

VACCINE READINESS ASSESSMENT

COVID VACCINATION CENTERS

Technical Report

April 2021

ACKNOWLEDGEMENTS

The World Bank commissioned the Health Services Academy (HSA), Islamabad to carry out an assessment of the readiness of COVID-19 Vaccination Centers to provide COVID-19 vaccination services. The HSA team, led by Dr. Muhammad Naseem Khan (Principal Investigator), included Dr. Ejaz Ahamad Khan (Co-Investigator), Dr. Ahmad Hussien Tareq (Co-Investigator), Dr. Khurram Shahzad (Research Coordinator), and Mr. Wahaj Zulfiqar (Finance Specialist).

This report was prepared under the overall leadership of the Ministry of National Health Services, Regulations and Coordination (MONHSRC), and in collaboration with the World Bank; in particular, Dr. Rianna L. Mohammed- Roberts (Task Team Lead and Senior Health Specialist), Dr. Ali Saeed Mirza (Health Specialist), Dr. Jahanzaib Sohail (Economist, Health) and Dr Aliya Kashif (Senior Health Specialist).

This report would not have been possible without the valuable assistance and support of Dr. Sabeen Afzal, Deputy Director Programs, MONHSRC, and Dr. Soofia Yunus, Deputy National Program Manager, Expanded Program on Immunization.

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Acronyms

AEFI	Adverse Events Following Immunization
CVCs	COVID-19 Vaccination Centers
CH	Civil Hospital
COVID-19	Corona Virus Infectious Disease 2019
COVIM	COVID 19 Vaccine Inventory Management System
DHQ	District Headquarter Hospital
EPI	Expanded Programme on Immunization
FAA	Federally Administered Areas
GoP	Government of Pakistan
HCWM	Healthcare Waste Management
HSA	Health Services Academy
ICT	Islamabad Capital Territory
IEC	Information Education and Communications
IPC	Infection Prevention and Control
KP	Khyber Pakhtunkhwa
MONHSRC	Ministry of National Health Service, Regulations and Coordination
NADRA	National Database & Registration Authority
NIMS	National Immunization Management System
RHC	Rural Health Center
SOPs	Standard Operating Procedures
THQ	Tehsil Headquarter Hospital
VIRAT	Vaccine Introduction Readiness Assessment Tool
WB	World Bank

Executive Summary¹

Pakistan started preparing for vaccine registration and deployment in January 2021. The country decided to deploy the vaccinations at selected health facilities which were designated as COVID-19 Vaccination Centers (CVCs). Since the government planned the rollout to be conducted in a phased manner, an assessment of the initially notified CVC sites was considered critical to ensuring operational readiness and planning for effective expansion in the vaccine rollout process. In the first phase of vaccination, and consistent with the World Health Organization (WHO) allocation framework, healthcare workers and the elderly population were identified as the prioritized groups. Initially, 582 CVCs were designated in January 2021 to start COVID-19 vaccine roll out for phase I. These vaccination centers formed the baseline for adult vaccination and provided an important snapshot of the preparedness and gaps in the initial rollout in late February – early March. Hence, the findings from this assessment served to directly inform the subsequent further expansion of Pakistan’s vaccination capacity and coverage nationwide and to ensure that the identified gaps were addressed.

Based on the conceptual framework for this assessment, heatmaps of COVID 19 cases (absolute number of COVID-19 cases reported by the province/regions) were used to identify high and medium/low-risk districts in all the provinces/regions. The sampling, while purposive, specifically focused primarily on the high burden districts which at the time were predominately urban, while also selecting sites in low risk (low burden) districts to gain a broader and more representative picture of the roll out preparedness. Each CVC in the sampled districts was assessed for readiness through a structured tool comprised of the following eleven domains:

- Operational status
- Entrance/registration
- Human resources
- Training needs assessment
- Infrastructure
- Infection Prevention and Control (IPC)
- Adverse Events Following Immunization (AEFI)
- Vaccine operations
- Healthcare waste management (HCWM)
- Cold chain management
- Cost of establishing a CVC

¹ The boundaries, colors, denominations, and other information provided in this work do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Operational Status: A total of 247 facilities, covering more than 40% of the country's CVCs, were assessed through field visits. Thirteen CVCs did not exist due to various reasons. One-third of the remaining 234 CVCs were not operational due to the non-availability of COVID-19 vaccines. More than half of these non-operational CVCs were in Sindh & Khyber Pakhtunkhwa (KP), and over 70% were in the Rural Health Centers (RHCs). This has significant implications for expansion of the vaccine roll out to rural areas as vaccine supply increases.

Human Resources: Dry runs were conducted in more than half (54%) of the CVCs assessed, and about 40% of CVCs were not monitored by the higher authorities (district, province, or federally administered area), with the least monitoring visits conducted in Sindh (35%), followed by KP (53%). Monitoring and supervision of CVCs are critical in ensuring high-quality and safe vaccine administration. The assessment also revealed gaps in the availability of adequate facilities for female clients' vaccination; for example, approximately 20% of facilities had no female staff, and 40% had no separate vaccination area for female clients. These gaps were most pronounced in KP (57% & 46% respectively).

Infection Prevention & Control: The availability of information, education, and communication (IEC) materials for the catchment population (23%) and vaccine administration checklist (49%) were deficient overall, particularly in Balochistan, KP & Islamabad Capital Territory (ICT)/federally administered areas (FAA). Regarding HCWM, only a third of the CVCs displayed waste management guidelines. This was lowest in KP & ICT/FAA.

Risk communication and IEC about vaccinations and their availability need to be strengthened. The availability of IEC materials for the catchment population (23%), for example, was found to be deficient overall and particularly low in Balochistan, KP, and ICT/FAA (15%, 18% & 14%, respectively). This has implications for generating and maintaining demand and needs to be addressed in a comprehensive manner especially as availability of vaccine supplies improves over the course of the roll out.

Adverse Events Following Immunization: Almost one-fourth (22%) of the CVCs did not designate a doctor for the AEFI management. In a third (35%) of instances, the AEFI focal person was neither trained nor readily available at the health facility. AEFI focal person availability was the lowest in Sindh (45%), followed by KP (54%). All the CVCs were relatively deficient in the availability of AEFI reporting forms, which could easily be provided and hence corrected.

Vaccine operations were going well in most CVCs, with every indicator assessed at around 90% among the provinces/regions. However, staff training to safely administer vaccines and to identify AEFIs was lowest in the province of Sindh, at 49% and 45%, respectively. Counseling of clients on both AEFIs (which was lowest in KP at 56%) and the importance of the second COVID-19 dose was not universal (87%). Only 60% of the CVCs had calculated their vaccination capacity

per shift, with low calculation ratios of 40% and 45% in KP and Sindh, respectively. One-fourth of the CVCs had not assigned a focal person to coordinate vaccination activities, including IPC; this was lowest in KP (63%).

