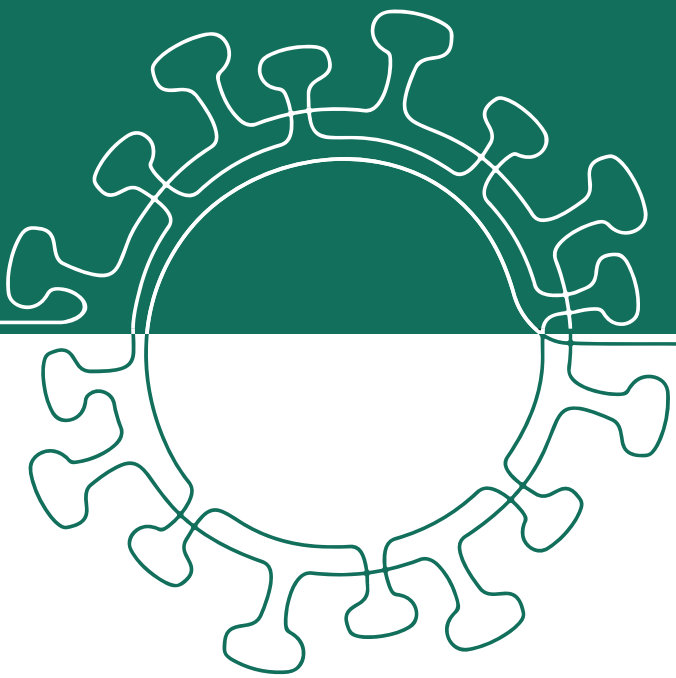


COVID-19

PAKISTAN'S RESPONSE & DOCUMENTATION OF LESSONS LEARNED 2020—2022

Technical Report

September 2023

COVID-19

PAKISTAN'S RESPONSE & DOCUMENTATION OF LESSONS LEARNED

2020—2022

Kohsar Block, 3rd Floor, Pak Secretariat, Constitution Avenue, Islamabad Capital Territory, Pakistan.
Web: nhsrc.gov.pk Phone: +92 51 924 5810

Suggested Citation: Ministry of National Health Services, Regulations and Coordination, Government of Pakistan. (2023). Pakistan's Covid-19 Response and Documentation of Lessons Learned, Technical Report. Islamabad: UNICEF and Contech International.

Research Team: Dr. Muhammad Adeel Alvi, Professor Dr. Rubeena Zakir, Ms. Mariam Z. Malik, Dr. Umer Farooq Rana, Dr. Muhammad Wasim Mirza, Dr. Shahid Ahmad, Mr. Muattar Abbas, Mr. Faisal Shehzad, Ms. Fareeha Jamil, Ms. Aiman Saleemi, Mr. Farhan Ahsan, Mr. Zaigham Altaf, Ms. Asiya Nawaz, Mr. Khawaja Mudassar, Ms. Maria Waheed, and Ms. Ayesha Naeem.

Internal Backstopping: Dr. Naeem uddin Mian, Dr. Shehzad Hussain Awan, and Professor Dr. Alexander Kraemer.

Advisory Team: Dr. Baseer Khan Achakzai, Dr. Atiya Aabroo, Dr. Ahsan M. Ahmad, Dr. Sabeen Afzal, and Dr. Malik Muhammad Safi from Ministry of National Health Services, Regulations and Coordination, Government of Pakistan; and Dr. Hari Krishna Banskota, Dr. Nabila Zaka, Ms. Samra Hanif, Dr. Muhammad Jaohar Khan, Dr. Jonathan Shadeed, and Mr. Yasir Farrukh from UNICEF Pakistan.

Dr. Nadeem Jan
Federal Minister
Ministry of National Health Services, Regulations & Coordination

In the archives of the global battle against the Covid-19 pandemic, Pakistan stands as a beacon of resilience and strategic acumen. Now, we need to translate the capacity gains and lessons learned into future preparedness and strengthening of health systems. The establishment of long-term strategies is not merely a national imperative; it will be a crucial contribution to global health security.

FOREWORD

As the world grappled with an unprecedented crisis, Pakistan emerged as a model of effective crisis management, earning accolades both domestically and internationally. This reflects upon the nation's commendable efforts in curbing the spread of the virus, the intricacies of safeguarding public health and sustaining economic vitality, and the imperative to transform hard-won lessons into enduring preparedness. In the face of a relentless adversary, Pakistan demonstrated unparalleled agility and determination. Timely and decisive actions were taken to stem the tide of the virus, displaying a keen understanding of the delicate balance between lives and livelihoods.

Pakistan's leadership exhibited a resolve that transcended the challenges posed by the pandemic. The nation's ability to make bold and daring decisions became a cornerstone of its successful strategy. One of the defining characteristics of Pakistan's response was its multifaceted approach. Recognizing the intertwined nature of public health and economic considerations, the country navigated this intricate terrain with a combination of measures that proved effective. From implementing stringent public health protocols to devising innovative economic interventions, Pakistan showcased a nuanced understanding of the complexities inherent in managing a crisis of this magnitude. The successes achieved in this battle against Covid-19 are not confined to a singular arena but reverberate across all facets of the response. The foresight demonstrated in deploying resources, the dexterity in adapting strategies to evolving circumstances, and the unity displayed by the nation collectively form a narrative of triumph over extraordinary challenges.

Now, with the receding threat, the focus must shift to the future – a future where the hard-earned capacity gains of the pandemic become the base for sustained resilience. This report underscores the critical need to translate these gains into a robust framework for preparedness, extending beyond Covid-19 to encompass a spectrum of potential threats, particularly infectious diseases that may loom on the horizon.

Dr. Iftikhar Ali Shallwani
Secretary
Ministry of National Health Services, Regulations & Coordination

ACKNOWLEDGEMENTS

Research to document Pakistan's Covid-19 response and lessons learned was carried out under the oversight of the Ministry of National Health Services, Regulations and Coordination and its Health Planning, System Strengthening, and Information Analysis Unit. Special thanks to the team at the Technical Wing of Ministry for the continued support and facilitation. Funded by UNICEF, the research was conducted by Contech International under technical guidance of Dr. Naeem uddin Mian and Dr. Shehzad Hussain Awan, and Professor Dr. Alexander Kraemer from University of Bielefeld Germany.

The Mo NHSR&C would like to extend its gratitude to the wide range of respondents engaged through roundtable consultations, key informant interviews and focus group discussions at national level and in all provinces and regions of Pakistan. Their generous time and insightful inputs during candid interactions with the research team were of great assistance in shaping up the lessons learned and proposing actions for future preparedness. Specifically, facilitation extended from the offices of provincial and regional Director General Health Services is highly appreciated, namely Dr. Muhammad Ilyas Gondal in Punjab, Dr. Shaheen Afridi in KP, Dr. Saleem Uddin in GB, Dr. Irshad Memon in Sindh, Dr. Qazi Noor Muhammad in Balochistan and Dr. Aftab Hussain Khan in AJK.

Lastly, I would like to thank UNICEF Pakistan – Dr. Abdullah Fadil (Country Representative) and his Team – for their trust, unstinted support and technical inputs to enhance the quality and scientific rigor of this assignment. I hope that the findings of this research will make a valuable contribution in future programming and emergency preparedness in Pakistan.

Dr. Muhammad Ahmed Kazi
Director General
Ministry of National Health Services, Regulations & Coordination

TABLE OF CONTENTS

LIST OF BOXES

LIST OF TABLES

LIST OF FIGURES

ACRONYMS & ABBREVIATIONS

ADB	Asian Development Bank
AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
AJK	Azad Jammu & Kashmir
BHS	Border Health Services
BMGF	Bill & Melinda Gates Foundation
CBO	Community-based Organization
CDC	Center for Disease Control
CEPI	Coalition for Epidemic Preparedness Innovations
CHE	Central Health Establishments
CSO	Civil Society Organization
CVC	Covid-19 Vaccination Centers
COVAX	Covid-19 Vaccines Global Access
Covid-19	Coronavirus Disease 2019
EDOH	Executive District Officer Health
EOC	Emergency Operations Center
EUA	Emergency Use Approval
DG	Director General
DGHS	Director General Health Services
DHO	District Health Officer
DOH	Department of Health
DRAP	Drug Regulatory Authority of Pakistan
DTM	Displacement Tracking Matrix
EPI	Expanded Programme on Immunization
FBR	Federal Board of Revenue
FCDO	Foreign, Commonwealth and Development Office
FELTP	Field Epidemiology and Laboratory Training Programme
FGDs	Focus Group Discussions
FIA	Federal Investigation Agency
GAVI	Global Alliance for Vaccines and Immunization
GB	Gilgit Baltistan
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
GHRP	Global Humanitarian Response Plan
GHSA	Global Health Security Agenda
HDF	Health Declaration Form
HPSIU	Health Planning, Systems Strengthening and Information Analysis Unit
ICT	Islamabad Capital Territory
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations 2005
IMF	International Monetary Fund
INGO	International Non-Government Organizations
IPC	Infection Prevention and Control

IsDB	Islamic Development Bank
IT	Information Technology
JEE	Joint External Evaluation
JSI	John Snow Inc.
KIIs	Key Informant Interviews
KP	Khyber Pakhtunkhwa
LHW	Lady Health Worker
Mo NHSR&C	Ministry of National Health Services, Regulations and Coordination
Mo PDSI	Ministry of Planning, Development and Special Initiatives
NADRA	National Database Regulatory Authority
NCC	National Coordination Committee
NCOC	National Command and Operation Center
NDMA	National Disaster Management Authority
NDMF	National Disaster Management Fund
NDVP	National Deployment and Vaccination Plan
NEOC	National Emergency Operations Center
NICC	National Inter-agency Coordination Committee
NIMS	National Information Management System
NITAG	National Immunization Technical Advisory Group
NPIs	Non-Pharmaceutical Interventions
PCR	Polymerase Chain Reaction
PDMA	Provincial Disaster Management Authority
PEI	Polio Eradication Initiative
PHSM	Public Health and Social Measures
PIMS	Pakistan Institute of Medical Sciences
POEs	Points of Entry
PPEs	Personal Protective Equipment
RCCE	Risk Communication Community Engagement
REMAP	Regional Evidence for Migration Analysis and Policy
RTC	Roundtable Consultation
SAI	Supreme Audit Institution
SAPM	Special Assistant to Prime Minister
SAFRON	Ministry of States and Frontier Regions
SOP	Standard Operating Procedures
SRO	Statutory Regulatory Orders
TORs	Terms of Reference
TTQ	Test, Track and Quarantine
UHC	Universal Health Coverage
UKHSA	United Kingdom Health Security Agency
UHC	Universal Health Coverage
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
UNHCR	United Nations High Commission for Refugees
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

On 5th May 2023, WHO announced that Covid-19 no longer constituted a global health emergency and recognized it as an ongoing health issue. While Pakistan has transitioned to its long-term management, it is important to integrate and sustain the capacity gains within health systems for other priority diseases. In this backdrop, Ministry of National Health Services, Regulations and Coordination through assistance of UNICEF commissioned this research to document Pakistan's response and to explain how the country's health system strategically realigned itself, enhanced its capacities, overcame challenges, suffered insufficiencies, and implemented plausible solutions to tackle the pandemic. A documentation framework, comprising of 12 documentation areas, guided the implementation of this research, and also the presentation of findings, lessons learned, and recommendations. Participatory approach was adopted through identifying and involving key stakeholders from government, healthcare, frontliners, and district administration. Stakeholders from development partners, civil society, media, and academia were also reached out to gather lessons learned. All these interactions were carried out through key informant interviews, roundtable consultations, or focus group discussions. Relevant literature, comprising of strategic and operational documents, publications, and media reports, was extensively reviewed covering the temporal span of documentation from the start of 2020 till the end of the pandemic.

Documentation of Covid-19 response revealed that Pakistan faced six waves, starting with the first wave in March 2020. It was followed by subsequent waves in October 2020, March 2021, July 2021, December 2021, and May 2022. Three waves took place before the start of vaccination and third wave was the most severe with total of 9,423 deaths. Total cases till end of June 2023 were 1,580,631 with a recovery rate of 98.4%. Pakistan administered 339,286,324 vaccine doses till end of 2022, with 132,612,911 fully vaccinated individuals. The government responded to the pandemic with a whole-of-nation approach and success of Pakistan's response was acknowledged worldwide, with recognition from international organizations, prominent figures and journalism, such as WHO, World Economic Forum, Larry Summers, Bill Gates, Forbes, and The Economist.

Specific findings and lessons learned within the 12 documentation areas are briefed as follows.

1. **Legislation and Policy** – At the outset of the pandemic, there were limitations in availability of specific laws to address public health emergencies of this scale, and in such scenarios, executive orders and directives provided quick solutions for legal cover. While uncertainty remained to be one of the defining features of policy formulation, review of emerging trends and projections helped in planning ahead. Initial success of Pakistan's response was attributable to comprehensiveness and practicability of national action plans. Implementation and stringency of non-pharmaceutical interventions (NPIs) varied over time, and smart and micro lockdowns proved as a successful strategy in containing the virus while ensuring continuation of regular businesses. Public trust was also fostered to build ownership for strict enforcement of NPIs across the country.
2. **Management and Coordination** – Pakistan's response to Covid-19 threat in early 2020 demonstrated a remarkable level of foresight and commitment, surpassing global understanding at that time. As the month of March 2020 saw growing anxiety with raising number of cases and heightened confusion, the government established National Command and Operation Center (NCOC) to address Covid-19 as a cross-cutting issue, extending beyond the health sector. The NCOC serves as a noteworthy case study of effective civil-military cooperation where military's

organizational discipline and ability to execute orders played a vital role to overcome inherent inertia. Further, the nonpartisan nature of the NCOC allowed for effective decision-making and cooperation among different political leaders. The National Disaster Management Authority (NDMA) acted as principal execution arm for procurement related to response. Through engaging different ministries, agencies, and development partners whenever needed, the NCOC displayed administrative prowess to provide maximum degree of multi-sectoral engagement and authority.

3. **Surveillance** – Early on deployment of air defense personnel, military officers, and data entry operators at health facilities and labs was done to expedite daily data capturing to shorten latency period. Later on, Covid-19 surveillance utilized the country's existing AFP surveillance system, which led to deployment of one of the world's largest surveillance networks comprising of 265,000 polio workers and more than 100,000 LHWs. Laboratory data was also integrated, linking test results with epidemiological and case-based information. The Test, Track and Quarantine (TTQ) strategy played a significant role in surveillance and use of digital tools and dashboards further amplified its efficacy. Among different entities implementing surveillance, district administration was found to be the frontrunner in Covid-19 surveillance, which led to a unified response.

4. **Case Management** – Initial phase of pandemic was confronted with shortages of supplies to deliver effective patient care, including ventilators, oxygen, specialized medicines, and PPEs. Instantly, investments were made for rapid deployment of resources, followed by segmentation of service delivery sites to augment the surge capacities while keeping view the changing guidelines. While it was easy to establish physical infrastructure, organizing advanced care at newly built facilities and remote locations remained challenging. Potential of innovative technologies including telemedicine was harnessed to increase access and reduce the risk of infection. Case management further benefited from the capacity building initiatives implemented by development partners.

5. **Infection Prevention and Control (IPC)** – Covid-19 being a highly contagious airborne virus necessitated robust IPC strategies. Early implementation of hand hygiene, use of masks, and physical distancing proved pivotal in slowing down its spread. Multi-pronged strategies were used in IPC planning at health facilities for limiting the intake of patients, universal mask usage, triage areas, designated wards, and ICUs. However, vast disparities were witnessed among public and private sector hospitals in implementation of IPC practices. Training and education on IPC raised confidence within frontline workers during their dealing withCovid-19 patients.

6. **Points of Entry (POEs)** – In pandemic of Covid-19 scale, with 19 operational POEs, minimizing the spread of infection was not possible without restrictions and cross-border coordination. Pakistan's Preparedness and Response Plan, developed in February 2020, outlined several pivotal actions for POEs to effectively manage the anticipated emergency. Lack of initial screening and quarantine facilities at Taftan led to virus entry in the country. Later on, setting up facilities at POEs with trained staff, screening equipment, and stringent application of SOPs augmented their readiness to detect suspects. Effective POE management was also found to be closely linked with adequate quarantine facilities with provision of shelter, food, and medical care.

7. **Vaccine** – Pakistan rolled out Covid-19 vaccination in a structured and phased manner. Transparency in prioritization based on scientific evidence helped to vaccinate the at-risk population groups. Building community trust through countering misinformation proved effective against vaccine hesitancy. With increasing number of cases during different waves, fear of contracting the disease was also a decisive factor in increased uptake. Experiences and capacities gained during Covid-19 vaccination helped in building inherent capacities for routine immunization through provision of advanced technologies and enhanced storage capacities.

8. **Workforce** – Public health emergencies, such as Covid-19, require a comprehensive HR strategy to address the additional workload on healthcare. Despite intense stress, the entire health workforce fought day and night to contain the virus. During rapid roll-out of capacity development activities, it was difficult to make it fully structured and streamlined due to changing guidelines, and these gaps affected the uniform application of the SOPs and protocols. A limited supply of PPEs during initial phases exasperated the existing fears and apprehensions of workforce. Clinical multidisciplinary team approach, engaging all relevant specialties, was limited to higher hospitals. Pakistan's government took steps to provide psychosocial support to healthcare as evident from WeCare Campaign but overall, psychosocial aspects gained a low priority during the pandemic.
9. **Risk Communication and Community Engagement (RCCE)** – De-stigmatization of disease was important to make people forthcoming to government interventions. Innovative, persistent and locally contextualized communication was key for effective social and behavioral change. Segmentation of community, based on literacy, media, mobile coverage, and socio- economic status, helped in priming RCCE interventions. Government took strict actions against fake news developers through engagement of Ministry of Interior and FIA. Development partners, including UNICEF, supported the government to develop RCCE strategies based on theoretical models and rapidly occurring research on behavioral insights helped tailor the government's narrative.
10. **Laboratory** – Need for a comprehensive preparedness planning in advance for lab testing cannot be over-emphasized, however, initial steps regarding testing were taken in a reactive mode. A proportional and steady increase in daily testing was observed that was instrumental for effective surveillance across different waves with real-time reporting of testing data to district, provincial and national platforms for timely actions. Health departments increased their testing capacities through re-designation of their existing labs working on other infections and programs. Private labs were supported through subsidized testing kits and supplies to reinforce national testing capacities. In underdeveloped provinces and regions of Pakistan, the pandemic provided an opportunity to strengthen and enhance the coverage of labs that would sustain beyond Covid-19.
11. **Financing** – The financial needs for Covid-19 response were substantial, and required the mobilization of resources from various sources, such as domestic revenues, international grants, loans, and public-private partnerships. The government's proactive approach in announcing a fiscal stimulus package in March 2020, enabled better resource allocation. Tax reliefs and exemptions in financial rules supported timely procurement and supply of essential commodities. However, private sector engagement was not formalized to their full potential. Centralized purchase through NDMA brought economies of scale. Going forward, contingency planning emerged as a key element of financial strategies for fast-track initiation of response during crisis.
12. **Essential Health Services** – Ensuring continuity of essential health services was a guiding principle in the country's emergency and response plans. Numerous services were affected, including outpatient and inpatient care, elective procedures, emergency, and intensive care. Despite significant adaptations, disruptions occurred due to various factors, including the need to allocate resources and healthcare personnel to Covid-19 response, concerns about infection transmission in healthcare settings, and logistical challenges posed by lockdowns. Additionally, preventive services, including vaccination and polio campaigns were also hampered – presenting significant implications for overall population health. In future crisis, government must prioritize essential health services in line with UHC Benefit Package to ensure uninterrupted delivery.

Pakistan's experience of Covid-19 response offers valuable insights for the global community, emphasizing the importance of a holistic, adaptable, and inclusive approach to pandemic response. The lessons learned from this journey will continue to shape the nation's health resilience and readiness for future challenges.

1. INTRODUCTION

1.1 Context

Pakistan reported its first 2 cases of Covid-19 on 26th February 2020, one in Karachi returning from Iran and the other in Islamabad Capital Territory (ICT). By late spring of 2021, a year later, the virus was claiming an average of 100 lives every day[1], while by the end of 2022, the total number of cases had surged to more than 1.5 million. The Pakistani government responded to the spread of the virus with a whole-of-nation approach. To organize and define a nationally coordinated effort in response to the Covid-19 pandemic and to carry out the decisions, the NCC (National Coordination Committee) established the National Command and Operation Center (NCOC) and engaged the NDMA (National Disaster Management Authority) as the primary execution agency. Over the course of the pandemic, Covid-19 Global Humanitarian Response Plan (GHRP), National Action Plan for Covid-19, Pakistan's Preparedness and Response Plan for Covid-19, and the National Deployment and Vaccination Plan (NDVP) strategically guided the Covid-19 vaccine rollout.

Still, despite concerted responses and efforts on the part of the government and all its partners, strict administrative measures, and mass-scale rollout of vaccines, the country saw six Covid-19 waves. Some waves were more severe than others, with three taking place before vaccination started and three since. By June 2023, out of the tested Covid-19 cases, 1,580,631 were confirmed; 1,548,286 recovered, 30,656 died due to Covid-19 and the country still had 11,757 active cases. By that time, 31,656,354 tests were performed. In addition, Pakistan saw a recovery rate of about 98.4%. About 300 medical professionals fell victim to the virus. The vaccine rollout began in February 2021 after the country received 500,000 doses of vaccine from China. Through rigorous Risk Communication and Community Engagement (RCCE), Pakistan had administered 339,286,324 vaccine doses till the end of 2022, with fully vaccinated individuals in Pakistan being 132,612,911, while 139,795,115 of the target population were partially vaccinated.

In order to document Pakistan's response, its successes, constraints, opportunities, and lessons learned, this research was commissioned to understand and explain how Pakistan's health system strategically realigned itself, enhanced its capacities, overcame challenges, suffered insufficiencies, and implemented plausible solutions to tackle the pandemic.

1.2 Object of Documentation – Pakistan's Covid-19 Response

The object of this documentation is Pakistan's Covid-19 Response and lessons learned from its experience of tackling the pandemic. UNICEF solicited proposals from national and international organizations/institutions to conduct this documentation. Contech International, having wide-ranging experience in applied research, evaluations, health security, and health systems strengthening, was selected to conduct this documentation while working closely with the Ministry of National Health Services Regulations and Coordination (Mo NHSR&C), UNICEF Pakistan, and other key stakeholders. Contech gathered and documented the processes and lessons learned from the Covid-19 response to

[1] Kamran, K., & Ali, A. (2021). Challenges and Strategies for Pakistan in the Third Wave of Covid-19: A Mini Review. Frontiers in Public Health, 9, 690820. https://doi.org/10.3389/fpubh.2021.690820

guide future preparedness programming and to carry forward the emergency measures and capacity gains into a normal situation.

1.2.1 Goal and Objectives

The goal of the assignment is to document the Covid-19 pandemic and lessons learned from the response in Pakistan. Taking into account gender, equity, and human rights considerations, the specific objectives of this documentation are:

- To provide an opportunity to collectively analyze and document the ongoing overall Covid-19 Pandemic response in Pakistan by the government, non-government sectors, and development partners both on multisectoral responses and vaccine deployment fronts. The impact of infection control measures like lockdown and social messaging will be explored, as well as the role of the NCOC platform ensuring smooth communication between organizations and countering prevailing misconceptions, and linkages with the National Coordination Committee (NCC) for operating harmoniously;
- To assess the impact of Covid-19 on health and immunization service delivery and the status of recovery. This will include a deep dive to measure the impact of the surveillance system and to what extent the data has been used for decision-making, and lessons for surveillance and response to priority infectious diseases;
- To apply lessons learned/good practices and make recommendations, suggesting how we can make the health systems more resilient during similar pandemics through systems strengthening;
- To study and document the role of the supply chain system and digital health in the overall response to the Covid-19 pandemic;
- To recommend ways for sustaining routine development programs along with humanitarian responses in the case of a pandemic of a similar scale;
- To recommend necessary measures for sustaining the continuity/restoration of essential health services during any future pandemics and humanitarian situations;
- To ascertain how the government and other partners can work together on preparedness for responding to any future pandemic at scale;
- To conduct stakeholder mapping for partnerships in case of a need for specific epidemic or pandemic responses; and
- To determine the preparedness, challenges, and responses for vaccine introduction and its continuity as per the National Deployment and Vaccination Plan (NDVP).

1.2.2 Stakeholders' Engagement

The key stakeholders for this documentation comprised of representatives of the Ministry of National Health Services, Regulations and Coordination (Mo NHSR&C), the UNICEF team, Contech International, and national technical experts. The documentation team identified appropriate individuals (federal, provincial, and district level) for key informant interviews, focus group discussions, and roundtable consultative meetings. The individuals involved in the Covid-19 response were prioritized and reached out to rather than interviewing the incumbents.

The documentation team mapped the key stakeholders (Table 1), who had contributed at various levels to enhance response preparedness and vaccine deployment in Pakistan. Resultantly, a range of multi-level stakeholders participated in and contributed to this documentation exercise. These included government health institutions at the federal level, provincial/regional departments, and healthcare providers and frontliners at public and private hospitals. At the district level, district administration comprising of Deputy Commissioners, CEOs/District Health Officers, and implementing agencies including NGOs, CBOs/CSOs were included. Other critical stakeholders involved in the Covid-19

response, including donors, development partners, media, and members of academia were reached out to gather lessons learned. Significant resources for the Covid-19 response were provided through global health initiatives, including GFATM, GAVI/COVAX, and PEI, and their role was explored around the effectiveness and timeliness of their support. A complete list of consultations (interviews, roundtable consultations, and focus group discussions) and contributors is attached as Annex 1. Altogether, the government health institutions, policymakers, and development partners, including UNICEF are the primary intended users of this documentation and will benefit from learnings relevant to their work. Women, children (girls and boys), families, communities, healthcare providers, and opinion leaders would be the secondary audience, who can benefit from this documentation exercise, directly or indirectly.

Table 1: Multi-Level Stakeholders

Level	Stakeholders
Federal	Ministry of National Health Services Regulations and Coordination (Mo NHSR&C) National Institute of Health (NIH) National Command and Operation Center (NCOC) National Emergency Operations Centre (NEOC) Federal Directorate of Immunization (FDI) National Disaster Management Authority (NDMA) Public Health Laboratories Division (PHLD) Ministry of Planning, Development & Special Initiatives (PDSI) Ministry of Finance/FBR Economic Affairs Division (EAD) Ministry of Industries and Production Pakistan Meteorology Department Ministry of Information and Broadcasting Aviation Division
Provincial	Offices of Chief Secretary Departments of Health (Offices of Ministers and Secretaries) DG Health Offices Provincial EPI Programs Provincial Emergency Operation Centers Implementing Agencies Provincial Disaster Management Agencies Provincial Disease Surveillance and Response Units Healthcare Commissions Budget & Accounts Officers
District	District Administration and District Health Offices
Development Partners	USAID, WHO, UKHSA, CDC, World Bank, BMGF, JSI, GAVI, PEI, FCDO, GFATM, ADB, IsDB and UNICEF
Healthcare	Public and private sector health facilities/hospitals, medical professional
Academia	Health related Research Universities (e.g., Health Services Academy, University of Health Sciences, Aga Khan University)
Media	Media Houses, Journalists, Anchors, Reporters
Civil Society	NGOs/CSOs with Community Outreach

1.2.3 Scope of Documentation

A participatory approach was adopted by identifying and involving all key stakeholders at every step of the assignment. Contech's implementation strategy was to carry out the assignment through the deployment of a multi-dimensional team. Technical appropriateness and the need for data were the most important factors influencing research methods of choice. It is envisaged that documentation produced through this exercise will be used to generate evidence and inform to improve the country's health system readiness for future pandemics. It will also be used to identify and capitalize on strengths (success factors i.e., what worked), weaknesses or challenges (failures/missed opportunities i.e., what did not work), and lessons learned. Following was the scope of documentation:

- The documentation process covered the government, including NCOC and other partners, direct response to the pandemic, in line with the Covid-19 Global Humanitarian Response Plan (GHRP) and Pakistan's Covid-19 Preparedness and Response Plan/Strategic response plan and National Deployment and Vaccination Plan (NDVP);
- The documentation had a national focus but spanned to the provincial level and districts;
- The temporal scope of the documentation spanned from February 2020, when the Covid-19 case was reported in Pakistan, until 30 December 2022;
- The documentation used a 12-areas all-encompassing framework highlighting major inquiries in each area;
- The assignment took a human rights approach and humanitarian response context; and
- The documentation will contribute towards the development of an action plan for preparedness and addressing a similar type of pandemic at scale.

1.3 Covid-19 Waves in Pakistan

The Covid-19 pandemic had a profound impact on nations worldwide, including Pakistan. Despite concerted responses and efforts on the part of the government and all its partners, strict administrative measures, and a mass-scale rollout of vaccines, the country experienced six waves, some more severe than others, with three occurring before start of vaccinations (Figure 1).

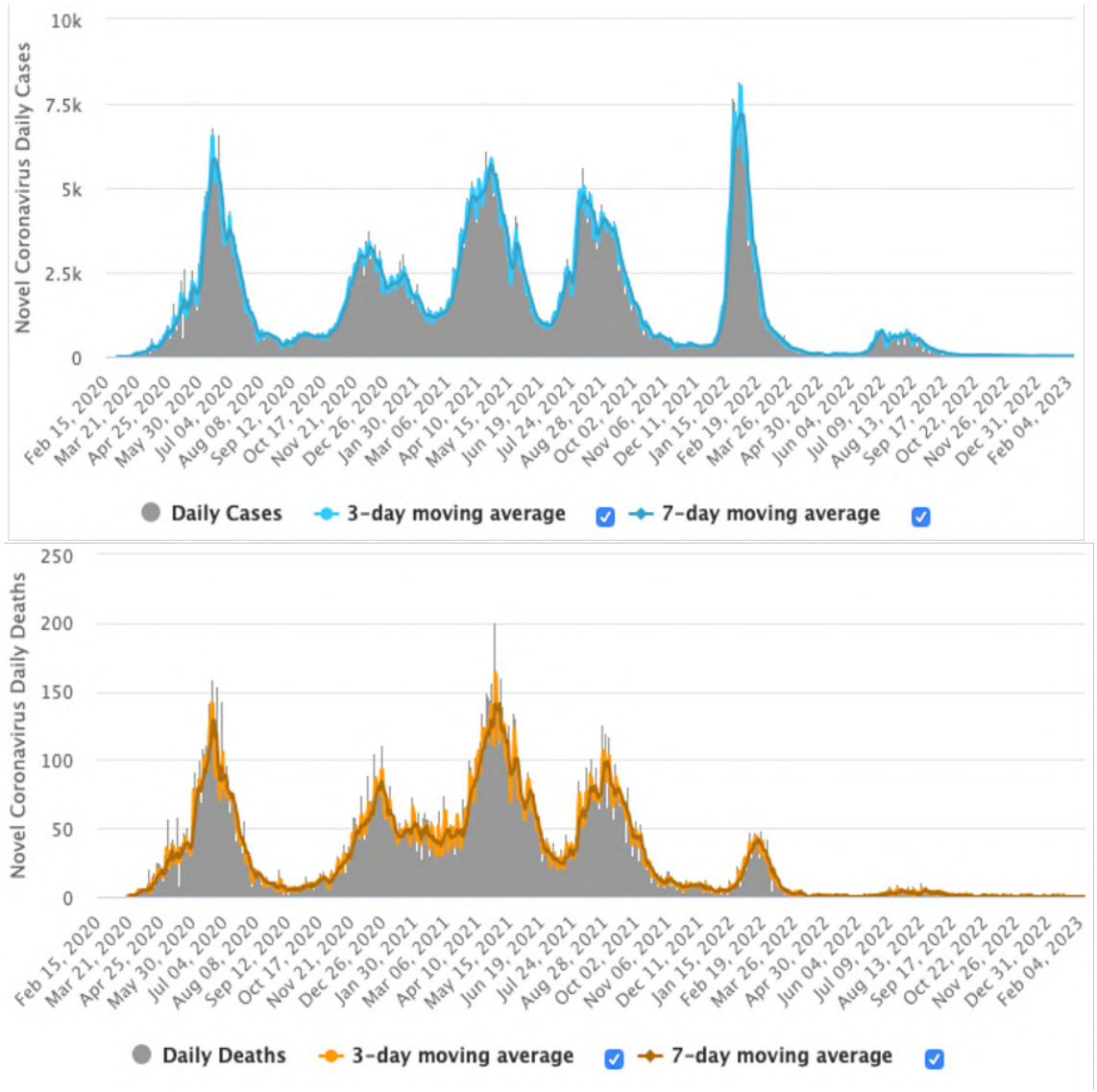
Each wave exhibited distinct patterns in case numbers, testing capacities, positivity ratios, and total deaths. The following is an overview of the different waves of Covid-19 in Pakistan, starting with the first wave in March 2020, followed by subsequent waves in October 2020, March 2021, July 2021, December 2021, and May 2022. By examining key dates, total cases, peak periods, and other relevant data, we can gain insights into the progression and impact of the virus in Pakistan during these different waves.

1.3.1 First Wave

The first wave of Covid-19 in Pakistan began on 18th March 2020 when cases started to rise after a period of relative stability. At the start of the wave, there were a total of 7 reported cases. The variant of concern was called Beta (*B.1*). The peak of the first wave occurred on 18th June 2020, with a maximum of 5,865 daily cases recorded.

On the testing peak day, there were approximately 41,666 tests conducted. The positivity ratio, which measures the percentage of positive cases out of the total tests conducted, was highest at the start of the wave with a rate of 25.62%. It remained consistently high throughout the wave but gradually decreased to its lowest point of 5.84%. By the end of the wave, the positivity ratio was recorded at 1.93%. The total number of cases at the end of the first wave was 293,752 representing the cumulative number of reported cases during the wave.

Figure 1: Epidemic Curves of Covid-19 Cases and Deaths in Pakistan



The first wave concluded on 3rd September 2020, marking the end date of this initial surge in cases. Key milestones and non-pharmaceutical interventions during the first wave are as follows:

March-April 2020

- National plan was developed to reinforce the pandemic response.
- Pakistan enforced a complete lockdown with interprovincial transport restrictions on 21st March.
- NCOC (National Command and Operation Center) was established.
- Academic institutions and public transport were closed with restrictions on public gatherings.
- Nationally, all domestic flights were canceled.
- Local reduction of personal protective equipment (PPE) was initiated.
- The army was deployed to enforce lockdown procedures.

May 2020

- A WhatsApp number was established for reporting SOP violations.
- The Integrated Disease Information Management System (IDIMS) was implemented.

- Complete contact tracing was conducted for all detected cases.
- Small stores and domestic planes opened when the lockdown was lifted.
- Domestic flights resumed, but international travel restrictions in place for certain zones.

June 2020

- Inter-provincial travel restrictions were lifted, and the lockdown ended.
- A smart lockdown was implemented in Islamabad, and later expanded to other cities.
- Only certain regions allowed limited foreign travel with quarantine requirements.

July 2020

- Public transport reopened.
- The Islamabad Isolation Hospital & Infectious Treatment Centre (250 beds) was inaugurated.

August 2020

- Lockdown was lifted in Punjab with restrictions on gatherings above 10 participants.
- Restaurants opened while workplaces partially reopened with work-from-home arrangements.

1.3.2 Second Wave

The second wave of Covid-19 in Pakistan commenced on 16th October 2020, with cases starting to rise following a period of relative stability. The new variant of concern was Beta (*B.1.36*). At the beginning of the wave, there were a total of 321,218 reported cases. The peak of the second wave occurred on 10th December 2020, with a maximum of 3,246 daily cases recorded, representing the highest number of new infections in a single day during this wave.

On the testing peak day, a total of 54,649 tests. The positivity ratio was 1.96% at the start of the wave. It fluctuated during the course of the wave, reaching its lowest point of 1.91% and peaking at 8.21%. By the end of the wave, the positivity ratio was recorded at 3.41%. The total number of cases in the second wave was 246,188. The second wave concluded on 10th February 2021, marking the end date of this particular surge in cases. Key milestones and non-pharmaceutical interventions during the second wave are as follows:

October 2020

- Mask wearing became mandatory.
- Broader SOPs were implemented, and office hours were reduced.

November 2020

- Only outdoor weddings with up to 300 attendees were permitted.
- 50% of workforce was required to work from home.
- Large-scale gatherings were prohibited, and schools, colleges, and universities were closed.

1.3.3 Third Wave

The third wave began on 6th March 2021, with three new variants – Alpha, Beta & Delta (*Alpha/B1.1.7/ Delta/ B.1.617.2*). At the start of this wave, there were a total of 587,014 cases. The peak of the third wave occurred on 25th April, with a maximum of 5,694 daily cases recorded. By April, people aged 40 and above were eligible to receive their doses. On the testing peak day, a total of 68,002 tests. The positivity ratio was 4.04% at the start of the wave. It fluctuated throughout the course of the wave, reaching its lowest point of 2.08% and peaking at 10.59%. By the end of the wave, the positivity ratio was recorded at 2.10%. The total number of cases at the end of the third wave was 377,668 representing the number of reported cases during this wave. The third wave concluded on 30th June 2021, marking the end date of this particular surge in cases.

Key milestones and non-pharmaceutical interventions during the third wave are as follows:

February 2021

- The vaccine rollout began on 15th February 2021, being only administered to registered health workers and people aged 65 years and above.
- The Sinopharm Vaccine (1st Dose) was administered.

April 2021

- 1st dose Sputnik V vaccine and CanSino Bio-Vaccine was administered.

1.3.4 Fourth Wave

Following a period of relative stability, the Delta and Beta variant (*Delta/ B.1.617.2*) began the fourth wave of Covid-19 in Pakistan on 2nd July 2021. At the beginning of this wave, there were a total of 958,408 reported cases. The peak of the fourth wave occurred on 7th August 2021, with a maximum of 4,729 daily cases recorded, representing the highest number of new infections in a single day during this wave. On the testing peak day, a total of 64,737 tests were performed. The positivity ratio was 2.32% at the start of the wave. It fluctuated throughout the course of the wave, reaching its lowest point of 4.48% and peaking at 8.46%. By the end of the wave, the positivity ratio was recorded at 1.41%. The total number of cases at the end of the fourth wave was 320,333 representing the number of reported cases during this wave. The fourth wave concluded on 25th October 2021, marking the end date of this particular surge in cases. Key milestones and non-pharmaceutical interventions during the fourth wave:

July 2021

- Moderna vaccine guidelines were announced and the Pfizer vaccine was administered to immunocompromised individuals.
- Tourism reopened.

August 2021

- 1.5 million people were vaccinated and AstraZeneca vaccine was made available to the public.
- Vaccination doses for 12-year-olds traveling internationally were allowed.

September 2021

- Individuals aged 17-18 became eligible to receive the vaccine.

