamed the Korea Disease Control and Prevention Agency (KDCA), during the pandemic—enabled an extraordinarily decisive response to the pandemic." "In September 2020, the Korean CDC, previously under the Ministry of Health and Welfare, transitioned to a stand-alone agency called the Korea Disease Control and Prevention Agency (KDCA), with increased	"Emerging COVID-19 success story: South Korea learned the lessons of MERS" by June-Ho Kim, Julia Ah-Reum An, SeungJu Jackie Oh, Juhwan Oh and Jong-Koo Lee (Exemplars in Global Health) published here on March 5, 2021

	staffing. KDCA releases daily reports that not only outline the raw numbers (e.g., cases, deaths, patients by severity), but also identify the location and case counts by different clusters and remaining health system capacity such as bed counts in intense care units." Ensuring citizen compliance/Supporting citizens: "South Korea has maintained a focus on mental health throughout the pandemic, creating hotlines and recordings for those in isolation as early as January and maintaining a national psychological support team." "South Korea expanded its usual workforce of Epidemic Intelligence Service (EIS) officers by quickly training staff at approximately 250 local public health centers, hiring 300 private epidemiologists, and leveraging staff at 11 non-governmental organizations that train and support EIS officers. This multi-level approach was effective, with the veteran EIS officers conducting the more difficult investigations in large clusters, and health facilities and temporary staff handling smaller clusters including families." Communication/Ensuring citizen compliance: "Throughout the pandemic, information on proper mask-wearing and distancing was widely shared, and the Government worked to find sources of misinformation. When misinformation was identified, the Korea Communications Standards Commission addressed the issue with cooperation from major websites like Google and Facebook." "Culturally and legally, South Korea is more tolerant of personal data-sharing, and its success has been heavily dependent on its ability to rapidly scale up technological solutions." Balancing economic pressures: "South Korea faced significant economic disruption, however, including large job losses. The Government responded by providing subsidies to businesses for payroll and to unemployment insurance and low-interest loans to low-income job seekers. The Government also lowered insurance premiums for social safety net programs for individuals and businesses. All households, regardless of income, received a disaster relief payment of KRW 400,000 (US$344) for single-person households, KRW 600,000 (US$516) for two-	

	person households, KRW 800,000 (US$688) for three-person households, and KRW 1 million (US$859) for households with four or more members."	
Taiwan	Learned from response to SARS epidemic in 2003 – the country had a national public health response mechanism in place "Taiwan leveraged its national health insurance database and integrated it with its immigration and customs database to begin the creation of big data for analytics; it generated real-time alerts during a clinical visit based on travel history and clinical symptoms to aid case identification." "It also used new technology, including QR code scanning and online reporting of travel history and health symptoms to classify travelers' infectious risks based on flight origin and travel history in the past 14 days." "In 2004, the year after the SARS outbreak, the Taiwan government established the National Health Command Center (NHCC). The NHCC is part of a disaster management center that focuses on large-outbreak response and acts as the operational command point for direct communications among central, regional, and local authorities. The NHCC unified a central command system that includes the Central Epidemic Command Center (CECC), the Biological Pathogen Disaster Command Center, the Counter-Bioterrorism Command Center, and the Central Medical Emergency Operations Center." "On January 20 [2020], while sporadic cases were reported from China, the Taiwan Centers for Disease Control (CDC) officially activated the CECC for severe special infectious pneumonia under NHCC, with the minister of health and welfare as the designated commander. The CECC coordinated efforts by various ministries, including the ministries of transportation, economics, labor, and education and the Environmental Protection Administration, among others, in a comprehensive effort to counteract the emerging public health crisis." "In addition to daily press briefings by the minister of health and welfare the CECC, the vice president of Taiwan, a prominent epidemiologist, gave regular public service announcements broadcast from the	Wang CJ, Ng CY, Brook RH. Response to COVID-19 in Taiwan: Big Data Analytics, New Technology, and Proactive Testing. JAMA. 2020;323(14):1341–1342. doi:10.1001/jama.2020.3151