Cold chain management: The cold chain was found to be working optimally at most of the sites, at the required temperature of 2-8°C. In most instances, it was the vaccinator's responsibility to ensure cold chain optimization, except in Punjab where this responsibility was shared amongst the vaccinator, storekeeper, and other staff in the same CVC.

The National Immunization Management System (NIMS) was explored through an in-depth interview with the official at NIMS. NIMS is a new system for registering and monitoring vaccinations. NIMS was available in 78% of CVCs assessed. Registration through NIMS needs to be further strengthened to ensure universal and real-time registration at all CVCs. The online data from each of the CVC is sent to the NIMS; this includes the number vaccinated each day, AEFI reported, and vaccine wastage. This data is used to estimate nationwide vaccine consumption and can also serve as a powerful monitoring tool for CVC staff, further strengthening vaccine roll out. Tracking the vaccine supply chain with the temperature monitoring data, if synced with NIMS, for example, can ensure better output in preventing loss or damage to vaccines. The establishment of early and quick feedback loops in NIMS will also ensure that gaps encountered during the implementation phase are identified early and rectified during the scaling-up phase.

Training Needs Assessment: Across all CVCs assessed, most of the staff did not have proper and structured training in IPC, HCWM, and AEFI. Not surprisingly, therefore, around two-thirds of supervisors suggested the need for training on IPC, HCWM, and AEFI. Adequate resources for refresher training are needed to ensure that staff are well-trained and prepared for further COVID-19 vaccination drives across Pakistan. AEFI reporting should be emphasized due to the exceptional fast tracking of the COVID vaccines for use in the current global scenario. This would contribute to better understanding of the safety profiles of the specific vaccines and help reduce vaccine hesitancy.

Infrastructure: Essential equipment for registration and reporting, and AEFI management, need to be made available to all the facilities. This includes the availability of a smartphone or computer with functional NIMS software along with basic stationery. Unplanned vaccine rollout to the facilities will lead to critical bottlenecks in vaccine administration, particularly as the rollout ramps up and surging demand needs to be managed with the requisite supply of vaccines. It will be essential for facilities to develop a clear understanding of their daily shift throughput capacity, which at time of assessment had only been calculated by 60% of CVCs overall. Such calculations should be reported to the distribution centers to ensure that the correct number of vaccines are

provided to each CVC to manage spoilage and mismatch of supply/demand. Requirements related to facilitating the vaccination of women were also relatively weak with privacy screens and separate beds being available at only 60% of CVCs.

Cost of establishing a CVC: The (recurrent and capital) costs required to establish a CVC with minimum essential requirements were estimated. Based on these standard costs obtained through consultation with the Expanded Programme of Immunization (EPI) and the Ministry of National Health Service, Regulations and Coordination (MONHSRC), the financing gap required to ensure a minimum level of functionality across the 234 CVCs assessed, disaggregated by province/region, was estimated. For recurrent costs, the estimated monthly financing needed is as follows: FAA- Rs. 1.29 million, ICT- 1.41 million, Balochistan- Rs. 1.16 million, KP Rs. 10.844 million, Punjab- 5.84 million, and Sindh- Rs. 6.86 million. Hence, assuming a 12-month rollout, the estimated financing gap across assessed facilities would be approximately 364.47 million PKR.

Pakistan's rollout of the COVID-19 vaccine is in its initial stage. A stepwise rollout to priority age groups could help it cope with the COVID-19 adult vaccination load but does not preclude the need to improve readiness capabilities of CVCs across the domains assessed in this study. Enhanced readiness would improve Pakistan's preparedness to deal with both the present pandemic and the future disease outbreaks, including those with pandemic potential.

To conclude, Pakistan has a functional immunization system from the federal to the district level. With proper planning and training, and efficient resource allocation, coupled with support from the country's well-developed EPI program, CVCs can be strengthened to accommodate vaccination surges for the COVID-19 pandemic and future epidemics and disease outbreaks.

Chapter 1: Introduction

Background

Pakistan has managed to respond effectively to COVID-19 during the first wave of transmission and is currently doing well in the 2nd wave despite being sandwiched between multiple pandemic epicenters. COVID-19 vaccine procurement is a priority for the Government of Pakistan (GOP). Pakistan, being a lower-middle-income country, is in the preparatory “GAVI Transition Phase 2020” and listed among the 92 COVAX Advance Marketing Commitment (AMC) countries that will receive doses for an average of 20% of the country’s population; in particular, health care workers and the most vulnerable group, in Q3 or Q4 of 2021.

The EPI program is responsible for routine childhood immunization and vaccinations for women of childbearing age (e.g., tetanus toxoid). During COVID-19, however, routine immunization services have been compromised². In an effort to mitigate against further disruptions to routine immunizations, the GOP decided to use CVCs at tertiary-level teaching hospitals and selected secondary-level health facilities to support COVID-19 vaccine rollout. Consequently, Pakistan designated CVCs among hospitals and health facilities for the initial phase of vaccine rollout in mid-January 2021.

Initially, 582 CVCs were designated across Pakistan by the GOP for phase 1. These CVCs comprised tertiary, secondary care hospitals, and some RHCs are geographically distributed throughout the country. CVCs are expected to vaccinate the population in a phase-wise manner. In the first phase, which is currently in place, healthcare workers and the population above 60 years are being vaccinated free of cost with the Sinopharm vaccine, which has been donated from the Chinese Government.

In an effort to understand the readiness of CVCs to carry out COVID-19 vaccinations, an assessment was carried out across key domains and core capacities to identify gaps, priority actions, and cost implications. This assessment was consistent with the updated COVID-19 Vaccine Introduction Readiness Assessment Tool, referred to as the VIRAT/VRAF 2.0. The VIRAT tool builds on the experience of prior vaccine deployment by the United Nations Children’s Fund (UNICEF) and the Global Alliance for Vaccines and Immunization (GAVI).

² Chandir S, Siddiqi DA, Mehmood M, Setayesh H, Siddique M, Mirza A, Soundardjee R, Dharma VK, Shah MT, Abdullah S, Akhter MA, Ali Khan A, Khan AJ. Impact of COVID-19 pandemic response on uptake of routine immunizations in Sindh, Pakistan: An analysis of provincial electronic immunization registry data. *Vaccine*. 2020 Oct 21;38(45):7146-7155. doi: 10.1016/j.vaccine.2020.08.019. Epub 2020 Aug 15. PMID: 32943265; PMCID: PMC7428732.

The scope of work, as outlined in Annex 1, covers the following domains and core capacities related to vaccine readiness:

- Operational status
- Entrance/registration
- Human resources
- Training needs assessment
- Infrastructure
- Infection Prevention and Control (IPC)
- Adverse Events Following Immunization (AEFI)
- Vaccine operations
- Healthcare waste management (HCWM)
- Cold chain management
- Cost of establishing a CVC

Initially, it was proposed that most of the data required for this assessment would be collected through national reports, national-level databases, and surveys, supplemented with primary data collection as needed. While secondary data provided good insights, there was no data pertaining to COVID-19 vaccinations in particular. Although nationwide planning to start COVID-19 vaccination was in progress, there was only very limited official information available.