1.3.5 Fifth Wave

On 30th December 2021, the fifth wave of Covid-19 in Pakistan began due to the spread of a new variant named Omicron (*Omicron BA.5.2.1.7*). At the start of this wave, there were a total of 1,290,000 reported cases. The peak of the fifth wave occurred on 31st January 2022, with a maximum of 7,198 daily cases recorded, representing the highest number of new infections in a single day during this wave. On the testing peak day, a total of 64,162 tests were performed. The positivity ratio was 0.82% at the start of the wave. It fluctuated during the course of the wave, reaching its lowest point of 0.53% and peaking at 12.28%. By the end of the wave, the positivity ratio was recorded at 0.53%. The total number of cases at the end of the fifth wave was 221,825 representing the cumulative number of reported cases during this wave. The fifth wave concluded on 13th April 2022, marking the end date of this particular surge in cases. The key milestone for the fifth wave:

April 2022

- Minister for Planning, Development, and Special Initiatives Asad Umar announced closure of the National Command and Operation Center (NCOC) operations.

1.3.6 Sixth Wave

The sixth wave of Covid-19 in Pakistan began on 7th May 2022. At the start of this wave, there were a total of 1,530,000 reported cases. The peak of the sixth wave occurred on 9th July 2022, with a maximum of 734 daily cases recorded, representing the highest number of new infections in a single day during this wave. Information regarding the daily tests conducted on the testing peak day showed a reduced number of daily testing with the maximum number of tests reaching 22,080. The positivity ratio fluctuated during the course of the wave. The highest recorded positivity ratio was 1.07%, while the lowest was 0.0%. These values demonstrate the variation in the proportion of positive cases among the tested individuals. The total number of cases at the end of the sixth wave was 1,570,000, representing the cumulative number of reported cases during this wave. Unfortunately, the sixth wave resulted in a total of 260 deaths due to Covid-19. The sixth wave concluded on 16th October 2022, marking the end date of this particular surge. Key milestone during the sixth wave are as follows:

September 2022

- Initiation of Covid-19 vaccination in individuals aged 5-11.

Table 2: Comparison of Covid-19 Waves in Pakistan

Parameters	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Variant	Beta	Beta	Alpha, Beta & Delta	Beta and Delta	Omicron	Omicron
Start & End	18th Mar to 3rd Sep 2020	16th Oct to 10th Feb 2020	06th Mar to 30th Jun 2021	2nd July to 25th Oct 2021	30th Dec to 13th Apr 2022	7th May to 6th Oct 2022
Total Cases	293,752	246,188	377,668	320,333	221,825	45,016
Peak Daily Cases	5,865	3,246	5,694	4,729	7,198	734
Total Tests	2,571,244	4,638,219	5,458,041	7,148,130	4,120,909	2,412,962
Peak Testing	41,666	54,649	68,002	64,738	64,162	22,080
Peak Positivity	25.62%	8.21%	10.59%	8.46%	12.28%	1.07%
Total Deaths	6,204	5,537	9,423	6,287	1,401	254

1.5 Report Organization

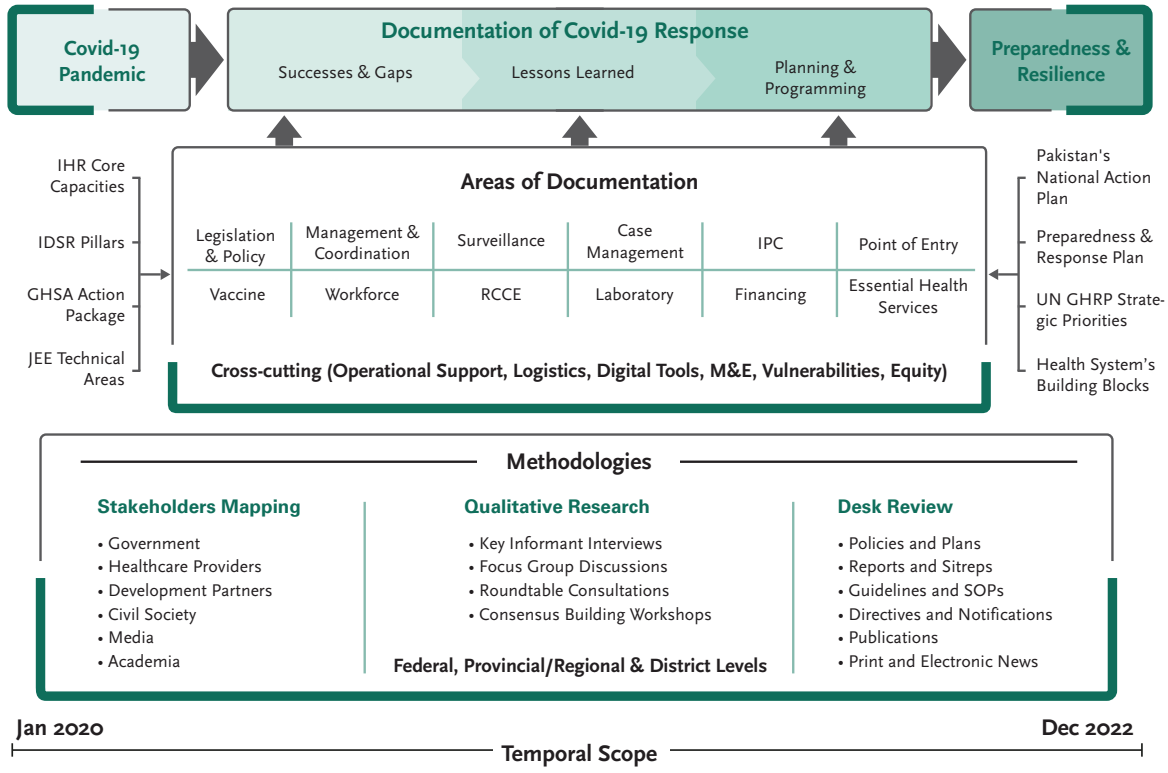
The report covers various aspects of the Covid-19 response in Pakistan at the national level and in all provinces, regions, and ICT. First, the report lays out the context and analyzes different Covid-19 waves in the country, stakeholders' engagement, and goals, objectives, and scope of the documentation. Following this, the methodology comprising the research framework, documentation areas, methodical design, analytical approach, and flow of work is provided. Next, in the third chapter, the report contains findings under 12 documentation areas, followed by a description of lessons learned, recommendations, conclusion, references, and annexes.

2. METHODOLOGY

2.1 Documentation Framework

Considering the scope and objectives of this assignment, a framework was developed to holistically cover all dimensions of documenting Pakistan's response and lessons learned. The documentation framework (Figure 2) outlines 12 documentation areas, national and global frameworks informing these areas, and proposed methodologies, including stakeholder mapping, qualitative research, and secondary research. Under each area, strategies and actions that were most successful, along with challenges, opportunities, and circumstances under which actions were taking place, are included in the documentation to inform planning and programming to improve preparedness and resilience of Pakistan's health system to face future crises.

Figure 2: Framework for Documentation of Pakistan's Covid-19 Response



2.2 Areas of Documentation

Ascertaining the areas of documentation was a critical step for capturing responses and recovery efforts implemented across the country. Different frameworks and global guidelines were reviewed to identify various areas of response, including International Health Regulations (IHR) Core Capacities, Integrated Disease Surveillance and Response (IDSR) Pillars, Global Health Security Agenda (GHSA) Action Package, Joint External Evaluation (JEE) Technical Areas, Pakistan's National Action Plan, and National Preparedness & Response Plan for Covid-19, UN Global Humanitarian Response Plan

(GHRP) Strategic Priorities, and Health System's Building Blocks. Based on desk review and consultations with Mo NHSR&C and UNICEF, the following 12 areas were identified for the documentation of response, and details of queries with identified respondents were developed in the form of a documentation matrix.

1. Legislation and Policy – Legislative landscape, Public Health Acts, action plans, administrative policies, and public health measures.

2. Management and Coordination – Pre-existing mechanisms, institutional arrangements, National Command & Operation Center, federal and provincial institutions, and provincial and district-level structures.

3. Surveillance – Surveillance system in Covid-19 response, recording & reporting, digitization & use of information, TTQ Strategy, and quality assurance of surveillance data.

4. Case Management – Policy and guidelines, planning and implementation, service provision, stockpiling, and public health measures.

5. Infection Prevention and Control (IPC) – IPC guidelines, supplies, and a safe environment in health facilities.

6. Points of Entry – Mapping, capacity assessment, services, and supplies.

7. Vaccine – National Vaccine Deployment Plan, vaccination sites, vaccination database, vaccination coverage, and Adverse Effects Following Immunization (AEFI).

8. Workforce – Workforce types, workforce strategy, workforce development, workforce protection, and HR surge capacity.

9. Risk Communication and Community Engagement (RCCE) – Risk communication systems, internal and partner coordination, public awareness communication, community engagement, addressing uncertainty and perceptions, and managing misinformation.

10. Laboratory – National testing strategy, lab supplies, IPC, information, and quality assurance.

11. Financing – Financial planning, Resource mobilization, shifts in development assistance, extra-budgetary means and re-allocations, purchasing of services from the private sector, and exceptional mechanisms during Covid-19.

12. Essential Health Services – Prioritizing essential health services, the impact on essential health services, and mitigation and resource redistribution.

2.3 Methodological Design

The design adopted is summative documentation through a participatory approach, where key stakeholders who worked to plan and implement the response activities were engaged throughout the process of data extraction, data collection, analysis, formulation of recommendations, and reporting. Qualitative and secondary research was conducted to collect the data.

Geographical Focus – Documentation had a national focus but spanned to all provinces and regions of Pakistan, including Balochistan, Khyber Pakhtunkhwa (KP), Punjab, Sindh, Azad Jammu & Kashmir (AJK), Gilgit Baltistan (GB), and Islamabad Capital Territory (ICT).

Temporal Focus – Covid-19 response documentation covered the period from the start of the pandemic till the end of 2022. Initially, the timeline of documentation was until June 2022, and after initial consultations with Mo NHSR&C and UNICEF, it was extended till December 2022 to capture the implementation of childhood vaccination activities.

2.3.1 Data Collection Methods

Qualitative Data Collection – Primary data was collected using qualitative methods at federal, provincial/regional, district, and health facility levels. A purposive sampling technique was utilized for the selection of key respondents who were directly involved in Covid-19 response rather than the currently incumbent ones. Techniques employed for qualitative data collection included:

- Key Informant Interviews (KIIs) – A total of 42 KIIs conducted at national, provincial, regional, and district levels across Pakistan.
- Roundtable Consultations (RTCs) – Six roundtable consultative meetings conducted in all provinces and regions of Pakistan.
- Focus Group Discussions (FGDs) – Five FGDs focusing on public and private healthcare providers, civil society organizations, media personnel, and health managers.

Secondary Research – A desk review of all the relevant data available at federal, provincial, district, and health facility levels was conducted in all 12 areas of documentation. A comprehensive list of strategic and operational documents developed during inception and implementation was thoroughly reviewed. Broadly, secondary research entailed the following:

- Policies and plans, including Pakistan's National Action Plan for Covid-19, Pakistan's Covid-19 Preparedness & Response Plan, NDVP, Acts, and TORs of institutional arrangements.
- Covid-19 Reports, including national and provincial/regional databases, and reports.
- Guidelines and SOPs, including National Guidelines on Case Management, IPC, Lab, POE, Public Health Measures, and Vaccination.
- Publications, including national and international literature.
- Media Watch – including print and electronic news covering the entire temporal scope.

2.3.2 Analytical Approaches

Qualitative data was analyzed thematically by reducing the overwhelming amount of information and extracting complex phenomena hidden in data, in a creative, flexible, yet systematic manner. A comprehensive coding framework was developed based on the documentation matrix. Transcripts were examined manually using thematic analysis and a system of constant comparison. This whole process included identifying general themes and categorizing and classifying overarching themes from the emergent data to elicit lessons learned. Overall, findings were analyzed in context of assignment objectives, areas of documentation, and questions as per the documentation toolkit. In the end, triangulation was applied to qualitative findings along with secondary research to present findings of documentation, lessons learned, and recommendations.

2.3.3 Ethical Standards and Compliance

Ethical considerations for this assignment were built on the UNICEF Procedure for Ethical Standards in Research, Evaluation, Data Collection, and Analysis (2021), and the UNICEF Strategic Guidance Note on Institutionalizing Ethical Practice for UNICEF Research and the research team also completed a course on 'Introduction to Ethics in Evidence Generation'. The technical team maintained the highest standards of integrity, respect, beneficence, justice, sensitivity, and confidentiality in dealing with informants/participants, to ensure that the human and civil rights of the people involved were given due consideration. All the participants were engaged in a manner that honors their dignity, well-being, participation, and personal agency.

Obtaining Informed Consent – Every individual had the right to refuse to participate or to refuse to answer specific questions, and interviewers respected those rights. Verbal consent was sought after explaining the objective, and data collection procedures, along with risks and benefits, based on the consent form. Interviewers read out the consent statement and clarified any apprehensions.

Privacy and Confidentiality – UNICEF's Policy on Personal Data Protection (2020) was fully adhered to. The data collection process was conducted in a manner comfortable for each respondent, and in which the individual was able to speak openly and honestly. Interviewers did not discuss participants' answers with anyone, except the technical team when clarification was needed. Individuals' names, addresses, or other identifying information was not linked.

Minimizing Harms and Maximizing Benefits – All necessary measures were taken into account to ensure that methodological choices, including choices of data sources, maximize benefits and minimize negative impacts on participants. Potential bias and implications were considered explicitly to prevent discrimination based on gender, race, religion, disability, or any other factors, and wherever possible, to ensure inclusiveness. The technical team ensured the respect, protection, and promotion of human rights and international standards at all levels.

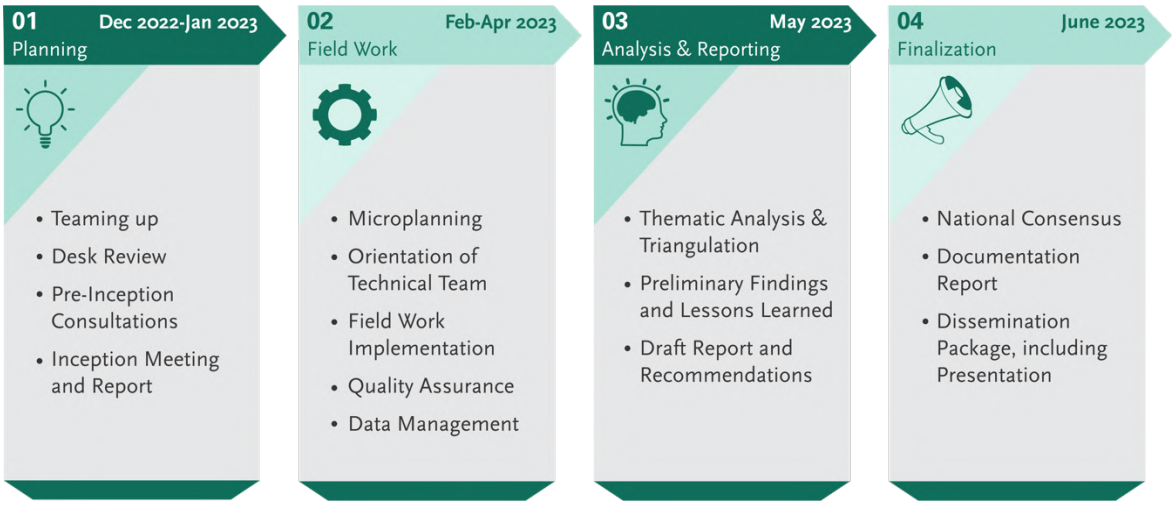
Safety and Security of Data – Hard copies such as field interview notes, prints of photographs, or audiotapes were kept securely in a locked cabinet that could only be accessed by authorized members of the research team. Soft copies on the computers were encrypted/password protected.

Conflict of Interest – No actual or potential conflicts of interest were identified for research team.

2.4 Phases of Work

The figure below shows the flow of activities that had taken place during the assignment:

Figure 3: Assignment Workflow



2.5.1 Continuous Liaison with Mo NHSR&C and UNICEF

The documentation team worked in close collaboration and continuous liaison with Mo NHSR&C and UNICEF Pakistan. A core group was nominated including the representatives of Ministry, HPSIU and UNICEF, who provided guidance regularly over the course of the assignment and reviewed the deliverables to ensure their quality. The data collected is the sole property of the Mo NHSR&C and UNICEF.

3. FINDINGS

This section describes the findings related to Pakistan's Covid-19 response, its successes, constraints, and opportunities under 12 documentation areas. The information is based on interviews, roundtable consultations, and focus group discussions with more than 165 key individuals involved in the Covid-19 response, including political leadership, government officials, technical experts, representatives from international organizations, development partners, civil society organizations, media, academia; and desk review of government's documents, reports, peer-reviewed publications, and print media.

3.1 Legislation and Policy

Instruments, legally binding and enforceable, to delineate authorities for an emergency declaration, preparedness, operational readiness, response planning, executive orders, non-pharmaceutical interventions (NPIs) and recovery actions with sector-specific provisions, and to engage communities, civil society, community organizations, and networks and private practitioners for early detection and immediate reporting of Covid-19.

Box 1: Legislative and Policy Landscape for Covid-19 Response

- At the outset of the pandemic, there were limitations in availability of specific laws to address public health emergencies of this scale, and in such scenarios, executive orders and directives provided quick solutions for legal cover.
- The National Institute of Health (Re-organization) Act 2021 was passed with the aim to strengthen the capacity to manage public health emergencies and incorporate a multi-sectoral approach within the legislative and policy frameworks.
- Provinces and regions also utilized context-specific laws and ordinances through pre-existing and fresh enactments to align their response with the evolving situation.
- While uncertainty remained to be one of the defining features of policy formulation, review of emerging trends and projections helped in planning ahead.
- Initial success of Pakistan's response was attributable to comprehensiveness and practicability of national level plans, including National Action Plan (February 2020), National Preparedness and Response Plan (April 2020), and National Deployment and Vaccination Plan (June 2021).
- During the 1st quarter of pandemic, there was very strict enforcement of NPIs and later on, the government's stance on lives versus livelihood debate led to relaxation of various measures.
- Public belief and confidence was also fostered to build their trust for strict enforcement of NPIs, even in remotest parts of the country.

3.1.1 Legislative Landscape for Pandemic Response

At the outset of the pandemic, legislative landscape was not structured and there were limitations in terms of availability of specific laws to address public health emergencies in Pakistan. The existing West Pakistan Epidemic Diseases Act of 1958, although a valuable legal instrument, did not cover the

range of measures required for addressing the pandemic comprehensively. A representative of international agency informed, "*It was introduced in the purview of influenza outbreak of 1957 and does not cater to mitigation measures such as contact tracing, containment (quarantine and isolation) and the social restrictions, while safeguarding basic human rights*." Nevertheless, the four-paged Act became a crucial legal instrument during the Covid-19 response in Pakistan, particularly in Islamabad Capital Territory (ICT), Azad Jammu & Kashmir (AJK), and Balochistan – providing authority to the government to develop and enforce regulations for pandemic control. However, its implementation faced complications, with individuals often challenging it in court. It was primarily due to stern measures taken under the act, such as the closure of businesses, being perceived as a violation of fundamental rights. A federal level respondent informed, "*Individuals and businesses affected by closures and other restrictive measures challenged the Act in High Courts, seeking relief or questioning its legality*." The existing National Disaster Management Authority (NDMA) Act of 2010 provided some functional space. The Pakistan Emergency (Coronavirus) Rules 2020 were developed under this Act, which supported emergency procurement of essential medical commodities, equipment, and later on, vaccines.

One of the key challenges faced during the pandemic was the devolution of many responsibilities, including health, to the provinces. As a result, there was no legal instrument in place that empowered the federal government to access real-time information, which was crucial in emergency situations. A federal health manager informed, "*The absence of such legal authority hindered the federal government's ability to gather comprehensive and timely data for decision-making and coordination*." The legislative response often took time, as the process of passing new laws was lengthy, and urgent actions were required during the pandemic. Another respondent explained the reason for not opting for passing comprehensive legislation after the onset of the pandemic, "*Of course, legislation was necessary but that's a very long process and at that point, we simply could not afford to waste so much time*." With prevailing inconsistencies in provincial laws, the federal laws possess constitutional preference with redistribution of power (Article 143 of the Constitution), reflecting a culture of cooperative federalism. Further, Article 149(4) of the Constitution empowers the federation to direct a province to exercise its executive authority for the purpose of preventing any grave menace to the peace or tranquility or economic life of Pakistan.[2] In this backdrop, the National Command and Operation Centre (NCOC) was established as an executive decision-making body. While not a legislative instrument, the NCOC functioned under the umbrella of constitutional provisions and received support from the superior courts, enabling it to make crucial decisions. Further, Section 144 of the Criminal Procedure Code (CrPC), empowered the district administration to issue orders in the public interest, including imposing bans on certain activities and enforcing penalties on non-compliance of instructions. Violations of these orders could lead to penalties under Section 188 of the Pakistan Penal Code (PPC). A representative of district administration described, "*Section 144, commonly known as the 'lockdown law' was imposed to maximize public safety and minimize the threat of Covid-19.*"

Efforts were made to update and review national legislation to align it with International Health Regulations (IHR) and address all notifiable diseases comprehensively. The efforts made by the federal and provincial governments, in collaboration with international organizations, helped bridge gaps in legislation. The National Institute of Health (Re-organization) Act 2021 was passed with the aim to strengthen the capacity to manage public health emergencies and incorporate a multi-sectoral approach within the legislative and policy frameworks. A federal level respondent informed, "*The*

[2] Aziz S. (2018). The Constitution of Pakistan: A Contextual Analysis (1st Edition, OUP), 157–64.

section on CDC in the National Institute of Health Act addresses the disease surveillance and various aspects of infectious diseases of public health importance in Pakistan."

Figure 4: National and Provincial Legislations Pertaining to Public Health Emergencies

3.1.2 Legal Instruments & Enactments at Provincial & Regional Level

Provinces and regions utilized context-specific laws and ordinances through existing and fresh enactments to align their response with the evolving situation. Notably, the Khyber Pakhtunkhwa province had already taken the lead in 2017 by introducing a public health act that focused on controlling and preventing communicable diseases and included provisions for surveillance, isolation, quarantine, and the establishment of public health institutions. Government of the Punjab enacted the Punjab Infectious Diseases (Prevention and Control) Ordinance 2020 in response to the Covid-19 pandemic. The ordinance contained a number of measures imposable by the Secretary of Primary & Secondary Healthcare Department and the Director General Health Services, who had extensive powers for controlling events, gatherings, and premises with provisions for closure of or restricted entry into certain premises and areas. However, it was argued that the ordinance did not provide a clear status for private sector and focused more on penalties for the violators rather than the cure and prevention of disease. One of the participants during roundtable consultations informed, "*The ordinance needs to be translated into rules and regulations to strengthen structures for tackling public health emergencies.*" The Sindh Government relied on The Sindh Epidemic Disease Act 2014 to provide legal cover to the Chief Secretary and Deputy Commissioners in the implementation of measures related to health emergencies across the province.

While ICT and Balochistan relied heavily on the West Pakistan Epidemic Diseases Act of 1958, AJK amended it as the West Pakistan Epidemic Diseases (Amendment) Act 2021. Describing the amendments, a representative of DOH AJK informed, "*With these provisions, the government is able to notify health emergencies along with authorization of relevant departments to recruit additional staff for tackling health emergencies.*" The Gilgit-Baltistan Infectious Diseases (Prevention and Control) Ordinance, 2020 provided a comprehensive legislative framework for prevention and control of infectious diseases in the GB. It is noteworthy that while there were variations in the acts across provinces, efforts were made to coordinate and align the response strategies through the NCOC. The

Pakistani soldiers wearing masks stand guard at closed Pak-Iran Taftan border at the outset of the pandemic.

Credits: AFP, 2020.

NCOC facilitated the sharing of best practices, coordination of policies, and implementation of guidelines at the national level, aiming to ensure a cohesive approach to addressing the pandemic across all provinces of Pakistan.

3.1.3 National Plans for Covid-19 Response in Pakistan

Initial successes of Pakistan's response to Covid-19 were attributable to development and implementation of comprehensive and doable plans at national level. The National Action Plan for Covid-19 was the first operational document that was developed on 12th February 2020 to cater to the potential epidemic. Experts from the Mo NHSR&C, NIH and representatives of the WHO contributed to development of this plan, which aimed to maximize the preparedness in different sectors of the government and efforts for a coordinated national response. It included SOPs, advisories, protocols, tools, and guidelines for risk assessment, goal assessment, case management, capacity assessment, screening of travelers, response generation, engagement of communities, and communication to public through various forms of media. Describing the timeliness of developing this action plan, a federal level respondent informed, "*A comprehensive National Action Plan was prepared long before the reporting of the first case in Pakistan and even before the declaration of Covid-19 as a global pandemic.*"

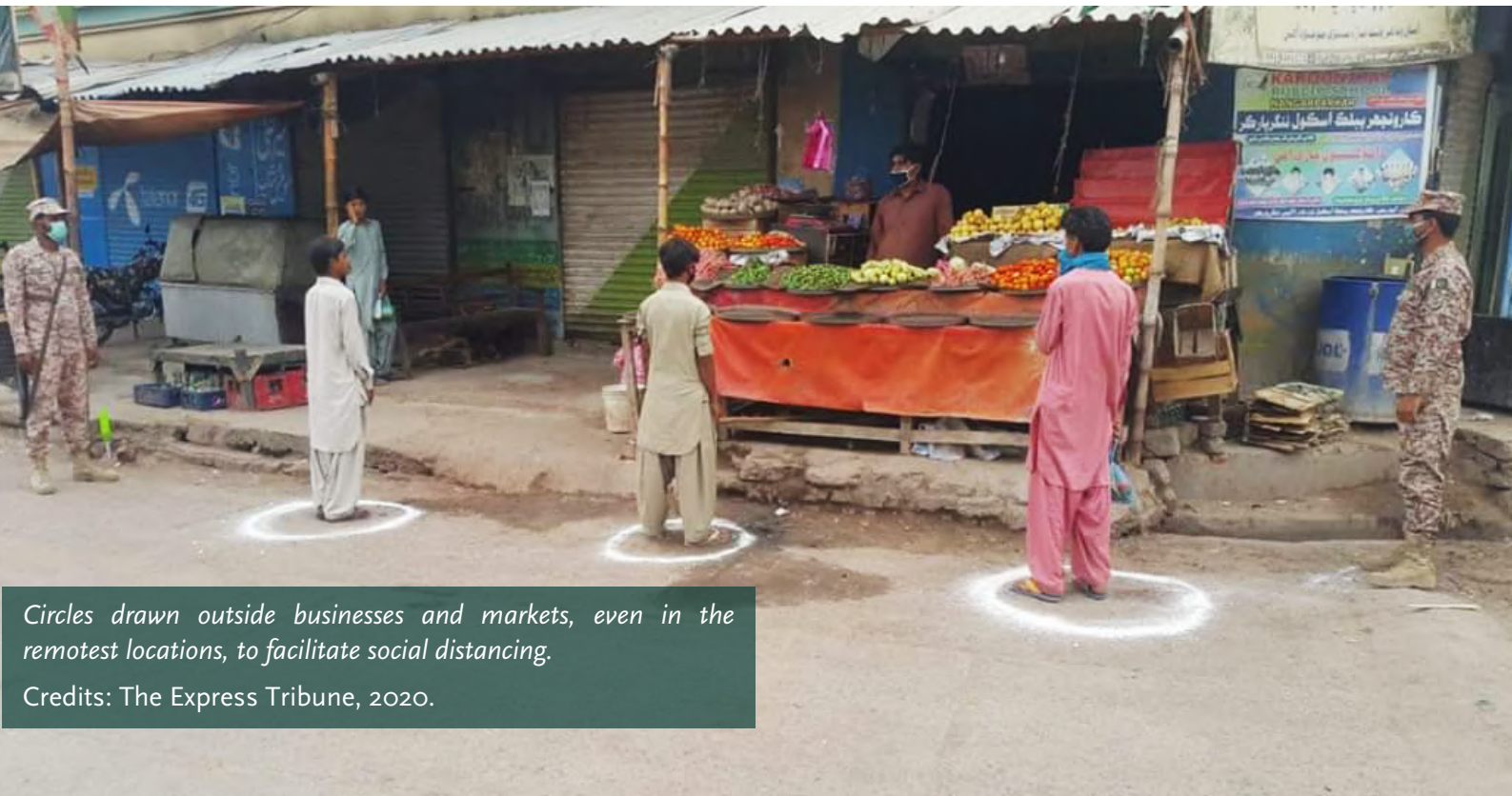
In line with Pakistan's National Action Plan, a National Preparedness and Response Plan was developed in April 2020 under the auspices of the Mo NHSR&C, with objectives to help prevent and limit the spread of Covid-19 in Pakistan and reduce the related morbidity and mortality due to the pandemic in the country. It followed the strategic pillars of the WHO strategic preparedness and response planning and the Global Humanitarian Response Plan (GHRP) to address the direct public health and indirect immediate humanitarian consequences of the pandemic. Strategic actions and interventions were proposed under each pillar and funding gaps were identified. The plan also coordinated international support in consultation with Ministry of Foreign Affairs to the Mo NHSRC, NDMA, and Provincial Health Departments to stop transmission of Covid-19 in the country. Although included in the pillars of strategic preparedness and response plan, safeguarding delivery of essential health services during the pandemic was an area that was glaringly missing in this plan.

National Deployment and Vaccination Plan (NDVP) for Covid-19 Vaccines was developed on 24th June 2021 by the Expanded Program on Immunization (EPI) of Mo NHSR&C. The plan unpacked various aspects of Covid-19 vaccination related to planning and coordination, regulatory preparedness, targeting of population, costing and funding, vaccine delivery strategy, supply chain management, microplanning, human resource management and capacity building, waste management, RCCE, surveillance of AEFI and evaluation of vaccination effects and outcomes.

3.1.4 Policies for Public Health and Social Measures

Non-Pharmaceutical Interventions (NPIs) are measures implemented to control the spread of infectious diseases when pharmaceutical interventions like vaccines or specific treatments are not available or insufficient. During the Covid-19 response, Pakistan implemented various types of NPIs to mitigate the transmission of the virus. NPIs were identified at the national level through NCOC and NCC, which were communicated to the provincial leadership. Implementation and stringency of NPIs varied over time based on the evolving situation, regional circumstances, best practices, global experience, and guidance from health authorities. The NCOC played a key role in coordinating and implementing NPIs nationwide, while provincial and local administration and health departments were responsible for their enforcement and monitoring. A member of the provincial Covid-19 Task Force informed, "*All NPIs were approved by the Chief Minister and Chief Secretary, while Deputy Commissioners ensured their implementation.*" Lots of efforts, pertaining to district administration, were going on at the ground as implementation of the NPIs kept increasing over time.

Social Distancing – These measures were aimed at reducing close contact through the closure of educational institutions, suspension of public gatherings and events, and restrictions on large gatherings such as weddings and religious congregations. The mandatory closure of premises and facilities generated more debate and conflict than any other NPI. The initial closures were carried out after the decisions made by the National Security Committee on 13 March 2020, which led to closure of all educational institutions, wedding halls and cinemas for a prescribed time. The provinces implemented these decisions and thereafter took charge by extending the duration of closure and inclusion of other premises like parks and restaurants. Awareness raising campaigns were conducted to encourage people to maintain physical distance and avoid unnecessary social interactions.



Circles drawn outside businesses and markets, even in the remotest locations, to facilitate social distancing.

Credits: The Express Tribune, 2020.

Travel Restrictions – International restrictions on travel were imposed to limit the importation of the Covid-19 cases in Pakistan whereas local travel was restricted at various times during the course of the pandemic to halt local spread. These measures included suspension of International and domestic flights, closure of land borders, and mandatory quarantine for travelers arriving from high-risk areas. A federal respondent informed about the process of imposing travel restrictions, "*Countries were categorized as high-risk, medium-risk, and low-risk, based on their situation and there was a lot of pressure to reopen the travel links with certain countries*." Flights remained banned from all Category C (high-risk) countries. Other than Category A countries (low-risk), travelers from all other countries were required to provide a mandatory Covid-19 PCR test conducted within 72 hours before commencement of travel to Pakistan.

Face Mask Mandates – In May 2020, the use of face masks was made mandatory in public places in Pakistan. Guidelines were issued regarding the proper use of masks, and penalties were imposed for non-compliance, as traffic wardens used to impose fines (challans) for not using face masks while driving. Public awareness campaigns were launched to educate people about the importance of wearing masks and proper mask etiquette. People were restricted from entering certain premises without wearing masks, like shops, malls, banks, pharmacies, mosques, and schools. The use of mandatory face masks remained in the NPIs throughout the pandemic and relaxations were made only after the vaccination of a large proportion of population. Efforts were also made to maintain fair pricing of masks and hoarding was monitored to ensure regular supply in the markets.

Hygiene Practices – Emphasis was placed on promoting good hygiene practices such as frequent handwashing with soap and water, use of hand sanitizers, and respiratory etiquette (covering mouth and nose while coughing or sneezing). Role of public awareness campaigns was crucial to educate the population about these practices and their importance in reducing the spread of the infection.

Work-from-Home Practices – Instructions were issued by the government to enforce work from home practices to minimize the spread of the infection. District administration supported in ensuring the implementation of these practices as a representative of district administration informed, "*So we inspected the offices and ensured the enforcement of government directions with respect to percentage of total staff present at any specific time*."

Business and Industry Regulations – To balance public health concerns with economic activities, Pakistan implemented regulations for businesses and industries. This included the closure of non-essential businesses during lockdown periods, restrictions on operating hours, and enforcement of health and safety protocols such as sanitization, temperature checks, and physical distancing in workplaces. During the first wave, non-essential markets remained closed for nearly two months, which were later reopened for limited working hours.

Quarantine and Isolation – These measures were implemented to prevent the spread of the virus among individuals who were suspected or confirmed to have Covid-19. Isolation facilities were set up, and individuals were required to self-isolate at home if they tested positive or had close contact with a confirmed case. Quarantine facilities were established for individuals returning from abroad or identified as high-risk contacts. At airports, district administration was engaged in testing all the incoming passengers, and their proper transportation to the quarantine centers with arrangements for their food and well-being while the results of the tests awaited. A representative of district administration described the challenges in management of these passengers, "*This all was a very daunting task considering the fear factor of contracting the virus.*" There were incidents of escape of travelers from the quarantine centers established at local hotels, which were located through mobile tracking mechanisms and through coordinating with the administration of their region. During the initial waves, strict monitoring was ensured for infected people isolated within their homes, and teams

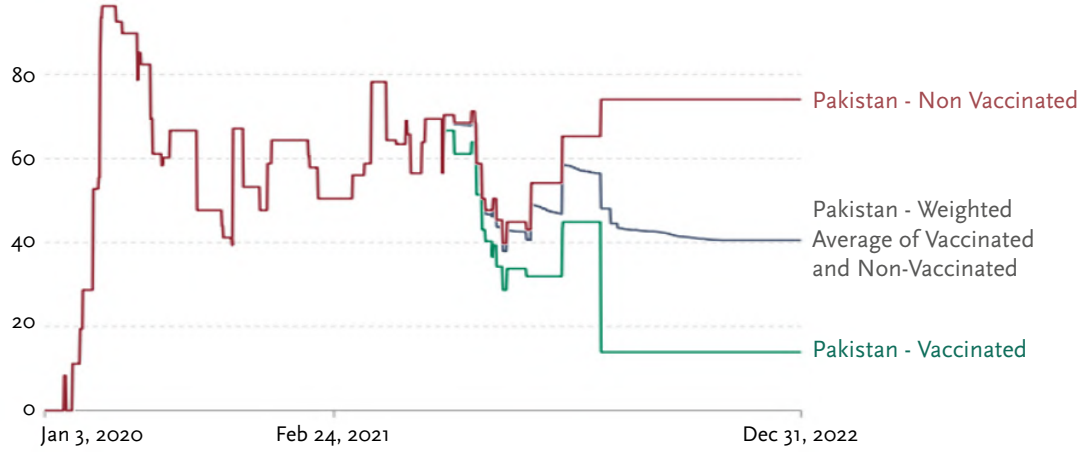
of health departments regularly checked the compliance of home isolation through conducting inspections.

Public trust played a key role in the implementation of the NPIs. With everchanging SOPs and NPIs according to the evolving situation of the pandemic, it was important to sensitize and educate the masses. In the absence of two-way communication or lag times in the dissemination of information through newspapers, it was difficult to reach out to masses within stipulated timelines. Normally, the public does not trust the government offices, and the issue was faced across all the provinces and regions of Pakistan. However, public trust was built, which was critical for the implementation of the NPIs. One of the respondents expressed, "*People's response was not good initially as government's credibility was not up to the mark but we managed to win confidence with time*."

3.1.5 Review of Stringency Index of Pakistan

The index describes the strictness of administrative measures and is based on nine metrics, including school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls. While the index shows very strict enforcement of administrative measures in the first quarter of the pandemic, the government's stance on lives versus livelihood debate led to relaxation of various measures after 10th May 2020. After that, the trends commensurate with the number of cases and positivity ratios, which ultimately came down after introduction of Covid-19 vaccination and its all-encompassing rollout in Pakistan. As of December 2022, the stringency index depicted the variation between the vaccinated and non-vaccinated, which continued till the WHO announced the end of the pandemic.

Figure 5: Stringency Index during Covid-19 Pandemic in Pakistan



3.2 Management and Coordination

Structures for ensuring effective response to the Covid-19 pandemic in the country and its federating units for coordinated efforts, mobilization of resources, and timely actions.

3.2.1 Initiation of National Pandemic Management

Pakistan demonstrated a remarkable level of awareness and attention towards the Covid-19 threat, surpassing the global understanding at that time. Despite the limitations of institutional arrangements, the top leadership and ministerial team in the country devoted significant attention to

Box 2: Arrangements for Pandemic Management in Pakistan

- Pakistan's response in early 2020 demonstrated a remarkable level of foresight and attention towards the Covid-19 threat, surpassing global understanding at that time.
- Pakistan's management and coordination structures, led by the National Command and Operation Center (NCOC), allowed for timely actions and resource mobilization by translating the concept of whole-of-nation approach into reality.
- The NCOC is a noteworthy case study of civil-military cooperation, providing maximum degree of authority, multi-sectoral engagement and action-oriented administrative prowess.
- Overall, the pandemic management was driven by data, utilizing a range of data sources from federal ministries, provincial governments, and related organizations.
- The National Disaster Management Authority (NDMA) acted as principal execution arm for expediting Covid-19 related procurement while cutting through bureaucratic red tapism.
- All development partners worked hand in hand with the governments in supporting Pakistan's response efforts, ranging from provision of direct financial assistance to provision of technical assistance, capacity building support, and provision of different needs of the health system.

the situation. Advocacy was broadened beyond the health sector and the Prime Minister's Advisor on National Security was engaged and the issue was debated in the meeting of National Security Council. This proactive approach ensured that the public health agenda was elevated and received the necessary attention, even in the absence of direct awareness at the top level of leadership. While several nations were slow to act, Pakistan recognized the gravity of the situation and took immediate steps as one of the national level advisors informed, "*Pakistan's response to the Covid-19 threat in early 2020 demonstrates a remarkable level of foresight and commitment, enabling them to identify the threat earlier than many other countries for addressing the situation promptly.*" Another federal level respondent described, *"The commitment shown by the highest levels of leadership was commendable, especially considering that many other countries had not yet taken action*."