	office of the president and made available via the internet." (local champion is respected and an expert)	
UAE	"The emergency response system of the UAE is managed by National Crisis and Emergency Management Authority (NCEMA) and the UAE government was vigilant in issuing the first alert of the new coronavirus outbreak, even before it was declared by WHO as a public health emergency of international concern." *Effective and efficient risk communication using new technologies:* • coronavirus helpline established by the Ministry of Health and Prevention (MoHAP) • chatbot service established by MoHAP called "Virtual doctor for COVID-19. • "Doctor for every citizen" app provides COVID-19 related information and services • The "Weqaya" platform by NCEMA enhances awareness among the public on the ongoing COVID-19 public health crisi • The ALHOSN UAE app is used for COVID-19 tests • The StayHome app for quarantined and isolated patients • The Government created a hotline for mental health counselling	Al Hosany F, Ganesan S, Al Memari S, Al Mazrouei S, Ahamed F, Koshy A, Zaher W. Response to COVID-19 pandemic in the UAE: A public health perspective. J Glbo Health 2021,11:0305 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8005306/pdf/jogh-11-03050.pdf
Vietnam	"Effective social protection measures have contributed to the success in halting the spread of SARSCoV-2 in Vietnam." "Swift governmental action, strict border control measures, large community involvement, expanded testing capacity and effective social measures would have attributed to the success in halting the spread of SARS-CoV-2 in Vietnam." "Based on lessons learnt from the outbreaks of SARS in 2003–2004, avian influenza in 2004–2005, and Zika virus in 2016, Vietnam coordinated a rapid response to address (unknown at the time) the novel epidemic caused by SARS-CoV-2. On 16 January, Vietnam's health system managers and other associated ministries developed and widely disseminated a national COVID-19 Response Plan and Technical Treatment and Care Guidelines." "The response to the crisis, overviewed by the prime minister, received strong support from political elites, including the general secretary of the Communist	Nguyen TV, Tran QD, Phan LT, et al. In the interest of public safety: rapid response to the COVID-19 epidemic in Vietnam. BMJ Global Health 2021;6:e004100. doi:10.1136/bmjgh-2020-004100

	Party and the Chairwoman of the National Assembly. Of note, a clear strategic response structure was overlaid on the Foundation of a one-party government, and the major response strategies and policies were made at the central level and executed through a top-down process." "During the first 6 weeks of the epidemic, the MoH was primarily responsible for ensuring measures for case isolation and quarantine in hospital of close contacts. Military personnel were then deployed and facilities across the country were also used to quarantine all people entering Vietnam." "Recognising the key role of the media during the epidemic, Vietnam disseminated their mid-term plan for communicating health risks for the 2020–2025 period, in January 2020." "On 5 February [2020], warning messages about the dangers and modes of transmission of COVID-19, as well as information on prevention measures were made publicly available through all media platforms."	

Challenges which country response teams have contended with and continue to contend with include:

- Health worker shortages and other workforce related challenges stemming from an increased pressure on the available human resources as well as health worker infection rates. A multidisciplinary health workforce with the capacity to render high quality services is vital for success in any country. Countries with critical workforce challenges prior to COVID-19 outbreak had more stiff challenges.

- Health systems related challenges including finances and access to vital commodities and supplies. To varying degrees, countries also had to deal with the challenge of ensuring the continuity and equitable access to essential health services as they built towards a more resilient health system.

- Balancing the need for surveillance with the capacity of health systems to cope with the number of cases and resources required for contact tracing, quarantine, or treatment. Countries had to adjust operational guidelines as the disease epidemiology evolved from what may be considered ideal to the best possible scenario taking their context into consideration.

- Disruption of the global and regional supply chain and market mechanisms leading to unmet demands for critical commodities like COVID-19 test kits, personal preventive equipment, diagnostic equipment Etc. National response mechanisms through regional collaborations, donor support and the support of global humanitarian organizations worked to resolve supply chain issues especially at the peak of the pandemic in their countries.

- Socioeconomic pressures emanating from the public health and social measures instituted to control COVID-19. Through joint reviews by multisectoral teams, countries have weighed the social and economic costs of the disease control with the available public health intelligence to inform targeted measures to mitigate socioeconomic impact on the population.

- Combating the widespread infodemic of misinformation and disinformation within the populace and the lack of timely access to credible information have remained a recurring theme through the phases of the pandemic. This infodemic has undermineed countries' efforts to implement evidence-based responses and ensure citizen compliance to prescribed social and public health measures.

- Social implications of reduced income resulting from the consequences of the public and social measures have led to increasing insecurity, limited access to health (especially in regions with increased out-of-pocket-expenditure), erosion of social cohesion and other challenges which may become more obvious in the long term.