COVID-19 vaccination rollout has a unique set of operational challenges. Firstly, COVID-19 vaccines approved globally and locally for rollout lies in the category of emergency use authorization; this requires additional checks and more stringent monitoring than a routine vaccine campaign. Moreover, the practice of adult vaccination is non-existent in Pakistan and was developed from scratch due to the COVID-19 vaccination rollout requirement. Therefore, the existing secondary data provided very limited useful information to formulate the necessary baseline for the COVID-19 vaccination rollout assessment.

Consequently, the data provided in this report is based largely on primary data collected at CVCs across the domains assessed. On-site visits of CVCs included physical observation of the various processes, interviews with the staff, monitoring of essential items, along in-depth analysis of compliance to the vaccination rollout checklist. The report provides details of the survey methodology, data analysis, results, conclusions, and recommendations drawn from in-depth information collected and insights gleaned.

The report, however, does have several limitations. Some information included in the survey tool, for example, was not available or accessible, as CVCs are being developed as a part of an evolving process and hence could not be collected. In some instances, the required interviewee was not available, and access to certain facilities was delayed or denied. Study limitations are discussed in detail in the methodology chapter.

Notwithstanding limitations, this report sets a strong baseline on the readiness of CVCs to rollout COVID-19 vaccinations in Pakistan. Future surveys which evaluate CVCs' process outcomes, therefore, could help to measure and monitor progress related to readiness, and in so doing, further, improve the vaccination rollout in Pakistan.

Chapter 2: Methodology

This chapter provides a detailed methodology of the CVC assessment. The chapter starts with the objectives of the assessment. This is followed by a description of the assessment settings and sampling methods. The measure used for the assessment and the various domains is then summarized. Following this, the pilot testing and training of the field team are described. Finally, the chapter provides the data collection and analysis plan and an overview of the study limitations.

Study Objectives

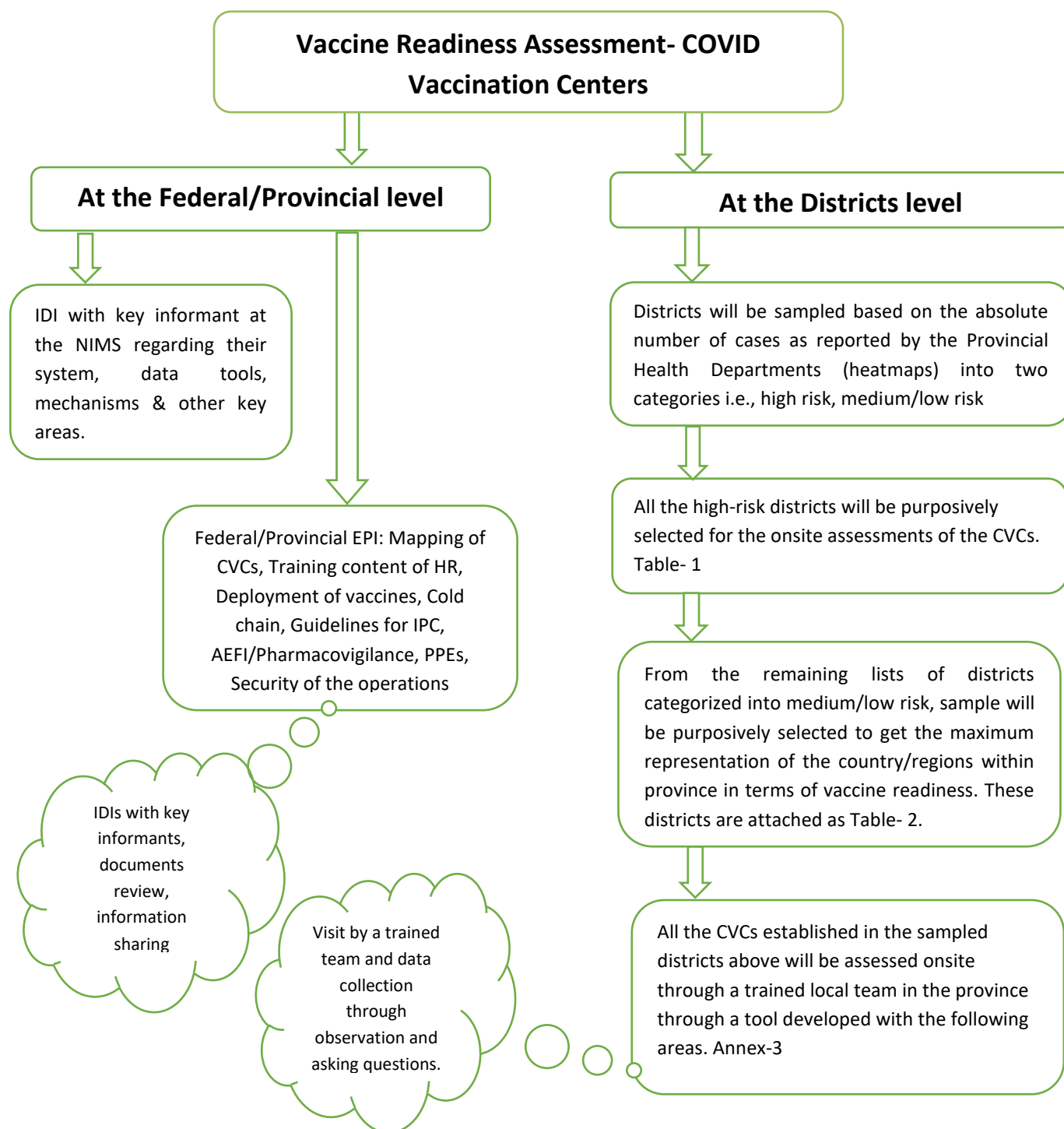
This study aimed to assess the capacity of CVCs to support vaccine rollout in Pakistan. This included:

1. Conducting a mapping of all the public health facilities across the country with CVCs.
2. Assessing and determining: (a) the number and training needs of the CVCs' human resources in terms of the cold chain, AEFI, safe injection practices, and vaccine operations; (b) the number of doses required in each CVCs for the first phase of vaccine rollout; and (c) the number of supplies and commodities required for the CVCs' vaccination for the first vaccine rollout phase.
3. Reviewing the existing IEC materials and assessing current IPC measures.
4. Evaluating and assessing the mechanism for recording and reporting vaccinations and AEFI during the first phase of the vaccine rollout.
5. Assessing HCWM practices and recommending specific requirements if not available.

Study design

The study was designed as a quantitative assessment, with most district-level assessments conducted through a cross-sectional survey design. For the federal level assessment, one in-depth interview was conducted, with informal discussions carried out with the EPI program and NIMS, as elaborated in the assessment framework (Figure 1). The tool guide for the in-depth interview is provided in Annex 2.