The country's swift response to management and coordination of pandemic began as early as the start of January 2020, with establishment of an Emergency Core Committee where military was also engaged through Military Operations, MO Directorate. This early-on military cooperation and support helped overcome inherent inertia and facilitated effective decision-making. Regular meetings with the Chinese Ambassador to stay informed about the situation further exemplified the foresight and decisive actions taken by Pakistan. The decision to allow Pakistani students to remain in China during that time further reflected the country's calculated approach. Emergency Operations Center (EOC) was established on 22nd January 2020, which accelerated the screening of all inbound passengers at the points of entry, including major airports. Ad-hoc arrangements were made for managing international travelers and their quarantine at appropriate places. After the emergence of Covid-19 cases in Pakistan, scale of the calamity called for a much more coordinated response, leading to the setting up of a National Coordination Committee (NCC) on 13th March 2020. This was initially headed by the Special Assistant to Prime Minister (SAPM) on Health and later on, with the increasing gravity of the situation, the Prime Minister stepped in to chair the NCC.

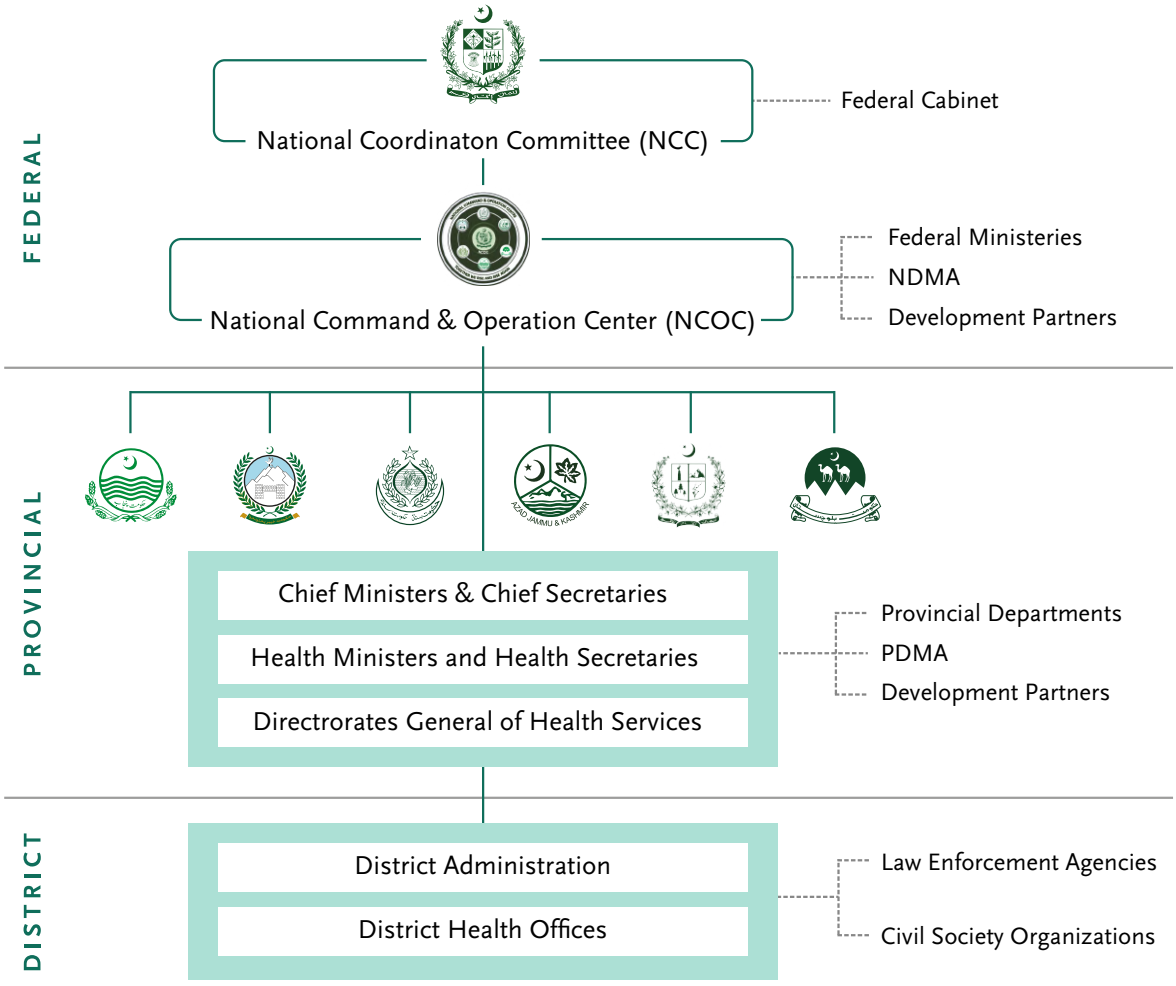
Pakistan's success in identifying the Covid-19 threat early on and initiating a timely and targeted response can be attributed to concerted advocacy during the initial month. This emphasizes the robustness of the systems to lift the agenda and public health threats to the political leadership, as

one of the federal level respondents reflected, *"Systems should be strong enough to push the agenda up even when top leadership is not aware or when the system to respond does not exist."*

3.2.2 National Command & Operation Center

The month of March 2020 saw growing anxiety with a raising number of cases and heightened confusion. Data points and their interpretations were contradicting in the provinces, which at times differed from those of the federal government as well. A technical expert engaged in Covid-19 response explained, "*Despite the creation of NCC, divisions between the cabinet, among the provinces, and between the provinces and federal government were consequential to lack of coherence and surge in cases and fatalities*." Therefore, on 27th March 2020, National Command and Operation Center (NCOC) was established, with its headquarters in Islamabad Capital Territory (ICT).

Figure 6: Management and Coordination Structure for Covid-19 Response



The formation of the NCOC was driven by several factors, presenting Covid-19 as a cross-cutting issue that extended beyond the healthcare sector as an NCOC Member explained, "*The challenge was so cross-cutting as it was not a routine health sector challenge. Similarly, solutions were not contained within the healthcare system*." Hence, the requirements posed by the Covid-19 pandemic cut across multiple sectors and required coordinated efforts from various stakeholders, including federal ministries, federal agencies, provincial governments, non-government actors, and each and every citizen of

Pakistan. The NCOC performed the role of clearinghouse for Covid-19 data and provided a unified platform for all the stakeholders to come together, share up-to-date data, take stock of performance, and make integrated decisions, enabling consensus, and coordinated actions on a national scale. A federal level respondent informed, "*Translating the concept of whole-of-nation approach into reality, the NCOC served as a centralized structure that enabled consensus-building and implementation of decisions throughout the country*."

Multilayered structure and cross-sectoral engagement in the NCOC played a crucial role in its success. One key factor behind the success of the NCOC was its structure, which brought together a diverse range of members as daily meetings involved federal ministers, chief secretaries of provinces, ministers and secretaries of health departments, and representatives from different sectors. This constant platform allowed for effective communication, consensus-building, and the implementation of decisions across the country. The centralized nature of the NCOC ensured that decisions could be made in one place and then effectively implemented throughout Pakistan, as a member of the NCOC described, "*Decisions for the entire country emanated from one place and were executed all across Pakistan, which would not be possible without a centralized structure like the NCOC*.

The NCOC also benefited from the engagement of various experts and stakeholders. Health experts were co-opted and multiple committees were formed under the NCOC, comprising specialists including infectious diseases experts to generate advice on pure health-related matters. Then there were IT and AI experts who supported predictive modeling and projections to guide the decision making, using SEIR model to predict infectious disease dynamics by compartmentalizing the population into four possible states Susceptible (S), Exposed (E), Infectious (I) or Removed (R). In the first Ramzan (2020) during pandemic, through support of the President of Pakistan, all sects of *Ulemas* (clergy) were called to the presidency to advocate for the implementation of NPIs affecting religious practices. Media was extensively engaged and separate sessions were conducted with anchorpersons and owners of media houses as their support was very critical in building the community trust and confidence. Business communities and different significantly affected segments of society were engaged to discuss their issues, identify solutions, and reach consensus through this national platform. The multidisciplinary approach ensured that decisions were based on a comprehensive understanding of health-related matters, predictive modeling, community engagement, and economic and societal impact, as NCOC also guided NCC on policy formulation on lives versus livelihood considerations. Describing the benefits of this approach, one of the federal level respondents informed, "*Inclusiveness helped build trust, confidence, and community support for different measures*."

The inclusion of both civil and military institutions in the NCOC contributed to operational excellence and effective implementation. It serves as a noteworthy case study on the effectiveness of civil-military cooperation where military's organizational discipline and ability to execute orders played a vital role in the success of the NCOC. While policy decisions originated from civilian leadership, such as the government's stance on not completely shutting down the country to prevent the suffering of daily wage workers; inputs from all NCOC members, both civilian and military, were imperative in the decision-making process. The final decisions were made by the Chair of the NCOC, a federal minister, who gauged the pulse of the nation and considered how the communities feel, live, and think. This highlighted the influence of the political leadership's connection with the people, which often surpasses that of bureaucratic institutions, be they civil or military. While it may be conjectured that a military-led decision-making process would have resulted in a complete shutdown, given global precedents at the time, the NCOC's hybrid structure combined the strengths of both civil and military institutions, as a member of the NCOC described, "*The NCOC combined the strengths of both civil and military institutions and it was one of the key reasons for its success. It would not have been successful if the NCOC was solely run by the military or by the civil leadership alone*."

NCOC – A platform established to combine civilian leadership and military's operational excellence.

Credits: Senate of Pakistan, 2020.

The daily meetings of the NCOC followed a structured approach, beginning with a comprehensive update on data and a review of media, including social media. Every single day, the team used to analyze the ground situation at various levels, from the macro level down to individual cities, over the past 24 hours. The review encompassed metrics such as positivity rates, trends, and any anomalies in the data, providing the basis for preemptive decision-making to stay ahead of the curve. Specialized topics that required decision-making were thoroughly deliberated, taking into consideration the direction of trends and future projections. For instance, the estimation of the number of people in need of oxygen and hospital beds, as well as the daily oxygen supply requirements would lead to its inclusion as an agenda item in the NCOC meeting to scan the entire oxygen supply chain of the country for ensuring sufficient and consistent supply of oxygen to the hospitals. The Ministry of Industry played a crucial role in organizing the oxygen supply and addressing any issues or bottlenecks in distribution, including the reactivation of previously closed-down oxygen manufacturing plants. To streamline airport operations and overcome screening-related delays, the Civil Aviation Authority (CAA) and airlines' representatives were engaged to develop efficient flight scheduling strategies. This helped ensure smooth operations while maintaining necessary health protocols at all airports across the country. The military leadership consistently emphasized the importance of continued stratified risk assessment and efficient resource management to effectively address the health crisis, economic repercussions, and psycho-social impacts, recognizing the need to manage multiple dimensions of the crisis and allocate resources accordingly.

The enforcement and implementation of actions were primarily the responsibility of the military within the NCOC organization, even for decisions falling within the civilian domain. Daily meetings were held to formulate the agenda for the next day's session, and the military's DG Operations and Planning, under the leadership of the National Coordinator (a serving Lieutenant General), oversaw the operational implementation and follow-up of decisions made in the NCOC. Different military personnel were assigned specific responsibilities, such as the implementation of Covid-19 vaccination and IT initiatives. This dedicated military cohort placed within the NCOC was primarily responsible for monitoring the implementation process. Red-tapism was minimized for rapid actions. One example was saving time in logistical supply through the direct provision of medicines and essential commodities from the federal level to the hospitals instead of routing through provincial governments. Such combination of civil leadership's political acumen and connection with the population, along with the operational expertise and implementation capabilities of the military, played a pivotal role in achieving effective decision-making and enforcement of actions. A federal manager while recounting the NCOC operations described, "*The NCOC's hybrid structure and strong civil-military cooperation were key factors in its success.*"

The nonpartisan nature of the NCOC allowed for effective decision-making and cooperation among political leaders from different parties. The NCOC recognized that the Covid-19 pandemic was a national challenge, transcending political boundaries. Despite having different political parties in power across various provinces and regions, the NCOC operated with a unified approach. The participation of leaders from different political parties, such as the AJK Prime Minister and GB Chief Minister belonging to PML-N, the Sindh government representing the Pakistan People's Party, and a coalition government of BNP in Balochistan, along with the PTI-led governments in KP, Punjab, and at the federal level, demonstrated the collective commitment to addressing the crisis. While there were instances of political leaders publicly expressing disagreement with certain decisions made by the NCOC, like the reopening of markets before Eid-ul-Fitr in 2020, these differences were largely at the political level. At the operational level, there was no dispute with any political party despite the diverse political landscape across Pakistan. The NCOC functioned as a platform for technical discourse, knowledge sharing, exchange of experiences and decision making to address the challenges posed by the pandemic. Provinces shared their data, discussed local issues, and sought advice from the group. Throughout the process, the nonpartisan attitude of all members remained evident. The commitment to putting the nation first was evident, as leaders set aside their political affiliations and worked together to overcome the crisis. The discussions within the NCOC remained purely technical, professional, and supportive. The statement, "*You have read our minds*," uttered by the Chair of the NCOC in response to a provincial Health Minister's proposition on increasing the engagement of local law enforcement agencies, exemplifies the effective collaboration and understanding among the participants. It reflects the cooperative and unified spirit within the NCOC, where ideas and proposals were valued and understood, irrespective of political affiliations, as one member wrote on the whiteboard erected on completion of 100 days of NCOC, "*Yet again Pakistan has proven that when we come together as a nation, we can face any challenge.*"

The NCOC was driven by data, utilizing a range of data sources from federal ministries, provincial governments, and related organizations. Daily data updates were provided, and in-depth reviews were conducted twice a week to identify emerging trends and projections for preparedness and policy development. AI-based predictive models were employed to guide future decisions, providing insights into the potential trajectory of the pandemic. AI programs were also used to monitor compliance with non-pharmaceutical interventions (NPIs) at the city and administrative block levels. This data-driven approach allowed the NCOC to identify areas requiring enhanced enforcement and to implement targeted measures such as micro lockdowns based on hotspot analysis. To ensure accurate and timely reporting of data, 760 military officers were appointed in major hospitals across Pakistan to facilitate the correct and timely reporting of data, highlighting the importance placed on accurate information. Additionally, a software system was developed that connected every hospital bed, providing consolidated information on bed vacancies in hospitals near local populations. The development of this software system to track bed availability and facilitate patient transfers was a critical aspect of the response, as one federal minister responded, "*We usually define the success but in Covid-19 response, there was a need to define the failure. Failure will be the day when one person who needs oxygen does not get oxygen-ready bed at the hospital. Those visuals on the screen would take the country into panic.*" This software was developed quickly with the support of the National Information Technology Board (NITB) and was rolled out nationwide. It proved instrumental in saving lives as emergency service operators used the application to identify hospitals having beds available in real time to efficiently organize patient transfers. The development of systems and software to collect, analyze, and disseminate information played a crucial role in the success of the NCOC's response.

By relying on accurate data, the NCOC could assess the availability of resources, identify areas of concern, and make informed decisions to ensure effective allocation of resources and timely response

to the evolving situation. Within each province and region of Pakistan, Covid-19 response was headed by the Chief Ministers and the Chief Secretaries with close engagement of Health Departments and District Administration. All Chief Secretaries, Health Ministers, and Health Secretaries used to attend the daily NCOC meetings where they jointly discussed the issues, solutions and implementation of public health and social measures and NPIs.

The National Disaster Management Authority (NDMA) acted as the principal execution arm for procurement related to Covid-19 response. It is pertinent to note that the NDMA, like all government agencies other than the Council of Common Interests and the National Curriculum Council, is a federal civil institution established under the NDMA Act 2010, responsible for disaster management and emergency response in Pakistan. It has national jurisdiction which is shared with provincial authorities. The decision to assign NDMA as the procurement authority, including the procurement of Covid-19 vaccines, was driven by the need for swift action and efficient processes during the emergency. The use of NDMA proved effective in expediting the procurement process and bypassing regular government procedures, which could have caused delays in acquiring essential commodities and vaccines. Describing the support of NDMA, a member of NCOC explained, "*Given the urgency of the situation, there was a need to cut through bureaucratic red tape and streamline the procurement process. NDMA's organizational structure, discipline, and ability to execute orders played a significant role in ensuring the timely procurement of necessary supplies*."

By utilizing NDMA's expertise and resources, the NCOC was able to leverage the efficiency and effectiveness of a civil institution specifically designed for disaster management. This decision helped overcome potential delays and ensured a more streamlined and swift response. Overall, the utilization of NDMA for procurement, logistics management, and establishment of temporary healthcare facilities during Covid-19 response demonstrated the recognition of the need for agility and effectiveness in emergency situations. It highlights the importance of utilizing the strengths of various institutions, both civil and military, to ensure an efficient and coordinated response to the crisis.

3.2.3 Role of Federal Ministries and Agencies

Federal ministries and agencies played a crucial role in supporting the overall Covid-19 response in Pakistan. These institutions worked in coordination with the NCOC to implement various measures, provide expertise, and ensure effective governance during the pandemic.

1. The Ministry of National Health Services Regulations and Coordination and relevant health agencies, including National Institute of Health, took a leading role in formulating health policies, guidelines, and strategies to control the spread of the virus. They provided technical expertise, conducted research, and monitored the health situation in the country. They also played a key role in coordinating the procurement and distribution of medical supplies, including PPEs, testing kits and vaccines.
2. The Ministry of Interior and law enforcement agencies collaborated with the NCOC to enforce preventive measures, such as lockdowns, movement restrictions, and social distancing guidelines. They were responsible for ensuring compliance with these measures at the national, provincial, and local levels. Role of Cyber Crime Cell of Federal Investigation Authority was essential in blocking social media accounts involved in the spread of fake news and rumors related to Covid-19.
3. The Ministry of Information and Broadcasting played a vital role in disseminating accurate and timely information to the public. They launched awareness campaigns, conducted media briefings, and utilized various communication channels to educate the public about Covid-19, preventive measures, and government guidelines.

4. The Ministry of Planning, Development, and Special Initiatives provided support in terms of resource allocation, budgeting, and coordination of development projects related to healthcare infrastructure, testing facilities, and vaccination centers. They worked closely with the other ministries to ensure the availability of necessary resources for an effective pandemic response.
5. The Ministry of Finance supported mobilization of financial resources to aid the government's response to the pandemic. This involved exploring various sources of funding, both domestic and international, to ensure adequate financial resources were available for the implementation of Covid-19 response initiatives. The ministry formulated and implemented fiscal policies and stimulus packages aimed at mitigating the economic impact of the pandemic through provision of financial support to affected sectors, individuals, and businesses, implementing tax relief measures, and facilitating economic recovery.
6. The Federal Board of Revenue (FBR) in Pakistan had an important role in managing the economic aspects of the crisis. The FBR supported in implementation of economic measures announced by the government to support affected businesses and individuals, including tax relief, extending filing deadlines, and special schemes to facilitate taxpayers and promote economic stability during the crisis. It worked closely with the NCOC to facilitate smooth importation through streamlined custom procedures and expedited clearness to ensure the timely delivery of necessary items. Statutory Regulatory Orders (SROs) were issued in the very initial phase of pandemic to provide exemption of custom duty, regulatory duty, and sales tax to 61 essential medical supplies and equipment to ensure timely delivery of necessary items. Describing the support of FBR, one of the federal level respondents informed, "*SROs were issued as early as third week of March 2020, which accelerated the import of 61 items to boost country's capacity to diagnose and manage Covid-19 cases*." Tax incentives and exemptions were provided on imports and donations of medical equipment, PPE, and other essential goods required for Covid-19 response.
7. The Economic Affairs Division (EAD) played a crucial role in mobilizing financial resources to support the government's response to Covid-19. This involved coordinating with international financial institutions, bilateral partners, and donor agencies to secure financial assistance, grants, and loans for health infrastructure development, procurement of medical supplies, and other necessary expenditures. The EAD worked closely with the Ministry of Finance and other relevant ministries to allocate and disburse funds for Covid-19 response measures. This also included overseeing the implementation of projects aimed at strengthening healthcare infrastructure, improving testing, and diagnostic capabilities, enhancing research and development, and supporting other initiatives to tackle Covid-19.
8. The Ministry of Industries and Production actively contributed to the Covid-19 response by coordinating industrial efforts, promoting local manufacturing, formulating supportive policies, and ensuring the continued operation of essential industries. Their role was crucial in addressing the oxygen supply challenges for Covid-19 patients in hospitals. Based on predictive modelling, oxygen needs were calculated and through NCOC, it was communicated to the Ministry of Industries and Production to ensure uninterrupted supply from the manufacturers. A federal technical expert while discussing the interventions to ensure adequate oxygen supply to the hospitals informed, "*A large amount of industrial oxygen is used in ship breaking yards, which was discontinued during Covid-19 to meet the needs of patients.*"
9. The Ministry of Information Technology & Telecommunication, through National Information Technology (NITB), played its role in leveraging technology and digital solutions to address the challenges posed by the pandemic. Working closely with the NCOC, the NITB developed mobile

applications, digital platforms, and online portals, focusing on data sharing, communication, contact tracing, vaccine registration, teleconsultations and public awareness.

10. The Aviation Division in coordination with other relevant authorities, implemented travel restrictions and guidelines to control the spread of Covid-19. This included imposing travel bans, suspending international and domestic flights, and implementing health screening measures at airports. The division developed and enforced SOPs for airports and airlines to follow during the pandemic. These SOPs encompassed health and safety protocols such as social distancing, sanitization, mask-wearing, and passenger screening to minimize the risk of virus transmission. The division coordinated with domestic and international airlines to align their operations with the prevailing health and safety protocols, facilitated repatriation flights, supported air cargo operations, and collaborated internationally to ensure the safe and efficient functioning of the aviation sector amidst the Covid-19 pandemic. Civil Aviation Authority (CAA), on the instruction of NCOC, was also involved in the implementation of closures of routes with countries posing high risk of virus transmission,
11. The Pakistan Meteorological Department's (PMD) expertise to provide regular and timely weather forecasts helped NCOC in planning and implementing Covid-19 related activities. This included forecasting temperature patterns, humidity levels, wind directions, and other meteorological parameters that could influence the transmission and spread of the virus. The PMD conducted climate analysis and research to understand the impact of climate factors on the spread and transmission of Covid-19, focusing on the relationship between weather patterns, temperature, humidity, and the virus's survival and transmission dynamics to enhance knowledge and inform public health strategies.
12. The Ministry of Foreign Affairs facilitates the repatriation of stranded citizens abroad. During the Covid-19 pandemic, when travel restrictions and lockdowns were imposed, many Pakistani nationals found themselves unable to return home. The Ministry coordinated with diplomatic missions and consulates to organize special flights, negotiate with foreign governments, and ensure the safe return of citizens. They also engaged with foreign governments and organizations to secure financial aid, medical supplies, vaccines, and technical expertise.
13. Pakistan Tourism Development Corporation was engaged to enforce closure of tourism at the start of the pandemic. They worked closely with the relevant authorities to issue travel advisories and guidelines for tourists and tour operators. These advisories provided important information and SOPs about travel restrictions, health protocols, sanitation practices, and safety measures to be followed during the pandemic. The PTDC collaborated with provincial tourism departments to coordinate efforts and work together to implement unified policies, exchange information, and support each other in reviving the tourism sector.
14. Ministry of Communications and National Highway Authority (NHA), in collaboration with law enforcement authorities, formed checkpoints at different entry and exit points along highways to enforce Covid-19 related SOPs and protocols. These checkpoints monitored the movement of people, conducted health screenings, and ensured compliance with safety measures such as mask-wearing and social distancing. The NHA also supported awareness campaigns to educate the public about Covid-19 preventive measures, through the installation of informative banners, signage, and digital displays at strategic locations along highways to promote hygiene practices, social distancing, and importance of following guidelines.
15. Ministry of Social Welfare and Poverty Alleviation, in collaboration with Mo NHSR&C addressed the socioeconomic impacts of the pandemic on vulnerable populations. Joint initiatives were launched to provide financial assistance, food rations, and essential supplies to families affected

by the pandemic's economic disruptions. By working together, the ministries ensured that those facing financial hardships had access to the basic necessities required to sustain themselves during challenging times. The Mo NHSR&C 's collaboration with the Ministry of Social Welfare and Poverty Alleviation resulted in the Ehsaas Emergency Cash Program. This program provided financial assistance to vulnerable households impacted by the pandemic. The Mo NHSR&C played a critical role in identifying beneficiaries who required medical support, ensuring that the funds reached those who needed it the most. This collaboration exemplified a holistic approach that addressed not only the health needs of the population but also their socio-economic challenges. This collaborative effort exemplified a holistic approach to pandemic response that addressed both health and socioeconomic dimensions.

16. Ministry and provincial education departments played a crucial role in managing the Covid-19 impact on Pakistani schools. In response to the pandemic, schools in Pakistan were closed in March 2020 to prevent virus transmission. This closure disrupted the education system and led to the adoption of online learning and hybrid learning. Teachers had to quickly adapt to digital platforms and develop new teaching methods to engage students virtually. The shift highlighted the importance of teachers in maintaining learning continuity. The experience underscored the need for equitable access to technology and highlighted the challenges in ensuring consistent education delivery during uncertain times. As the situation evolved, it prompted discussions about the future of education and the potential long-term integration of technology into learning environments. In coordination with health authorities and NCOC, education departments provided guidelines for hygiene, sanitation, and distancing, ensuring a safe environment. The success of the hybrid model depended on factors such as technology accessibility and the school's capacity to manage both online and in-person learning effectively. The experience underscored the need for equitable access to technology and highlighted the challenges in ensuring consistent education delivery during uncertain times. As the situation evolved, it prompted discussions about the future of education and the potential long-term integration of technology into learning environments. The government also trained staff, monitored safety measures during hybrid learning, and maintained communication to prevent outbreaks. By converting educational institutions into vaccination centers, students, teachers, and administrative staff were provided convenient access to Covid-19 vaccines. This collaborative effort not only ensured higher vaccination coverage among the education sector but also contributed to building confidence in the vaccination process. As a result, the safe reopening of educational institutions became a reality.

17. Pakistan's Ministry of Youth Affairs worked together with the government during the Covid-19 pandemic on initiatives that harnessed the energy and potential of the youth. A standout effort was the **Corona Relief Tiger Force**, which engaged young volunteers in distributing supplies, raising awareness, and supporting pandemic-related tasks. Through digital campaigns, the ministries reached the youth with accurate health information and preventive measures. The **Kamyab Jawan Program** was also a noteworthy initiative launched by the government to empower the youth and address their socioeconomic challenges, including those exacerbated by the Covid-19 pandemic. The program aimed to provide opportunities for skill development, entrepreneurship, and access to financial resources. Through various components, such as interest-free loans, vocational training, and business development support, the Kamyab Jawan Program sought to equip young individuals with the tools to establish and grow their businesses, thereby contributing to economic growth and job creation. Skill development and training programs equipped young individuals to contribute effectively to relief efforts and awareness campaigns. The collaboration also emphasized mental health awareness among the youth,

offering support for both physical and mental well-being. This joint approach showcased the power of youth engagement in responding to the pandemic's challenges.

18. The Ministry of Science and Technology worked to foster innovation and scientific research related to the pandemic. This partnership supported the development of indigenous diagnostic kits, therapeutic drugs, and medical technologies. Noteworthy successes included the production of locally developed ventilators and the establishment of high-capacity testing laboratories. Through joint efforts, Pakistan was able to achieve self-reliance in producing critical medical supplies and technologies.
19. Collaboration between the Mo NHSR&C and Religious Leaders and Councils fostered a sense of community responsibility and cooperation in adhering to health protocols. Religious leaders' sermons, statements, and fatwas emphasized the importance of protecting lives and adhering to health measures in accordance with Islamic principles. This guidance not only debunked misconceptions but also facilitated the safe conduct of religious gatherings by advising on modified practices that ensured public safety.

These federal ministries and agencies worked closely with the NCOC, providing their respective expertise, resources, and support to ensure a coordinated and comprehensive response to the Covid-19 pandemic. Their collaboration and collective efforts were instrumental in addressing the challenges posed by the pandemic and mitigating its impact on the population. Through engaging these ministries and agencies whenever needed, the NCOC displayed effective and action-oriented administrative prowess, as a federal level respondent described, "*The convening power of NCOC was the differentiating feature of the forum to provide the maximum degree of multi-sectoral engagement and authority*."

3.2.4 Role of Donors and Development Partners

All donors and development partners worked hand in hand with the federal and provincial governments in mitigating the impact of Covid-19 and supporting Pakistan's response efforts (Table 3), ranging from the provision of direct financial assistance to provision of technical expertise, capacity building support and provision of different requirements and needs of health system. Financial assistance enabled the procurement of medical supplies, testing kits, and vaccines, while technical expertise strengthened the healthcare system and response capabilities.

Covid-19 vaccine arriving at Islamabad International Airport under COVAX global vaccine initiative.

Credits: US Embassy in Pakistan, 2021.

Donors and development partners also facilitated vaccine procurement, distribution, and storage, ensuring equitable access in different parts of the country. Other areas of support included research initiatives, risk communication campaigns, public awareness programs, disseminating accurate information, and promoting behavior change. Additionally, they provided support for social and economic recovery through funding social protection programs and initiatives to revive affected sectors. These contributions strengthened Pakistan's healthcare system, improved testing and surveillance capacities, and facilitated the equitable distribution of vaccines, ultimately enhancing the country's ability to respond to the challenges posed by Covid-19.

Table 3: Role of Donors and Development Partners

Donor/ Partner	Description of Assistance
WHO	Starting with the support to the government in launching Pakistan Preparedness and Response Plan in consultation with Ministry of Foreign Affairs, NDMA and Health Departments, the WHO established Covid-19 Expert Think Tank, coordination room at Mo NHSR&C, and Provincial Scholars Task Forces. Under RCCE, the WHO funded Google ad-words and Facebook ad-credits campaigns whereas workforce development initiatives included trainings, Rapid Response Teams, and provision of equipment and supplies for case investigation. Technical assistance was provided for development of a national laboratory testing strategy and technical assessment of Covid-19 laboratories across Pakistan, which supported subsequent enhancement of labs from 7 to 150, resulting in achieving a testing capacity of 65,000 daily tests. Other areas of support included strengthening POEs and maintaining essential health services through use of telemedicine, advocacy, helplines, planning for the resumption of EPI services, and assistance for mental health and psychosocial support for healthcare providers.
UNICEF	UNICEF played a significant role in safeguarding the health, well-being, and rights of children and communities. Key areas of support included support to health facilities through supplying oxygen concentrators, PPEs and implementation of IPC guidelines; immunization campaigns and deployment of female vaccinators; Covid-19 management guidelines for children; RCCE interventions; and research, and analytical support. UNICEF supported in development of Covid-19 management guidelines for children, which took a multi-sectoral approach and human rights perspective, ensuring that children's needs were addressed comprehensively. Support was further provided to the Punjab Planning & Development Board in rolling out multi-sectoral nutrition program, which addressed adolescent girl, maternal and child health along with the advocating for breastfeeding and IYCF practices. In addition to health and nutrition initiatives, UNICEF played a crucial role in supporting the continuity of learning and safe school operations through collaborative efforts with local authorities resulting in the establishment of a National Education Response and Resilience Plan for Covid-19. '**Mera Ghar Mera School**' was a UNICEF-supported initiative in collaboration with Balochistan's Secondary Education Department. Through remote learning materials, digital platforms, broadcasting lessons, and teacher interaction, the program supported uninterrupted learning.

Donor/ Partner	Description of Assistance
USAID	Through IHSS-SD Activity implemented by the JSI consortium, support was provided to establish the network of PDSRUs and DDSRUs across all the districts of Pakistan, to conduct case management training of healthcare providers from both public and private sectors, use of digital tools for Covid-19 surveillance, medial oxygen supplies, RCCE, capacity building for ICU care, strengthening of labs and home-based care. After introduction of vaccine, US Government provided nearly 80 million Covid-19 vaccines, including 16 million pediatric doses. The support was extended to establish Covid-19 vaccination centers in 25 districts of Sindh and Khyber Pakhtunkhwa, training data entry operators (DEOs), social mobilization, demand creation, and administering more than 8 million vaccine doses and later on the project supported pediatric vaccination for children aged 5-11 years in 14 major districts of Punjab, Sindh and ICT.
World Bank	Development assistance from World Bank was channeled through Pandemic Response Effectiveness in Pakistan Project, under the global framework of the Work Bank Covid-19 response. Under emergency preparedness and response component, the project contributed to the vaccination of 4% of total eligible population of Pakistan, including 21 million doses of Pfizer vaccines, supplies for vaccine administration, stock management tools and procedures, and ensuring availability of female vaccinators. Under its component of mitigation of disruptive impacts, the support included cash transfers to the Benazir Income Support Program, RCCE and safeguarding education services.
Center for Disease Control USA	CDC provided support to the government in establishing and enhancing the capacity of laboratories, data management systems, and reporting mechanisms. Their role was instrumental in carrying out trainings of healthcare providers and providing supplies for laboratory operations, and strengthening Pakistan's overall health security and preparedness.
UK Health Security Agency	Initially, as Public Health England, the agency provided crucial technical expertise and guidance to Pakistani authorities for implementing effective public health measures. Initially, when the response measures weren't widely known, UKHSA supported the development of coordination mechanisms, triage, and other related guidelines, aiding in the control and mitigation of the pandemic. Through collaborative efforts, UKHSA helped developing a surveillance and response system, which included development of public health laboratories, to improve its capacity to respond to health emergencies. Specific support was also provided through engaging Pakistani labs with the UK's National External Quality Assurance Scheme (NEQAS) for quality assurance and new variant analysis program.
The Global Fund	Through the Global Fund Covid-19 Response Mechanism, the support primarily focused on the oxygen generation plants to meet the increasing needs of the health facilities through engaging the UNDP. Other support areas included outreach activities, advocacy, and provision of lab reagents, rapid diagnostic kits, and PPEs.

Donor/ Partner	Description of Assistance
GAVI	GAVI supported Pakistan in procuring Covid-19 vaccines through the COVAX facility, co-led by GAVI, WHO, and CEPI (Coalition for Epidemic Preparedness Innovations) to ensure equitable access to vaccines, especially for vulnerable populations. This includes providing technical support and expertise to ensure efficient vaccine distribution, vaccine storage, trainings, cold chain management, and delivery systems to reach remote areas of the country. Technical guidance was provided on vaccine introduction, adverse event monitoring, vaccine safety, and overall program management.
FCDO	FCDO spent £88.2 million responding to the Government of Pakistan's priorities on Covid-19 response in initiatives under Pakistan Multi-Year Humanitarian Programme, pivoting their portfolios of economic growth, education, and governance programming. UK support played a key role in the development of an economic stimulus and social protection mechanism to address the impact of Covid-19, laying the foundation of Pakistan's national cash transfer programme, the Benazir Income Support Programme (BISP), and invested in the data systems and multiple government-run helplines which enabled the Government of Pakistan to reach 14.9 million people during the Covid-19 pandemic.
Islamic Development Bank	IsDB provided financial support to Pakistan to address the health and socioeconomic impacts of the pandemic. By addressing the humanitarian aspects of the Covid-19, IsDB contributed in supporting the country's recovery efforts.
BMGF	BMGF supported in performing a comparative analysis on Covid-19 vaccine effectiveness and surveillance leveraging routinely collected health data to support vaccine delivery effectiveness. Other areas of support include the evaluation of transmission dynamics of SARS-CoV-2 in Pakistan, and technical assistance in building technical and decision science policy capacity in Pakistan around costing and modeling of Covid-19 for epidemiological understanding and planning.
UNDP	Through engaging a number of agencies and partners, UNDP supported the government in workforce development, trainings, protocols, telemedicine solutions, RCCE and guidelines, procurements and supplies, and particularly in facilitating manufacturing of PPEs under China-UNDP Triangular and South-South Cooperation Project on strengthening PPE-related manufacturing in Pakistan.
Asian Development Bank	ADB provided financial support to Pakistan to address the health and socioeconomic impacts of the pandemic. In April 2020, ADB approved a $1.5 billion emergency assistance package to help strengthen the country's healthcare system, expand social protection programs, and support economic recovery.

Overall, Pakistan's management and coordination structures, led by the NCOC, allowed for effective response and coordination among various stakeholders, enabling timely actions and resource mobilization. The NCOC combined the best features of federalism without the burden of its limitations. The success of the NCOC can be attributed to factors such as data-driven decision-making, an organized and inclusive platform, non-partisan collaboration, clear public messaging, and behavior change communications, and fairness and transparency of the decision-making process. Lenin's

legendary saying, "*There are decades where nothing happens, and there are weeks where decades happen*", truly depicts the untiring efforts, extended hours of stressful work, and sleepless nights of Covid-19 response team at NCOC in Pakistan. The capacities of Pakistan's institutions in responding to the crisis without compromising constitutional principles and federal character highlight the country's ability to adapt and effectively address emergent challenges while upholding its democratic values and governance structures. Recounting the acknowledgements of Pakistan's response, one federal level respondent informed, "*The success of the NCOC in Pakistan has been acknowledged worldwide, with recognition from prominent figures and organizations such as WHO, World Economic Forum, Larry Summers, Bill Gates, Forbes, and The Economist.*"

3.3 Surveillance

A systematic ongoing collection, collation, and analysis of Covid-19 data and its timely dissemination and use for evidence-based response.