At the point where we wrap up the National Coordination of COVID-19 response collaborative, the COVID-19 immunization roll-out continues and many countries are combating a new surge driven by the Omicron variant.

According to WHO, the COVID-19 vaccine roll-out has been one of the most complex immunization roll-outs in history. Countries have had to simultaneously use different vaccines having different properties in countries with varying contexts while dealing with a novel pathogen with an ever-changing disease epidemiology[x]. Despite the plans by the COVID-19 Vaccines Global Access (COVAX) facility, vaccine roll-out has been marred with inequities. According to a study by the Global Health Innovation Centre of Duke University, they estimate that the world's poorest 92 countries may not reach the target 60% vaccination until 2023 or later. Inequitable access to vaccines has implications for global health outcomes and the WHO Director General captures them in the following quote.

"An uncoordinated, "me-first" approach to vaccination not only condemns the world's poorest and most vulnerable to unnecessary risk, it is strategically and economically self-defeating. Short-termism, and the pursuit of narrow national self-interest could have disastrous consequences in the medium term. The continued spread of SARS-CoV-2 around the world hastens the day that new variants of the virus will emerge with the potential to undermine the effectiveness of vaccines, therapeutics, and diagnostics; the restrictions needed to contain SARS-CoV-2 around the world will be unnecessarily prolonged, leading to increased human and economic suffering in every country, but hitting the poorest and most vulnerable hardest". - Dr Tedros Adhanom Ghebreyesus

While some countries are struggling to gain access to the vaccines, in some other countries, the limited access is complicated by vaccine hesitancy compounding the challenges for national response teams. The fight against COVID-19 is far from over. However, it is clear that effective national coordination will remain critical at all phases of the pandemic response.

[i] Worldometer. COVID-19 pandemic. Available online at https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1?%20 (Accessed May 11, 2021)

[ii] Haider, N., Yavlinsky, A., Chang, Y.M., Hasan, M.N., Benfield, C., Osman, A.Y., Uddin, M.J., Dar, O., Ntoumi, F., Zumla, A. and Kock, R., 2020. The Global Health Security index and Joint External Evaluation score for health preparedness are not correlated with countries' COVID-19 detection response time and mortality outcome. *Epidemiology & Infection*, *148*.

[iii] World Health Organization (2020). Strategic preparedness and response plan. Operational planning guidelines to support country preparedness and response.

[iv] Ha, K.M., 2016. A lesson learned from the MERS outbreak in South Korea in 2015. Journal of Hospital Infection, 92(3), pp.232-234

[v] Kim, I., 2020. Emerging Covid-19 Success Story: South Korea Learned The Lessons Of MERS. Available at https://www.exemplars.health/emerging-topics/epidemic-preparedness-and-response/covid-19/south-korea

[vi] Pollack, T et al., 2020. Emerging Covid-19 Success story: Vietnam's commitment to containment. Available at https://www.exemplars.health/emerging-topics/epidemic-preparedness-and-response/covid-19/vietnam

[vii] Pollack, T et al., 2020. Emerging Covid-19 Success story: Vietnam's commitment to containment. Available at https://www.exemplars.health/emerging-topics/epidemic-preparedness-and-response/covid-19/vietnam

[viii] Yicai global and Yicai research institute (2020) . Comprehensive Assessment and Ranking Report on the Response to the Covid-19 Pandemic and Economic Recovery of 108 Economies. Available online at https://www.yicaiglobal.com/news/comprehensive-assessment-and-ranking-report--on-the-response-to-the-covid-19-pandemic-and-economic-recovery-of-108-economies (Accessed May 1, 2021)

[ix] World Health Organization (2021). COVID-19 strategic preparedness and response plan: February 2021 to January 2022.

[x] World Health Organization (2021). COVID-19 strategic preparedness and response plan: February 2021 to January 2022.