Figure 1: Assessment Framework for the Vaccine Readiness Assessment- COVID Vaccination Centers (CVCs)



Assessment settings & sampling methodology

The assessment was carried out in seven administrative regions, including four provinces, ICT, and FAA. The sampling technique adopted for this assessment was a multistage sampling methodology. Districts were sampled based on the absolute number of cases as reported till 10th February 2021 by the Provincial Health Departments (heatmaps). These were then organized into two categories, i.e., high and medium/low risk. Districts categorized as high-risk are summarized in Table 1, along with the number of CVCs. These CVCs were purposively selected for face-to-face onsite assessments. From the remaining lists of districts categorized as medium/low risk, the sample selected purposively to get the maximum representation of the country/regions within the province in terms of vaccine readiness. These districts are summarized in Table 2. During the second stage of sampling, all the designated CVCs established by the respective health departments (list provided by the federal EPI) were included in the assessment.

Table 1: High risks districts

No.	Province/Region	Districts	# COVID Vaccination Centers
1	Punjab	Multan	8
2		Rawalpindi	12
3		Lahore	25
4		Faisalabad	11
5		Gujranwala	4
6	Sindh	Hyderabad	1
7		Karachi	9
8	Khyber Pakhtunkhwa	Peshawar	7
9		Abbottabad	10
10		Swat	12
11	ICT	Islamabad	14
12	FAA	Gilgit	2
13		Mirpur	4
14		Muzaffarabad	3
15	Balochistan	Quetta	11
TOTAL			133

Table 2: Medium/Low risks districts

No.	Province/Region	Districts	# COVID Vaccination Centers
1	Punjab	Kasur	5
2		Bahawalpur	6
3		Gujrat	5
4	Sindh	Shikarpur	10

No.	Province/Region	Districts	# COVID Vaccination Centers
5		Dadu	7
6		Mirpurkhas	7
7		Ghotki	5
8		Larkana	9
10	Khyber Pakhtunkhwa	Kohat	8
11		Dir Lower	10
12		Haripur	11
13		Mardan	11
14	FAA	Kotli	2
15	Balochistan	Ziarat	1
16		Jaffarabad	1
17		Khuzdar	1
19		Lasbella	2
TOTAL			101

Study tool

For this assessment, the tool developed was based on indicative areas outlined in the terms of reference (ToRs) developed by the World Bank. As noted above, these were consistent with the VIRAT/VRAF 2.0. The measure's methodology was based on observation, physical observation of the various processes, interviews with the focal person or the vaccinator, monitoring of essential items, and in-depth analysis. The final tool is attached as Annex 3. The eleven domains assessed are summarized below.

1. Operational status

An operational CVC was defined as “those CVCs offering COVID vaccination to the frontline health care workers or the elderly population.” Meanwhile, non-operational CVCs had all the structural components and staff needed to carry out vaccinations but were not offering vaccinations at the time of the field survey. The third category was CVCs that were designated as such but did not exist during the visit.

2. Entrance/Registration

The entrance of the CVC was assessed based on the existence of the following inputs: a banner, a chart/standee for the designation of the vaccination area, a reception area, a NIMS registration desk, and a waiting area adequate for 6-8 people, with adequacy determined based on the availability of sufficient space to allow for a distance of 6 feet between persons in the waiting area, as per GOP COVID guidelines.

3. Human Resource

This domain assessed the human resources deployed for the various functions of the CVC and their adequacy in terms of number. The following areas were assessed: (a) the number of nurses in a given shift; (b) the availability of female staff for vaccination of females, security guards, and support staff; (c) the number of shifts per day (i.e., morning, evening, and night shifts, if any); (d) the operations of the CVC vaccination during the week (i.e., the number of days the CVC is operational for COVID vaccinations); and (e) monitoring visits by higher authorities from the district, provincial or federal levels.

4. Training Needs Assessment

In this domain, the focal person was asked to highlight areas needing refresher training, with a focus on IPC, HCWM, AEFI, and other areas of importance.

5. Infrastructure

The majority of areas assessed under this domain were done through observation of key structural elements directly required for safe and effective vaccination. This included, for example: (a) the availability of a chair, desk, and seat stool at the vaccination desk; (b) a dedicated area for post-vaccination observation; (c) a computer/smartphone/laptop and internet availability for data entry, printer; (d) adequacy of space for pre- and-post-vaccination areas for vaccine operations in line with the COVID-19 prevention guidelines; (e) electricity and backup in case of load shedding; and (f) a separate bed and screen, etc., for vaccination of females.

6. Infection Prevention & Control

IPC holds significant importance, particularly during a public health emergency. Questions under this domain were related to the following: (a) the assignment (or not) of a focal person for IPC; (b) training of the focal person on IPC; (c) the availability of handwashing station/hand sanitizer; (d) the existence of standard operating procedures (SOPs) for hand hygiene, which is displayed, and practiced, before and after every vaccination; (e) routine cleaning of CVC surfaces at the start and end of the day's operation; and (f) the correct use of a face mask.

7. Adverse Events Following Immunization (AEFI)

The CVC's readiness for AEFI was assessed based on the following: (a) the existence of clear processes in case of an AEFI; (b) the availability of a trained focal person for AEFI; (c) the existence of a clear definition, and care process for dealing with severe AEFI, and knowledge by the nurse of this process; and (d) the existence of an AEFI management kit with an Intra Venous (IV) cannula, drip sets, adrenaline, and hydrocortisone injections.

Additionally, in case of severe AEFI, the following were also assessed:

- the availability of emergency resuscitation, i.e., oxygen cylinder, Ambu bags, blood pressure (BP) apparatus, and endotracheal tube;
- for reporting of AEFI, sufficient availability (at least 10% of the total scheduled vaccinations) of AEFI reporting and detailed investigation forms; and
- Nurse competence in filling the online reporting mechanism on NIMS system.

8. Vaccine Operations

This domain assessed all aspects of proper vaccine operations, from preparing vaccines to administering and, finally, adequate waste disposal. This included an assessment of the following: (a) the availability of a designated person responsible for vaccination; (b) injection preparation in an aseptic environment through auto disabled syringes; (c) handling of sharps in the safety boxes; (d) (appropriate) storage temperature; (e) availability of vaccination schedule for the day; and (f) consistency between vaccines availability and the vaccination schedule.

For the vaccination session, the following areas were observed (either directly in operational CVCs or through roleplays in CVCs which were non-operational at the time of the team visit): the counseling of the client for injection site pain and fever; proper injection site technique; counseling regarding post-vaccination observation; counseling regarding the next dose of vaccine; mechanism if any AEFI experienced; and NIMS system data entry and working on the phone/tablet/laptop/computer system.

9. Healthcare Waste Management

Under HCWM, the following areas were assessed: (a) whether the focal person had read the COVID-19 vaccination guidelines for HCWM released by EPI, and HCWM guidelines and /or SOPs were displayed; (b) methods (and frequency) for disposition of the hazardous waste; and (c) knowledge regarding hazardous waste.