Box 3: Summary of Surveillance Strategies

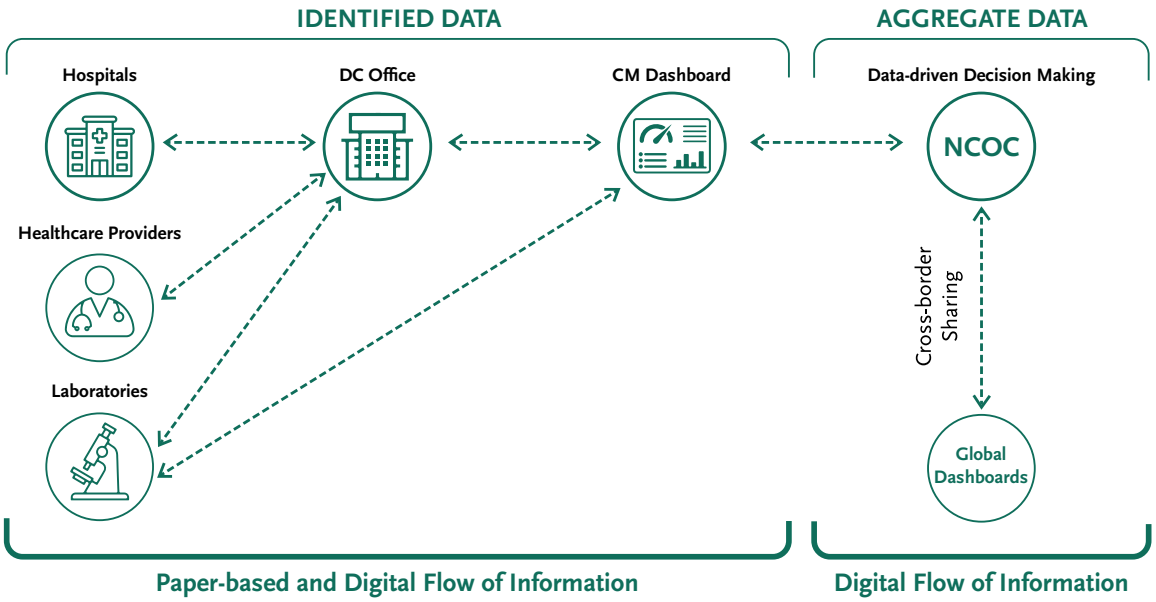
- Early on deployment of air defense personnel, military officers, and data entry operators at health facilities and labs was done to expedite daily data capturing to shorten latency period.
- In absence of a national integrated disease information system, Covid-19 surveillance was piggybacked on the AFP surveillance system, resulting in the deployment of one of the largest surveillance networks comprising of 265,000 polio workers and more than 100,000 LHWs.
- Laboratory data was fully integrated, linking test results with epidemiological and case-based information.
- The Test, Track and Quarantine (TTQ) strategy played a significant role in the surveillance.
- Digital tools, dashboards, and visualizations – developed through the support of NITB, HISDU, and telecommunication firms – established real time data feedback loop with 12 hours latency.
- Among different entities implementing surveillance, district administration was found to be the frontrunners in Covid-19 surveillance, which led to a unified response.
- The hierarchical structure, use of reporting formats, integration of laboratory data, and establishment of dashboards facilitated informed decision-making, resource allocation, and effective response.

3.3.1 Surveillance System

The implementation of a surveillance system and the collection of data played a crucial role in monitoring and tracking Covid-19 cases in Pakistan. The hierarchical structure, use of reporting formats, integration of laboratory data, and establishment of dashboards facilitated informed decision-making, resource allocation, and effective response. The emphasis on targeted sampling, contact tracing, readily available data, vigilance, and technology integration accentuated the significance of a robust surveillance system. Since IDSR (Integrated Disease Surveillance and Response) was in its infancy during the Covid-19 pandemic and the existing surveillance system was more focused on event-based surveillance rather than regular surveillance, the system was designed with level-wise structures, including the NCOC Secretariat, Provincial Dashboards, District Control Rooms, Tehsil Focal Persons and UC Focal Persons, which were responsible for surveillance at different administrative levels. This hierarchical approach ensured efficient data flow and coordination throughout the system, where

varied reporting formats, including electronic systems, were used for data collection and reporting across Pakistan.

Figure 7: Surveillance and Flow of Information



Use of the expansive existing polio network spread across the country gave a substantial head start to Covid-19 surveillance. During the initial phase of the pandemic, air defense personnel were made responsible for compiling data from designated hospitals and health facilities. A senior official involved in surveillance at Federal level explained the rationale of utilizing this workforce, *"Air defense is the armed forces unit that is deployed to do census across Pakistan... One of their jobs is to do the census, so they are disciplined and they know every nook and cranny of Pakistan. We deployed air defense personnel across at least 1600 different hospitals across the country. Wherever, and whenever Covid-19 tests were being done at these hospitals, ...they used to make sure that the data was entered right then and there."* The existing polio network and its tools were utilized for Covid-19 response, and the reporting system was revised to accommodate Covid-19 surveillance. Initially, the reporting tools were derived from existing Acute Flaccid Paralysis (AFP) materials and distributed through national and district Emergency Operations Centers (EOCs). The flow of information involved compiling data around midnight and analyzing it at the National Command and Operation Center (NCOC) by morning. The staff earlier reporting suspected polio cases were mobilized for reporting Covid-19 cases, which provided access to one of the **world's largest surveillance workforce** to maximize the network and reach. A senior official from NEOC explained, "*Polio dashboards were improved, with help of NITB along with other IT resources from both the government and the military.*"

Real-time information on hospitals, available beds, and resources was obtained through the Resource Management System (RMS). This timely collection of data allowed for real-time monitoring of Covid-19 cases, testing data, and other relevant indicators. Collaboration between different stakeholders was instrumental in enhancing data collection and surveillance efforts. The engagement of industries and ministries helped gather data on oxygen consumption and availability, ensuring the availability of critical resources. Furthermore, the National Information Technology Board (NITB) played a crucial role in harnessing information technology and digital tools for surveillance and data collection. They developed solutions for contact tracing using telecommunication and IT technologies and

collaborated with private sector organizations, especially in the GIS space, to accelerate the development of surveillance platforms.

Multiple information systems were considered, with the refinement of the existing DHIS system to align with the circumstances, which paved way for establishment of IDIMS (Integrated Disease Information Management System), developed to include various types of surveillance beyond polio. IDIMS developed by the National Emergency Operation Centre (NEOC) was integrated with all provincial systems for near real-time data exchange. Templates for data collection were shared with health facilities and made available on the website. Patient reporting was also incorporated into the surveillance system. Data collection initially involved paper-based methods but transitioned to a digital system after the first quarter. With time, systems capacity was enhanced and the process streamlined. As described by Former In-charge of NEOC, "*We began with paper reporting; we developed a format and then distributed it through national EOCs, while district EOCs made sure they went everywhere*."

Laboratories played a vital role in the surveillance system, where data from them was integrated into the surveillance system, linking laboratory results with epidemiological data and other case information. By linking laboratory results with epidemiological data and case information, health officials could accurately assess the number of cases, their severity, and potential spread patterns. This integration facilitated the identification of trends and enabled targeted measures such as testing strategies and cluster isolation. At the start, NIH spearheaded lab surveillance with involvement of about 22 laboratories mainly public across Pakistan, from which the data was extracted directly. Varied methods and means were adopted to integrate the lab data into the centralized dashboards. Public sector labs shared data on confirmed Covid-19 cases either electronically or via email to the Chief Ministers' office, and that data was updated on the provincial dashboard. At the start, Laboratories sent information on Covid-19 cases through WhatsApp and email on a daily basis, while data from both private and public sector labs was later collected and compiled using the existing dashboard by NEOC (National Emergency Operations Centre). This data from laboratories and hospitals, including Covid-19 test results, were collected and tallied to ensure accuracy. A senior official from NITB mentioned, "*We used to tally the data directly from the labs and the hospitals.*" Key personnel trainings were conducted in person, while hospital-based trainings and training for laboratory staff were also provided to facilitate entry and compilation of collected information.

Public Reference Labs Network acted as the mainstay for testing, while private sector laboratory networks including that of Shaukat Khanum Hospital labs, Chughtai Labs, and Aga Khan University labs all contributed to enhancing testing capacity with integration in the centralized surveillance system. In provinces like Punjab, additional reference labs were established and added to the network, as evident from the statement of Government of Punjab representative, "*At first, there was only one lab, but over time, 8 more labs were established.*" Further, HIV, TB, and Hepatitis labs across Pakistan were also engaged in Covid-19 surveillance. As explained by one of the key officials leading surveillance in Punjab, the process triggered the identification of a suspected patient, after which sample was forwarded and entered in the HISDU database, which then blinked on their lab dashboards, depicting that the sample was received. After receiving the sample, the lab would start the process of testing. It was opined that the dashboard was monitored 24/7 to react according to the positive or negative results.

Alerts were generated in the form of color-coded indicators, where red color showed on dashboard when the test was positive; showed white color when the test was negative; showed yellow color if

testing was in process; showed green color if patient recovered; and blue color if the patient was dead. The integration of labs dashboard with Covid-19 surveillance system led to enhanced contact tracing and response. As explained by a Senior Covid-19 Advisory Group member, "*When a person became positive, their results reflected on our dashboard at the provincial level along with the place where the sample was taken...the result also showed on App used for contact tracing by the rapid response team.*" Use of such Apps and integrated lab data facilitated identification of persons who had tested positive in certain geographical areas, paving way for conducting contact tracing through testing their family members and 10 randomly selected people against the single positive case. A senior member of NCOC clarified, *"All data was compiled in NCOC; which then informed the provincial government about areas from where a high number of cases were being reported*."

The data flow for Covid-19 surveillance was complex, involving multiple data sets from hospitals, labs, and contact tracing. Information flowed from health facilities to the district and then to the provincial and national level through WhatsApp groups and email communication. Data entry and collection were done at designated centers in each district, usually tertiary hospitals with testing capacity. The surveillance teams at ICT used the **KoboCollect** App to digitize surveillance data, plot reported cases, and identify geographical areas for hotspots, while a separate system was established at the provincial level in Sindh and in other provinces and regions. CM dashboard in Sindh was established, which was linked with the national level dashboard. The Provincial Disease Surveillance and Response Units (PDSRU) were established in all provinces across Pakistan with donor assistance along with a presence in districts in form of District Disease Surveillance and Response Units (DDSRUs). These platforms were utilized to compile and monitor the data on a daily basis. These dashboards were linked with the district dashboards, and decisions were based on the data monitored by the PDSRU. However, in Punjab, a digital information system tool was developed by HISDU in the format of an electronic dashboard. The control room was established in response to the first Covid-19 case in Pakistan, with a designated focal person. Initially, data collection was done manually by calling hospitals and districts to check for Covid-19 patients, which was later on war footing followed by development of a dashboard to track and manage Covid-19 cases. This was fully aligned with data requirements of both National Command and Operation Center (NCOC) and National Information Technology Board (NITB). Since Punjab already had tablets at health facilities, their use for data entry was prompt, simplifying the process which was not the case in other provinces, where multiple modes of data entry were adopted, including use of MS Excel, Android Apps, and manual entry on paper. The frequency of reporting was daily, and strict measures were in place to ensure timely data submission. Action was taken against those who failed to submit data on time. Additionally, real-time data collection and monitoring allow for tracking the spread of the virus, identifying emerging hotspots, and making timely and informed decisions, including the implementation of targeted smart lockdowns in specific areas. The strategy of targeted smart sampling from public gatherings was thus adopted for surveillance. In addition to labs, surveillance also reached out and expanded to include points of entry.

3.3.2 Implementation of Test, Track and Quarantine Strategy

The Test, Track, and Quarantine (TTQ) strategy played a significant role in Covid-19 surveillance, contact tracing, testing, and the identification of hotspots. This approach was conceptualized at NCOC and proved essential in managing the Covid-19 pandemic as it focused on three key elements: testing individuals for the virus, tracing their contacts, and quarantining those who had been exposed. By implementing this strategy, authorities were able to identify and isolate infected individuals, break the chain of transmission, and mitigate the spread of the virus. As mentioned by one of the Health Ministers of a province, "*The TTQ strategy emphasized quarantining positive cases, even asymptomatic individuals who were known contacts, to prevent virus transmission. Initially, patients were quarantined at*

hospitals, but later, positive cases were isolated within homes with restricted movement to contain the virus within households, which led to less burden on our health system."

Different entities had specific roles in implementing the strategy and District Administrations were the frontrunners in Covid-19 surveillance across Pakistan, which resulted in a unified response. District administration through offices of Deputy Commissioner (DC) led the TTQ Strategy implementation in their respective districts, where they were responsible for setting up quarantine centers, imposing lockdowns in the areas with high number of cases, enforcement of the law through ensuring minimal movements, provisioning of rations and necessary items for those in need, sealing of markets and industries according to the smart lockdown requirements, In many cases, they were acting as hub for the entry of Covid-19 surveillance data. One of the interviewed DC while reiterating their time during Covid-19 explained, "*District Health Office and DC Office were involved in implementing [the TTQ] strategy, where every district administration then came up with the solution and ran this system all over Pakistan through pooling up the resources available with them*."

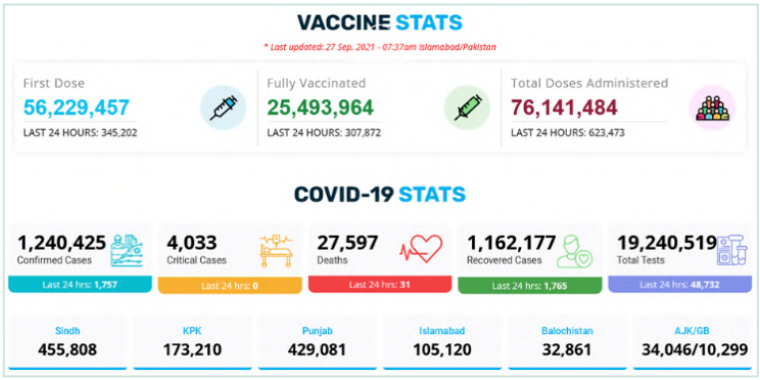
District Health Offices through the CEOs/DHOs/EDOHs, health facilities, laboratories, rapid response teams, and the community all played crucial parts in rolling out the TTQ Strategy. This multi-sectoral approach ensured that each entity was responsible for specific tasks, contributing to the overall effectiveness of the strategy. District surveillance teams contributed to conducting contact tracing, investigating cases, and monitoring testing and quarantine measures. This demonstrated the importance of surveillance teams in identifying individuals who may have been exposed to the virus, monitoring their testing and quarantine, and ensuring adherence to protocols. Further, health facilities were involved in testing, treatment, and referral of individuals. This highlighted the role of healthcare institutions in providing necessary medical services, including testing individuals for Covid-19, treating those who were infected, and referring severe cases to higher levels of care. Similarly, testing laboratories played a vital role in conducting Covid-19 testing and reporting the results to health authorities. This emphasized the importance of efficient and accurate testing procedures to identify infected individuals and provide data for surveillance and decision-making purposes. Rapid response teams were responsible for tracing contacts, collecting information, and following up on testing and quarantine requirements. These teams facilitated locating individuals who had been in close contact with confirmed cases, collecting relevant information, and ensuring that they underwent testing and adhered to quarantine protocols.

Community participation was essential in the implementation of the TTQ strategy. District Administration worked in close collaboration with the community influential and motivated them in promptly reporting symptoms, cooperating with contact tracers, undergoing testing when necessary, and following quarantine protocols. The importance of public awareness, education, and active engagement in controlling the spread of the virus was amplified in the media as well, which led to enhanced community involvement in identifying potential cases, reducing transmission through adherence to protocols, and fostering a collective effort in managing the pandemic.

Development of technology solutions and the use of digital tools and dashboards augmented the efficacy of TTQ Strategy. Digitization of the Covid-19 surveillance system was recognized at its inception, as mentioned by a Senior member of NCOC, "*Because we had to be quick, one of the biggest things was that we needed digital data flows*." This led to NCOC reaching out to the National Information Technology Board (NITB) which played a crucial role in harnessing information technology and digital tools for surveillance and data collection during the pandemic. NITB developed Smart Lockdown Technology, including a dashboard, to visualize hotspots and facilitate localized lockdowns. Field officers utilized this technology to take immediate actions such as closing specific areas or streets. They developed solutions for contact tracing using IT technologies and telecommunication data to track the movement of cell phones and identify potential exposures. NITB also collaborated with

private sector organizations, especially in the GIS space, to accelerate the development of surveillance platforms. Further, NITB developed recording tools and a centralized repository to store and analyze the data. Experts in business intelligence and data visualization were hired to transform the data into actionable insights. During the pandemic, NCOC dashboard linked with NEOC database served as a central platform for data management and decision-making. In addition to NITB, other provinces such as Punjab through HISDU also developed digital information system tools in the format of electronic dashboards.

A national dashboard (covid.gov.pk) was created by merging national and provincial dashboards, providing comprehensive information related to patients, critical care, deaths, recoveries, hospitals, contact tracing, and labs. Surveillance data, testing data, immunization data, geospatial monitoring, and information on variants were used for advanced analysis and decision making. Logistic management and inventory management systems were also established for monitoring of resources, such as oxygen, hospital beds, ICUs, ventilators, medicines, PPE, and other requirements and were made part of these dashboards, however challenges existed in ensuring data consistency across different dashboards. Digital platforms in form of Apps, portals, and tools were utilized extensively for data entry, tracking, and contact tracing as well as for imparting tele trainings to facilitate training activities. Video links were utilized for health department or district administration meetings, connecting hospitals, District offices, DDSRUs, and in most instances, CM and Chief Secretary offices. Geographical mapping of hotspots was mainly done by the district staff on the basis of the data being relayed through the dashboards. The information gathered from testing and mapping helped in identifying hotspots and making informed decisions. Smart and micro-lockdowns were then implemented in hotspot areas identified through the surveillance system and GIS mapping, after discussions with the local community. As mentioned by a Senior Official at HISDU, "*Our TTQ cell prepared a list of lockdown areas and issued notifications... they were marked using GPS and if they broke quarantine, the district administration was immediately notified*."



3.3.3 Use of Information and Evidence-Based Decision Making

The Covid-19 pandemic necessitated the adoption of evidence-based decision making to effectively manage and mitigate its impact. Considering the significance of surveillance led evidence-based decision making in Pakistan's response to the pandemic, there was a heavy reliance on scientific research, data analysis, and expert advice to make informed decisions in various areas, such as public health guidelines, testing strategies, treatment guidelines, vaccine prioritization, travel restrictions, and risk communication strategies. Various aspects, including the role of data, analysis and modeling, technology solutions, timeliness of decision making, integration of data and resources, emphasis on surveillance and implementation of TTQ strategy played a crucial role.

Data-driven decision making based on Covid-19 surveillance resulted in effective containment of disastrous pandemic effects in the country. The importance of data-driven decision-making through integration of different dashboards and data analysis was recognized early on, resulting in the utilization of IT and digital tools. This enhanced real-time data availability, enabling prompt policy adjustments. Collaboration with the private sector and the development of surveillance platforms and

data visualization tools further aided in transforming data into actionable insights. By considering scientific research, authorities gained insights into the nature of the virus, its transmission dynamics, and effective interventions. Data analysis helped in understanding trends, patterns, and impact, enabling decision-makers to assess the effectiveness of interventions and adjust strategies accordingly, while expert advice from professionals in the field provided valuable insights and recommendations based on their expertise and experience.

Further, public health guidelines, testing strategies, treatment guidelines, vaccine prioritization, travel restrictions, and risk communication strategies were all informed by evidence. To leverage the data from the RMS (Risk Management System), an app called **Pak Neghayban** was introduced, providing open access to the public. As stated by NITB official, "*This app gained significant popularity and became a reliable resource for ambulance and emergency services.*" Furthermore, technology played a crucial role in streamlining travel procedures and surveillance. The implementation of the **Pass Track** application facilitated passengers, airports, and disease surveillance units, ensuring efficient management of inbound travel and reducing the risk of importing diseases. Based on the surveillance data on the type and kind of variant, patients, and age groups were being affected, public health guidelines provided recommendations on preventive measures, such as mask-wearing, physical distancing, and hand hygiene, based on scientific evidence of their effectiveness in reducing transmission. Testing strategies were developed based on data analysis to ensure efficient and targeted testing, identifying cases, and mitigating the spread. Treatment guidelines were established mainly through a review of what worked and what did not work, ensuring the most effective approaches were adopted. Vaccine prioritization decisions took into account risk factors, vulnerability, and efficacy data to prioritize the distribution of limited vaccine supplies, while travel restrictions were implemented based on epidemiological data and the assessment of risks associated with specific regions. Risk communication strategies were developed to effectively convey accurate information, address concerns, and promote behavior change, drawing on evidence from those most affected in that specific area or geographical region.

A key aspect of evidence-based decision making had been the reliance on data. The flow of data from districts and hospitals to the National Command and Operation Centre (NCOC) indicated the importance of using data as the foundation for decision making. Timely and accurate data collection, management, and analysis allowed decision makers to gain insights into the state of the pandemic, identify areas requiring intervention, and assess the effectiveness of current measures. Data analysis and modeling played a crucial role in informing decision making. The NCOC collaborated with experts in disease surveillance and infectious diseases to analyze data and guide decision-making processes. Disease modeling at national and provincial levels provided valuable insights into the spread of the virus, allowing decision makers to anticipate and respond to emerging trends and challenges. NITB played a pivotal role in providing real-time data and analysis to support evidence-based decision making. They developed visualizations, graphs, and summarized data to present accurate and precise information to decision makers. The collaboration between NITB and experts ensured the selection of appropriate indicators and facilitated timely data entry through the deployment of air defense personnel in hospitals.

Efforts were made to ensure the timely availability of data for decision making. The low latency period of data collection and analysis, approximately 12 hours, allowed decision makers to respond promptly to emerging situations. Pakistan's low latency was highlighted by a Senior official of NITB in comparison with countries like USA, "*When Bill Gates came to Pakistan, the first question he asked was the kind of feedback loop we created and what was its latency...our latency was less than 12 hours, while it was 5 days in the US.*" Regular meetings and discussions at the NCOC facilitated collective decision making, involving relevant stakeholders at the provincial and national levels. The integration of data from multiple sources, such as surveillance data, testing data, immunization data, geospatial

monitoring, and information on variants, enabled advanced analysis and decision making. The creation of a comprehensive dashboard, merging national and international dashboards, provided decision makers with comprehensive information to inform their strategies. Monitoring of resources, such as oxygen, and collaborations with relevant ministries helped address shortages and allocate resources effectively.

3.4 Case Management

Process of diagnosing cases and providing medical care and treatment to individuals who have been diagnosed with Covid-19.

Box 4: Case Management of Covid-19

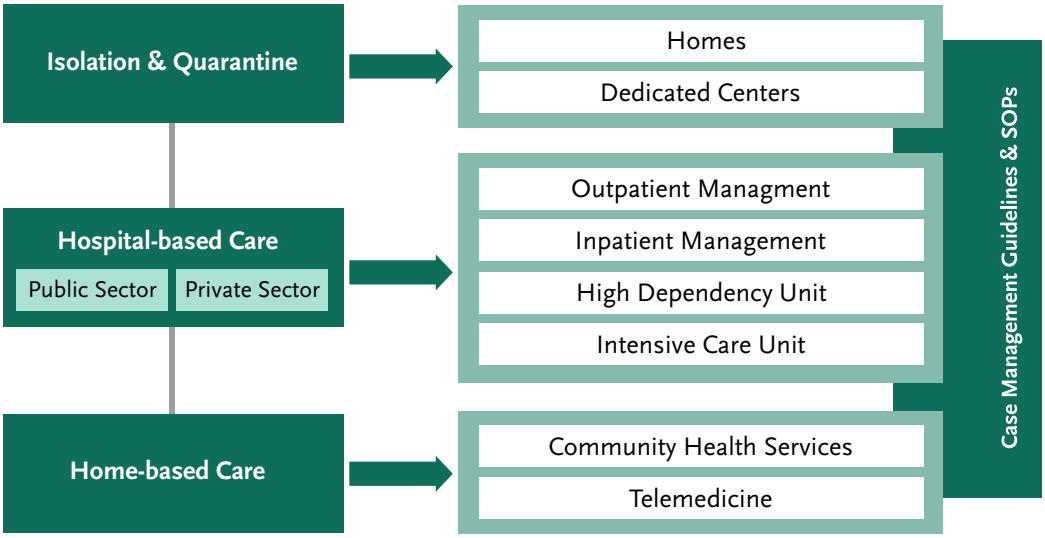
- A multi-faced approach was used for management of suspected and confirmed cases of Covid-19 through a network of designated hospitals and isolation/quarantine centers.
- National case management guidelines were developed even before the confirmation of first case of Covid-19, which were regularly updated based on emerging scientific evidence.
- Initial phase of pandemic was confronted with shortages of supplies to deliver effective patient care, including ventilators, oxygen support, and specialized medicines.
- Government increased its capacity for oxygen supply by setting up oxygen plants, procuring concentrators, and distributing oxygen cylinders to healthcare facilities.
- Potential of innovative technologies including telemedicine was harnessed to provide care to patients and reduce the risk of infection.
- Case management benefited from augmentation of surge capacity and training initiatives of government and development partners for healthcare staff and frontline workers.

The treatment of Covid-19 cases in Pakistan involved a multi-faceted approach that evolved over time based on emerging scientific evidence and global guidelines. Treatment strategies implemented in Pakistan for individuals with mild symptoms of Covid-19 were advised to self-isolate at home and monitor their condition. They were recommended to follow supportive care measures, including rest, hydration, and over-the-counter medications to alleviate symptoms such as fever and cough. While, patients with moderate to severe symptoms, including respiratory distress, were admitted to designated Covid-19 treatment facilities. These facilities provided medical care, including oxygen therapy, to manage respiratory symptoms and prevent complications. Supportive treatments such as antipyretics, cough suppressants, and respiratory physiotherapy were also administered as required. Oxygen therapy played a crucial role in managing moderate to severe Covid-19 cases.

Government increased its capacity for oxygen supply by setting up oxygen plants, procuring concentrators, and distributing oxygen cylinders to healthcare facilities. High-flow nasal cannula (HFNC) and non-invasive ventilation (NIV) were used to provide respiratory support, and in severe cases, invasive mechanical ventilation was employed. Development partners, including UNICEF, provided oxygen concentrators for hospitals to ensure uninterrupted supply of oxygen to Covid-19 patients. As regards to medications, in the early stages of the pandemic, drugs such as chloroquine and hydroxychloroquine were included in the treatment guidelines. However, as evidence evolved, their routine use was revised due to safety concerns and lack of proven efficacy. Instead, antiviral drugs like Remdesivir were authorized for use in selected severe cases. Additionally, other medications, such

as corticosteroids (E.g., dexamethasone), were prescribed for patients with severe disease and systemic inflammation. Continuous monitoring of patients' clinical condition, including vital signs, oxygen saturation, and laboratory parameters, was carried out. Chest X-rays and CT scans were employed for disease progression assessment. Regular testing, including viral PCR and antibody testing, was conducted to monitor viral load and detect potential reinfections. As Covid-19 vaccines became available, Pakistan initiated a nationwide vaccination campaign. Priority was given to healthcare workers, the elderly, and individuals with comorbidities. Vaccination efforts aimed to curb the spread of the virus, reduce severe illness, and protect vulnerable populations.

Figure 8: Levels and Components of Case Management of Covid-19



Surge capacities were augmented and different training platforms were utilized to train the workforce. This included face-to-face sessions, virtual courses, printed materials, and job-aids; leading to an enhanced understanding of the disease and its management at the designated facilities. The Covid-19 pandemic posed a significant challenge, with escalating morbidity and mortality, which infected 548,719,924 individuals with 6,350,355 fatalities globally. In Pakistan, as of June 26, 2022, the virus infected more than 15 million individuals, resulting in around 30 thousand deaths. [3, 4] A comprehensive and coordinated approach was crucial to reduce transmission, provide appropriate care, and protect vulnerable populations. Continuous evaluation, adaptation to new variants, and global collaboration proved essential for effective case management. The case management key components and approaches include 1) testing and diagnosis, 2) treatment and care, 3) vaccination, 4) contact tracing and isolation, 5) public health messaging and education, and 6) data monitoring and surveillance.

The Covid-19 case management guidelines portrayed country's approach to identifying, diagnosing, treating, and monitoring Covid-19 patients. These guidelines were developed based on scientific evidence, international best practices, and local considerations to ensure the efficient management of

[3] Jamal, Z., Haider, M., Ikram, A., Salman, M., Rana, M. S., Rehman, Z., Haider, S. A., Ammar, M., Nisar, N., & Umair, M. (2022). Breakthrough cases of Omicron and Delta variants of SARS-CoV-2 during the fifth wave in Pakistan. *Frontiers in public health*, *10*, 987452. https://doi.org/10.3389/fpubh.2022.987452

[4] Emmanuel, F., Hassan, A., Ahmad, A., & Reza, T. E. (2023). Pakistan's Covid-19 Prevention and Control Response Using the World Health Organization's Guidelines for Epidemic Response Interventions. *Cureus*, *15*(1), e34480. https://doi.org/10.7759/cureus.34480

Covid-19 cases in Pakistan. These guidelines encompass various aspects, including surveillance, diagnosis, clinical management, infection prevention, and post-recovery care. By adhering to these guidelines, healthcare professionals in Pakistan can ensure standardized and evidence-based care for Covid-19 patients, thereby mitigating the impact of the virus on the population's health. Regular updates and refinements to these guidelines, based on evolving scientific evidence and global experiences, were essential to maintaining an effective response to the Covid-19 pandemic in Pakistan.

Healthcare Infrastructure and Resources – Initially faced problems included insufficient healthcare infrastructure, delays in the availability of essential medicines, and inadequate resources at Covid-19 treatment centers.

Coordination and Referral Gaps – Referral mechanisms were in place, but there were gaps in the referral protocols, such as insufficient availability of ambulances and limited resources particularly at the district level. Patient referral delays and poor service were caused by a lack of coordination between different levels of care. A senior health specialist said *"Covid-19 has challenged our healthcare systems, but it has also highlighted our resilience and adaptability. Let's implement evidence-based case management strategies to save lives and protect our communities."*

Management Policy and Guidelines – Although case management guidelines were timely developed at the national level, healthcare providers reported delayed availability of national guidelines, leading to the use of international guidelines during the initial months. While others described that provision and implementation of guidelines resulted in improved patient handling. *A private sector responder said "We all were in a panic state at the start of Covid-19 because we didn't have any guidelines at that time."* UNICEF supported in development of case management guidelines for children, which took a multi-sectoral approach and was guided through a human rights perspective, ensuring that children's needs were addressed comprehensively.

Planning and Implementation – Lack of awareness among healthcare providers, insufficient resources (PPE, medical equipment, trained personnel), and a lack of motivation and incentives for healthcare providers were mentioned as shortcomings in implementing the guidelines. Some hospitals faced difficulties in fully implementing guidelines due to a lack of infrastructure, such as malfunctioning HEPA filters in operating theaters. A senior health executive said, *"In a meeting with the PM held in March 2020, I gave a proposal to shut down all flights for 6 weeks, so that we can improve our preparation, and develop a strategy for how to quarantine people on arrival, establish quarantine centers, and then we can resume flights. So, all flights were stopped for 6 weeks."*

Health workers engaged in Covid-19 care.
Credits: Arab News, 2020.

Service Provision – There was a need for additional bed capacity in designated hospitals to effectively manage Covid-19 patients. A district health officer mentioned that there were beds allocated for Covid-19 patients, but additional designated beds were needed in specific hospitals like PIMS and Poly Clinic. Respondents also mention shortages of supplies such as oxygen, N95 masks, and sanitizers for hospital staff who were more at risk while working at their duty places. A surgeon from private sector said, *"As I am a surgeon, I would like to tell you about surgery point of view that when Covid-19 occurred, elective surgery was postponed and everything was closed for 3-4 months because of no guidelines provided by the government."* Responses from different regions (Hyderabad, Sindh, and Lahore, Punjab) and healthcare professionals highlighted specific challenges and experiences related to case management. A respiratory specialist at a medical university informed, *"The non-invasive mechanical ventilation technique is a groundbreaking advancement in respiratory care. It has transformed the way we support patients with respiratory conditions, offering a gentler and more comfortable alternative to invasive methods. This technique empowers us to provide effective treatment while preserving patient dignity and improving overall outcomes."*

In order to strengthen Covid-19 service provision, transitory facilities up to the level of specialized Covid-19 hospitals were established, like Islamabad's Isolation Hospital and Infectious Treatment Center, Lahore's Isolation Center at Expo Center, and Karachi's Infectious Diseases Hospital. While the physical infrastructure for these facilities was quickly established through engagement of the NDMA, FWO, other government agencies, and private sector, their clinical preparedness remained perplexing leading to difficulty in ensuring the full spectrum of medical services within these newly established facilities, particularly those required to cater intensive care for Covid-19 patients. A healthcare provider informed, "*While physical infrastructure was established very quickly, provision of advanced services including intensive care was scanty with lack of essentials, like CT scanning.*" Referral delays and poor service were caused by a lack of coordination between the various levels of care as well as insufficient availability of ambulances and lack of resources at treatment centers. Quarantine facilities were established, and at times, patients were quarantined in barracks after discharge.

3.5 Infection Prevention and Control

Enabling safe healthcare services delivery through prevention and control of hospital acquired Covid-19 infections, while minimizing the risk of transmission among communities.

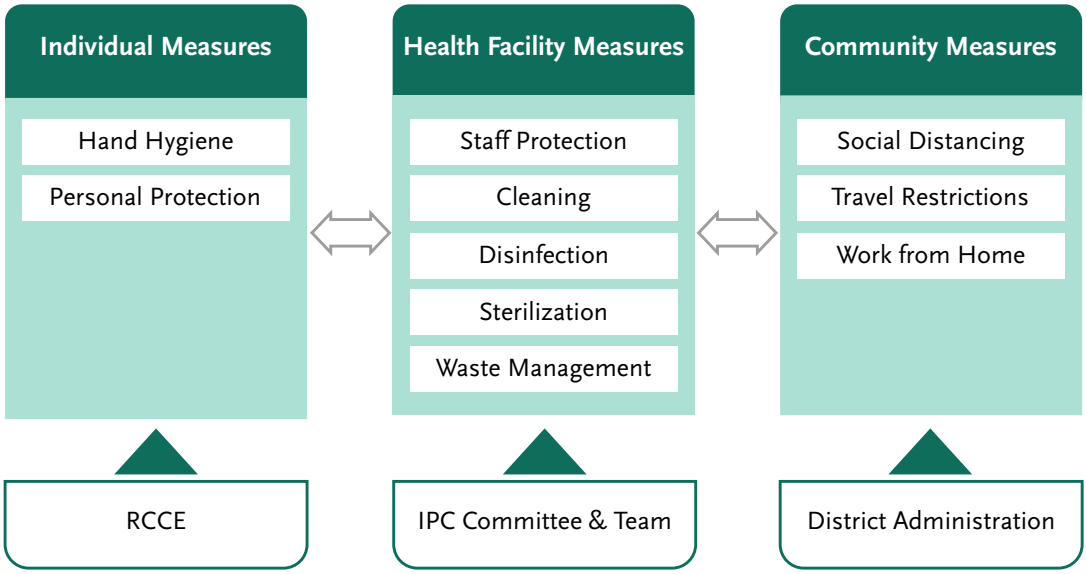
Box 5: IPC Strategy and Response

- Covid-19 being a highly contagious airborne virus necessitated robust infection, prevention and control (IPC) strategies.
- National IPC strategy was developed and comprehensive guidelines, SOPs and directives were issued from time to time by both federal and provincial authorities related to hospitals, schools, mosques, markets, banks, communal gatherings and public transport.
- Initial phase of pandemic was confronted with shortages of PPE and other IPC related items.
- Creating a safe environment in health facilities took center stage during Pakistan's pandemic response, and multi-pronged IPC measures were implemented at health facilities for limiting the intake of patients, universal mask usage, triage areas, and designated wards and ICUs.
- Local leaders, religious scholars, and influential figures were involved in disseminating IPC guidelines and encouraging communities to follow.

Covid-19 being a highly contagious airborne virus necessitated robust infection, prevention, and control (IPC) strategies. Creating a safe environment in health facilities took center stage during pandemic response, which was implemented within hospitals, health facilities, labs, and outreach through establishment of critical IPC measures. Since the onset of the Covid-19 pandemic, Pakistan implemented various measures to prevent and control the spread of the virus. The situation continued to evolve over time as new information and strategies emerged.

National IPC strategy was developed and disseminated at all levels to begin with, while comprehensive guidelines, SOPs, and directives were issued from time to time by both federal and provincial authorities related to hospitals, schools, mosques, markets, banks, communal gatherings, and public transport. Key elements of IPC were ensuring supplies of PPEs, capacity building of staff, monitoring and reporting of hospital acquired Covid-19 infections, and availability of at least minimal requirements of resources at health facilities.

Figure 9: IPC Measures at Individual, Health Facility and Community Levels



The IPC strategies implementation was initiated immediately with the onset of pandemic. A nationwide lockdown was imposed in March 2020, closing schools, businesses, and public gatherings to contain the virus's spread. The government launched public awareness campaigns targeting community behaviors emphasizing hand hygiene, social distancing, and mask-wearing. International travel restrictions were imposed, with mandatory quarantine for incoming passengers and PCR testing. Certain countries were categorized as high-risk, and travel bans or stricter regulations were implemented accordingly. As regards to testing and contact tracing, Pakistan established testing facilities across the country and ramped up testing capacity over time, and these efforts also supported to identify and isolate individuals who came into contact with confirmed cases. Further, isolation wards were set up to accommodate infected individuals, and efforts were made to increase the availability of ventilators and other medical equipment. In order to curb localized outbreaks, targeted lockdowns were imposed in specific areas with high infection rates. Such smart lockdowns focused on restricting movement in high-risk areas while allowing essential services to operate. Socioeconomic factors, misinformation, and vaccine hesitancy were key challenges faced which were addressed through enhanced public communication, community engagement, and vaccination awareness campaigns. An epidemiologist said, *"We must be proactive in implementing IPC strategies, from*

enhanced cleaning protocols to ensuring proper ventilation in public spaces, to minimize the risk of Covid-19 transmission."

The initiative for preventing and controlling Covid-19 infections targeted on 1) personal hygiene, 2) physical distancing, 3) respiratory hygiene and mask usage, 4) Vaccination, 5) Environmental Cleaning and Disinfection, 6) engineering controls and ventilation, 7) educational institutions, and 8) government initiatives and support included establishing the National Command and Operation Centre (NCOC) to monitor and coordinate Covid-19 response efforts nationwide, providing guidelines and recommendations to different sectors on IPC practices during the pandemic, and conducting training programs for healthcare workers and other frontline personnel on IPC measures. Covid-19 IPC (Infection Prevention and Control) guidelines were a set of measures developed to prevent the transmission of the novel coronavirus within healthcare settings and the community at large. These guidelines aim to mitigate the risk of infection among healthcare workers, patients, and the general population.

A number of guidelines for the safe functioning of routine activities were formulated and healthcare workers were trained on infection prevention and control protocols. The National Reference Public Health Laboratory quickly acquired the requisite capability for Covid-19 diagnostics on February 1, 2020, and the country-wide testing capacity for performing Covid-19 polymerase chain reaction (PCR) testing was established. Moreover, mass Covid-19 public awareness and educational campaigns were launched on multiple media platforms, including electronic, print, and social media. Messages were developed to promote hand hygiene, social distancing, use of masks and PPE, environmental cleaning and disinfection, and to provide information on the disease itself. A senior health manager said *"Strengthening IPC protocols is essential to safeguard the lives and well-being of our healthcare workers and patients. Let's provide them with a safe environment to work and heal."* The situational overview of pandemic under selected themes of infection prevention and control includes the following.