Annex II: Operational guidelines from the WHO and the World Bank

The Word Health Organization issued an operational planning guideline to support country preparedness and response. This document advocated for a multisectoral coordination adapted to different country contexts (developing or developed), government capacities (high or low), and constitutional systems (federal or unitary).
The National coordination mechanism in each country requires closely aligned interaction with multiple institutions and ministries, which when underpinned with high-level leadership will determine the overall performance of the country response. Irrespective of constitutional systems, the World Bank Group identified some critical factors for effective National coordination[1]:

1. Strong backing and commitment of the top leadership.
2. Well defined mandate for actors within the country's defined and operationalized strategic response priorities.
3. The pandemic coordination body creates an institutional interface for all responding Ministries, departments, and agencies. This interface facilitates timely communication and centralized problem-solving avenues to avoid duplication of efforts.
4. Having simple dashboards, reporting routines and reasonable number of performance indicators which create synergies with existing reporting structures at all levels of Government are useful for coordination.
5. Empowering stakeholders to solve problems at the lowest possible levels with clear progressive escalation mechanism, leaving only the very difficult technical challenges to be tackled at the policy maker level.
6. Ensure seamless communication across multiple stakeholder groups on designated communication platforms.

[1] Jana Kunicova (2020). Driving the COVID-19 response from the center: Institutional mechanisms to ensure
whole-of-government coordination. The World Bank Group.

Annex III: Collaborative members' COVID-19 coordination structures

Country	COVID-19 Coordination structure
Kingdom of Bahrain	• The COVID-19 pandemic response is coordinated and spear-headed by HRH the Crown Prince of the Kingdom of Bahrain via the National Team for Combating Covid-19 (NTCC-19). This team is headed by the chairman of the supreme council of health. The following entities are represented in this team: The office of HRH the crown prince, ministry of health, Ministry of Interior, The Royal Medical Services of the Ministry of Defense, Salmaniya Medical Complex, King Hamad University Hospital, Primary care, the National Health Regulatory Authority (NHRA), Public Health, Center for operations and Medical Equipment Directorate • This team works with the Center for Operations, and all public and private stakeholders, with regular meetings and updates
Bangladesh	• The National Coordination Committee was established to coordinate the COVID-19 response in March 2020. The committee is headed by the Minister of Ministry of Health and Family Welfare and Secretary of the Health Services Division of Ministry of Health and Family Welfare is the member secretary. The Honorable Prime Minister of Bangladesh directly supervises the committee • The committee has a membership of 42 comprising representatives of various ministries, Prime minister's office as well as from various Development Partners • To improve coordination, coordination committees were formed in Divisional, District, City corporation and sub-district level • A COVID-19 vaccine preparedness and deployment core committee was created in October 2020 to formulate the national to subnational vaccine deployment
Ethiopia	• A National Taskforce for multisectoral COVID-19 pandemic response is led by the Deputy Prime Minister and is directly accountable to the Prime Minister. • The Taskforce is comprised of representatives from almost all agencies and sectors, including, but not limited to, the Ministry of Peace, Ministry of Justice, Ministry of Defense, Ministry of Foreign Affairs, Ministry of Health and Ministry of Innovation and Technology • The Taskforce has sub committees - communication, technology, diplomacy, security and legal affairs • COVID-19 vaccine roll-out is led by Ethiopia's Ministry of Health and the Ethiopian Pharmaceutical Supply Agency. • Similar coordination structures at the regional and sub-regional level led by the regional presidents and sub-regional leadership respectively
Kenya	• The COVID-19 response is led by a National Emergency Response Committee (NERC) appointed by the President through an executive

	order in March 2020. The NERC has Ministers and Principal Secretaries from the Ministry of Health; National Treasury; Interior and Government coordination; Transport; Foreign Affairs; and representation from the county Governments among others. This team reports to the President and to the council of Governors through existing constitutional structures of the summit ● Ministry of Health leads a COVI9-19 national taskforce that has representation from all sector stakeholders--MOH; Counties; private sector; partners working in health; NGOs, civil society among others. This team is responsible for the day to day coordination and works through several technical committees including; disease Surveillance; Rapid Response Team and case investigations ; Case management and Research Committee; Communication and Health Promotion; Capacity Building; Resource Mobilization and the maintenance and continuity of essential health services ● There is also a multisectoral command centre coordinated by the Ministry of Interior and Government coordination (security) that mainly does some sort of surveillance of the whole response by all sectors and trouble shoots should the need arise ● NERC works with the Kenya National Immunization Technical Advisory Group on COVID-19 vaccine-related issues. This group contains members from N-ICC (National Immunization Interagency Coordinating Committee), the KENITAG (Kenya National Immunization Technical Advisory Group), and the NVSAC (National Vaccine Safety Advisory Committee). Representatives from these organization provide overall technical and policy advisory on immunization.
Mongolia	● Covid-19 response is led by the Deputy Minister and organized by the National Emergency Management Agency with representation of all sectors ● Ministry of Health leads the National Health Emergency Group which includes other ministries and agencies team ● An Incident management team has also been activated
Senegal	● The National Epidemic Coordination Committee (NECC) works with a monitoring committee based at the Presidency, and provides guidance and measures for implementation by the regional committees ● Regional committees and departments chaired by the Governors and Prefects of the regions coordinate the response within their regions taking into account local circumstances