10. Cold Chain Management

Cold chain management is a vital component of effective vaccine operations. The following areas under this domain were assessed: (a) the availability and designation of the person responsible for cold chain management; (b) training on cold chain management; (c) presence of expired vaccines in the refrigerator; (d) whether COVID-19 vaccine protocols for safe disposal of vaccines were followed; and (e) knowledge of vaccinator in making a consumption report.

In addition, the availability of the following items was assessed: functional ice lined refrigerator (ILR) and its volume in litres, vaccine carrier for 100 doses of vaccine, syringes at the ratio of 1:1 for the vaccine (if not prefilled vaccine), and temperature recording and monitoring device.

11. Costing of CVCs

Understanding the cost of a CVC is essential in ensuring the functionality of CVCs and in scaling up the vaccination drive for COVID-19 vaccination in Pakistan. In this regard, a list of standardized essential items- across the eleven domains- that should be available at all CVCs was developed in consultation with EPI and MONHSRC.

Standardized/centralized prices for items were taken from the MONHSRC with an assumption that procurement would be done through centralized procurement at the Federal level. Notably, prices excluded inputs needed for construction or renovation because CVCs were established in government healthcare facilities. The unit price for HR was calculated based on the government Basic Pay Scale (BPS) pay scale.

Pilot testing

After incorporating feedback from the National EPI program, the MONHSRC, and the World Bank, the tool was pilot tested in RHC Tarlai (an operational CVC). During the pilot testing, the following observations made were incorporated in the updated version.

1. The tool was sequenced logically along the vaccine delivery pathway from the entrance, reception area, NIMS registration confirmation to other technical areas for ease of data collection.
2. Questions related to the safety box, HCWM and AEFI management, and training needs assessments were refined.
3. For each domain, the appropriate respondent was identified (e.g., focal person, AEFI focal person, vaccinator) and highlighted in the assessment tool.
4. Repetitions in questions were removed.
5. Additional questions were added based on observations by the Health Services Academy (HSA) team (e.g., separate reception and registration desk at the CVC).
6. For validity, the investigators ensured face and content validity (whether the overall flow and contents are aligned) as experts in the research and subject fields.

Training of the team

Training on “Vaccine Readiness Assessment- COVID Vaccination Centers” for field supervisors’ and surveyors was conducted at HSA, Islamabad, on 14th and 15th February 2021. The first day focused on familiarizing the team with the different aspects of the survey tool. For this purpose, a participatory approach was developed and implemented, and the teams were actively involved in the training. To support and show the best practices and standard methods, YouTube



videos were shown to improve understanding of the concepts and aspects of the tool. The second day was used to pilot test the tool through the field teams in five operational CVCs in Islamabad. The teams were sent for pilot testing based on their province/regions to one of the five CVCs established in the ICT.

After pilot-testing, the teams gave their feedback which was incorporated and discussed for clarity. The main issue identified was that in most of the CVCs, the focal person was not available during the pilot-testing exercise. To address this, the teams were instructed to build liaison and coordination with the District Health Office teams to fix a date and time with the CVC focal person to avoid this issue in the field. The second critical reflection was that some of the questions were based on observation of the actual vaccination session. As some of the CVCs were not operational at the team visit, they could not complete these questions. This issue was discussed at length, and it was decided that roleplay of the vaccination session would be used to mitigate this challenge. Apart from these two significant issues, no other issues were observed during pilot testing.

The teams were arranged based on their location, and supervisors were assigned with their province/region, as in Table 3. The assessment took place starting from 17th February till 6th March 2021.

Table 3: Field team assignment in the provinces/regions

Province/Region	Field supervisor	Surveyors	Number of CVCs
ICT/FAA	1	4	25
Punjab	1	4	76

KPK	1	4	69
Sindh	1	4	48
Balochistan	1	4	16
TOTAL CVCs Covered			234

Data Collection

Data collection commenced following administrative approvals from the respective Director General Health and letters of support and facilitation from the respective District Health Office in the sampled districts. This was done immediately after the training of the survey teams in the week starting 15th February 2021. The deployed teams regularly checked in through WhatsApp to share inter alia, location data, and photographs documenting the designated CVC being assessed. Initial data was scanned and shared with the HSA based team to assess the accuracy and to ensure that any missing data or confusion was addressed on a real-time basis. This coordination modality was followed throughout the data collection, and information was obtained from each of the surveyors and their respective supervisors.

Data Analysis

Data was entered in the EPI INFO software. Double-entry was done to remove any data entry discrepancies. Analysis of data was done through SPSS version 25. Mean and standard deviation was calculated for scale data. In contrast, frequency and percentages were calculated for categorical data with graphs and charts developed to aid in the presentation of results.

Ethical Consideration

Ethical approval for the project was obtained from the Institutional Review Board (IRB) of HSA at the start of the field activities. Additionally, through the Director-General Health for Pakistan, letters were sent for administrative approvals and facilitation to each of the respective Director Generals in the provinces and regions. Administrative permissions followed this in each of the districts through the District Health Office. Informed verbal consent was obtained from every participant after explaining the



research's purpose and providing information to participants. The right to withdraw from the study at any time, without giving a reason, was reinforced to all participants during consent and before the survey was conducted.

Limitations and Challenges

Several limitations and challenges were encountered. These are summarized below.

- The survey sample was not representative as the sites were selected purposively. This decision stemmed from the MONHSRC need to have the survey completed fast enough to inform the subsequent expansion phase, and to specifically focus on the high burden districts where the most cases were clustered at the time of the assessment and were prioritized for vaccine rollout.
- It was impossible to assess all the established CVCs given funding constraints and tight timelines; the need for detailed validation of the tool, for example, required multiple field tests, and given the just-in-time nature of this assessment, available time for this was quite constrained. Pre-empting the limitations, in part, a statistically significant proportion (almost 40%) of the total sample size was visited and assessed.
- The approvals from the federal, provincial, and district health departments took longer than anticipated.
- The tool was developed to collect information across the eleven domains outlined above. However, there was missing data among the CVCs assessed. Owing to limitations experienced during field visits, this was due to inter alia, unavailability of a focal person, reluctance by sub-ordinate staff to share information, tendency to hide certain limitations of CVCs, correlated with staff direct responsibility and performance. During field visits, teams attempted to mitigate data gaps by visiting a few CVC sites multiple times.
- Some of the CVCs were not operational. In these instances, and as noted above, the team relied on role-playing to assess the various areas in the assessment. Role-play and actual in-the-field observations might have different implications. For example, it was not possible to assess sufficiency and compliance with safe distancing protocols.

Chapter 3: Results

CVC assessments were conducted in tandem with local and provincial health departments. During phase one of the country's vaccine rollout, 247 out of the total 582 designated CVCs across the country were approached and assessed regarding COVID-19 vaccination. This covered around 40% of the total CVCs in the country at the time of study design. The results across the eleven domains assessed are detailed below.