IPC Policy and Guidelines – Initially, there was a lack of awareness among the general population regarding the importance of IPC measures, such as hand hygiene, mask-wearing, and physical distancing. These difficulties were addressed by providing technical assistance to provincial and district health departments for establishing and implementing the IPC program, and conducting training and capacity building programs for healthcare providers on IPC measures.

IPC orientation being carried out at a hospital for nurses and health workers.

Credits: WHO/Pakistan, 2020.

Personal Protective Equipment – Healthcare facilities faced shortages of personal protective equipment (PPE) in the early stages of the pandemic, posing risks to frontline healthcare workers. However, efforts were made to address these shortages through local production, imports, and donations, ensuring that healthcare workers had access to adequate PPE to protect themselves and patients. Initially, there were shortages and availability issues of personal protective equipment (PPE). Supply chain management was disrupted due to strict lockdown measures.

Planning and Implementation of IPC – The steps the government took comprised of designated IPC focal persons in health facilities responsible for IPC implementation and monitoring, documentation, and daily reporting on dashboards were established to track IPC activities and monitor compliance.

Community Engagement – Local leaders, religious scholars, and influential figures were involved in disseminating IPC guidelines and encouraging communities to follow them. Mass vaccination campaigns were launched to achieve herd immunity and further control the spread of the virus. However, it is important to note that the effectiveness of IPC measures varied across different regions of Pakistan. Urban areas generally had better access to resources, healthcare facilities, and awareness campaigns compared to rural areas, where challenges persisted. A civil society member said *"Covid-19 may have disrupted our lives, but it cannot break our spirit. Let's implement IPC strategies diligently, so we can emerge stronger and more united than ever before."* There were several issues and challenges faced in the Covid-19 IPC implementation which included PPE shortages and availability issues, supply chain disruptions due to strict lockdown measures affecting the timely distribution of PPEs. There were certain issues reported with the implementation of IPC guidelines that needed clarity, comprehensiveness, or practicality of the guidelines. Waste management presented challenges that needed to be addressed in the IPC program.

3.6 Points of Entry

Effective management of international entry and exit points for containing spread and ensuring a safe environment for travelers.

During a pandemic such as Covid-19, the points of entry (POE) play a crucial role in controlling the transmission of the disease within a country. By implementing various measures like designating specific POEs for International entry and exit, ensuring sufficient staffing, conducting traveler screening, implementing testing and quarantine protocols, providing health education, establishing

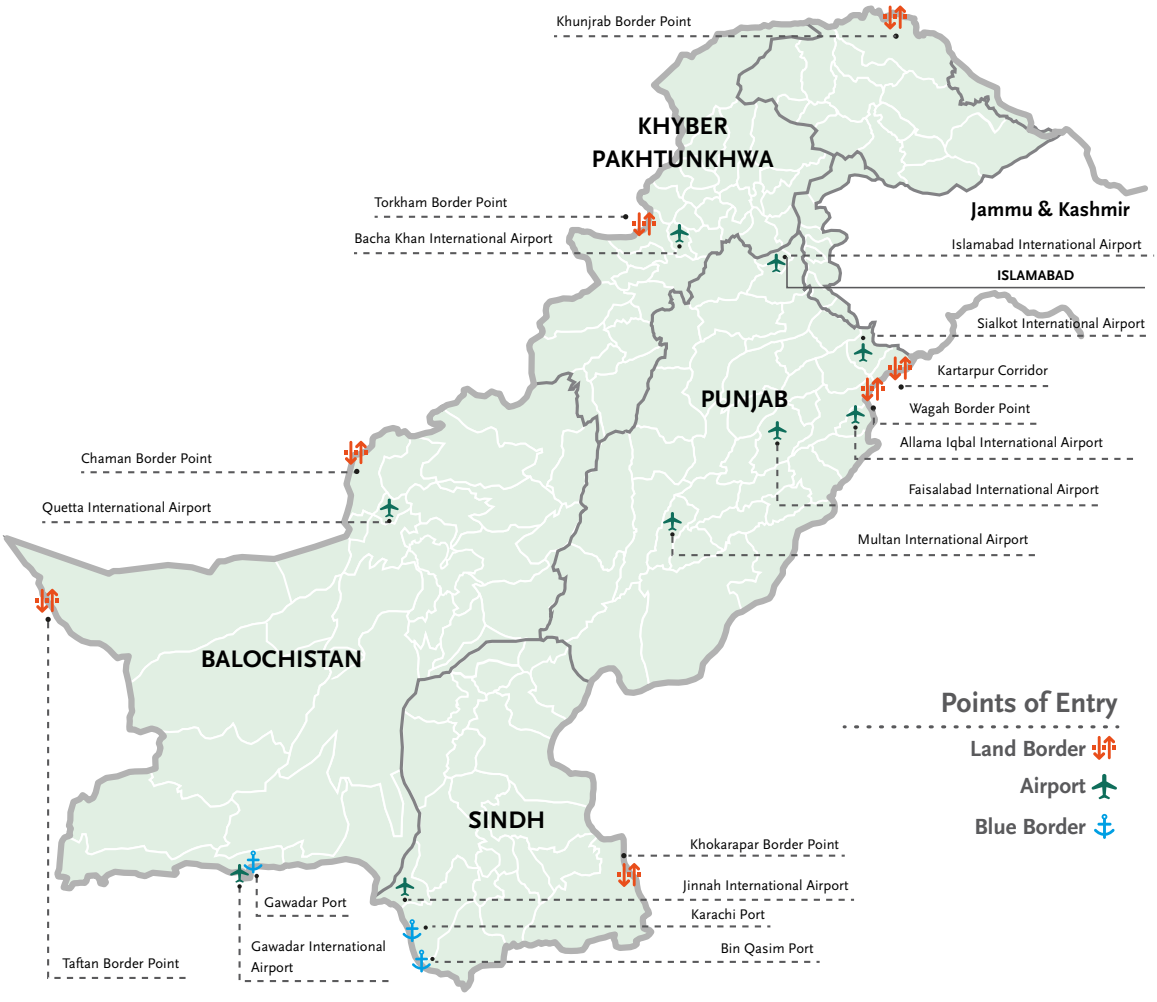
Box 6: Actions for Strengthening POEs

- At the time of Covid-19, Pakistan had 19 POEs, including nine international airports, seven land border crossings, and three seaports.
- The National Preparedness and Response Plan (NPRP) developed in February 2020, outlined several pivotal actions regarding POEs to effectively manage public health emergencies.
- As the pandemic unfolded, SOPs and guidelines were developed and regularly updated to ensure the safety of passengers and to minimize the risk of transmission of the virus.
- Capacities were improved through digital tools, like Pass Track App, dedicated isolation and quarantine facilities, and delivery of PPEs and screening devices (thermal guns and scanners).
- Close coordination between BHS, Mo NHSR&C and NCOC facilitated a streamlined and coordinated approach in managing the POEs.

efficient data management systems with relevant connections, and conducting regular risk assessments, countries can effectively reduce the importation of cases and contain the spread.

Pakistan had 19 operational designated Points of Entry at the time of Covid-19, to facilitate the entry of individuals into the country. These POEs encompassed various types of transportation hubs, including nine international airports, seven land border crossings, and three seaports. These locations serve as gateways for travelers coming into Pakistan. The responsibility for implementing precautionary measures at these designated POEs lies with the Central Health Establishment (CHE), which was later renamed as Border Health Services (BHS). In addition to managing the POEs, BHS also oversees a network of 24 dispensaries that play a vital role in providing healthcare services and support at the POEs. There were also some porous entry points with the Iran and Afghanistan borders which exacerbated health problems during the pandemic. These entry points increased the risk of undetected cases of infectious diseases, including the spread of Covid-19.

Figure 10: Designated Points of Entry in Pakistan



Sufficient staffing was critical for the effective management of POEs. Regarding the BHS staff hierarchy at POEs, it typically begins with the Health Officer as the head, followed by the Assistant Health Officer and Quarantine Assistants. Additionally, there may be coolies and support staff to assist with various operational tasks. During an internal assessment in 2019, it was observed that there was a shortage of staff at POEs. There were also capacity issues. To address this, CHE closed 18 dispensaries out of

24. Pooled their staff and redeployed their personnel to POEs. Approximately 250 to 300 staff members were reassigned. Through this redeployment, BHS was able to meet 50% to 60% staff requirements. During Covid-19, staff gaps were filled by taking staff from provincial governments through NCOC on a temporary basis. Staff was also trained based on the assessment findings. As a senior official from Border Health Services explained the issue faced due to staff taken from provincial governments on a temporary basis, *"The problem comes when you borrow and train staff and they go back to the provinces, which actually happened, so you stand in your old position."*

Before Covid-19, CHE carried out an internal assessment in 2019**.** As a senior official from Border Health Services explained, "*CHE carried out an internal assessment in 2019 against the standards of International Health Regulation Standards. Preparation for war is done in times of peace and not during war. If you are not prepared before war, then there is only luck.*" This internal assessment allowed for the identification of gaps in POEs preparedness before the Covid-19 outbreak including shortage of staff, capacity issues, and shortage of equipment and quarantine facilities. The second assessment was carried out during Covid-19 with the support of the World Health Organization. To address these shortcomings identified during assessment, BHS took various measures. They closed 18 dispensaries and relocated their staff to the POEs, significantly enhancing the workforce. The department also conducted trainings to improve the capacity and skills of the POE staff. In terms of equipment, they procured screening devices such as thermal guns and scanners, BHS developed a PC-1 to secure funding for the establishment of more quarantine centers at the POEs. WHO also supported in provision of equipment including PPEs and masks.

The National Preparedness and Response Plan (NPRP) developed in February 2020, also outlined several pivotal actions regarding POEs to effectively manage public health emergencies. One of the key actions was the development and implementation of a comprehensive POE emergency plan. This plan aimed to communicate up-to-date disease information, and standard operating procedures, and provide necessary equipment and training to staff members, enabling them to take appropriate actions in managing ill passengers. Additionally, the plan emphasized the importance of establishing rapid health assessment and isolation facilities at POEs, ensuring prompt and safe transportation of ill passengers to designated health facilities. To enhance public awareness and knowledge, the plan emphasized the need to communicate vital information about Covid-19 to travelers. Furthermore, regular monitoring and evaluation of the effectiveness of readiness and response measures at POEs were recommended, allowing for necessary adjustments to the readiness and response plans.

An airport health staff screening temperatures of inbound international passengers.

Credits: CHE/NIH, 2021.

As the outbreak unfolded, SOPs and guidelines were developed to ensure the safety of passengers and to minimize the risk of transmission of the virus. Mo NHSR&C issued guidelines on 09 September 2020 to aviation authorities and crew regarding identification, management, and reporting of suspected cases of Covid-19. This guideline suggested a steps wise approach to be followed by every traveler. Prior to boarding, all travelers were required to register on the Pass Track App and fill Health Declaration Form. No Covid-19 RT-PCR test was required from travelers from category A countries. However, travelers from category B countries were required to present a negative RT-PCR test taken within 96 hours prior to travel. Upon disembarking, all travelers were required to maintain a distance of 6 feet from each other and form queues as part of the entry process. Thermo screening guns and/or thermo scanners were used to conduct temperature checks on individuals. Travelers who were identified as having a fever were identified and directed to the Health Counter. Pass Track App or completed Health Declaration Forms (HDFs) were collected at the counters and analyzed based on the provided information, facilitating the segregation of travelers into two classes of travelers. Symptomatic travelers from category B countries required having a Covid-19 RT PCR test conducted and its result was essentially submitted to the designated authorities within 48 hours of arrival. Contact details of such suspected case were acquired by port authorities before leaving the port. Asymptomatic traveler was allowed to go home with written instructions. Staff was also required to observe the overall precautions. Pass Track App shared data with NADRA and subsequently with NEOC.

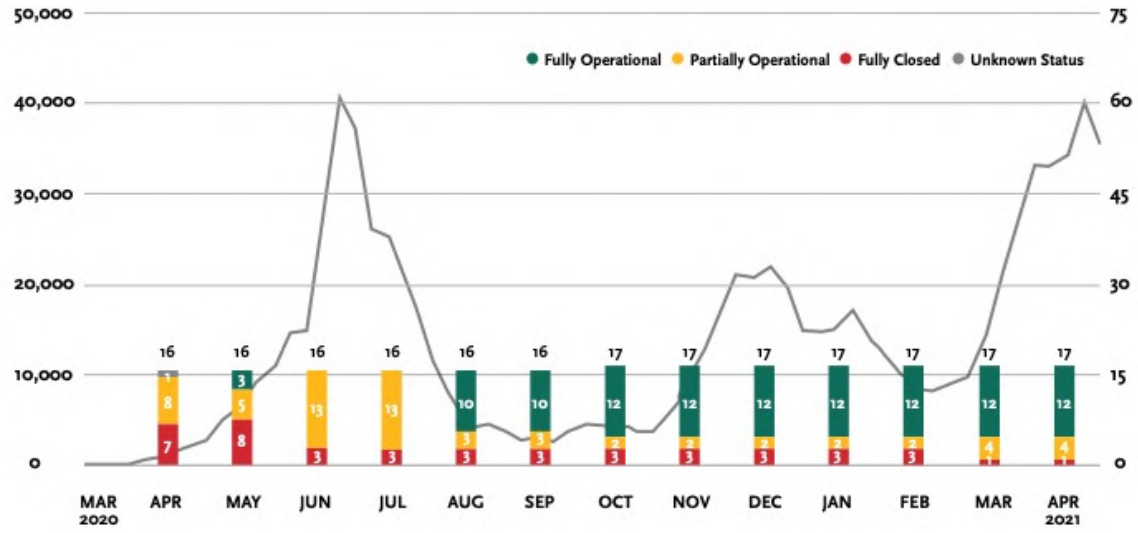
Service availability condition was enhanced following an internal assessment of the POEs. During second assessment with the support of the WHO, capacities of POEs were improved as compared to previous findings. Delivery of PPEs and screening devices like thermal guns and scanners at POEs was ensured. Their availability at all designated POEs was 60 to 70%. Testing of patients was not conducted at the points of entry (POEs). Instead, suspected and confirmed cases were referred to hospitals for testing. Ambulances were available for transportation of sick travelers to the hospitals. Quarantine facilities were not available at all POEs. There was just one quarantine hospital and nineteen POEs. When the patient came from outside and was suspected, no quarantine facility was available at 18 POEs. As there was no quarantine facility at the Taftan border, the Pakistan House was used for quarantining the pilgrims returning back from Iran. Due to insufficient space, all the travelers were kept together there, which resulted in spread of Covid-19 as the first case identified on February 26, 2020 in Karachi was a traveler from Iran. Pilgrims were also allowed to go to their respective provinces and isolated in specific quarantine centers. There was no proper testing facility available at POEs and therefore all the individuals who exhibited symptoms or were suspected of having Covid-19 were referred to hospitals for testing. Later on, fabricated quarantine facilities were established for the isolation of travelers.

A representative from the federal government explained, "*We cannot close the POEs, but we can restrict flights from countries with higher Covid-19 spread. The management of POEs during the Covid-19 pandemic involved a strategic approach to balancing trade, travel, and public health. While complete closure of POEs was not feasible, restrictions on flights from specific countries were implemented based on the extent of Covid-19 spread in those countries.*" Close monitoring of confirmed cases across different countries was conducted through different websites on a daily basis, which helped the authorities to determine entry restrictions by comparing percentages and adhering to predetermined thresholds. The NCOC played a crucial role by categorizing countries as high, middle, or low risk based on the recommendation of Mo NHSR&C, which influenced the formulation of travel policies. As a result, flights from countries with higher Covid-19 transmission were temporarily suspended to control movement of the virus. Additionally, stringent measures were enforced, including mandatory quarantine for all passengers. Recognizing the significant impact of POEs, a color-coding system (green, grey, and red) was utilized

to convey the risk level associated with different countries. These coordinated efforts ensured effective management of passenger traffic and implementation of risk mitigation measures during pandemic.

In April 2021, the Displacement Tracking Matrix – Regional Evidence for Migration Analysis and Policy (DTM-REMAP) team in Pakistan conducted an assessment of 17 points of entry (POEs) in the country including 9 airports, 6 land border crossings and 2 seaports. The assessment aimed to provide valuable information for implementing mobility restrictions, preparedness measures, and response strategies at these entry points and to improve the overall understanding of the situation at POEs. The status of POEs underwent changes between March and April 2021 due to the increase in Covid-19 cases and the emergence of new strains in other countries. Out of the assessed POEs, twelve were fully operational, four were partially operational, and one was fully closed. The gathered data and mapping efforts by the DTM-REMAP team provided valuable information for understanding the locations, statuses, and restrictions at POEs in Pakistan, aiding in effective response measures and preparedness initiatives.

Figure 11: Readiness Assessment of Points of Entry in Pakistan



Source: IOM. (2021). DTM-REMAP.

Collaboration between BHS, Mo NHSR&C, and NCOC facilitated a streamlined and coordinated approach to managing the POEs, ensuring a consistent and evidence-based response to the pandemic. Internally, the health department, specifically BHS, was responsible for overseeing the activities at the POEs. Data, information, and events occurring at the POEs were shared with the Directorate of BHS, which then disseminated the relevant information to the Mo NHSR&C. This internal coordination ensured that decisions and actions were based on accurate and timely information. Furthermore, BHS provided feedback on suspected cases and contact tracing, contributing to an effective response. Externally, coordination occurred at the national level, primarily through the NCOC. The NCOC issued administrative orders and travel policies either regional or international based on the information provided by the CHE.

3.7 Vaccination

Process of administering vaccines specifically designed to provide protection of the population against Covid-19 to reduce its incidence, severity of illness, and mortality rates.

The United Nations and the WHO launched a strategy to vaccinate 40% of the world's population against Covid-19 by the end of 2021 and 70% by mid 2022. Safe and effective vaccines were perceived

as a game-changing tool, and fair and equitable access to every country was of utmost importance to protect the people.

In June 2020, the WHO, GAVI, and the Coalition for Epidemic Preparedness Innovations (CEPI) launched the COVAX Facility and Advance Market Commitment (AMC) with the goal of ensuring rapid equitable access to safe and effective vaccines to all countries, regardless of income level. Pakistan also joined the GAVI COVAX AMC facility. With the confidence accorded by this facility in getting access to Covid-19 vaccine supply, Pakistan started planning for the deployment under different situations. As per the guideline from WHO and guidance from the National Technical Advisory Group (NITAG), developed comprehensive a National Vaccine Deployment Plan (NVDP) and allocation framework prioritizing the high-risk groups based on risk assessment. The risk-based criteria were developed to prioritize the specific population groups for the vaccination, which includes risk of acquiring infection, severe morbidity and mortality, socio-economic impact, and risk of transmitting to others. These criteria were applied to specific population groups through a scoring matrix and phase-wise vaccination was recommended in the context of shortage of vaccine supplies initially.

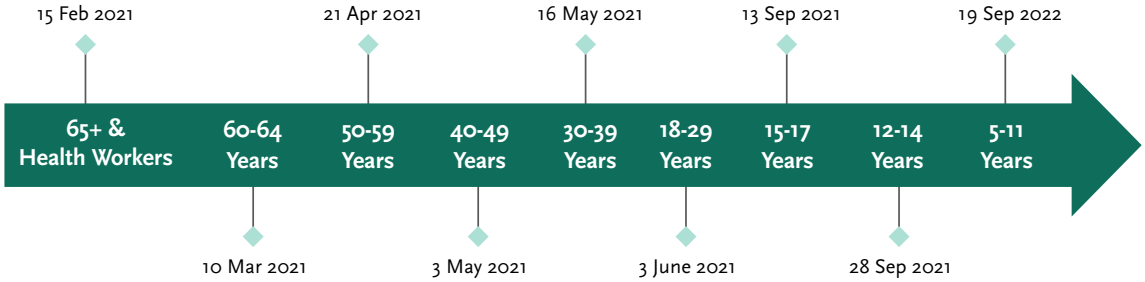
Box 7: Covid-19 Vaccine Rollout in Pakistan

- Pakistan rolled out Covid-19 vaccination in a structured and phased manner under guidance of National Deployment and Vaccination Plan.
- National Disaster Management Authority (NDMA) was the leading government agency responsible for Covid-19 vaccine procurement and having negotiations with the manufacturers.
- Total of 770 Covid-19 vaccination centers and 22 mass vaccination centers were established across Pakistan.
- Different strategies were implemented to increase the uptake of vaccine like deployment of female vaccinators by UNICEF, and RED (reach every door) strategy in Punjab.
- Transparency in prioritization based on scientific evidence helped to vaccinate the at-risk population groups, including healthcare workers and the elderly.
- Fake news and widespread circulation of untrue information on social media worsened vaccine hesitancy, which was countered through widespread RCCE interventions through support of development partners.
- Implementation and experiences gained during Covid-19 vaccination also helped in building inherent capacities for routine immunization services through provision of advanced technologies and enhanced storage capacities.

National Deployment and Vaccination Plan guided the rollout and entire implementation of Covid-19 vaccine. Age-group and high-risk populations were preliminary criteria for initial prioritization. Vaccine hesitancy and reluctance were faced during the early phases, however, widespread RCCE interventions by government, development partners, and media gradually enhanced compliance. Fear of infection and mandatory requirements for international or domestic travel, hoteling, and other essential services further resulted in increased uptake. Large-scale adult vaccination sites, drive-throughs, and mobile vehicles were deployed across all the country with uniform SOPs, microplanning, distribution, resources, cold chain, logistics, and waste management. Centralized database (NIMS) was developed by NADRA to streamline vaccine administration, consolidate data, and avoid duplication and issuance of certificates. Vaccine rollout began in February 2021, after the country received 500,000 doses of

Sinopharm vaccine from China, but was met with hesitance and mistrust from the people. Federal EPI established a technical working group with three subcommittees for supply and vaccine logistics, surveillance of Adverse Events Following Immunization (AEFI), and RCCE (Risk Communication and Community Engagement). The false information, rumors, mistrust of government policies, and a poor healthcare system led to hesitance toward Covid-19 vaccines. By 31st March 2022, Pakistan had received 287,496,700 vaccine doses while fully vaccinated persons in Pakistan were at 61.1% while 78.9% of the target population was partially vaccinated (Ali et al., 2022).

Figure 12: Timeline of Covid-19 Vaccine in Pakistan



Covid-19 Global Humanitarian Response Plan (GHRP), Pakistan Preparedness and Response Plan Covid-19, and National Deployment and Vaccination Plan (NDVP) drove the country's response and strategically guided the Covid-19 vaccine roll out. Other highlights of NDVP include population prioritization, regulatory framework, costing and funding, service delivery strategies, M&E, waste management, risk communication, community engagement, and application for COVAX to obtain free vaccines as well as operational support, and establishment of decision-making platforms in the shape of National Immunization Technical Advisory Groups (NITAG) and National Interagency Coordination Committee (NICC). A Cabinet Committee was constituted to supervise and oversee the Covid-19 vaccine deployment and to make all the necessary decisions related to administration and management under the direct guidance of the Prime Minister.

National Disaster Management Authority (NDMA) was the leading government agency responsible for Covid-19 vaccine procurement and negotiations with manufacturers. Provinces being the key stakeholders in the implementation of the deployment process were taken on board. The vaccine deployment-related discussions were taking place on a daily basis and consensus was achieved over matters requiring thorough debate. The message that should go to the public/ media in terms of vaccines was also discussed at the NCOC first and then it went on air. Inter-sectoral collaboration among various line departments/ministries was also considered as the social mobilization component was leveraged in mobilizing the adult population for vaccination and it became a common cause as a nation and everyone contributed its share to protect the masses against the deadly disease.

As a pre-requisite for introducing Covid-19 vaccination in Pakistan, NCOC constituted two committees; Expert Committee on Vaccines and Immunization, that was composed of renowned public health experts and researchers to guide the Mo NHSR&C on the target populations that were prioritized for vaccination (in phases) and vaccine characteristic to be preferred for use in Pakistan. Besides this committee, a National Vaccine Task Force (VTF) was also formed with a wider participation of all local stakeholders and vaccine experts to make timely decisions and oversee the preparedness process of vaccine deployment. Both the expert committee and VTF were supported by the Mo NHSR&C and EPI to carry forward the decisions taken by these planning and coordination bodies. Besides these committees, a Development Partners Coordination Committee (DPCC)

comprising of Federal EPI, GAVI, World Bank, WHO, UNICEF, ADB, FCDO, USAID, and other partners was constituted for wider participation of all national and international stakeholders and vaccine experts to take timely decision and oversee the preparedness process of vaccine deployment and look for additional resource mobilization in order to meet the upcoming operational cost. The DPCC was responsible for supporting the implementation of recommendations of the Cabinet Committee, National Vaccine Task Force and Expert Committee in relation to planning and implementation of a quality Covid-19 campaign/introduction. The DPCC developed and utilized the National Deployment and Vaccination Plan (NDVP), Vaccination Introduction Readiness Assessment Tool (VIRAT)/Vaccine Readiness Assessment Framework (VRAF), Covid-19 Costing Tool (CVIC), and other planning, monitoring, and reporting tools of Covid-19 vaccination. The DPCC was also responsible to provide technical support to provinces for ensuring effective micro-planning, assessing/informing the cold chain needs, developing training guidelines, vaccine specific guidelines, and SOPs, developing AEFI protocols, and developing communication plan. The DPCC also developed vaccine specific guidelines for Sinopharm, AstraZeneca, Sputnik, Sinovac, and CanSino Bio. In addition, guidelines for Covid-19 Vaccination Counter (CVCs) were also prepared. In addition, a dedicated Technical Working Group (TWG) for planning and coordination related to refugee vaccination was also constituted with active participation from relevant stakeholders, such as SAFRON and UNHCR.

In relation to Adverse Events Following Immunization (AEFI), the already established National AEFI Review Committee worked to strengthen the AEFI surveillance system following the recommendation of WHO-led International AEFI Workshop for ensuring vaccine safety. The committee was chaired by Professor of Pediatrics and Director Research, Agha Khan University, Karachi and notable pediatricians from across the country were members of the committee. The strength of the committee was enhanced with participation of members from pharmacovigilance department of the DRAP and co-opted members that may be needed from time to time for causality assessment if required. Besides this, the Pharmaco-vigilance section of the DRAP was also revitalized and it made connections with national and provincial focal points while the district level representatives were nominated to strengthen the AEFI surveillance system in the country prior to vaccine introduction. Development partners further supported the government through the Pandemic Response Effectiveness in Pakistan (PREP) Project, which was a 3-year project to address critical country-level needs for vaccination in the context of Covid-19, supported by WB, IsDB and ADB.

22 mass vaccination centers were established countrywide.

Credits: Expo Center Karachi, 2021.

National Vaccine Deployment Plan – NDVP comprehensively discusses different types of vaccines, delivery strategy, storage, logistics, identification of target population, prioritization, COVAX facility, local development etc.

Vaccination Sites – Community-based Covid-19 Vaccination Centers (CVCs), including mass vaccination centers were established to facilitate the vaccination process.

Vaccination Database – Centralized database (NIMS) was developed by NADRA to streamline vaccine administration, consolidate data, and avoid duplication and issuance of certificates. The system was able to track what person had received which dose of which vaccine. This was something that even a lot of developed countries couldn't do, and it really gave us a lot of advantages because it was a unique identifier and you could easily link the vaccination status to people who ended up in hospitals or died.

Adverse Effects Following Immunization (AEFI) –The Mo NHSR&C developed an AEFI monitoring and management system in line with the WHO guideline on Covid-19 vaccination program and trained all health workers on the guidelines. As a precaution, all individuals were pre-screened for any risk factors before vaccination and were mandatorily kept under observation for at least 30 min after receiving the injection. One KII respondent recalled, *"We already had a limited AEFI* system *that existed within EPI, and we quickly boosted this. The AEFI committees which we had at the national and provincial level; we quickly took it down to the district level as well."*

Vaccine Hesitancy – As the country initiated the vaccination, vaccine hesitancy was a big issue. Reports on the Covid-19 vaccines being produced within a short span of time, fake news, and widespread circulation of untrue information on social media most likely worsened vaccine hesitancy. The timely and effective risk communication and continued awareness program by the Mo NHSR&C through various platforms were critical in reducing vaccine hesitancy and maximizing vaccine uptake. During the campaign, most people took the vaccines, perhaps due to wide availability of the vaccine at the doorstep and increasing local and global confidence in the vaccines. Vaccine hesitancy and reluctance were faced during the early phases; however, widespread RCCE interventions by the government, development partners, and media gradually enhanced compliance. Fear of infection and mandatory requirements for international or domestic travel, hoteling, and other essential services further resulted in increased uptake. Large-scale adult vaccination sites, drive-throughs, and mobile vehicles were deployed across the country with uniform SOPs, micro planning, resources, cold chain, logistics, and waste management.

3.7.1 Vaccination Coverage

Pakistan initiated registration of its population for Covid-19 vaccination in February 2021. Vaccination was initiated in early March 2021. The vaccination process was a bit slower initially but saw an exponential increase from June 2021 onwards. The first 10 million doses were administered in 113 days, the second 10 million in 28 days, the third 10 million doses were administered in 16 days, and the last 10 million doses in only 12 days; with the health system administering more than 1 million doses on an average per day, since September 2021. As of December 2022, Pakistan administered a total of 339.2 million doses, and fully vaccinated 132.6 million.

Some of the key achievements in this regard included: firstly, vaccination of more than 90% of total eligible population, which included AstraZeneca-Oxford vaccines, Sinopharm, Sinovac, CanSino, Sputnik-V, Moderna, PakVac-Cansino and Pfizer BioNTech (mRNA Covid-19 vaccine); secondly, expedient review of available literature, and emergency use approval (EUA) for seven vaccines in the country by the Drug Regulatory Authority of Pakistan (Sinopharm, CanSino, Sinovac, Sputnik V, Astra

Zeneca, Pfizer, and PakVac-Cansino); thirdly, permissions to the private sector for import and administration of vaccines with strict pricing control mechanism regulated through DRAP; fourth, established 770 Covid-19 vaccination centers (CVCs) and 22 mass vaccination centers across the country and finally, packaging and production of in-country Covid-19 vaccines through the NIH.

Role of Partners in Covid-19 Vaccination – For equitable distribution, WHO established COVAX. Pakistan got its first vaccination from China; CanSino. Then Pfizer and other vaccinations came around. Of course, there was a lot of information and misinformation around all of them. 230 CVCs were set up for people who were going abroad. WHO handled trainings and communication and carried out separate programs related to placement of Covid-19 vaccinators, their trainings and payments. UNICEF supported in deployment of female vaccinators to increase the access of vaccination services.

USAID's Integrated Health Systems Strengthening and Service Delivery (IHSS-SD) Activity supported the Government of Pakistan and health departments in Sindh and Khyber Pakhtunkhwa provinces to establish and operationalize Covid-19 vaccination centers at strategic locations in 25 districts. The project supported in administration of vaccines to both adult and young populations of these targeted districts.

Health Information Service Delivery Unit (HISDU) Punjab played a monumental role in roll out of Covid-19 vaccination in Punjab province. The largest vaccination center was established at Expo Center Lahore, where a system was also in place to manage the process of vaccination. HISDU staff worked untiringly at the center and managed the vaccination of a large proportion of the population of Lahore city. Staff was also monitoring the center with the CCTV. Data entry and management of the IT equipment was also its responsibility. The responsibility of HISDU was to ensure data entry, staff, equipment, and CCTV monitoring at all the vaccination centers.

3.8 Workforce

Understanding the dynamics of human resources and frontline workers engaged in Covid-19 pandemic, their capacities, workloads and protection as a cross-cutting element.

A successful response by health system to a public health emergency on the scale of Covid-19 depends on a strong public health workforce, with the capacity to correctly manage those affected and handle the emergency situation. Human resources include nurses and midwives, physicians, public health and environmental specialists, social scientists, communication, occupational health, laboratory scientists/technicians, biostatisticians, information technology (IT) specialists, biomedical technicians, epidemiologists, and others. Human resource professionals were involved in strategic planning, coordination, logistics, and implementation of emergency response plans. They assess staffing needs, allocate resources, and develop and execute contingency plans to respond to surges in cases. Without this vital input, no country can hope to manage a situation of such magnitude. This documentation of workforce was aimed at understanding the dynamics of human resource with respect to the emergency situation developed as a result of Covid-19; focusing on capacity building, adjustments to manage the increasing workload, and protective measures for staff at risk of exposure to Covid-19.

Human resource is a multidimensional pillar of the health system. On one hand, there is recruitment of qualified staff, capacity building, scheduling, responsibilities, and performance review; while on the other hand, there are rights, benefits, performance incentives, and psycho-social support. In the event of a global pandemic like Covid-19, this presents quite a complicated picture. The challenge becomes even more daunting in case of resource constrained countries like Pakistan. In the documentation of Pakistan's Covid-19 response, the focus with respect to workforce was on strategies used to effectively

manage the pandemic response given the challenges of a system already facing HR shortages and resource constraints.

Box 8: Workforce Development for Covid-19 Response

- Situation was tough during initial phase for health workers due to lack of guidelines, limited PPEs, fears and overburdening. Despite the intense stress, entire health workforce fought untiringly to manage the patients and contain the virus.
- Additional HR requirements were managed through task shifting, roster adjustments and ad-hoc hiring of additional staff.
- Expansive capacity building interventions were carried out across the country through support of development partners.
- During rapid roll-out of capacity development activities, it was difficult to make it fully structured and streamlined due to changing guidelines, and these gaps affected the uniform application of the SOPs and protocols.
- Pakistan government took steps to provide psychosocial support to healthcare as evident from WeCare Campaign but overall, psychosocial aspects gained a low priority during the pandemic.

The subsequent paragraphs present an overview of the role of HR in Pakistan's Covid-19 response, the key lessons learned and recommendations for managing public health emergencies in future through building a resilient healthcare system, thus safeguarding public health. It was based on consultations with health managers, clinicians, district administrators, and key stakeholders at national, provincial, and district levels.

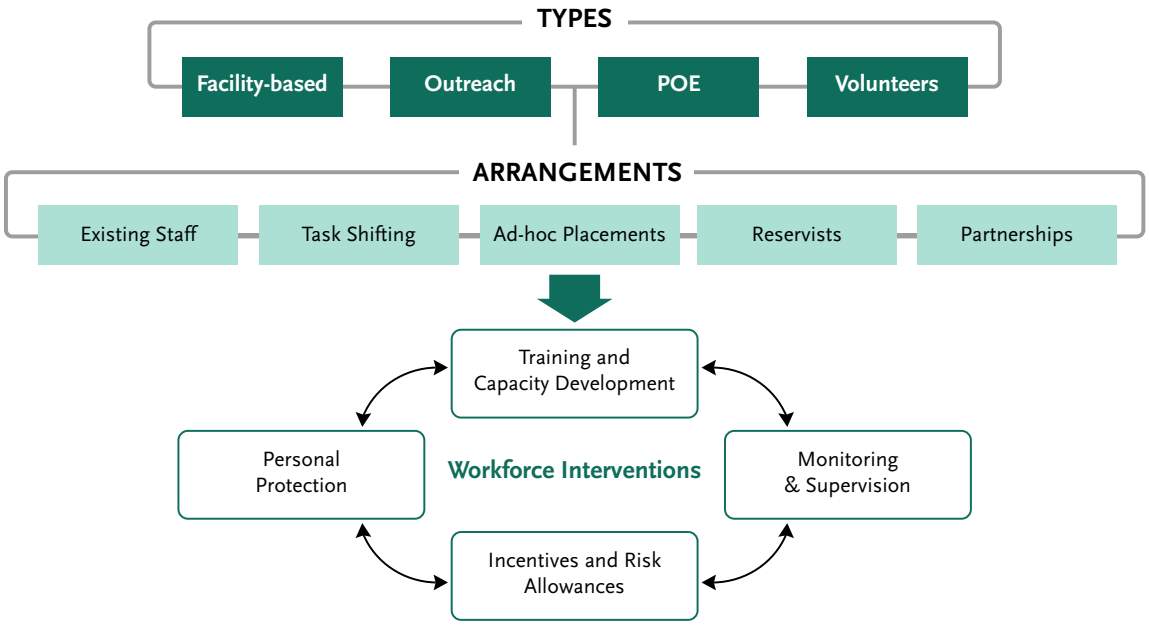
3.8.1 Addressing HR requirements

Public health emergencies of the magnitude of Covid-19 are inherently linked with additional workload, and a need to develop and execute an HR strategy to address this additional workload on the staff. Because of the fact that a pandemic of this magnitude had not been seen for more than a century, a comprehensive HR strategy to deal with this rapidly evolving and expanding crisis was not available. However, once the caseload started increasing Pakistan government and relevant stakeholders realized the need for a strategy to meet HR requirements and moved fairly quickly to develop and execute a strategy to meet the HR requirements in view of the increasing workload. As mentioned by a district administrator, *"Fulfillment of HR requirement is very important because the only way in which health systems can improve is that well-trained human resource is made available so that things can be done properly."* A key consideration in this regard was resource constraints that necessitated a strategy that would put minimum additional financial burden on the exchequer. With this in view, a multi-pronged strategy was devised, that focused on meeting the HR requirements due to additional workload through task shifting, roster management, and temporary employment.

Task shifting, roster management, and temporary recruitment strategies were implemented to address the increased demand for healthcare services. Staff were reassigned and redeployed from non-essential or low-workload areas to Covid-19 treatment centers and high-workload areas. This task shifting allowed for the redistribution of workload and efficient utilization of available resources. The staff members were provided orientation regarding their new roles to ensure provision of quality care services. Roster management was aimed to streamline provision of care, as well as to minimize the risk of exposure. Staff members were assigned to dedicated shifts and departments, ensuring a

structured and organized approach to the distribution of manpower. This also facilitated in minimizing the risk of exposure as the same group of staff members worked together in each shift. This indirectly facilitated in reducing the requirement of hiring new staff. As described by an administrator of a private hospital, *"Roster management was streamlined... by doing this, we managed with our existing workforce instead of recruiting additional HR."* In the initial phase, service provision continued with the existing workforce. A senior provincial manager stated, *"Resource allocation should be according to the needs."* With this in view, additional staff was recruited on temporary basis according to the need of the additional workload. The number of additional staff recruited varied according to the requirements as well as available funds. For example, in Punjab, over 2000 individuals were employed on a temporary basis, at different levels. Among the newly recruited doctors, the senior doctors were given the designation of Covid-19 consultants, while the junior doctors were called Covid-19 medical officers. This additional staff helped in alleviating the strain on existing healthcare professionals.