Annex IV: Participants in virtual events (December 2020 to February 2022)

Name	Country or Affiliation
Jameela Al Salman	Bahrain
Raja Alyusuf	Bahrain
Maryam Al Ansary	Bahrain
Samiul Huda	Bangladesh
Subrata Paul	Bangladesh
Shahadt Hossain Mahmud	Bangladesh (Speaker)
Fatema Zohara	Bangladesh
Abnet Zeleke	Ethiopia
Beza Aseffa	Ethiopia (Speaker)
Yihenew Yirdaw	Ethiopia
Wondwossen Eshetu	Ethiopia
Iman Abdulhakim	Ethiopia
Nesibu Yasin	Ethiopia
Frehiwot Gebrehiwot	Ethiopia
Melaku Tekola	Ethiopia
Tatek Wondimu	Ethiopia
Marian Opoku-Agyeman	Ghana
Isaac Amenga-Etego	Ghana
Kwame Amponsa-Achiano	Ghana (Speaker)
Meboh Abuor	Kenya
Walter Obita	Kenya
Stephen Muleshe	Kenya
Esther Wabuge	Kenya
Anastasia Nyalita	Kenya
Andrew Mulwa	Kenya
Omar Ahmed Omar	Kenya
Meboh Abuor	Kenya (Speaker)
Oyunkhand Ragchaa	Mongolia
Munkhnasan Enkhtaivan	Mongolia
Maggie - UB Health Department	Mongolia
Sodnomdarjaa Vaanchigarslan	Mongolia
Anwar Abubakar	Nigeria
Oluwatosin Ijimakinwa	Nigeria
Nneka Orji	Nigeria
Aissatou Nomokho	Senegal
Oumy Ndiaye	Senegal
Cheikh Tidiane Athie	Senegal
Samba Cor Sarr	Senegal
Aida Kanoute	Senegal
Aminata Suzanne Diop	Senegal
Alice Namale	Uganda
Rawlence Ndejjo	Uganda
Steven Kabwama	Uganda (Speaker)
Will Wang	Gates Ventures/Exemplars in Global Health

Name	Country or Affiliation
Raquel Duarte	Portugal (Technical Facilitator)
John Ryu	South Korea (Technical Facilitator)
Samba Sow	Mali (Technical Facilitator)
Camilla Ducker	United Kingdom (Technical Facilitator)
Christine Ezenwafor	Health Strategy & Delivery Foundation
Uchenna Gwacham	Health Strategy & Delivery Foundation
Nonye Egekwu	Health Strategy & Delivery Foundation
Yosola Fadugba	Health Strategy & Delivery Foundation
Kamiar Khajavi	Joint Learning Network for UHC
Sara Wilhelmsen	Joint Learning Network for UHC
Amanda Folsom	Results for Development
Agnes Munyua	Results for Development
Chloe Lanzara	Results for Development
Loriade Akin-Olugbade	Results for Development
Kaela Barna	Results for Development

Annex V: Country COVID-19 pandemic response self-reflection in February-March 2021

The National Coordination of Multi-sectoral and Multi-level Pandemic Responses Collaborative has engaged country teams through collaborative meetings and one-on-one outreach calls. From these engagements, a number of challenges have been identified in coordinating a response inclusive of all sectors, state and non-state stakeholders and sustaining this level of engagement over a prolonged period.

In the next collaborative meeting, the technical facilitation team will facilitate a session for reflection and action-oriented review of country coordination approaches to the COVID-19 pandemic response to further strengthen health system resilience. The session will also engage in a similar reflection process on the topic of vaccine readiness in preparation for the roll out of the COVID-19 vaccine. The session will also facilitate concrete action planning that countries can take forward in their countries.

In preparation for this session, the technical facilitation team has prepared this tool to provide guidance for country-level reflection. The technical facilitation team encourages each member of the team to review the tool and come prepared for a discussion to identify what is working well and areas for improvement. The technical facilitation team referenced the WHO Multisectoral preparedness coordination framework and the Accelerator institutional architecture framework while developing this tool.