1. Operational status

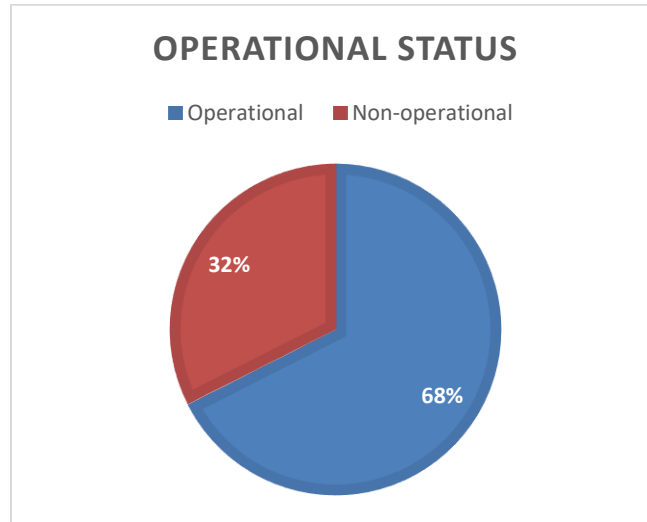
Out of the 247 assessed CVCs, 13 CVCs were not developed or existed in the field for various reasons outlined in Table 4. The main reasons were that the designated CVC was shifted to another hospital, or the staff was not aware of any such developments when the field team visited the health facility.

Table 4: List of Non-existent CVCs

No.	Facility Name	Reason
1	Basic Health Unit (BHU) Tumair	No CVC existed
2	BINUQ Quetta	BINUQ doesn't exist
3	Br. Hospital Bahawalpur	CVC shifted to Civil Hospital
4	CDA Dispensary I-8	No orders issued to establish CVC over this site
5	Govt. Eye Hospital Lahore	CVC shifted to Khawaja Saeed Hospital
6	Institute of Mental Health Lahore	Staff was unaware of CVC being setup
7	Punjab Dental Hospital	CVC shifted to Nawaz Sharif Hospital
8	Rural Health Clinic Mirwah	Mirwah Center development is on hold
9	Rural Health Clinic Tando Jan Mohammad	Tando Jan Muhammad is going to merge with Digri
10	Said Mitha Hospital Lahore	No orders issued to establish CVC at this site
11	THQ Hospital Gujar Khan	CVC shifted to a nearby hospital
12	THQ Hospital Khairpur	Refusal by Medical Superintendent to provide information
13	Trauma Centre Quetta	Staff was unaware of CVC being setup

Figure 2 below represents the operational status of the CVCs across the assessed CVCs. Almost two-thirds of the assessed CVCs were operational at the time of the field team's visit and were giving vaccination to the frontline health care workers and the elderly population. The remaining 32% were functional in other aspects but not operational due to there being no supply of COVID-19 vaccines.

Figure 2: Operational status of CVCs



Figures 3 and 4 show the region/province-wise and facility-wise operational status of the CVCs assessed. All CVCs in Balochistan were operational, while in the province of Sindh & KP, more than 50% of the assessed CVCs were found to be non-operational. Similarly, more than 70% of the CVCs established in the RHCs were non-operational, and around 40% were non-operational in the Tehsil Headquarter Hospitals (THQs) and Civil Hospitals. Most of the smaller hospitals' CVCs (e.g., RHCs) were non-operational mainly due to having no supply of COVID-19 vaccines. While the initial rollout by the government has focused on the high priority districts and urban areas, the issues pertaining to rural facilities will have to be addressed as a priority during subsequent expansion to ensure equitable access.

Figure 3: Operational status in the provinces/regions

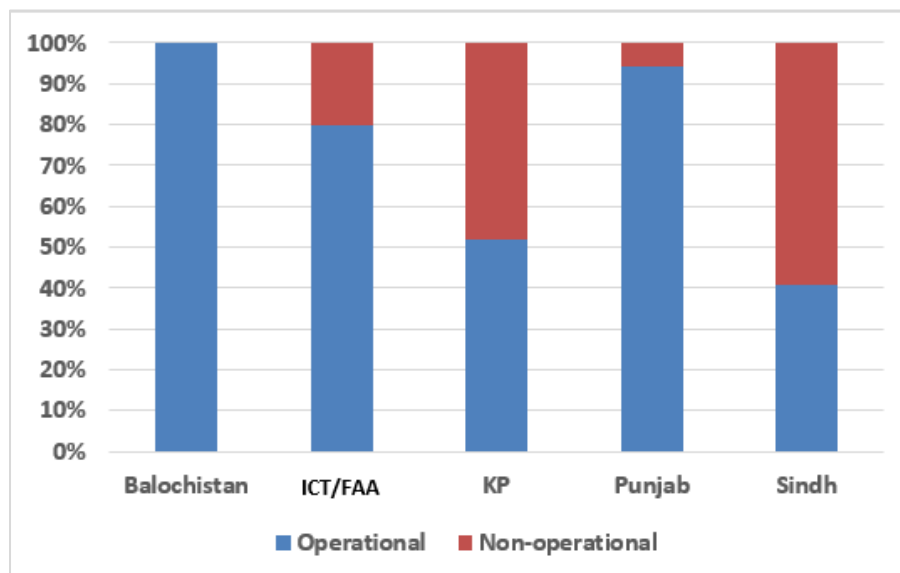
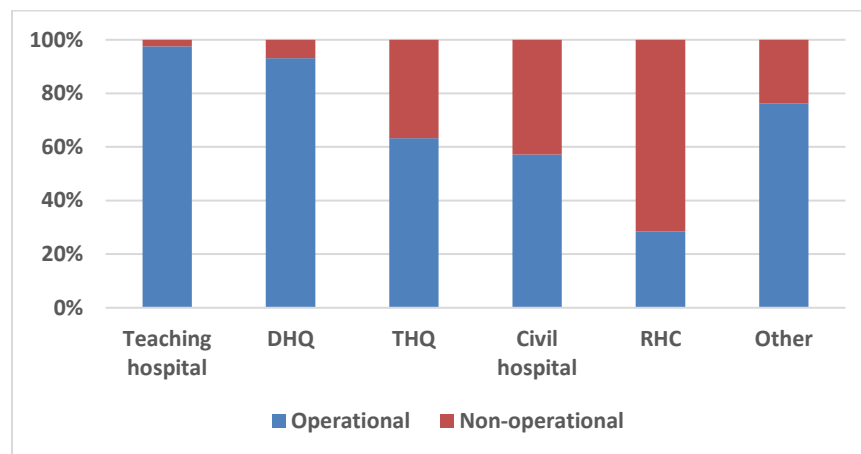


Figure 4: Operational status in the health facilities



Facility attributes

Table 5 below summarizes facility attributes by province/region. Almost half of the health facilities where the CVCs were established were either THQs or RHCs. Nonetheless, in the province of Punjab, more CVCs were found in THQs (48%), followed by the Teaching Hospitals (32%), while in Balochistan, the focus was on the CVCs established in “other facilities” (54% in specialized hospitals not falling in the designated categories of hospitals such as hepatitis hospital Dadu or Pak Italian modern Burn center Multan), along with almost one-third (31%) CVCs developed in District Headquarter Hospitals (DHQs). In KP province, designated CVCs were largely in RHCs.