Figure 13: Types, Arrangements and Interventions for Covid-19 Workforce



3.8.2 Capacity Building

Capacity building is an essential component in ensuring provision of quality care services. This becomes even more valid in a never before seen situation like Covid-19. The very initial phase of the pandemic was more or less a hit-and-trial approach, as the world came to grips with this unforeseen public health emergency. However, the global health community moved fairly quickly to try to understand this new crisis; and develop guidelines to manage the patients suffering from it, as well as to minimize the risk of spread. Pakistan's government was cognizant of the need to try to limit the impact of Covid-19, especially given the potentially disastrous effects on a resource-constrained health system. Government was in continuous liaison with the international community; and international guidelines were disseminated to all relevant quarters, as soon as these become available. Furthermore, the international guidelines were reviewed and customized according to Pakistan's requirements. This was followed by dissemination of the guidelines and the updates that followed to all relevant stakeholders. Adherence to any guidelines lies in their timely and proper dissemination, and providing orientation to the target audience of these guidelines. Once guidelines became available, process of

workforce training on these guidelines was initiated. The focus of these trainings was to ensure that orientation was provided to staff members on all aspects of Covid-19 management from treatment to patients, to protective measures for staff members. As described by the administrator of a private sector hospital, *"Once guidelines were received for patient management and self-*protection *during admission, treatment and discharge of the patient and also how to manage their attendants, trainings were started. Staff members were also told how to wear masks & PPEs etc."*

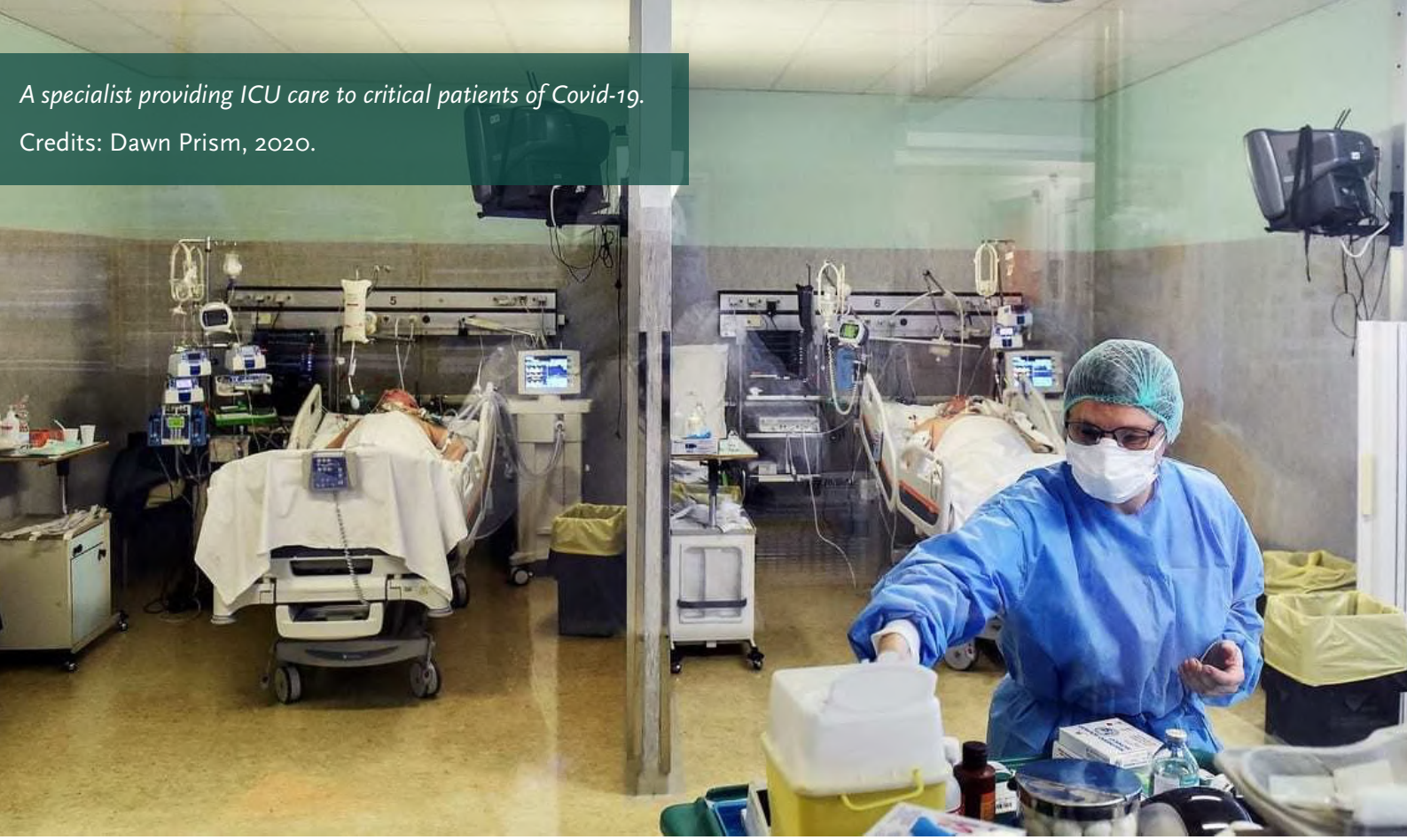
The Mo NHSR&C developed a plan for training over 5000 frontline healthcare workers for critical care under the BASIC (Basic Assistance and Support in Critical Care) program. Training was provided on a wide range of topics to cover different aspects of Covid-19 management. Cadre specific trainings were arranged by government according to the roles and responsibilities of different levels of staff. Development partners also provided support for this capacity building activity. Physical trainings as well as virtual sessions were utilized to maximize dissemination, keeping in view the need to minimize the risk of exposure. However, because of the urgent and rapidly evolving nature of Covid-19 pandemic coupled with the resource constraints, there were considerable gaps in the training of the health workforce, which need to be addressed.

Box 9: Types of Workforce Trainings

- Clinical Management of Covid-19
- Using Personal Protective Equipment
- Infection Prevention and Control
- Counselling of Covid-19 patients
- Counselling of Close Contacts
- Diagnostics for Covid-19
- Inter-Personal Communication
- Telemedicine
- Covid-19 Vaccination
- Social Mobilization
- Data Entry Operations

3.8.3 Workforce Protection

The highly infectious nature of Covid-19 posed a serious risk to healthcare workers, especially the frontline workers dealing with the patients in wards and ICUs. Timely availability of good quality Personal Protective Equipment (PPE) was an essential requirement for healthcare workers. It also was a major challenge in the initial phase of the pandemic. Healthcare facilities struggled to procure an adequate supply of masks, gloves, gowns, face shields, and other essential protective gear. This shortage was mainly due to the sudden surge in demand worldwide, disrupted supply chains, and limited domestic production capacity. As a result, healthcare workers had limited access to the necessary equipment to protect themselves while treating Covid-19 patients in the very initial phase of the pandemic. This not only resulted in increasing the risk of exposure; it also led to added anxiety among healthcare workers about their safety. Pakistan government took cognizance of this acute problem, and initiated steps to remedy this issue. NCOC collaborated with the provincial governments, healthcare authorities, and relevant stakeholders to strategize and coordinate efforts related to PPE procurement and distribution. The government initiated efforts to procure PPE from international sources as well as took measures to boost domestic production. As a result of these steps situation gradually improved, and the availability of PPE became easier. In addition to efforts for procurement of PPE, the government also arranged orientation for healthcare workers about the proper use, disposal, and importance of PPE. Information regarding recommended PPE protocols, guidelines, and best practices was disseminated through various channels, including print, electronic media, and online platforms. As a result of these efforts, the situation improved considerably after the initial challenging phase, and PPEs became available for healthcare workers. As stated by a district health administrator, "*NDMA provided us with ample stocks through Ministry of National Health Services Regulations & Coordination and NCOC and we never faced shortages."*



A specialist providing ICU care to critical patients of Covid-19.

Credits: Dawn Prism, 2020.

3.8.4 Psycho-Social Support

The challenges for health workforce related to Covid-19 management were multi-fold. The mortality of patients, risk to self while treating patients, the apprehension associated with the risk of exposure, seeing other colleagues getting infected, and the fear of transmitting the infection to family members put a lot of strain on the mental health of healthcare workers. The deaths of healthcare workers especially in the first phase made the situation quite challenging for the healthcare workers.

Healthcare workers faced constant fear of contracting the virus themselves and transmitting it to their families. This accompanied by excessive workload, and uncertainty added to the emotional distress. The lack of PPE in the early stages of the pandemic intensified this fear, leading to anxiety and stress. Pakistan's healthcare system faced overwhelming pressure due to the rapid spread of the virus especially in the initial phase of the pandemic. Healthcare workers experienced long working hours, and increased patient loads, leading to physical and mental exhaustion. Healthcare workers witnessed the suffering of patients on a daily basis, which took a significant emotional toll. As stated by a healthcare provider, *"Dealing with severe illness and death, was naturally quite difficult for the healthcare workers, and added to their psychological burden."* The evolving nature of the pandemic, and repeated changes in protocols, guidelines, and information created a sense of unpredictability, making it challenging to plan and adapt to the situation. In addition, the disruption of family life, and most importantly fear of transmission of infection to family members created quite an emotionally difficult situation for the healthcare workers.

Pakistan's government took steps to provide psycho-social support to healthcare workers. The 'WeCare' training program was initiated for 100,000 frontline health workers to ensure their personal safety and psychological well-being. Furthermore, a support package for doctors was also finalized by the Mo NHSRC. Risk allowance was also announced for other healthcare staff. However, there was a view that this component was not sufficiently addressed due to limitations in terms of resources and this issue being lower down in the order of priorities.

3.9 Risk Communication and Community Engagement

Coordinated and strategic approach to communicate information, address concerns, and engage communities in pandemic response.

Box 10: Risk Communication and Community Engagement for Covid-19

- RCCE was supportive of the whole-of-the-nation approach and concentrated on the principle of leaving no one behind in Covid-19 response.
- The NCOC-led dynamic RCCE approach characterized by regular examination of data guided the strategic response adjustments.
- Development partners, including UNICEF, supported the government to develop RCCE strategies based on theoretical models and rapidly occurring research on behavioral insights.
- Effective RCCE platforms included policy statements through press releases, public service messages, Covid-19 helpline, and call waiting ringtones.
- Challenges were faced in promoting behaviors like physical distancing and the use of masks due to the parallel pandemic of misinformation.
- Efforts were made to address misinformation and to maintain a high level of trust in the government's decisions through radio, television, social media, and influencers engagement.

Risk Communication and Community Engagement (RCCE) was supportive to the whole-of-nation approach and concentrated on the principle of leaving no one behind in Covid-19 response. A formal risk communication system was non-existent at the start of pandemic. Later on, the NCOC-led dynamic RCCE approach characterized by regular examination of data and behavioral insights guided the strategic response adjustments. Effective RCCE platforms included policy statements through press releases, public service messages, Covid-19 helpline, and call waiting ringtones. Challenges were faced in promoting behaviors like physical distancing and the use of masks due to the parallel pandemic of misinformation. Scientific approaches, including social constructionist approach relating risks in sociocultural context and behavior change models, were employed in the development of communication material.

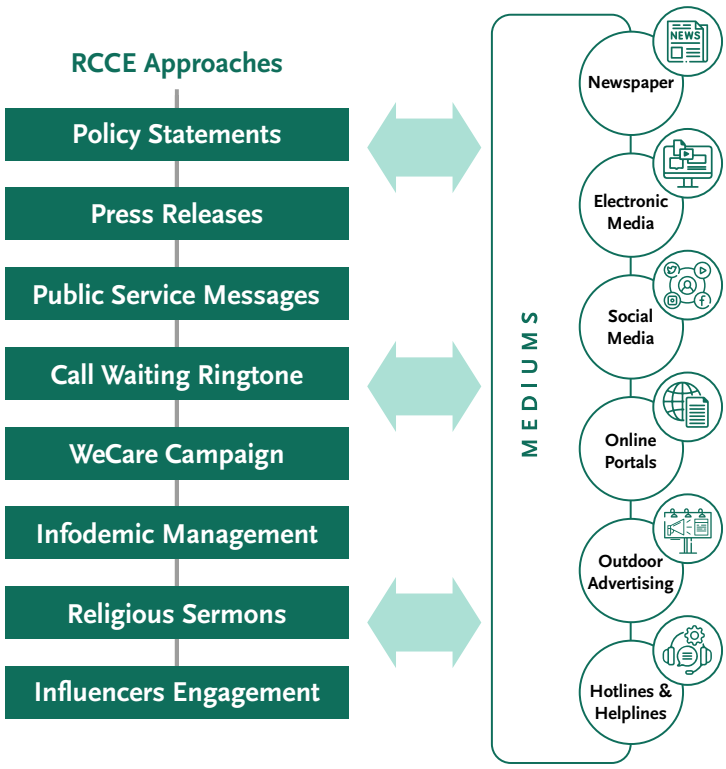
3.9.1 Risk Communication System

In the face of a fragmented health system, Pakistan faced a significant challenge when the Covid-19 pandemic emerged, requiring an urgent and coordinated response. Effective communication became paramount in promoting crucial preventive measures such as physical distancing and mask-wearing to contain the spread of the virus. One of the issues at the start identified was the lack of a multi-hazard, multi-sectoral national/provincial RCCE plan or communication policy. As explained by a Senior Advisor on media, "*The absence of a comprehensive public communication strategy posed difficulties in reaching and engaging the public effectively*." To address this critical need, Pakistan swiftly established the Risk Communication and Community Engagement (RCCE) framework and implemented a range of strategic interventions. The combined endeavors resulted in a dynamic RCCE approach characterized by regular analysis of Covid-19 data and behavioral insights, enabling strategic adjustments in the response. The evolving epidemiological and psycho-behavioral landscape informed communication decisions, guided by the social constructionist approach. This approach recognized that risk was intertwined with sociocultural context, going beyond mere scientific measures. Global

guidance was adapted to the local context, and diverse communication platforms were utilized to maximize outreach and engagement opportunities.

The RCCE emerged as a robust pillar in Pakistan's Covid-19 response, contributing significantly to its success. In the absence of any formal pre-existing policies and frameworks for RCCE at the national, provincial, and district levels in Pakistan, focus was diverted towards the inclusion of these policies in the initial guidelines and plans developed to facilitate effective communication, community engagement, and behavior change. During the preliminary phase of the response, the Mo NHSR&C established an RCCE Taskforce comprising representatives from various ministries, line departments, and development partners. The taskforce received support from the Inter-Services Public Relations (ISPR), the media wing of the Pakistan Armed Forces as well as the private sector media houses and channels. As a Senior member of NCOC informed, "*The state channels like PTV, Radio Pakistan, and Ministry of Information were also on board but along with that we had frequent interactions with private channels.*" To enhance coordination and response at the federal and provincial levels, the NCOC was established in late March 2020. This collaborative effort facilitated a data-driven, cohesive, and targeted response.

Figure 14: RCCE Approaches and Mediums in Covid-19



Pakistan demonstrated adherence to three key components, namely the National Response Plans, Pakistan's National Preparedness and Response Plan (NPRP), and the RCCE Approach and Strategy. At the national level, the RCCE task force, co-led by the Government of Pakistan and UNICEF, was established. The RCCE strategic approach in Pakistan focused on four main objectives to mitigate the spread of Covid-19. These objectives included analyzing behavioral patterns using anthropological and social data, promoting positive behaviors, addressing resistance and misinformation, and advocating for and building capacity in RCCE efforts. At the national level, policies such as the National Preparedness and Response Plan and the National Health Communication Strategy provided guidelines for handling emergencies and disease outbreaks. The existence of these

policies helped in providing a structured approach to risk communication efforts. However, it should be noted that the effectiveness of these policies depended on their implementation and coordination with other stakeholders. Further, Development partners like UNICEF and WHO led the RCCE initiatives and supported the Government in rolling out its plans and strategies. Guidelines for journalists & media professionals were developed in English as well as local languages including Urdu and Sindhi to guide the media on how to carry out professional and accurate reporting. Effective leadership and coordination at the regional level contributed to the success of risk communication efforts and strengthened public trust. In Sindh, the Chief Executive of the province led the RCCE which entrenched public trust, as mentioned by a Senior media professional, "*CM Sindh played a crucial role in providing daily briefings to the media on the Covid-19 situation... he would come on the television daily and gave policy statements.*"

The UN RCCE coordinating group and UNICEF RCCE teams collaborated to develop concrete strategy scenario-based plans. A strong emphasis was placed on promoting social distancing and protective actions in various settings including grocery stores, banks, homes, and businesses. Advocacy efforts targeting national and local religious leaders were accompanied by the dissemination of SOPs. Religious leaders themselves, along with government platforms, played a significant role in communicating specific messages related to religious rituals. Further, the National Ministry provided technical support for the public-facing aspect of the "WeCare" health workers' campaign. A senior official at the Ministry stated, "*WeCare campaign proved to be a good way of showing appreciation, motivation, and solidarity towards health workers.*" Various channels, including video content, social media, and mass media campaigns, were utilized to communicate messages tailored to different audiences. Further, outdoor advertising in the form of posters and billboards was placed around the cities to appreciate frontline workers.

An effective method employed during Pakistan's Covid-19 response was the collaboration between UNICEF and Viamo, a mobile company. This partnership ensured nationwide outreach to provide knowledge and information about Covid-19. Overall, the campaign reached 8.84 million people across the country, with a specific focus on individuals at higher risk of infection who had limited access to information. Social media engagement also played a crucial role, reaching over 1 million people through various social media activities. At the provincial and district levels, health communication cells were established to plan, implement, and monitor RCCE activities. This cell worked in coordination with other departments, stakeholders, and partner organizations to ensure a coordinated and effective RCCE response. The presence of a dedicated health communication cell demonstrated the commitment to effective risk communication at the local level.

To reach a wide audience, a variety of media sources were utilized during the Covid-19 pandemic in Pakistan. These media sources played a crucial role in disseminating accurate information, countering misinformation, and engaging the public. The awareness campaign extended for a duration exceeding 20,000 hours across electronic media platforms. Additionally, over 30,000 posts were shared on various social media networks, effectively reaching an audience of more than 50 million individuals. Notably, the videos disseminated through social media garnered an impressive viewership of over 500 million people. The following media sources were commonly used:

- Television: Television channels played a significant role in broadcasting public service messages, government briefings, and awareness campaigns. Daily briefings by government officials were televised to provide updates and address public concerns.

- Radio: Radio broadcasts were used to disseminate information, public service messages, and awareness campaigns, especially in rural areas where access to television and the internet was limited.
- Print Media: Newspapers and magazines carried public health messages, informational articles, and guidelines related to Covid-19. These print media sources were particularly important for reaching segments of the population with limited access to electronic media.
- Social Media Platforms: Social media platforms, including Facebook, Twitter, Instagram, and WhatsApp, were extensively used to disseminate information, engage with the public, and address their concerns. Government agencies, health authorities, and public health experts utilized these platforms to share updates, debunk misinformation, and provide guidance.
- Outdoor Advertising: Billboards, banners, posters, and signage were used as outdoor advertising tools to display Covid-19-related messages and promote preventive measures. These were particularly effective in high-traffic areas and public spaces.
- Official Websites and Online Portals: Official government websites and online portals were regularly updated with accurate information, guidelines, and resources related to Covid-19. Covid.gov.pk as an online platform served as a reliable source of information for the public.
- Helplines: '*Sehat Tahaffuz* 1166 Helpline at the very start to respond to the community's apprehensions and frequently asked questions.

Innovative RCCE approaches were adopted to cater to the diverse requirements. Analysis of behavioral patterns through anthropological and social data through consistent collection, analysis, and utilization of social data proved to be highly effective in informing communication and program responses. Weekly analysis of social and behavioral perspectives, including qualitative studies and telephone interviews, provided valuable insights. Additionally, a call center served as a community feedback mechanism, handling over 2 million phone calls. Other data sources such as social media sentiment analysis, media tracking, and surveys by agencies like IPSOS and Gallup were also examined. The findings were consolidated into an RCCE brief that guided decision-making, informed discussions with the Ministry, and contributed to the Minister's media briefings on program initiatives.

Promoting positive behaviors was achieved through a multi-faceted approach utilizing various communication channels. Social media outreach, engagement with religious leaders, and community-based initiatives were employed to ensure a comprehensive reach. An overall matrix was developed to ensure that all target audiences were effectively engaged. Proactive measures were taken to address resistance and misinformation. Real-time monitoring of social media sentiment, helplines, and media tracking were used to identify and counteract fake news. Research and advice based on real-time troubleshooting data were provided. Over 10,000 media workers received training and orientation on effectively responding to rumors and fake news. Further, advocacy and capacity building played a crucial role in identifying challenges and providing strategic guidance for targeted initiatives. The insights gathered inform the program activities of the Ministry, UNICEF, and other UN agencies. Information was shared with donors, embassies, and partners. Collaborations with health professionals, media outlets, social influencers, and celebrity influencers were leveraged to maximize reach and impact.

A focal person was appointed in the Ministry and provincial departments to coordinate with the media and provide guidance on message development and dissemination. Strategies were revised to address public fear and misperceptions, and notable figures, including Chief Ministers and Health Ministers

addressed the public, contributing to trust-building efforts. The health education wing effectively managed uncertainty and the infodemic. District administrations organized mass community awareness campaigns, while effective coordination with key influencers of the community proved beneficial for raising awareness. Press conferences, mass media, social media, and public campaigns were utilized to promote awareness. As reiterated by a Senior Journalist, "*The 1166 helpline initiative was highly useful... initially, misinformation and panic spread among the public, especially through TV media, but responsible journalists in electronic and print media provided* verified *information from authentic sources, however stigma and fear led to people, including doctors, hiding information.*" Information to journalists was primarily sourced from the government and further verified by reaching out to primary, secondary, and tertiary care providers, while data was collected from various hospitals and the central dashboard of the government. One of the media officials informed that "*information was disseminated daily by the government through WhatsApp groups so that reliable information and reporting on cases, tests and deaths could be given.*" By implementing these RCCE approaches, the government, along with UNICEF and other partners, ensured a coordinated and comprehensive response to the Covid-19 pandemic in Pakistan.

3.9.2 Communication and Community Awareness

During the Covid-19 pandemic in Pakistan, several Risk Communication and Community Engagement (RCCE) initiatives were undertaken to effectively communicate risks and engage communities. These initiatives aimed to provide accurate information, address misconceptions, promote preventive measures, and encourage community participation in controlling the spread of the virus. The following were some key RCCE initiatives implemented in Pakistan:

Public Service Messages – Public service messages were developed and disseminated through various media platforms to reach a wide audience. Collaboration between government agencies, health authorities, media agencies, and communication experts played a crucial role in creating and distributing these messages. Television, radio, print media, social media platforms, and outdoor advertising were utilized to ensure transparency, consistency, and prompt distribution of messages. Further, guidance during congressional gathering and events were published as and when required.

Community Awareness Sessions – Community awareness sessions played a vital role in disseminating important information and educating the public about Covid-19. These sessions were conducted in collaboration with local leaders, community influencers, religious bodies, and community workers. The sessions were tailored to address the specific concerns and cultural sensitivities of the communities. Mosques, community centers, religious gatherings, and local events served as venues for these awareness sessions. A Deputy Commissioner explained, "*Efforts were made to engage with the Afghan community...leaders from the community were engaged, voluntary organizations were formed, and support was received from the Rural Support Program Network (RSPN) and the Tiger Force. MNAs (Members of the National Assembly) were approached for support through their* representatives *in union councils. These representatives helped in arranging suitable vaccination locations and bringing people for vaccination.*"

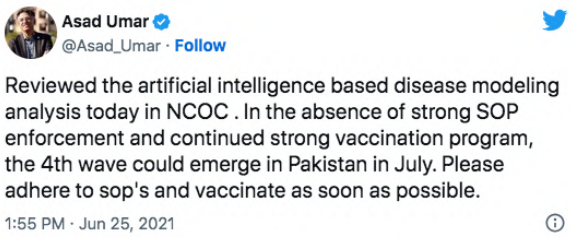
Engagement with Local Influencers – Authorities actively engaged with local influencers, including religious leaders, community leaders, and influencers from various sectors. These influencers played a crucial role in disseminating accurate information, dispelling myths and misconceptions, and

building trust within their respective communities. Their endorsement and support of preventive measures and vaccination campaigns were instrumental in encouraging community participation.

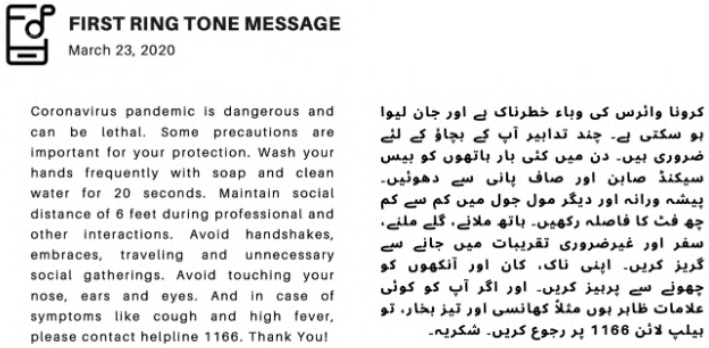
Health Education Cell – The establishment of a Health Education Cell played a significant role in disseminating information and addressing community concerns. This cell collaborated with NGOs, religious institutions, and local community leaders to ensure effective communication. The cell was responsible for developing and disseminating health education materials, conducting public awareness campaigns, and addressing community inquiries and concerns.

Helplines and Hotlines – Dedicated helplines (1166) and hotlines were established to address public inquiries, provide accurate information, and clarify doubts regarding Covid-19. These helplines served as a reliable source for the public to seek information, report cases, and address concerns. Trained professionals and volunteers manned these helplines to ensure prompt and accurate responses to public queries. A dedicated helpline with 250 call agents operates round the clock, from 8:00 am to midnight, seven days a week was initially adapted from the polio programme. At the start, the majority of daily calls, over 80%, pertained to basic Covid-19 information like symptoms, however, later on, home-based treatment was also provided through support from NIH-placed doctors. Since the pandemic began, the volume of calls surged dramatically, reaching 50,000 to 70,000 calls per day. To meet the growing demand, the government intervened by allocating additional resources. A Senior official of NEOC mentioned, "*The Prime Minister's Office played a crucial role in recruiting 165 more agents, while the National Institute of Health assigned 10 additional doctors to the technical team.*" The Sehat Tahaffuz 1166 helpline, led by the Government of Pakistan, received support from esteemed organizations such as UNICEF, the World Health Organization, and the Bill and Melinda Gates Foundation through the Global Polio Eradication Initiative.

Utilization of Social Media – Social media platforms, including Facebook, Twitter, and WhatsApp, were extensively used to disseminate information, answer queries, and address public concerns. Official government accounts and public health agencies actively engaged with the public through these platforms, sharing updates, debunking misinformation, and providing guidance on preventive measures and vaccination. Further, they were utilized by celebrities, policy makers, politicians, and influential as a medium for communication.



The use of innovative strategies like the ringtone message demonstrated the commitment of Pakistan's government to leverage technology and effective communication channels to reach a wide audience and effectively disseminate critical information during the pandemic. In the quest for innovation, a challenge was faced in choosing communication channels that would have the widest



reach while remaining cost-effective. Early on in the Covid-19 response in Pakistan, national-level statistics highlighted the potential of mobile phone channels for mass public messaging. Among the available options, blast SMS, SMS chatbot, and Robocalls had their limitations. SMS was hindered by low population literacy rates, while Robocalls often faced non-response or immediate cancellation. Seizing an opportunity to overcome this challenge, UNDP Innovation – AccLab Pakistan proposed a unique solution replacing the conventional mobile phone ringtone with a recorded health message, referred to as the ringtone message. The concept coined and endorsed by the then SAPM Dr. Zafar Mirza was pretty straightforward every time someone made a call (even on a feature phone), they would hear the ringtone message. With the support and collaboration of Digital Pakistan, Ministry, E. Ocean, and Pakistan Telecommunication Authority, the idea was refined, messages were developed for the first wave, and the implementation and dissemination processes were carried out. The ringtone message emerged as the most effective communication channel, surpassing others in terms of outreach and cost-effectiveness. Moreover, the message reached each person directly, ensuring maximum impact. The impact of the ringtone message was significant, with over 113 million individuals across the country directly hearing it. This achievement solidified the ringtone message as the most successful communication medium.

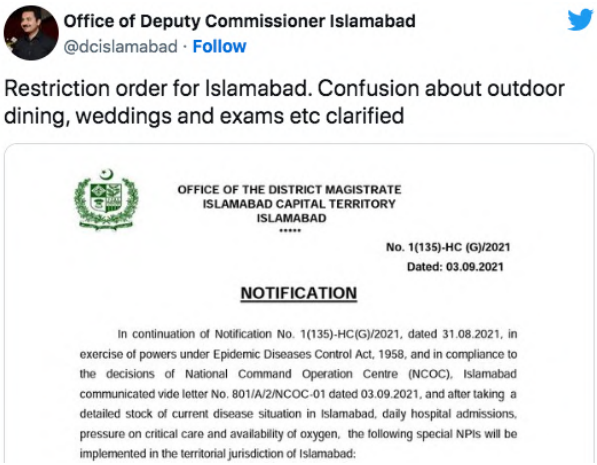
3.9.3 Addressing Misinformation and Managing Uncertainty

Efforts were made to address misinformation and build trust among the public. To manage uncertainty and address rumors and disinformation, dedicated helplines were established where the public could report and seek clarification on questionable information. Accurate information was disseminated through radio, television, and social media platforms to counter misinformation and rumors. Influencers were engaged, and public awareness campaigns were organized to provide accurate information and combat the infodemic surrounding Covid-19. A Senior government official shared that an increased presence on social media was established, including the creation of videos in Urdu. Secondly, religious leaders (Ulema) were involved and requested to convey government policies and instructions during Friday prayers, while refraining from contradicting them. The official mentioned, "*Around 90% of the religious leaders supported these efforts, and for the rest, efforts were made to emphasize the legal consequences of violating the Epidemic Diseases Act.*" The Government of Pakistan took several measures to manage misinformation during the Covid-19 pandemic. Recognizing the potential harm caused by misinformation and the need for accurate information dissemination, the government implemented strategies like fact-checking and dissemination of accurate information, where the government established dedicated teams to fact-check information related to Covid-19. These teams worked in collaboration with health experts, researchers, and credible sources to verify the accuracy of information before dissemination. Accurate information and updates were promptly shared through official government channels, including websites, social media platforms, and press conferences. The government's vaccination efforts were also supported by the media to allay misinformation and panic spread through social media by anti-vaccine and religious groups, as shared by a Senior Anchor in Punjab, "*press conferences were held with Punjab's Corona Expert Advisory Group (CEAG) to address public concerns...electronic media had a wider reach, but print media was considered more reliable*."

The government collaborated with media outlets, including print, broadcast, and online media, to ensure responsible journalism and accurate reporting. Regular press briefings were held to provide updates on the Covid-19 situation and address public concerns. Media houses were encouraged to rely on official government sources for information and to fact-check before reporting. Extensive public awareness campaigns were launched to combat misinformation and promote accurate information. Information was disseminated in multiple languages, including local languages, to reach a wider audience and counter misinformation effectively. The endorsement of official guidelines and

information by known celebrities and influencers helped build trust and credibility among the public ass mentioned by Senior member of NCOC, "*Celebrities like cricketers, film actors and artists, including Bushra Ansari, Shaan, and Shahid Afridi facilitated in building trust and disseminating RCCE messages of social distancing, hand washing, and mask-wearing.*"

The government also established mechanisms to monitor and report misinformation related to Covid-19. Dedicated helplines and hotlines were set up for the public to report questionable information and seek clarification. The reported misinformation was investigated, and corrective action was taken, including issuing clarifications and debunking false claims through official channels including the Cyber Crime Cell of Federal Investigation Agency (FIA). The FIA Cyber Crime Cell actively worked to address and investigate cybercrimes related to the Covid-19 pandemic. This included identifying and taking action against individuals and groups involved in spreading misinformation, fake news, and rumors related to the virus. They also focused on combating online scams, phishing attempts, and other fraudulent activities exploiting the pandemic. They collaborated with social media companies to track and remove such content, ensuring that accurate and reliable information was available to the public. FIA worked to prevent and mitigate cyberattacks that could potentially disrupt vital services required for the Covid-19 response, such as healthcare facilities and vaccine distribution networks. As mentioned by a Senior NITB official, "*During the period from February to May 2020, within Pakistan, the FIA and the Pakistan Telecommunication Authority (PTA) took immediate action to investigate a significant data breach affecting a staggering 115 million mobile users in Pakistan and the subsequent illicit sale of data on the darknet.*" The government also collaborated with social media platforms to curb the spread of misinformation. Regular monitoring of social media platforms was conducted to identify and take down false or misleading content. Efforts were made to strengthen content moderation and ensure that accurate information was prioritized in users' news feeds. Media professionals highlighted in the FGD that there were strict actions taken in case of the spread of misinformation, "*the government took legal actions against individuals or groups involved in spreading misinformation that could endanger public health... laws related to the spread of false information were enforced to deter the dissemination of misleading or harmful content.*



It is important to note that managing misinformation was an ongoing challenge, and the government's efforts were aimed at mitigating its impact. An area of improvement identified was the absence of a dedicated infodemic management or rumor management committee specifically designed to address socio-behavioral and socio-cultural aspects of the community. Lessons learned included the importance of having a plan and strategy in place for guidance during health emergencies and the need for a comprehensive policy to address community concerns and potential negative impacts.

3.10 Laboratory

Laboratory capacity and testing is crucial for improving surveillance and preparing response for limiting the spread of Covid-19.

Laboratory testing plays a crucial role in the diagnosis, surveillance, and control of Covid-19. Accurate and timely diagnosis based on PCR was essential for identifying infected individuals, initiating appropriate treatment, and implementing necessary isolation measures to prevent further spread of

the virus. Laboratory testing helped in tracking the prevalence and spread of Covid-19 within communities and populations. Laboratory testing was also essential for contact tracing by identifying individuals who were exposed to the virus through close contact with confirmed cases. Testing these contacts helped in early detection, ensuring timely intervention, and reducing the risk of further transmission. Furthermore, laboratory testing helped in the identification of asymptomatic individuals who were infected with the virus. These individuals could unknowingly spread the virus to others, making testing an essential tool for controlling the spread of Covid-19. Improving laboratory capacity and testing on large scale was a crucial component of the response strategy for limiting the spread of Covid-19. For this reason, it was important to have a national testing strategy and a plan to integrate stakeholders, laboratories and diagnostics to provide a robust response. In the documentation of Pakistan's Covid-19 response, the focus concerning laboratory testing was on strategies used to effectively manage the pandemic response given the challenges of a resource constrained system.

Box 11: Laboratory Capacity

- Laboratory testing being one of the most important aspects of pandemic management became an area of focus in the early stages of the Covid-19, under patronage of the NIH.
- Testing capacity increased quite rapidly from 19 labs at the start of pandemic to more than 170 labs by September 2021.
- Daily Covid-19 testing also showed proportional and steady increase over the course of pandemic, starting from 500 to more than 65,000 daily tests.
- Provincial health departments strengthened their testing capacities through re-designation of existing labs established for other infectious diseases and programs.
- The role of private sector labs was instrumental in improving the testing capacity across the country, which were support through subsidized provision of testing kits and supplies.
- In underdeveloped provinces and regions of Pakistan, the pandemic provided an opportunity to strengthen and enhance the coverage of labs that would sustain beyond Covid-19.

The subsequent paragraphs present an overview of the laboratory testing component of Pakistan's Covid-19 response, including the testing strategy, improvement of testing capacity, the key lessons learned, and recommendations for managing public health emergencies in the future based on consultations with health managers, clinicians, district administrators, and key stakeholders at national, provincial and district levels.

3.10.1. National Testing Capacity

Development and Implementation of Testing Strategy – Once Covid-19 was declared a pandemic, Pakistan moved fairly quickly to try to limit its spread, cognizant of the fact that an already resource constrained health system would be hard-pressed to bear the full brunt of the pandemic. Laboratory testing being one of the most important aspects of pandemic management became an area of focus in the early stages of the pandemic. The National Institute of Health was assigned the task of preparing a National Testing Strategy for Covid-19. Team from the Public Health Laboratory at NIH initiated the process of strategy development in collaboration with the WHO team. Later on, an advisory group comprising of representatives from Aga Khan University and provincial stakeholders was constituted to support the finalization of strategy. PCR was recommended as the diagnostic test for Covid-19. The

strategy was shared with the advisory group for finalization. Later on, the strategy was presented to NCOC for approval, and for matters related to procurement. The approved strategy was disseminated to all relevant stakeholders in the public and private sectors.

After the finalization of strategy, guidelines were developed for implementation of the strategy. These guidelines were primarily based on WHO guidelines but customized according to local needs. As stated by a senior Mo NHSR&C manager, "*We reviewed the guidelines developed by WHO, and tailored these guidelines according to Pakistan's requirements.*" Because of the rapidly evolving nature and understanding of the pandemic, guidelines were updated from time to time, which were disseminated to all relevant quarters for implementation of the testing strategy.

Testing Capacity – One of the most crucial challenges was increasing the testing capacity for Covid-19, and matching the testing capacity with the increasing number of cases and contacts. Government being keenly aware of this took steps through NCOC and NIH in collaboration with development partners to remedy this situation. As stated by a senior manager at Mo NHSRC, "*In the initial phase of the pandemic, Pakistan received some kits from China. NIH was the first laboratory in Pakistan where Covid-19 testing was started.*" WHO provided 5 PCR machines to NIH to improve testing capacity. Gradually the number of labs providing PCR testing for Covid-19 in public sector increased across the country. Covid-19 testing services also started in the private sector providing a much-needed boost to the testing capacity in the county. Government also provided support to private sector to increase testing capacity. Training of HR of private sector regarding PCR testing, biosafety and reporting systems was done in all provinces. As stated by a provincial minister, *"We started with one lab but by the end of the pandemic, we had a whole network of labs across the province. Our capacity of testing had gone up to 50,000, while we had started with 500.*"

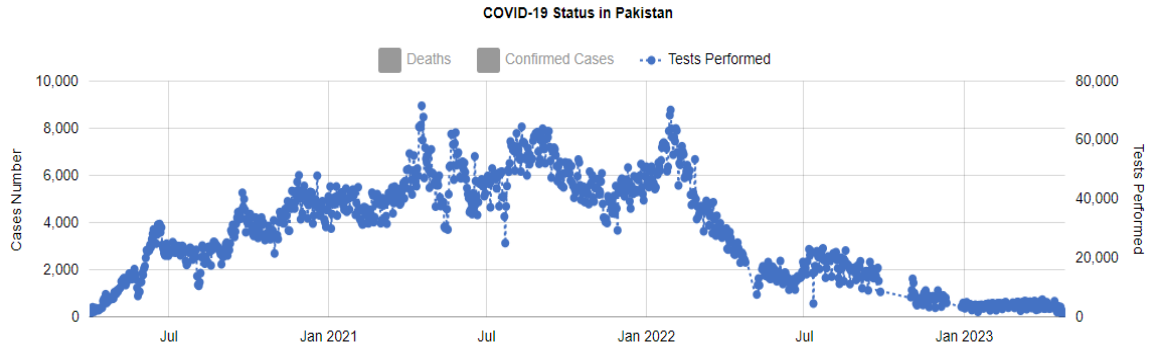
As a result of these efforts, testing capacity increased quite rapidly from 19 labs at the start of pandemic to more than 170 labs by September 2021. According to the data record of NIH, by January 2022, 50 laboratories were providing Covid-19 testing at Federal level. In Punjab, Covid-19 testing was being done in 97 laboratories; while the number of labs in Sindh was 49. Similarly, 33 labs in KP, 6 in Balochistan, 4 in AJK, and 3 labs in Gilgit Baltistan were providing Covid-19 testing services. Furthermore, mobile lab was also used in the Taftan and Gwadar areas of Balochistan. Establishment of PCR labs in smaller provinces was a significant development. As stated by a senior provincial manager, "*We had never thought that we would have a PCR lab in our province so soon; and now there is a PCR lab in every district.*" Another senior provincial manager stated, "*We started from 10 tests, and went up to 10,000 tests every day*."