There are two main domains in this tool – multisectoral coordination and vaccine deployment coordination. For each domain, there are a series of questions to support the group's brainstorming and reflection on the actors and processes needed for the success of these two domains. Responses will be provided based on a Likert scale rating, with justification given for each rating. Where the team feels there is a need for improvement, we strongly encourage the team to add actions that are required for improvement. This will be the basis of the action plan and next steps for the collaborative.

The questionnaire will take you about 40 minutes to complete.

DOMAIN	Response and justification					How can this be improved?
	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	
	1	2	3	4	5	
A) MULTISECTORAL COORDINATION						
Multisectoral Coordination Actors						
1. The composition of the national coordination body in my country has representation from all relevant agencies and sectors.						
2. The engagement and coordination with sub-						

national levels of Government has been effective.		
Decision making processes		
1. We have a clear national plan to guide decisions for public health and hygiene measures (e.g., limiting mass gathering by school closure, allowable number of persons at gatherings)		
2. We hold sufficient consultations with multisectoral teams before each public health measure is deployed.		
3. We have integrated data systems enabling us to track COVID-19 cases to understand disaggregated population group patterns and outcomes of measures at all levels of Government.		
4. We have a trusted ecosystem of local (governmental and non-governmental) experts to generate, synthesize, and/or translate evidence for the COVID-19 response		
5. We have access to regional and global sources of evidence to support our COVID-19 response decisions.		
6. My country is taking adequate steps to institutionalize and integrate the pandemic coordination into existing		

public health and health service delivery systems.		
B) COVID 19 VACCINE DEPLOYMENT COORDINATION		
COVID-19 vaccine deployment planning and actors		
1. My country has conducted a COVID_19 vaccine introduction readiness assessment to identify the current state of readiness and resources available for the vaccine roll-out for our country.		
2. My country has a National Deployment and Vaccine Plan (NDVP) that has defined all the actors needed to roll out an equitable roll-out of the COVID-19 vaccine		
COVID-19 vaccine deployment processes		
1. My country's NDVP has outlined a clear demand plan (advocacy, communication, social mobilization etc) to boost vaccine confidence and acceptance.		
2. We have monitoring tools for tracking progress and vaccine coverage for general and specific populations.		

Annex VI: Template and example of a country action plan

National Coordination of Multi-sectoral and Multi-level Pandemic Responses Collaborative

Action plan template and instructions

Background

- **Today (March 23),** countries engaged in a self-reflection and action-oriented review of country coordination approaches to the COVID-19 pandemic response to further strengthen health system resilience in two domains
  - ***Multi-sectoral coordination of the pandemic***
  - ***Vaccine deployment coordination***
- **As a follow on to this self-reflection exercise,** the country teams will identify specific areas where there is a need for improvement - and actions required for improvement - to populate an action plan over 6 months (May – November 2021).
- **This action plan** will outline goals, desired change, measures/processes, action steps and responsibilities for each step.
- The technical facilitation team encourages only 1 or 2 issues/problems per country team. Proposed actions need to be within the scope of work and available resources of the country team -- and would benefit from collaborative problem solving and peer learning support.

Country name:

Goal:
Desired change:

Identified issue/ problem	Actions/ Steps for improvement	Responsibility/ Actors	Inputs/ Resources required? (human, financial, others?)	Timeline	How will improvement be measured?

Country name: XXXX – (Illustration only)

Goal: Develop and implement an updated strategic communications plan focused on increasing citizen compliance with current public health recommendations
Desired change: Increased citizen compliance with public health recommendations (face coverings, social distancing)

Identified issue/ problem	Actions/ Steps for improvement	Responsibility/ Actors	Inputs/ Resources required? (human, financial, others?)	Timeline	How will improvement be measured?
Citizen non-compliance to public health measures – social distancing, handwashing, face coverings	1. Establish a strategic communications TWG 2. Develop the strategic communications plan 3. Disseminate the plan to stakeholders 4. Activate above and below the line media channels	COVID coordination taskforce – medical and communications teams, Ministries of ICT, Security, Education, Trade	Human: COVID coordination taskforce communications officer to lead the TWG, ministries appoint focal person for the TWG Financial: Community activations $$$ Media spot buys $$$	April-June July August-September September - November	1. Strategic communications plan disseminated 2. Number of media channels activated 3. Monitor uptake of messages and change in knowledge attitudes perception (KAP)