Table 5: Health facilities attribute in the provinces/regions

Facilities attributes		Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Facility type	Teaching hospital	15.4%	17.2%	4.5%	31.9%	14.6%	17.3%
	DHQ	30.8%	17.2%	9.0%	5.8%	20.8%	12.8%
	THQ	0.0%	20.7%	11.9%	47.8%	27.1%	26.5%
	Civil hospital	0.0%	6.9%	10.4%	2.9%	2.1%	5.3%
	RHC	0.0%	13.8%	41.8%	0.0%	29.2%	20.4%
	Other	53.8%	24.1%	22.4%	11.6%	6.3%	17.7%
Facility ownership	Public	100.0%	100.0%	100.0%	98.5%	97.9%	99.0%
	Private	0.0%	0.0%	0.0%	1.5%	2.1%	1.0%

Location	Urban	92.3%	69.2%	38.5%	88.4%	43.5%	63.6%
	Rural	7.7%	30.8%	61.5%	11.6%	56.5%	36.4%

2. Entrance/Registration

Figure 5 below shows the status of key parameters assessed at entrance and registration centers. All parameters were assessed as being around 60% or above. Functional NIMS software installed in the internet-connected devices (laptops or tablets) to facilitate online data entry and verify clients was available in almost 80% of CVCs.³ Similarly, around 70% of CVCs had a designated waiting area for vaccination and a reception counter to guide clients coming for vaccinations. Visible banners and standee charts were displayed in nearly 65% of CVCs.

Figure 5: Entrance and registration of the CVCs

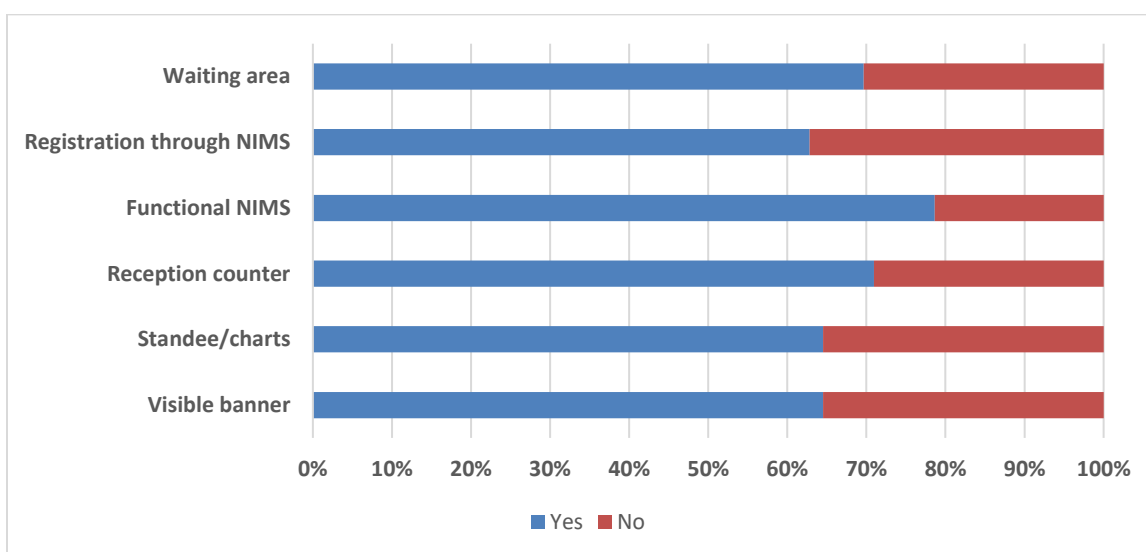


Table 6 shows the entrance and registration centers developed at the CVCs Province/region-wise. Almost all CVCs had a visible banner in Balochistan, but only 46% in KP and 53% in Sindh province. Around half of the CVCs in KP had any charts/standee and 39% in Sindh. Similarly, a reception counter was developed in about 46% of CVCs in KP province. Functional NIMS and registration through NIMS were very low (41%) in Sindh province, which is quite alarming. Another critical point was that in KP, while almost 91% of CVCs had a functional NIMS, registration was done

³ NIMS is a state-of-the-art system managing COVID-19 vaccination information. The system integrates with National Database & Registration Authority (NADRA) for accurate verification of clients. The system also enables authentic and verifiable vaccination records to be produced at the individual and community levels. The NIMS system provides analytical information at the district, provincial and national levels. The system can track vaccines' consumption and compare them with uptake from COVID 19 Vaccine Inventory Management System (COVIM). The NIMS team is constantly working to improve and upgrade the system as per the emerging requirements from various stakeholders. Online training is conducted for data entry operators for any new features.

through the NIMS in only 45% of cases. This might be because around half of the CVCs in KP were not operational and therefore were not doing live registration. Meanwhile, the availability of a dedicated waiting area was relatively evenly distributed across the provinces/regions.

Table 6: Entrance and registration of the CVCs in the provinces/regions

Entrance/registration		Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Visible banner indicating COVID-19 vaccination counter	Yes	100.0%	79.3%	45.9%	79.7%	53.1%	64.5%
	No	0.0%	20.7%	54.1%	20.3%	46.9%	35.5%
Standee /charts in place providing basic information on COVID-19	Yes	92.3%	79.3%	50.0%	87.0%	38.8%	64.5%
	No	7.7%	20.7%	50.0%	13.0%	61.2%	35.5%
Reception counter for registration of clients in the health facility	Yes	92.3%	75.9%	45.9%	92.8%	69.4%	70.9%
	No	7.7%	24.1%	54.1%	7.2%	30.6%	29.1%
Functional NIMS registration	Yes	61.5%	86.2%	90.5%	92.8%	40.8%	78.6%
	No	38.5%	13.8%	9.5%	7.2%	59.2%	21.4%
Registration in NIMS through National ID Card (NIC) and one-time password	Yes	61.5%	79.3%	44.6%	91.3%	40.8%	62.8%
	No	38.5%	20.7%	55.4%	8.7%	59.2%	37.2%
Dedicated waiting area adequate for clients to wait, implementing social distancing	Yes	84.6%	62.1%	62.2%	78.3%	69.4%	69.7%
	No	15.4%	37.9%	37.8%	21.7%	30.6%	30.3%

3. Human Resource

Figure 6 shows the human resources and schedule of CVCs. Around half of the CVCs were assessed as having done dry runs, with a similar percentage doing one vaccination shift per day. Regarding human resources for health, around 80% of the CVCs had a female staff to vaccinate females, at least two security guards, two nurses, and at least two support staff to assist in the vaccination and reporting activities. Monitoring visits conducted by higher authorities from the district, provincial or federal level was 59%.