Drive-through Covid-19 testing facilities were established for safety in major cities.

Credits: Dawn, 2020.

According to the government of Pakistan, till 16th June 2023, a total of 31,656,354 Covid-19 tests had been performed in the country (Figure 15). This was a reflection on the success of efforts to enhance the testing capacity across the country.

Figure 15: Trends of Covid-19 Testing in Pakistan



In some cases, in place of PCR, Rapid Antigen Test was used as well. Within the approved guidelines and strategies, provinces had the option to modify the implementation approach. Based on this, KP and Sindh used antigen-based testing; but Punjab did not use antigen-based testing.

The role of private sector labs was instrumental in improving the testing capacity across the country. In the initial phase of Covid-19, testing was limited to public sector. Gradually, the private sector got involved, and testing services were started in private sector labs. Initially, government of Pakistan offered diagnostics free of cost to all private labs. These private labs were required to share all reports with the government. With time, as a result of efforts led by NIH as the National Public Health Reference Lab, the number of private sector labs providing Covid-19 testing services increased quite considerably. Strict adherence to guidelines and protocols was ensured through monitoring by the provincial public health laboratory. As stated by a senior provincial manager, "*The task to supervise quality assurance in private labs was assigned to provincial public health labs. All private labs that could not fulfill the basic prerequisites like biosafety cabinets, PCR machines, and trained staff were closed.*"

3.10.2 Logistic Management

NDMA was mainly responsible for procurement of supplies and equipment items for Covid-19 management. Similar was the case with PCR testing as well. Most of the kits were procured through NDMA; while some of the supplies were arranged from NIH. Once the testing capacity and network expanded, private sector also did some procurement as per requirements. NDMA being the primary agency for procurement of supplies for Covid-19 testing also facilitated the supply chain management, under the oversight of NCOC. In the initial phase, there were small delays of 1-2 days, as global systems were coming to terms with the magnitude of the crisis, which later on, proceeded fairly smoothly.

Guidelines for sample collection and transport were developed and disseminated to service delivery points at all levels. Complete guidelines for sample collection and transportation were developed and samples were transported from collection centers across the country to testing laboratories according to these guidelines. Samples from collection centers of NIH, as well as CEO/DHO/EDOH offices of nearby districts like Rawalpindi, Attock, and Jhelum were transported to NIH for testing. Samples from district health offices were transported using official cars, while NIH being the testing hub also received samples from Punjab and KP, delivered through courier service. Gradually, as the labs were established at provincial levels, the transportation to federal level decreased considerably. As stated by a senior manager at NIH, *"We tested 4000 to 4500 in a day. In the peak days of Covid-19, 7 PCR*

machines in 2 to 3 shifts were working at NIH." Development partners also provided support to strengthen the sample collection and transportation system. As mentioned by a representative of the development partners, *"WHO provided 16 motorbikes for transportation of samples in Lahore."* With the objective to improve quality, Pakistan participated in WHO regional quality assurance and got good scores. Based on WHO's quality assurance panels, NIH developed customized panels and shared these with provincial labs. The overall performance of provincial labs in terms of quality assurance was quite satisfactory, as their results were comparable with those of NIH. IPC guidelines were disseminated to all labs and healthcare commissions ensured the compliance of these guidelines.

3.10.3 Information Sharing

Accurate recording of data followed by timely dissemination to relevant stakeholders was critical for decision making. Perhaps the most important part of this data was the lab test data, as it not only provided information about positive cases, it also helped in contact tracing and further necessary measures. With this in view, lab test data was included in the IDIMS dashboard. A software was developed to enter the lab test data, and this data was then incorporated into the IDIMS dashboard. Details of these tools are explained under areas of Surveillance (3.3). The recorded data included the patient's name, age, phone number, CNIC, and address, to facilitate the process of contact tracing, and analysis of disease patterns and trends. Field epidemiologists and public health specialists were involved in the analysis of this data, which was presented to NCOC for decision making.

3.10.4. Quality Assurance

Quality assurance was of paramount importance in a disease like Covid-19, where a range of measures were taken depending on the result of the test report. With this in view, SOPs specific to Covid-19 testing were developed, covering various aspects of sample collection, transport, testing protocols, reporting, and quality control. Training sessions were organized for the laboratory staff and adherence of quality measures was monitored through the healthcare commissions.

3.11 Financing

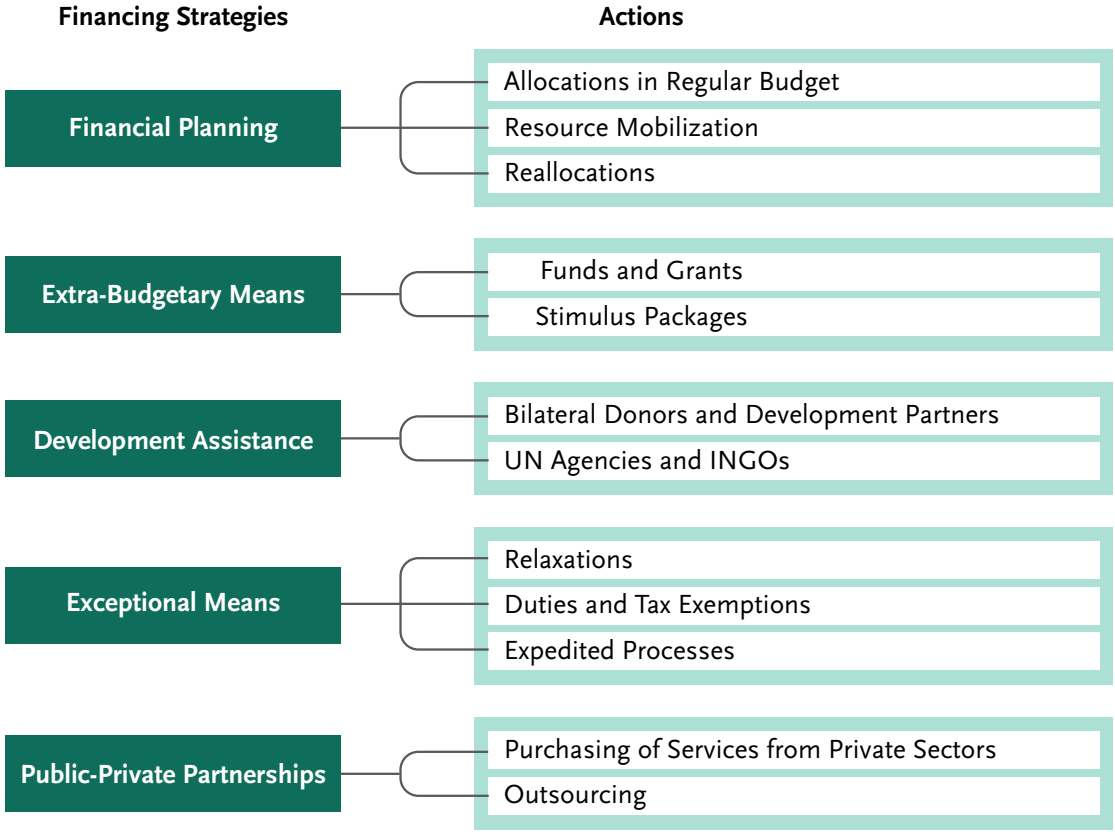
Raising and managing financial resources and development assistance to support the country's efforts to combat the pandemic.

Box 12: Financing the Pandemic Management

- The financial needs were substantial, and required resource mobilization from domestic revenues, international grants and loans, and public-private partnerships.
- The government's proactive approach in announcing a fiscal stimulus package in March 2020 enabled better resource allocation and utilization.
- FBR vide various SROs provided relaxations in the form of tax reliefs during the pandemic.
- Centralized purchase through NDMA brought economies of scale to help in efficient and effective use of limited resources.
- The government outsourced several services to augment the its capacity and leveraging external expertise and resources.
- Donors and development partners shifted their assistance to address government's pressing needs while ensuring transparency in funds utilization.

Financing in the context of Covid-19 response refers to the funding for the health sector, social protection programs, economic stimulus, and other initiatives designed to mitigate the impact on the population. The financing needs for the Covid-19 response in Pakistan were substantial and required mobilization of resources from various sources, such as domestic revenues, international grants and loans, and public-private partnerships. Government was required to prioritize its spending and investments to ensure that resources were directed towards the most urgent needs. This included investments in healthcare infrastructure, personal protective equipment (PPE), testing and contact tracing, and vaccine distribution. Efforts to finance the Covid-19 response also involved innovative financing mechanisms to provide additional resources for the response while also incentivizing private sector investment in pandemic preparedness and response.

Figure 16: Financial Strategies and Actions for Covid-19 Response



The Covid-19 pandemic presented significant challenges to financial management in Pakistan. This section analyzes the financial planning and budgeting mechanism, resource mobilization, sufficiency of resources, extra-budgetary means, reallocations, relaxations for timely availability of resources, and the role of development partners during this period.

3.11.1 Financial Planning & Budgeting

The pandemic brought unprecedented challenges to governments worldwide, including Pakistan, necessitating swift and effective financial planning and budgeting mechanisms. The existing financial planning and budgeting mechanism faced difficulties in accurately allocating funds for the Covid-19 response. This resulted in insufficient allocations for essential activities, hampering the effectiveness of the pandemic response. The lack of precision in fund allocation indicates the need for improvements in forecasting and prioritization. The assumption of ownership by the provincial

government played a vital role in enhancing financial planning and budgeting at the local level. This empowered decision-makers to efficiently allocate resources based on the specific needs of their respective regions, leading to more effective outcomes.

Direct supervision by the Prime Minister (PM) and Chief Ministers (CM) facilitated efficient financial management and decision-making. This ensured that funds were allocated appropriately and utilized effectively, mitigating mismanagement and improving accountability. The government's proactive approach in announcing a fiscal stimulus package in March 2020, with significant allocations for Covid-19, enabled better resource allocation and utilization. This swift response helped address the immediate needs arising from the crisis to support various sectors.

By incorporating Covid-19 related expenses into the budget for the fiscal year 2020-2021, the government ensured sufficient financial provisions to support the healthcare sector and implement relief measures. This strategic budgeting approach demonstrated responsiveness and enabled timely support for critical sectors. The pandemic necessitated a shift in focus from infrastructure and energy to the social sector, particularly healthcare. The role and responsibilities of the Social Sector in the Planning Commission of Pakistan played a crucial role in realigning priorities. This shift allowed for emergency response and life-saving interventions to be prioritized appropriately. However, limited public awareness and participation in the financial planning and resource allocation processes during the pandemic created a gap in transparency and accountability. Engaging the public and fostering transparency in decision-making can enhance the efficiency and effectiveness of financial planning and budgeting.

Resource Mobilization – Resource mobilization for emergency response refers to the process of gathering and deploying various resources, including financial, human, material, and logistical, to effectively address and manage emergencies or crises.

Sufficiency of Financial Resources – The allocation and sufficiency of financial resources play a crucial role in effectively responding to a crisis like the Covid-19 pandemic. One of the primary challenges was the insufficient allocation of resources to address the magnitude of the Covid-19 crisis. This hindered the provision of necessary healthcare services and support to affected communities. District Health Office didn't have much effect of the insufficient resources due to the fact that various sources, including NDMA, were fulfilling most of their procurement needs, however, District Administration faced serious problems due to limited funding which limited the government's ability to respond effectively and provide essential resources to combat the pandemic. The initial reliance on the District Administration's own resources and subsequent requests for government funds highlighted the limitations in resource mobilization during emergencies as a representative of District Administration said, *"There was no budget available at the time of Covid-19. In the beginning, District Administration used its own resources."* Another representative of District Level Health Office said, *"Yes, we have limited financial resources but the financial constraints were not very serious as NDMA provided us with the PPEs and Vaccines and we only faced difficulty in financing the activities such as conducting the awareness sessions campaigns or printing of banners etc."*

Despite the resource constraints, the availability of required resources was ensured through various channels. The establishment of the National Disaster Management Fund (NDMF) and a dedicated bank account provided quick access to resources for prompt emergency response. Additionally, foreign pledges and assistance from international financial institutions (IFIs) augmented the available resources, enabling a stronger response. The inclusion of the International Monetary Fund's (IMF) USD 1.4 billion Rapid Fund Facility in the government's budget bolstered the available resources. This financial support from international partners strengthened Pakistan's ability to address the challenges

posed by the pandemic. Collaboration with IFIs and international partners proved vital in bridging the resource gap.

The Covid-19 crisis highlighted the importance of proper budgeting for public health emergencies. The government's understanding of this lesson led to the allocation of sufficient funds for addressing the crisis. This strategic approach ensured that financial resources were directed towards activities that would have an effective response. Pooling resources at a central hub improved coordination and resource allocation for Covid-19 interventions. This centralized approach facilitated efficient utilization of the available resources and enhanced coordination among different stakeholders involved in the pandemic response. The coordinated effort ensured that resources were allocated where they were most needed. Inadequate data management and reporting systems hindered the accurate tracking and monitoring of financial resources allocated and spent during the pandemic. The lack of sufficient capacity and training in financial management among relevant government officials hindered the effective utilization of resources.

Mechanism for Resource Mobilization – Resource mobilization was a critical aspect of effectively responding to a crisis like the Covid-19 pandemic. Pakistan utilized the National Disaster Management Fund (NDMF) as a dedicated source of funding for disaster management, including Covid-19. This fund provided a platform for pooling and mobilizing financial resources for the pandemic response. The government leveraged the NDMF, along with foreign funding received through pledges, to finance essential Covid-19 response activities. Inter-sectoral financing played a significant role in enhancing the availability of financial resources for Covid-19 response activities. By leveraging funds from various sectors or departments, the government maximized the pool of resources dedicated to addressing the crisis. This approach ensured a comprehensive and coordinated financial response. Collaboration with international non-governmental organizations (INGOs) provided supplementary financial resources for the Covid-19 response in Pakistan. This engagement with INGOs enabled access to additional funding and support, strengthening the financial capacity to address the crisis effectively.

Pakistan engaged with international financial institutions (IFIs) such as the International Monetary Fund (IMF) and the World Bank to secure financial assistance for addressing the Covid-19 crisis. The Ministry of Finance, Ministry of Foreign Affairs, and Economic Affairs Division (EAD) played vital roles in coordinating and managing funds from both domestic and international sources. This engagement with IFIs provided additional financial support and expertise in navigating the challenges of the pandemic. As far as funds mobilization from domestic sources was concerned, mostly it was mobilized from tax and non-tax revenues. As per a representative of the Federal Finance Ministry, *"In that period the revenue mobilization from domestic sources decreased."*

3.11.3 Extra Budgetary Means & Reallocations

Extra budgetary means involve sourcing funds from external sources, including donors, international organizations, and public-private partnerships. These funds are typically provided in the form of grants, donations, or loans specifically earmarked for emergency response efforts. These are additional financial resources beyond the regular budgetary allocations to respond to emergencies effectively. Reallocations involve redirecting funds from existing budgetary allocations to cover the costs associated with emergency response.

Extra Budgetary Means – Pakistan utilized the National Disaster Management Fund (NDMF), a dedicated fund for disaster management. The NDMF served as a crucial source of funding, enabling the government to allocate resources for immediate emergency response activities. This fund played a vital role in addressing the challenges posed by the pandemic. Financial support from the IMF through the Rapid Fund Facility provided a significant boost to Pakistan's finances. The IMF's support

provided additional resources to strengthen the country's healthcare system, implement relief measures, and support the economy during the crisis.

The State Bank of Pakistan introduced schemes to provide cheaper loans to businesses, aiming to support the economy and mitigate the impact of the crisis. These initiatives aimed to ensure liquidity and encourage economic activities during the challenging times of the pandemic. The availability of affordable loans played a crucial role in sustaining businesses and safeguarding livelihoods. A **Relief Package** worth PKR 1.2 trillion was announced by the federal government on March 24, 2020, which was almost fully implemented. Key measures include: (i) elimination of import duties on emergency health equipment (recently extended until December 2020); (ii) cash transfers to 6.2 million daily wage workers (PKR 75 billion); (iii) cash transfers to more than 12 million low income families (PKR 150 billion); (iv) accelerated tax refunds to exporters (PKR 100 billion); and (v) support to SMEs and the agriculture sector (PKR 100 billion) in the form of power bill deferment, bank lending, as well as subsidies and tax incentives. [5]

Reallocations – During the Covid-19 pandemic, reallocating funds became an important strategy for redirecting resources towards urgent requirements. This approach allowed for the reprioritization of existing budgets to address emerging priorities associated with the Covid-19 pandemic. By reallocating funds, the government ensured that financial resources were effectively utilized to tackle the crisis. Principal officers, such as secretaries, had the authority to approve reallocations within the same grant. This authority enabled swift decision-making at the departmental level, facilitating the timely allocation of funds to meet emerging priorities. The involvement of principal officers ensured a streamlined process within the respective ministries and departments. Shifting funds from one demand to another required approval from the Ministry of Finance. This step ensured oversight and control over the reallocation process to maintain fiscal discipline. The involvement of the Ministry of Finance provided a check-and-balance mechanism, ensuring that funds were being shifted in accordance with established guidelines and regulations.

Supplementary budgets, both regular and technical, were utilized to accommodate additional expenditures related to Covid-19. These supplementary budgets allowed for allocation of additional resources beyond the initially planned budgets. The Cabinet played a crucial role in approving the supplementary budget requests. This high-level body ensured prompt allocation of necessary funds by reviewing and authorizing the reallocation proposals. The involvement of the Cabinet enhanced transparency, accountability, and oversight in the resource reallocation process.

3.11.4 Purchasing Services from Private Sector

Purchasing services from the private sector refers to the process of procuring and obtaining various services from private businesses or organizations to meet specific needs or requirements. Instead of developing or providing services internally, governments may opt to contract with private sector providers to access specialized expertise, resources, and capacities.

Outsourced Services – The mechanism to outsource various services during Covid-19 involved a combination of government coordination, policy formulation, and contractual arrangements. The government identified the specific services that needed outsourcing based on their expertise and resources. It then established criteria and guidelines for selecting qualified private entities or organizations to carry out the outsourced services. During the pandemic, the government outsourced

[5] SAI. (2022). Pakistan's Experience in Auditing Covid-19 Expenditure.

several services to augment the government's capacity and leverage external expertise and resources. Key outsourced services during this period include:

- Testing and Diagnostic Services
- Quarantine and Isolation Facilities
- Contact Tracing
- Telemedicine and Tele consultation

Outsourcing often comes with financial implications. The cost of outsourcing during the pandemic placed additional burdens on the government's budget. Ensuring the affordability of outsourced services and cost-effectiveness in comparison to in-house provision required careful financial planning and management. Maintaining accountability and oversight of outsourced services was crucial. The government needed to establish mechanisms to monitor the performance, quality and delivery of outsourced services as lack of effective monitoring or evaluation processes could result in inadequate service delivery, delayed reporting or non-compliance with contractual obligations.

3.11.5 Exceptional Mechanisms for Health Emergencies

Exceptional mechanisms refer to temporary measures implemented during health emergencies to facilitate the procurement of goods, services, and supplies needed for an effective response. These mechanisms are put in place to address urgent and critical needs, allowing for faster and more flexible procurement processes while still maintaining transparency and accountability.

Relaxations for Timely Availability of Resources – The government established the NCOC, which facilitated coordination among ministries, including the Ministry of Finance, PDSI, and the NDMA. This collaborative approach enabled swift decision-making and timely resource mobilization. Although measures were implemented to expedite the release of funds, but specific details regarding relaxations during the Covid-19 period were not provided. The failure of the government to declare a Health Emergency deprived the district administration of relaxation in spending as per PPRA Rules, indicating a gap in providing necessary relaxations during emergencies. The specific rules and relaxation measures during Covid-19, particularly regarding procurement, should have been communicated clearly to relevant departments to ensure the timely availability of resources.

Relaxations Provided by FBR & State Bank of Pakistan – FBR vide various SROs provided relaxations in the form of Tax Reliefs during Covid-19 in Pakistan. The State Bank of Pakistan also introduced schemes to provide cheaper loans to businesses, aiming to support the economy and mitigate the impact of the crisis. These initiatives aimed to ensure liquidity and encourage economic activities during the challenging times of the pandemic. The availability of affordable loans played a crucial role in sustaining businesses and safeguarding livelihoods.

11.6 Shifts in Development Assistance

Shifts in development assistance refer to changes in the allocation and focus of international assistance to address the immediate and long-term needs arising from a health crisis.

Role of Development Partners – The role of development partners in providing financial assistance during the Covid-19 pandemic was instrumental in supporting Pakistan's response efforts. Development partners, including international financial institutions such as the IMF and World Bank, played a significant role in providing financial assistance to Pakistan. The rapid disbursement of USD 1.4 billion through the IMF's Rapid Fund Facility provided a substantial boost to Pakistan's finances, enabling the government to address urgent needs promptly. Development partners contributed to the NDMF through financial commitments and grants, ensuring dedicated resources for disaster

management efforts. A representative of the Planning Commission said, *"As we moved on different things came into effect and UNICEF, UN, UN Women, WHO and World Bank etc. were there. Whenever we had to start anything, we told UNDP, which deals with all the development partners, and their working groups were already established."*

Development partners emphasized the importance of transparency in fund utilization. The government was required to provide expenditure reports and undergo auditing processes to ensure responsible use of the allocated funds. This focus on transparency enhanced accountability and ensured that the funds were utilized efficiently and effectively. Development partners supported Pakistan's resource mobilization efforts by facilitating grants and loans channeled through government treasuries. They collaborated with relevant organizations to encourage funding and donations, enabling the government to access additional financial resources for the response. Development partners provided guidance and flexibility to the government's fiscal stimulus package. The coordinated approach between the government and development partners, facilitated by the NCOC, ensured effective coordination, communication, and data sharing. This collaboration enhanced financial management and the Covid-19 response efforts by leveraging the expertise and resources of both the government and development partners.

3.12 Essential Health Services

Maintaining safe delivery of prioritized health services during emergencies and humanitarian crises.

In the wake of Covid-19 pandemic, country faced the dual challenge of responding to the emergent threat while maintaining safe delivery of essential health services. Systematic response for continuation of essential services was important to prevent unwanted additional mortalities and morbidities. During the initial peak periods of outbreaks, many routine health services were suspended, including OPDs, elective surgeries, and immunization. Apprehensions, lockdowns, and suspended transportation led to underutilization of services. Indicators of preventive (vertical) programmes, like TB case detection rate, antenatal care, FP services, showed a reversal of progress made during recent years, which are now on the path of a quick recovery after the pandemic.

Box 13: Impact of Covid-19 on Essential Health Services

- Ensuring continuity of essential health services was a guiding principle in the country's emergency and response plans.
- Despite concerted efforts, numerous services were affected, including outpatient and inpatient care, elective procedures, emergency as well as intensive care.
- Prioritized services, like routine immunization, polio campaigns, nutrition, MNCH and other priority diseases, showed initial downward trends.
- During Covid-19, incidence of breastfeeding appeared to have initially decreased due to lack of education, fear of disease transmission and lack of antenatal services.
- Disruptions occurred due to various demand and supply side factors, including the need to allocate resources and personnel to response efforts, concerns about infection transmission in healthcare settings, and logistical challenges posed by lockdowns and travel restrictions.
- Significant adaptations were implemented during Covid-19 to ensure the delivery of essential health services in response to the changing context.

3.12.1 Prioritizing Essential Health Services (EHS)

Ensuring continuity of essential health services was a guiding principle in the country's emergency and response plans. During the Covid-19 pandemic in Pakistan, there was a crucial need to prioritize essential health services while ensuring the effective management of the public health crisis. To address this, the health sector and national emergency preparedness and response plans incorporated guidelines aimed at maintaining the continuity of EHS. Stakeholders played a vital role in the development of these guidelines, ensuring a comprehensive and collaborative approach. Through their engagement, experts from various sectors, including healthcare professionals, policymakers, and public health officials, provided valuable insights and expertise to shape the guidelines. These guidelines prioritized essential services based on their criticality and impact on public health, ensuring that the most vital healthcare services were uninterrupted. Director General Health Services of a province while explaining the rationale, mentioned, "*The rationale behind these priorities was to safeguard the well-being of the population by ensuring access to critical healthcare, minimizing the potential adverse consequences of disruptions caused by pandemic.*" By incorporating these guidelines into the national emergency response plans, Pakistan aimed to mitigate the impact of Covid-19 on the overall healthcare system and ensure the delivery of essential services.

3.12.2 Impact of the Pandemic on Essential Health Services

At the time of Covid-19 there were instances of disruption to prioritized essential health services. Several types of services were affected, including curative services such as outpatient and inpatient care, emergency and elective procedures, as well as surgical and intensive care. The disruption occurred due to various factors, including the need to allocate resources and healthcare personnel to Covid-19 response efforts, concerns about infection transmission in healthcare settings, and logistical challenges posed by lockdowns and restrictions. Additionally, preventive services, including vaccination and polio campaigns, also experienced disruptions. These disruptions had significant implications for the overall healthcare system and population health, requiring strategic planning and adaptation to minimize impact and ensure provision of essential services.

Several underlying **supply-side reasons** contributed to the disruption of essential services. Firstly, the diversion of resources, including human, financial, and material, played a significant role. A senior WHO official mentioned, "*As the healthcare system struggled to cope with the influx of Covid-19 patients, resources such as medical personnel, funding, and essential medical supplies were redirected to combat the virus, leading to a strain on the provision of other essential services.*" Moreover, both public and private service providers faced reluctance in delivering services due to various reasons. Public service providers were overwhelmed with the demands of pandemic response, while some private providers were hesitant to continue operations amidst the uncertainty and risks associated with the virus. During the FGD with private health practitioners, all respondents expressed their apprehensions, "*All of us feared for our own lives and that of our loved ones.*" These factors combined to create disruptions in essential services, posing additional challenges to the already strained healthcare system.

There were some underlying **community-side reasons** that contributed to the disruption of essential services. Primarily, a lack of awareness and low demand among the community played a role. Many individuals had a reduced demand due to fear and concerns about contracting the virus. This fear and hesitancy to visit health facilities further hindered the accessibility and utilization of essential services. Additionally, as mentioned by respondents of FGD with Civil Society, "*Limited access to facilities due to transport and mobility barriers added to the disruptions...with restricted movement and transportation challenges, individuals faced difficulties in reaching healthcare facilities, exacerbating the disruptions in the provision of essential services.*"

Healthcare staff mobilizing parents of zero-dose children about safe vaccination during initial wave of Covid-19.

Credits: GAVI/Asad Zaidi, 2020.

These community-side factors collectively contributed to the challenges faced in maintaining uninterrupted essential services during the Covid-19 crisis. Further to the above, there were disruptions in essential health services due to the focus and strain on designated facilities providing Covid-19 care services. Isolation and quarantine services, which were crucial for containing the spread of the virus, were often overwhelmed and faced disruptions, leading to challenges in providing adequate care to individuals requiring isolation or quarantine. Furthermore, the rollout of routine immunization and vaccination campaigns faced challenges, including vaccine supply issues, logistical constraints, and the strain on healthcare systems, which led to disruptions in the timely and efficient administration of vaccines to the population. These disruptions in essential health services caused by the focus on Covid-19 care services had wide-ranging implications for healthcare provision, as agreed by WHO official, "*Initially, there was quite a dip in routine immunization services and there were missed doses, however by August 2020, we were again able to gradually revert back the numbers, this however caused challenges in reaching the vaccination targets.*"

A shortage of health workforce was faced in maintaining essential health services. The shortage was primarily attributed to several common reasons. A large number of healthcare staff was dedicated to Covid-19 related tasks, such as testing, contact tracing, and treating Covid-19 patients, which created a strain on the overall workforce available for other essential health services. Secondly, sickness or mortality caused by Covid-19 among healthcare workers further exacerbated the shortage, as frontline personnel fell ill or, in unfortunate cases, lost their lives to the virus. Healthcare providers interviewed mentioned, "*The increased workload resulting from the surge in Covid-19 cases imposed additional demands on the healthcare workforce, leading to fatigue, burnout, and reduced capacity to adequately manage and maintain essential health services.*"

3.12.3 Mitigation and Resource Redistribution

Significant adaptations were implemented during Covid-19 to ensure the delivery of essential health services in response to the changing context. To adhere to social distancing measures and reduce the

risk of virus transmission, a change was made in the mode of service delivery. Healthcare facilities introduced telehealth and virtual consultations, allowing patients to receive medical advice and prescriptions remotely, minimizing physical contact. Additionally, the frequency of service provision was modified to reduce the number of in-person visits, with healthcare providers emphasizing the importance of self-care and home management for certain conditions. A private healthcare provider while highlighting the use of technology in continuing routine health services mentioned, "*The use of digital platforms played a crucial role in facilitating provision of essential health services, enabling healthcare professionals to remotely monitor patients' health conditions, provide follow-up care, and offer health education and awareness campaigns.*" Through the utilization of digital technologies, Pakistan successfully adapted its essential health services delivery to the evolving pandemic situation, ensuring the continued provision of healthcare while prioritizing the safety and well-being of both patients and healthcare providers.

Efforts were made to maintain a safe and effective patient flow for priority essential health services and specific instructions were provided to managers and service providers in both public and private sectors to ensure adherence to safety protocols and guidelines. These instructions included measures such as screening patients for symptoms, implementing social distancing measures, and enforcing the use of personal protective equipment. One of the SOPs implemented was temperature screening of all patients upon arrival to identify individuals with elevated body temperatures, which could be indicative of potential Covid-19 infection. Suspected Covid-19 cases were quarantined to prevent the spread of the virus if they exhibited symptoms or had a history of potential exposure. Confirmed Covid-19 cases were isolated, ensuring they received appropriate care while minimizing the risk of transmission to other patients and healthcare workers. Additionally, steps were taken to ensure the availability of necessary resources, including human, financial, and material resources, to effectively provide essential health services. This involved mobilizing healthcare workers, allocating sufficient funding, and procuring essential medical supplies and equipment. Adjustments were also made in referral pathways to streamline the process and ensure timely access to appropriate healthcare services. WHO official mentioned conducting pilot programs and refining working modalities to resume essential immunization services. These infection prevention measures played a crucial role in maintaining the continuity of essential health services while prioritizing the safety and well-being of both patients and healthcare providers.

At the time of Covid-19 several actions were taken to mitigate the shortage of healthcare workforce and supplies and equipment, and various strategies proved effective in addressing this challenge. One of the key approaches was assigning overtime to full-time staff, while part-time staff was asked to expand their working hours to meet the increased demand for healthcare services. Staff from non-affected areas was re-positioned to areas experiencing higher Covid-19 cases to ensure adequate coverage. To further bolster the workforce, additional deployment of contract staff was implemented, and resources from the non-government or private sectors were mobilized to support healthcare services. Moreover, efforts were made to accelerate training or provide early certification in medical and nursing institutions, equipping healthcare professionals with the necessary skills to respond effectively to the pandemic. Web-based platforms played a crucial role in providing key trainings, both managerial and clinical, to healthcare workers, allowing for continuous professional development despite the challenging circumstances. Further, task-specific rapid trainings were introduced to build key capacities swiftly and efficiently. These multifaceted strategies collectively contributed to mitigating the workforce deficiency and ensuring the continuity of essential healthcare services.

The supply chain of equipment, medications, and supplies for essential healthcare services (EHSs) faced disruptions due to outbreaks, leading to potential stockouts. As mentioned by DGHS of a province, "*Vaccines and testing for TB and Hepatitis got affected badly as we had to divert these capacities*

for Covid-19 response." Further, stockouts were faced and strategic stockpiling of critical items, implementing inventory management systems, and streamlining logistics processes were hindered. To maintain adequate supplies, several actions were taken, inclusive of an increased focus on monitoring and forecasting the demand for essential items to ensure timely replenishment. Efforts were also made to establish coordination mechanisms among relevant stakeholders, such as healthcare facilities, suppliers, and government agencies, to facilitate efficient procurement and distribution of materials. Collaboration with international organizations and donor agencies played a crucial role in securing additional resources and support. Further, vaccination campaigns and catch-up programs were carried out to cover the gaps in immunization services, and nationwide outreach activities and collaboration with stakeholders was done to recover immunization coverage. These collective actions facilitated resource redistribution, sustaining the supply chain, preventing stockouts, and ensuring continuous availability of equipment, medications, and supplies for essential healthcare services.

3.12.4 Covid-19 Impact on Nutrition

As per the assessment by the World Food Program (WFP), the global impact of the Covid-19 pandemic resulted in 271.8 million individuals experiencing acute food insecurity. Likewise, within Pakistan, approximately 40 to 62 million people, which constitutes around 20% to 30% of the population, faced acute food insecurity due to the combined effects of the pandemic, as well as socio-economic and environmental factors.

The lockdown measures during the pandemic and unemployment within the country led to disruptions in the food supply. The loss of income and remittances further posed significant food security risks in Pakistan during that time. The Pakistan Bureau of Statistics also documented that the Consumer Price Index witnessed a rise of 8.2% in Pakistan from May 2019 to May 2020. Furthermore, there was an escalation in food inflation during the pandemic period, with an increase of 13.73% in rural areas and 10.94% in urban areas. To counteract the effects of Covid-19 on food insecurity and loss of income, a comprehensive multi-sectoral nutrition program was established in March 2021 by the Punjab Planning & Development Board. This plan also addresses adolescent girl and maternal child health along with advocating for breastfeeding and IYCF practices. Furthermore, with technical support from UNICEF, the Nutrition Working Group (NWG) developed the nutrition section for Pakistan Preparedness and Response Plan for Covid-19 and the Covid-19 Social-Economic Impact Framework and Plan, which guided the continuity of nutrition services. This resulted in access to lifesaving, preventative, and promotional nutrition services countrywide for women and children at facility and community levels.

During Covid-19, the incidence of breastfeeding appeared to have initially decreased due to lack of education, fear of disease transmission, and lack of antenatal services. Mothers who gave birth to their first child during the pandemic were disproportionately impacted, with the majority of them chose mixed feeding. WHO and UNICEF encouraged mothers to continue the practice as there was no evidence of Covid-19 transmission through breastfeeding. During World Breastfeeding Week in 2021, UNICEF developed and implemented a district-based plan aimed at raising awareness in 83 districts of Sindh, KP, and Punjab, which collectively reached a total of 252,000 individuals. A total reach of 50.5 million individuals was achieved through a breastfeeding media campaign, complemented by a UNICEF social media campaign that connected with 23.9 million social media users. In 2021, UNICEF supported the development of the SMART Nutrition Information System (NIS) which was a dashboard for live nutritional data for the whole country. UNICEF also entered into a Memorandum of Understanding (MOU) with the Benazir Income Support Programme (BISP) and the World Food Programme (WFP) to offer assistance in Social Behavior Change (SBC) for Maternal Infant Young

Child Nutrition (MIYCN) and the treatment of Severe Acute Malnutrition (SAM) for BISP beneficiaries across 14 pilot districts.

3.12.6. WASH Interventions

Amid the Covid-19 pandemic, the Government of Pakistan implemented a series of targeted Water, Sanitation, and Hygiene (WASH) initiatives to address public health challenges. One significant initiative involved improving WASH facilities in healthcare settings. The government rehabilitated and installed WASH resources in 111 healthcare facilities, contributing to infection control and hygiene within these crucial spaces. The government also focused on promoting hygiene awareness. Collaborating with local authorities, handwashing stations were strategically placed in public areas, emphasizing the importance of proper hand hygiene.

In educational and communal spaces, efforts were made to improve sanitation. For instance, the establishment of handwashing stations and distribution of hygiene kits aimed to improve overall sanitation practices. Recognizing the importance of infection prevention, the government provided training sessions for frontline workers, particularly in healthcare and high-risk settings, to ensure adherence to rigorous hygiene standards. Throughout the Covid-19 pandemic, UNICEF played a pivotal role in Pakistan's WASH initiatives, ensuring access to clean water, promoting hygiene practices, and addressing infection prevention challenges. UNICEF's efforts encompassed various critical areas. In healthcare facilities, the organization rehabilitated and equipped 111 facilities with WASH resources. This initiative benefited over 686,551 individuals and significantly reduced the risk of Covid-19 transmission among healthcare workers and patients. UNICEF extended its reach through hygiene promotion campaigns, leveraging digital platforms and community engagement. These campaigns reached 2.2 million people and emphasized proper handwashing and hygiene practices. Additionally, the strategic placement of handwashing stations and distribution of hygiene kits contributed to wider awareness and adoption of good hygiene practices.

3.12.7 Child Protection During the Pandemic

Children who had contracted Covid-19 seemed to exhibit milder symptoms and lower mortality rates compared to other age groups. However, the impact of the Covid-19 crisis on children was distressing in various ways, potentially leading to enduring and negative consequences. With over 1.5 billion students unable to attend school worldwide, widespread job and income loss created economic instability. Family strains, particularly among those living under quarantines and lockdowns, heightened the likelihood of domestic violence. As the global Covid-19 death toll rose, a significant number of children were left orphaned, rendering them susceptible to exploitation and abuse. In 2020, UNICEF trained a total of 8,290 social workforce related to psychological first aid and mental health and psychosocial support. The skilled personnel delivered psychosocial support services to a total of 216,144 individuals. These recipients included parents, caregivers, children, and other individuals. Messages focusing on the prevention of Violence Against Children (VAC) and Online Safety were created and successfully reached a total of over 5.71 million individuals in the same year. These messages were disseminated across Sindh, Balochistan, and Punjab provinces, and the recipients included approximately 1.28 million girls, 1.39 million boys, 1.35 million women, and 1.67 million men.

4. LESSONS LEARNED & RECOMMENDATIONS

4.1 Legislation and Policy

1. Existing legislative gaps emphasized the importance of further legal reforms to strengthen the government's capacity to respond effectively to similar crises in the future.
2. In the absence of existing legislation required to perform specific health emergency functions, executive orders, and directives provided quick solutions for legal cover.
3. Legislative focus should be on meeting the requirements of the International Health Regulations (IHR) and addressing all notifiable diseases.
4. Uncertainty remained to be one of the defining features of policy formulation.
5. Comprehensiveness and practicability of national plans directed the attainment of desired results at all stages of the pandemic.
6. Review of emerging trends and projections strengthened preparedness through planning ahead and shaping future policies.
7. Building public trust is critical for the enforcement of policies and public health measures.
8. Smart and micro lockdowns proved to be a successful strategy in preventing the spread of Covid-19 while ensuring the continuation of regular businesses.
9. Social restrictions were made achievable through transparent and rigorous implementation by law enforcement agencies.
10. Different sets of policies obligate communication and advocacy with different groups and those related to religious activities were effectively enforced through all-inclusive engagement of clergy.

4.1.1 Recommendations for Legislation and Policy

» Complete enforcement of NIH Act 2021 and enactment of provincial public health legislations in remaining provinces and regions to form regular and comprehensive structures for disease surveillance and response.

» Provisions in legal instruments with comprehensive rules, regulations, and SOPs for declaration of emergency with inbuilt actions according to threat levels (E.g., Level 1 to Level 3).

» Maintain a uniform national list of priority diseases with a caveat that any emerging threat in one of the provinces/regions must be communicated and included in the national list through NIH.

» The Directorate General of Health Services (DGHS) should serve as the operational hub for managing public health emergencies.

4.2 Management and Coordination

11. Unity of command and decision making is critical during a humanitarian crisis of such magnitude.
12. Civilian leadership coupled with operational excellence of military led to a holistic pandemic response.

13. Crisis tends to make authorities react forcefully and in turn, make the people reluctant to cooperate.
14. Minimizing red tapism was critical for timely actions, particularly for procurement and logistics.
15. Convening power of the NCOC paved the way for the engagement of different ministries, agencies, and institutions in the implementation of the executive orders.
16. Keeping political differences aside and putting their country first, NCOC demonstrated a nonpartisan whole-of-nation approach that yielded results.
17. Clearly defined roles and responsibilities of provincial and district administration delivered a concerted response.

4.2.1 Recommendations for Management and Coordination

» Institutionalization of emergency management and coordination platforms as permanent structures at national, provincial/regional, and district levels with regular meetings.

» Ensuring multi-sectoral coordination through legal cover to establish such structures at national, provincial, and regional levels.

» Strengthening of disease surveillance and response units at provincial DGHS in terms of reach, resources, and technical expertise.

» Streamlining interagency collaboration between different government institutions, healthcare sectors, and partners to facilitate effective information sharing and decision-making during a crisis.

» Identification and meeting capacity development needs of senior managers on emergency management and coordination through international exposure and simulations.

4.3 Surveillance

18. Quick inclusion of Covid-19 in the list of notifiable diseases paved way for its mandatory reporting.
19. Presence of AFP surveillance machinery provided the authorities an expansive platform to mobilize resources for both passive and active surveillance.
20. Shorter latency period was achieved through real-time data transmission from multiple sources.
21. Use of parallel information systems triggers disparities in surveillance data, thus hindering evidence-based actions.
22. Surveillance data provided the basis for accurate and effective implementation of targeted NPIs across geographical vicinities.
23. Digital adoption of various tools and solutions ensured timely data for policy decisions.

4.3.1 Recommendations for Surveillance

» An integrated national surveillance system needs to be established for comprehensive geographical coverage and centralized actions.

» Implementation and scale-up of DHIS-2 would be imperative for strengthening routine surveillance of priority diseases at all public and private sector facilities.

» Surveillance data quality must be safeguarded through placement of data validation and quality assurance checks.

4.4 Case Management

24. Rapid deployment of healthcare infrastructure and segmentation of service delivery sites in form of isolation/quarantine centers, field hospitals, and Covid-19 treatment centers, was effective in delivering the designated mandate.
25. Timely and proper dissemination of case management protocols and SOPs led to improved quality of care over time.
26. While it is easy to establish physical infrastructure, organizing advanced clinical services at newly built facilities and remote locations is challenging.
27. Ever-changing treatment guidelines remained an issue with poor outcomes, particularly in distant and remote locations.
28. Potential of innovative technologies including telemedicine and online consultation services was harnessed to provide care to patients and reduce the risk of infection.
29. Case management benefited heavily from frontline workers' trainings and capacity building initiatives taken up by government and development partners.
30. In the absence of preparedness, initial phase of pandemic was marred with shortages of supplies to deliver effective patient care, including ventilators, oxygen support, specialized medicines, and PPEs.

4.4.1 Recommendations for Case Management

» Strengthen healthcare delivery system through enhancing infrastructure, personnel and ensuring the availability of essential medical supplies and equipment to cater the priority diseases.

» Uniform case management guidelines should be disseminated for management of all communicable diseases.

» Regular staff refresher orientation sessions and mock drills should be mandatory in all healthcare establishments to simulate case management during emergencies and crises.

» Prioritize research and adoption of latest medical technologies and treatment modalities.

» Establish specialized infectious diseases hospitals across major cities of all provinces and regions of Pakistan, while focusing on the list of priority diseases.

» Improve strategies that allow for continued provision of essential services including non-urgent medical procedures and to prioritize and schedule such procedures based on urgency and needs.

4.5 Infection Prevention and Control

31. Early implementation of hand hygiene, use of masks, and physical distancing proved pivotal in slowing down the spread of the virus.
32. Rapidly evolving measures and guidelines tailored to specific settings aided in educating the population and in turn allaying apprehensions.
33. Multi-pronged strategies were used in IPC planning including limiting the intake of patients, universal mask usage, triage areas, and designated wards and ICUs.
34. Training and education on IPC raised confidence within frontline workers in dealing patients.
35. Lack of negative pressure rooms and limited supply of appropriate PPE exposed health workers to a high risk of infection.

36. Engaging communities and attaining their support proved fundamental in implementing hygiene promotion and control of infection.
37. Vast disparities were witnessed among public and private sector hospitals in the implementation of IPC practices and access to necessary resources.

4.5.1 Recommendations for IPC

» Introduce IPC programs with inbuilt surveillance of hospital-acquired infections (HAI) to track and monitor compliance of IPC measures.

» Integrate IPC into healthcare practices within different service delivery units of the hospitals through mandatory development of IPC plans and formation of designated teams and their capacity development.

» Establish mechanisms to ensure adequate IPC supplies through investing in local production, equitable distribution, and long-term storage of surplus PPEs.

» Establish IPC surveillance system to monitor IPC practices and compliance in healthcare facilities to help identify gaps, assess effectiveness, and facilitate targeted interventions.

» Integrate waste management components with IPC guidelines and IPC implementation plans to address the challenges related to waste disposal and management.

4.6 Points of Entry

38. Lack of initial screening and quarantine facilities at Taftan led to the spread of infection in the entire country.
39. Conducting an assessment at the onset of a pandemic or public health emergency allowed for identifying gaps and weaknesses in the existing systems of POEs.
40. Timely setting up facilities at POEs with trained staff, screening equipment, and stringent implementation of SOPs augmented their readiness to detect suspected cases.
41. Effective POE management is closely linked with adequately equipped quarantine facilities, including provision of adequate food, water, and medical care.
42. Communication and public awareness campaigns to inform travelers about the measures being implemented at POEs are vital for ensuring compliance.
43. In pandemics of Covid-19 scale, minimizing the spread of infection is not possible without cross-border coordination and collaboration.

4.6.1 Recommendations for Points of Entry

» Invest in capacity building for staff involved in managing POEs, including training on screening, testing, contact tracing, and infection prevention and control measures.

» Strengthen border control measures and collaborate with relevant authorities to identify and address illegal points of entry.

» Develop and establish quarantine and isolation facilities at all 19 POEs to effectively manage suspected and confirmed cases of Covid-19.

» Improve coordination and collaboration among different departments, and agencies involved in managing POEs for consistent and effective implementation of preventive measures.

» Establish a system for regular monitoring and evaluation of the readiness and response measures at POEs.

» Explore the use of technology and innovation to strengthen POE services, including the use of digital health certificates and biometric screening.

4.7 Vaccination

44. Effective communication with accurate and consistent messaging played a crucial role in achieving vaccination coverage.
45. Building community trust through countering misinformation facilitated the rollout of vaccination.
46. Transparency in prioritization based on scientific evidence helped to vaccinate the targeted population groups who were most at risk in a structured manner.
47. Fear of contracting the disease was a leading factor for enhanced uptake of vaccines.
48. The implementation and experiences gained during the Covid-19 vaccination campaigns have contributed immensely to strengthening the overall immunization system in the country.
49. Coordination mechanisms like COVAX established with international organizations, vaccine manufacturers, and other stakeholders were pivotal in vaccine procurement and its distribution.
50. Arrangements for Covid-19 vaccination built inherent capacities of routine immunization services through provision of advanced technologies and storage capacities.
51. Deployment of female vaccinators helped to overcome the barriers during vaccination campaigns.
52. Implementing user-friendly centralized registration system streamlined the vaccination process and tracking of vaccine doses.

4.7.1 Recommendations for Vaccination

» Continuous public education and community mobilization to disseminate accurate information and debunk myths to encourage vaccination.

» Incorporation of vaccination protocols, handling of adverse events and education of public about vaccine benefits and side effects in health professionals training programs.

» Establish robust supply chain, including procurement, storage, transport capacity, and distribution systems to reach remote and marginalized communities effectively.

» Vaccine campaigns should be adaptable to changing circumstances, such as emerging variants, vaccine effectiveness data, and evolving global supply chains.

» Explore opportunities to incorporate Covid-19 vaccination in the routine immunization programs and protocols along with inherent mechanism for validation of vaccination data.

4.8 Workforce

53. Public health emergencies, such as the Covid-19 pandemic, require a comprehensive HR strategy to address the additional workload on healthcare staff. It is crucial to develop a strategy beforehand that covers all workforce related aspects for the management of a public health emergency.
54. During the rapid roll-out of capacity development interventions, it was difficult to make it fully structured and streamlined.
55. Psychosocial aspects of workforce were largely ignored due to its low priority during pandemic.

56. Gaps in staff capacities affected the uniform application of case management guidelines.
57. Clinical multidisciplinary team approach, engaging all relevant specialties, was limited to higher level facilities.
58. Limited supply of PPEs for protection during initial phases exasperated the existing fears and apprehensions of the workforce.
59. Incentives are good motivational factors for frontline workers dealing with potentially hazardous emergency situations like Covid-19.

4.8.1 Recommendation for Workforce

» Putting mechanisms in place for timely and accurate dissemination of various guidelines to all relevant cadres of the workforce.

» Structured job-specific capacity development framework should be developed at national and provincial levels focusing on existing and emerging public health threats.

» Increasing investment in healthcare infrastructure especially properly staffed specialized infectious disease hospitals, training facilities, and resources for capacity building programs.

» Preparedness planning must be informed of the requirements and needs of frontline workers at all levels.

» Mechanisms should be developed for the provision of risk allowances to frontline workers as well as compensation to the families of workers who die in the line of duty.

» Prioritizing capacity building in rural and under-served areas by providing training opportunities closer to the healthcare facilities.

» Government should encourage research and innovation to address HR challenges during public health emergencies, focusing on workforce management and innovative technologies for HR optimization to enhance the resilience of healthcare systems.

4.9 Risk Communication and Community Engagement

60. Segmentation of community, based on literacy, media and mobile coverage, and socio-economic status, primed targeted interventions.
61. Government dealt with strict actions against fake news developers through the engagement of Ministry of Interior and FIA.
62. De-stigmatization of disease is important to make people forthcoming to government interventions.
63. Innovative, locally contextualized, and persistent communication is the key to effective social and behavioral change.
64. Development partners supported the government to develop RCCE strategies guided by theoretical models and principles.
65. Deficient level-specific capacities caused trouble in the timely management of rumors.
66. Rapidly occurring research on behavioral insights helped tailor the government's directions.

4.9.1 Recommendation for Risk Communication and Community Engagement

» Establishing formal mechanism under Mo NHSR&C and DOHs for uniform implementation of RCCE interventions.

» Plan and organize regular RCCE trainings from grass-root level workers and managers up to the ministerial level.

» Institutionalizing research for guiding RCCE and development of awareness messages in local languages to tackle future humanitarian crisis.

4.10 Laboratory

67. Initially steps regarding testing were taken in a reactive mode and the need for comprehensive preparedness planning in advance for lab testing cannot be over-emphasized.
68. Proportional increase in daily testing was instrumental for effective surveillance across different waves.
69. Real-time reporting of Covid-19 testing data to district, provincial, and national levels led to timely actions.
70. Provincial health departments strengthened their testing capacities through the re-designation of existing labs established for other infectious diseases and programs.
71. Private sector labs were enhanced through subsidized provision of testing kits and supplies to enhance national testing capacities.
72. Connectivity with international referral labs was beneficial in confirmatory testing and genome sequencing.
73. Covid-19 provided an opportunity to strengthen and enhance the coverage of lab services in both public and private sectors.

4.10.1 Recommendation for Laboratory

» Enhance lab preparedness for large-scale testing of priority diseases to appropriately respond to future public health events.

» Formulate testing strategies and plan to enhance surge capacities through networking of laboratories in all sectors.

» Quality assurance of lab services through instituting simulation exercises, pre-testing, and comprehensive checks to cover all aspects of laboratory services.

» Establish frameworks for private sector engagement to quickly enhance the lab testing capacities.

4.11 Financing

74. Contingency planning emerged as an essential constituent during the development of financial management strategies.
75. Tax reliefs and exemptions in financial rules supported timely procurement and supply of essential commodities for pandemic response.
76. The availability of affordable loans played a crucial role in sustaining businesses and safeguarding livelihoods.
77. Business continuity heavily benefited from the digitization of marketplaces in Pakistan.
78. Private sector engagement was not formalized to fully avail their potential in response.
79. Centralized decision making brought economies of scale to help in efficient and effective use of financial resources.

80. A major portion of financial allocations relapsed due to various issues related to systems' capacities and inherent inertia.

4.11.1 Recommendation for Financing

» Allocating discretionary funds for fast-track initiation of response during crisis, like contingency budget.

» Supporting financial systems through updating regulations to cater to emergency scenarios for public sector entities.

» Strengthening platforms like public-private partnership authority (P3A) to amplify resources and availability of expertise.

» Allocation of regular budget for strengthening operations of PDSRUs and DDSRUs network across the country.

» Enhance capacities of government officials responsible for financial management, focusing on budget utilization.

4.12 Essential Health Services

81. Significant redeployment of resources was carried out to tackle the shifting priorities resulting from the pandemic.
82. Fear of spread of infection reduced service utilization in both public and private sector facilities.
83. Lockdowns and global travel restrictions hampered medical tourism from Europe and the US, leaving local health systems as the only option, even for the affluent, to obtain healthcare.
84. Telemedicine provided an effective alternative strategy for continued delivery of health services.
85. Essential services were hampered due to dedication of certain facilities and labs to deliver Covid-19 testing and management.
86. Actions to cease the spread of infection also disrupted the supply chain management of essential medical commodities and vaccines at the national level and globally.
87. Reduced focus on routine monitoring and follow-up of chronic illnesses resulted in poor compliance and in instances, progression of disease.

4.12.1 Recommendation for Essential Health Services

» Governments must prioritize essential health services in line with the UHC Benefit Package to ensure their uninterrupted delivery during emergencies.

» Adoption of strategies for redistribution of human resource, particularly community health workers, to maintain the routine services in future crises.

» Scaling up the use of digital and m-Health tools to safeguard essential services for their continuation.

5. CONCLUSION

Pakistan's response to the Covid-19 pandemic stands as a testament to its ability to adapt, mobilize, and unify in the face of a global health crisis. Faced with six waves of the virus, the nation demonstrated remarkable resilience and resourcefulness. This documentation of Pakistan's Covid-19 response reveals a multifaceted approach that encompassed legislation and policy formulation, effective management and coordination, robust surveillance strategies, and successful case management. Implementation of public health measures, and non-pharmaceutical interventions, particularly the strategy of smart and micro lockdowns proved highly effective in securing livelihoods and saving the country from an economic meltdown. Pakistan's management and coordination structures, primarily the NCOC, exemplify the nation's commitment to a coordinated response, transcending traditional boundaries and harnessing the strengths of civil-military cooperation. Pakistan's ability to engage diverse stakeholders, from government institutions to development partners, played a pivotal role in its response. The NCOC combined the best features of federalism without the burden of its limitations. Success of this platform was attributed to numerous factors, such as data-driven decision-making, an organized and inclusive platform, nonpartisan collaboration, clear and effective public messaging, and the fairness and transparency of the decision-making process. All development partners realigned their aid and assistance to support the government in mitigating the impact of the pandemic. These contributions strengthened Pakistan's healthcare system, improved testing and surveillance capacities, and facilitated equitable distribution of vaccines, ultimately enhancing the country's ability to respond to the challenges posed by Covid-19.

Several challenges were faced during the course of the pandemic but Pakistan also implemented effective strategies to address them. Despite lacking a surveillance system at the start, effective utilization of the existing polio network in Pakistan provided a significant advantage in establishing Covid-19 surveillance. Laboratories played a crucial role by integrating their data with the surveillance system. The implementation of technology solutions and digital tools, aided by dashboards, further enhanced the effectiveness of the surveillance activities. Evidence-based decisions, supported by reliable surveillance inputs, played a pivotal role in containing the devastating effects of the pandemic. Under the case management strategy, Pakistan focused on diagnosing cases, providing appropriate medical care and treatment, and prioritizing vaccination efforts. While challenges were encountered, important lessons were learned. These lessons highlighted the significance of healthcare infrastructure, guidelines dissemination, technological innovations, and capacity building for future preparedness. For IPC, key challenges included PPE shortages, disparities between public and private sectors, and waste management issues, whereas lessons learned emphasized early IPC implementation, tailored guidelines, education, and community engagement. Laboratory services were rapidly strengthened, offering an opportunity for underdeveloped provinces and regions to build their testing capacities, which would last beyond the pandemic. At points of entry, effective management, including adequate staffing, regular readiness assessment, SOPs and guidelines, and coordination proved critical for containing the spread of infections like Covid-19 and ensuring a safe environment for travelers.

Workforce related challenges were addressed through strategies like task shifting, roster management, and temporary recruitment. Capacity building initiatives trained healthcare workers, while efforts were made to procure and distribute PPE for their protection. Psycho-social support programs were very

limited, and frontline workers and their families suffered from a lot of trauma. Timely guidelines dissemination, increased investment in health security infrastructure, and support for research and innovation in workforce management will be essential for future preparedness. The successful rollout of Covid-19 vaccination, prioritized based on scientific evidence and bolstered by community trust-building, exemplifies Pakistan's adaptability in the face of evolving challenges. Lessons learned from vaccination campaigns have also fortified the country's capacity for routine immunization services, leaving a lasting legacy of preparedness. However, it is essential to acknowledge that the pandemic exposed vulnerabilities in the healthcare system, including disparities in infection prevention and control practices, workforce challenges, and disruptions to essential health services. As Covid-19 transitions from a global health emergency to an ongoing health issue, Pakistan must focus on sustaining these gains while prioritizing the continuity of essential health services in line with the UHC principles.

Pakistan's experience offers valuable insights for the global community, emphasizing the importance of a holistic, adaptable, and inclusive approach to pandemic response. The lessons learned from this journey will continue to shape the nation's health resilience and readiness for future challenges.

Civil society placed billboards across different cities to express gratitude to the frontline healthcare workers.

Credits: Xinhua/Ahmad Kamal, 2020.

6. REFERENCES

Akhtar, H., Afridi, M., Akhtar, S., Ahmad, H., Ali, S., Khalid, S., Awan, S. A., Jahangiri, S., & Khader, Y. S. (2021). Pakistan's Response to Covid-19: Overcoming National and International Hypes to Fight the Pandemic. JMIR Public Health and Surveillance, 7(5). https://publichealth.jmir.org/2021/5/e28517

Ali, S., Pasha, S. A., & Khalid, A. (2022). Covid-19, Vaccination, and Conspiracies: A Micro-Level Qualitative Study in Islamabad, Pakistan. The Yale Journal of Biology and Medicine, 95(2), 177–190.

Federal EPI Cell. (2021). Pakistan's National Vaccine Deployment Plan.

Finance Department, Government of Sindh. (2022). Annual Budget Statement 2022-23. Volume III (Current Revenue Expenditure). https://finance.gos.pk/Budget/BudgetBooks

International Organization for Migration. (2021). Pakistan - Covid-19 Point of Entry (POE) Analysis Covid-19 [Infographic]. Relief web. https://reliefweb.int/report/pakistan/pakistan-covid-19-point-entry-poe-analysis-march-december-2020

Kamran, K., & Ali, A. (2021). Challenges and Strategies for Pakistan in the Third Wave of Covid-19: A Mini Review. Frontiers in Public Health, 9, 690820. https://doi.org/10.3389/fpubh.2021.690820

Mirza, Z. (2021). Pakistan's Response to Covid – An Aerial View. Think Global Health. https://www.thinkglobalhealth.org/article/pakistans-response-covid-aerial-view

Ministry of National Health Services, Regulations & Coordination, Government of Pakistan. (2020). Pakistan Preparedness and Response Plan for Covid-19.

Ministry of National Health Services, Regulations & Coordination, Government of Pakistan. (2020). National Action Plan for Coronavirus Disease 2019 (Covid-19) Pakistan. https://www.nih.org.pk/wp-content/uploads/2020/03/Covid-19-NAP-V2-13-March-2020.pdf

Mushtaq A, Ikram A, Chaudhry A, Sandhu M, Khalid. F, Hussain F. Khan M.A., Ansari J.A.&; Salman M. (2020). Evaluation of the Covid-19 Laboratory-Based Surveillance System in Islamabad-Pakistan 2020. Global Biosecurity, 2. DOI:10.31646/gbio.73

National Deployment Vaccination Plan (NDVP) For Covid-19 Vaccines. (2021). Expanded Program on Immunization, Ministry of National Health Services Regulations & Coordination Islamabad 24th June 2021

Noreen, N., Syed, A. R., Naveed, I., Niazi, S. K., & Furqan, I. B. (2021). Pakistan's Covid-19 Outbreak Preparedness and Response: A Situational Analysis. Health Security, 19(6). https://doi.org/10.1089/hs.2021.0006

SDG Knowledge Hub. (2023). WHO Declares End to Covid-19 as Global Health Emergency.

Sohil, F., Sohail, M. U., & Shabbir, J. (2021). Covid-19 in Pakistan: Challenges and priorities. Cogent Medicine, 8(1). https://doi.org/10.1080/2331205X.2021.1966179

Special Report by Dr. Faisal Sultan. (December 25, 2022). A recount of major challenges and lessons from Pakistan's Covid experience. The News international.

United Nations. (2020). Global Humanitarian Response Plan for Covid-19.

United Nations Development Programme (UNDP). (2022). Beyond Recovery: Towards 2030. https://www.undp.org/pakistan/beyond-recovery-towards-2030.

World Health Organization (WHO). (2020). Covid-19: operational guidance for maintaining essential health services during an outbreak: interim guidance. https://apps.who.int/iris/handle/10665/331561. License: CC BY-NC-SA 3.0 IGO

World Health Organization (WHO). (2021). Covid-19 Strategic preparedness and response plan: Operational planning guideline. https://www.who.int/publications/m/item/covid-19-strategic-preparedness-and-response-plan-operational-planning-guideline

World Health Organization (WHO). 2022. Joint external evaluation tool: International Health Regulations (2005), third edition. https://www.who.int/publications/i/item/9789240051980

World Health Organization (WHO). 2022. Public financial management for effective response to health emergencies. Key lessons from Covid-19 for balancing flexibility and accountability. https://www.who.int/publications/i/item/9789240052574

World Health Organization (WHO). (2023). Statement on the fifteenth meeting of the IHR (2005) Emergency Committee on the Covid-19 pandemic.

7. ANNEXES

Annex 1: List of Consultations and Contributors

FEDERAL			
1.	Dr. Malik Muhammad Safi Worked as Federal DG at Mo NHSR&C	2.	Dr. Rana Muhammad Safdar Worked as Federal DG at Mo NHSR&C
3.	Dr. Atiya Aabroo Deputy Director at Mo NHSR&C	4.	Dr. Ahsan M. Ahmad Technical Expert at HPSIU, Mo NHSR&C
5.	Dr. Sabeen Afzal Deputy Director at Mo NHSR&C	6.	Dr. Muhammad Salman Worked as Chief PHL NIH, CEO NIH
7.	Mr. Asad Umar Worked as Chairman NCOC	8.	Dr. Nabeela Ali Country Director JSI and Chief of Party
9.	Mr. Hamza Shafqat Worked as Deputy Commissioner ICT	10.	Dr. Faisal Sultan Worked as SAPM & Focal Person Covid-19
11.	Dr. Muhammad Sartaj Country Director UKHSA	12.	Dr. Shabnum Sarfraz Worked as Member Social Sector at PC
13.	Dr. Arshad Mehmood Director M&E JSI	14.	Mr. Jeremy Kiff The Global Fund
15.	Mr. David Wilson The Gates Foundation	16.	Dr. Aliya Kashif Health Specialist World Bank
17.	Mr. Shabahat Ali Shah Worked as CEO at NITB	18.	Dr. Nadeem Hassan Senior Adviser JSI
19.	Dr. Muhammad Asif Khan Bettani Federal Advisor UKHSA	20.	Mr. Nohman Ishtiaq Consultant to Ministry of Finance
21.	Mr. Usman Mushtaq Worked as Advisor at Mo NHSR&C	22.	Mr. Mirza Zeeshan Iqbal Baig Lead for Surveillance Epidemiology UKHSA
23.	Dr. Zaeem Zia DHO ICT	24.	Mr. Mustafa Mahmood UNDP
25.	Dr. Irfan Tahir Worked as Chief CHE/BHS	26.	Mr. Kamil Cheema Meteorologist, PMD
AZAD JAMMU & KASHMIR			
27.	Dr. Tahir Zaman DC Muzaffarabad	28.	Professor Dr. Zakar Zakaria Vice Chancellor University of Poonch

29.	Dr. Aftab Hussain Khan DGHS AJK	30.	Dr. Bushra Shams Worked as In-charge EOC AJK
31.	Dr. Bushra Provincial Program Officer EPI	32.	Dr. Zahid DHO Representative
33.	Dr. Mumtaz Ahmad Khan Pathologist AIMS Muzaffarabad	34.	Dr. Mahmood Kiani Worked as Coordinator National Program for PHC and Director CDC
35.	Dr. Abdul Sattar Khan Provincial program manager EPI AJK	36.	Dr. Syed Nadeem ur Rehman AMS SKBZ Hospital CMH Muzaffarabad
37.	Dr. Murtaza Director Training DGHS AJK	38.	Ms. Uzma Mass Vaccination Centre University of AJK
39.	Dr. Bashir ur Rahman Dean Faculty of Health Sciences	40.	Dr. Kamran Tanveer Lecturer Sociology AJK University
41.	Dr. Adnan Altaf HOD Department of Public Health	42.	Dr. Junaid Ahmad Mir HOD Institute of Allied Health Sciences
43.	Dr. Laharisib Khan Lecturer Biochemistry AJK University	44.	Dr. Abida Sherazi HOD Physiotherapy Department
45.	Mr. Sheraiz Civil Society Representative		

BALOCHISTAN

46.	Dr. Ali Nasir Bugti Worked as DGHS Balochistan	47.	Mr. Fazeel Asgher Worked as Chief Secretary Balochistan
48.	Dr. Sarmad Saeed Khan Worked as In-charge Operations Cell Covid-19 Balochistan	49.	Dr. Ehsan Larik Worked as In-charge PDSRU Balochistan
50.	Mr. Aurangzeb Worked as DC Quetta	51.	Dr. Lubna Khalil Worked as Divisional Director
52.	Dr. Shereen Khan Worked as Professor in Fatima Jinnah Institute Quetta	53.	Dr. Abdul Hafeez Sial Worked as Focal Person of Covid-19 Vaccine at SPH Quetta
54.	Dr. Irfan Ahmad Raisani Worked as Project Manager TB Control	55.	Dr. Rubaba Khan Buledi Worked as Parliamentary Secretary Health
56.	Dr. Ahmad Wali Worked as Consultant Covid-19	57.	Dr. Abdul Qadir Worked as Provincial Coordinator at HRD
58.	Dr. Sheikh Ahmad Molecular Biologist at BMCH	59.	Ms. Laiba Baloch Reporting Officer in Manzil Organization

60.	Dr. Ehsan Ahmad Worked as Consultant at Quetta	61.	Dr. Ghulam Mustafa Worked as In-charge Covid-19 Operation Cell
62.	Dr. Adnan Ayub Worked as Microbiologist at PPHL Quetta	63.	Dr. Aamir Akram Health Specialist in UNICEF
64.	Dr. Sarmad Khan Worked as Provincial Lead in UNFDA	65.	Ms. Merium Mukhtar Ghauri Worked as Pharmacist at DGHS/PDSRU
66.	Dr. Naqeebullah Worked as PD Covid-19 CRNCBP	67.	Dr. Noor Bezinjo Worked as DHO Quetta
GILGIT BALTISTAN			
68.	Mr. Sannaullah Secretary Health GB	69.	Dr. Saleem Uddin DG Health Services GB
70.	Dr. Afzal Siraj DHO Ghizer	71.	Dr. Muhammad Bashir DHO District Kharmang, Baltistan
72.	Dr. Riaz Muhammad Khan DHO Diamer	73.	Dr. Shakeel Ahmad DHS Baltistan
74.	Dr. Mubashir Hassan DHS Diamer/Astore	75.	Dr. Abdul Salam Incharge PDSRU, GB
76.	Dr. Bahadar Khan FP UHC GB	77.	Dr. Iqbal Rasool Director EPI GB
78.	Dr. Muhammad Iqbal Director Health Services, Gilgit Division	79.	Mr. Wajahat Hussain Worked as IDSR FP District Nagar
80.	Dr. Shah Zaman Worked as Incharge GB EOC/EPI	81.	Dr. Nazir Ahmed Associate Professor NUMS/JSI
82.	Dr. Muhammad Latif ADMO	83.	Dr. Hidayat Ali PC NP GB
84.	Dr. Afzal DHO Nagar		
KHYBER PAKHTUNKHWA			
85.	Dr. Shaheen Afridi Worked as DGHS KP and Chief HSRU	86.	Dr. Muhammad Asif Khan Head of Pulmonology (HMC Peshawar)
87.	Dr. Syed Wasif Javed Health Advisor UKHSA	88.	Dr. Nek Dad Public Health Specialist

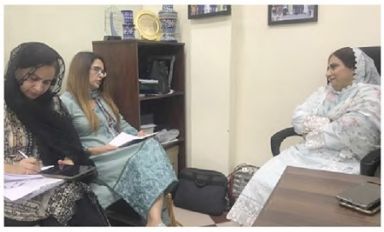
89.	Dr. Shehzad Akbar Medical Director (HMC Peshawar)	90.	Dr. Bilal Bahrawar Khan PM IDSR
91.	Dr. Yaser Yousafzai Director PHRL KP	92.	Dr. Fatima Fareed Trainee FCPS Part II (HMC Peshawar)
93.	Mr. Abdul Basit Worked as EOC Coordinator	94.	Dr. M. Usman Khattak Medical Specialist (HMC Peshawar)
95.	Dr. Shehzad Faisal Medicine Specialist (HMC Peshawar)	96.	Dr. Noor Wazir Medicine Specialist (HMC Peshawar)
97.	Dr. Atta Ullah Deputy Chief HSRU	98.	Dr. Anthony Public Health Coordinator
99.	Dr. Fasihullah Medicine Specialist (HMC Peshawar)	100.	Dr. Beenish Malik HSRU Coordinator
101.	Dr. Ikramullah Khan PD HCIP	102.	Dr. Nosheen Khan Health Officer- UNICEF
103.	Dr. Inamullah UNICEF Representative	104.	Dr. Javed Sattar HSRU Coordinator
105.	Dr. Mohsin DD EPI Coordinator	106.	Mr. Irfan Rashid M&E Specialist
107.	Dr. Sohail Afridi Deputy Director Public Health	108.	Mr. Khurram Shoraz Logistic Officer- DGHS
109.	Dr. Qasim Program Manager – IVCP	110.	Dr. Faryal Saeed HSRU Coordinator
PUNJAB			
111.	Dr. Muhammad Ilyas Director General Health Services	112.	Professor Dr. Muhammad Ashraf Majrooh Professor of Community Medicine
113.	Professor Dr. Asad Aslam Worked as CEAG Advisor	114.	Dr. Muhammad Saeed Akhtar Provincial Health Advisor UKHSA Punjab
115.	Professor Dr. Yasmin Rashid Worked as Health Minister Punjab	116.	Dr. Tahir Manzoor Health Specialist at UNICEF
117.	Dr. Yadullah Ali DHS CD&EPC	118.	Dr. Jamshaid Ahmed Head of WHO Sub-office Punjab
119.	Dr. Yahyah Gulzar WHO Punjab	120.	Dr. Anzar Ahmed Manager Trainings CD&EPC
121.	Dr. Mohsin Wattoo Worked as Incharge PDSRU Punjab	122.	Mr. Khalid Sharif Worked as Manager MIS HISDU Punjab

123.	Dr. Muhammad Shaban Nadeem Manager Operations DGHS	124.	Mr. Amer Malik Senior Correspondent, The News Lahore
125.	Dr. Naeem Majeed TFP-EPI	126.	Dr. Madeeha Worked as WMO at DHQH Sargodha
127.	Dr. Ahmed Muqeem Worked as Commandant at CMH Okara	128.	Dr. Mukhtar Ahmed DHS-EPI
129.	Dr. Zubair Hafeez WHO	130.	Dr. Ahmed Shafique Consultant Surveillance PDSRU
131.	Professor Dr. Maroof Khan Worked as Principal at GMC, Prof of ENT and Principal of UHS	132.	Dr. Osama Worked as General Surgeon at Fatima Memorial Hospital Lahore
133.	Dr. Sayeda Worked as House Office at National Hospital Lahore	134.	Dr. Muhammad Asif Project Manager PTP
135.	Mr. Noman Liaqat Reporter, Dawn TV	136.	Dr. Irfan Ahmed NPO WHO
137.	Dr. Fahad Worked as Registrar at PKLI Lahore	138.	Ms. Umm-e-farwah Correspondent Geo TV Lahore
139.	Dr. Shumaila Usman Provincial Disease Surveillance Unit	140.	Ms. Nazia Worked as Nursing IPD at IMC Hospital
141.	Ms. Acteria Worked as Critical Nursing Manager at Shalimar Hospital Lahore	142.	Mr. Zahid Ch City 42 TV Representative
143.	Dr. Muhammad Shoaib Akmal Manager Surveillance CD&EPC DGHS	144.	Ms. Batool Worked as Staff Nurse at National Hospital
SINDH			
145.	Dr. Asif Syed Worked as Member CM Task Force	146.	Dr. Ahmed Khan Laghari Director Program JSI
147.	Dr. Sohail Raza Shaikh Worked as Provincial FP Covid-19	148.	Dr. Samreen Afzal Worked as FP Covid-19 Vaccination at PDSRU
149.	Dr. Wali Muhammad Rahimoon Senior Manager JSI	150.	Dr. Sikander Memon Add DG Health Sindh
151.	Dr. Ali Akbar Dahri Add Director CDC-III	152.	Mr. Faizan Gulzar Shaikh Worked as IT Consultant FP NIMs
153.	Dr. Ghulam Murtaza Deputy Director MIS	154.	Dr. Lala Jaffar DHO Hyderabad

155.	Dr. Dileep Kumar ADHO Preventive, Hyderabad	156.	Dr. Imdad Ali Channa Addl. DHO (PA&A), Hyderabad
157.	Mr. Qamar Shaikh Head of Health Department, HANDS	158.	Dr. Mudassar Hussain Deputy Director PDSRU-II
159.	Dr. Aftab Deeshak Assistant Director/FP Court Matters	160.	Mr. Zubair Ahmad Laghari Deputy Director Planning
161.	Dr. Muhammad Temoor Assistant Director M&E	162.	Dr. Kashif Hussain AD VBD, DGHS Office
163.	Dr. Faheem Uddin Assistant Director PDSRU	164.	Dr. Naveed Masood Deputy DHO
165.	Dr. Nazir Ahmed Rind Addl. Director HRD/PME	166.	Dr. Khalilullah Memon Deputy Project Director EPI
167.	Mr. Khadim Hussain District Project Officer Larkana, Sindh Rural Support Organization (SRSO)	168.	Mr. Iftikhar District Coordinator Indus Development Society (IDS)
169.	Dr. Sameera Ashiq Deputy Director CDC-III	170.	Dr. Mushtaque Syed DDG VBD
171.	Dr. Shahid Junejo MS Liaquat University Hospital	172.	Dr. Saima Shaikh DDHO RMNCH/ EPI Focal Person Malir
173.	Dr. Jai Parkash THO	174.	Mr. Shehzad Khan DSV Hyderabad
175.	Mr. Mansoor Field Supervisor National Rural Support Program (NRSP)	176.	Ms. Ishrat Representative Action for Public Prosperity Empowerment Awareness & Literacy (APPEAL)

Annex 2: Snapshots of Meetings and Consultations

Key Informant Interview with
DC Muzaffarabad



Key Informant Interview with
Dr. Bushra Shams WHO

Key Informant Interview with
Sardar Aftab Khan DGHS AJK

Key Informant Interview with Dr. Faisal
Sultan SAPM/Covid-19 Focal Person

Key Informant Interview with Dr. Yasmin
Rashid Ex-Minister for Health Punjab

Key Informant Interview with
Mr. Asad Umar Chairman NCOC

Online Interview with
Mr. Aurangzeb Ex-DC Quetta

FGD with Media Representatives

Key Informant Interview with
Worked as DC Rawalpindi

Roundtable Consultative Meeting AJK

Roundtable Consultative Meeting Punjab

Roundtable Consultative Meeting GB

Roundtable Consultative Meeting Sindh

Roundtable Consultative Meeting
Khyber Pakhtunkhwa

Roundtable Consultative Meeting
Balochistan

Covid-19 Pakistan's Response and Documentation of Lessons Learned is a research conducted under Ministry of National Health Services, Regulations & Coordination through funding of UNICEF by Contech International, which is a healthcare consulting, research and management organization, established with the mission to improve the health of all, especially women and children.

Email contech@contech.org.pk for more information.