Figure 6: Human Resources and schedule of the CVCs

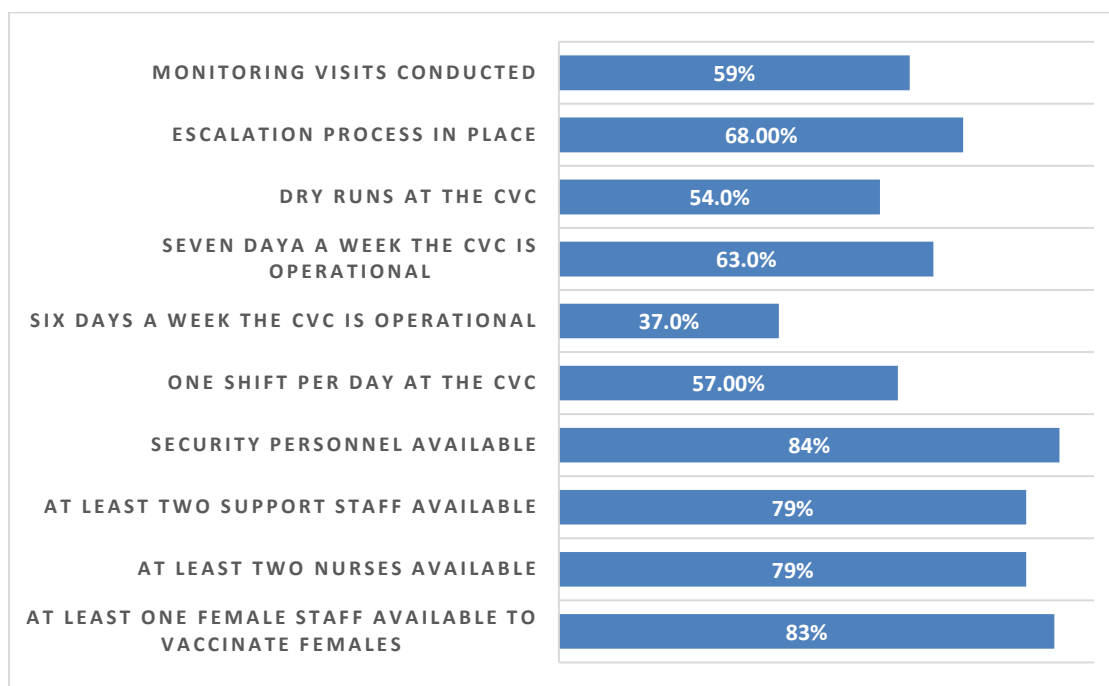


Table 7 shows the human resources and schedule of the CVC in the five regions/provinces. Monitoring visits were the least conducted in the province of Sindh, followed by KP. Dry runs were conducted the least in Balochistan (15%), followed by Sindh (45%). All CVCs assessed in Sindh were operational for seven days a week. Support staff availability was the least in the ICT/FAA region (35%). The availability of at least two nurses and one female staff to vaccinate females was lowest in the province of KP.

Table 7: Human Resources and Schedule of the CVCs in the provinces/regions

HR Indicators		Province/Region					Overall
		Punjab	Sindh	KP	Balochistan	ICT/FAA	
Monitoring visits conducted		65.2%	34.7%	52.7%	100.0%	86.2%	59.4%
Escalation process in place		88.4%	34.7%	59.5%	100.0%	79.3%	67.5%
Dry runs at the CVC		73.9%	44.9%	50.0%	15.4%	51.7%	54.3%
CVC is operational	seven days	75.4%	100.0%	41.3%	46.2%	57.1%	62.7%
	six days	24.6%	0.0%	58.7%	53.8%	42.9%	37.3%
One shift per day at the CVC		63.1%	16.7%	48.3%	76.9%	88.9%	57.1%
Security personnel available		89.9%	69.4%	85.1%	100.0%	86.2%	84.2%
At least two support staff available		75.4%	100.0%	82.4%	69.2%	34.5%	77.4%

At least two nurses available	82.6%	100.0%	62.2%	92.3%	69.0%	78.6%
At least one female staff available to vaccinate females	100.0%	93.9%	56.8%	76.9%	96.6%	83.3%

Table 8 below summarizes the number of human resources in assessed CVCs. The number of female staff available to vaccinate females and the number of nurses and support staff on duty for a given shift were around 2 in terms of median and mode statistics, except in the case of the number of female staff available to vaccinate females where the median was 1. The maximum number of human resources was 59; this was in the Agha Khan hospital- a large private sector hospital. This was removed as an outlier from the analysis. The number of shifts for CVCs was one, but some facilities were operational for three shifts, i.e., morning, evening, and night shifts. Additional details are outlined in Table 8 below.

Table 8: Human Resources in the CVCs

Human Resource	Mean \pm S.D.	Median	Mode	Minimum	Maximum
# female staff to vaccinate females	2.08 \pm 4.06	1	2	0	51
# nurses on duty for a given shift	3.91 \pm 5.95	2	2	0	35
# support staff on duty for a given shift	3.65 \pm 3.67	2	2	0	26
# shifts in CVC operational per day	1.46 \pm 0.55	1	1	1	3
# days a week CVC will operate	6.63 \pm 0.485	7	7	6	7

Table 9 and 10 below show the mean number of human resources by province/region and facility type, respectively. As shown, the mean number of human resources in each category is higher in Sindh than in the other regions/provinces. Similarly, across facility types, the mean numbers are higher in DHQ and teaching hospitals.

Table 9: Human Resources number in the provinces/regions

	Punjab	Sindh	KP	Balochistan	ICT/FAA	Overall
# female staff to vaccinate females	2.0	4.4	1.1	1.2	1.4	2.1
# nurses on duty for a given shift	2.5	14.2	1.4	3.4	2.3	3.9
# support staff on duty for given shift	4.5	7.8	2.2	2.1	1.3	3.6
# shifts CVC is operational per day	1.4	1.9	1.6	1.3	1.1	1.5
# days a week CVC will operate	6.8	7.0	6.4	6.5	6.6	6.6

Table 10: Human Resources number in the health facilities

	Teaching Hospital	DHQ	THQ	Civil Hospital	RHC	Other
# female staff to vaccinate females	2.3	4.0	1.6	2.0	1.1	2.3
# nurses on duty for a given shift	4.8	7.4	2.0	4.3	1.4	3.7
# support staff on duty for given shift	4.3	4.8	3.7	4.5	1.9	2.8
# shifts in CVC operational per day	1.4	1.6	1.4	1.3	1.3	1.6
# days a week CVC will operate	6.9	6.7	6.6	6.6	6.3	6.6

4. Training Needs Assessment

Focal persons at each of the CVCs were asked about their training needs in the areas of IPC, HCWM, and AEFI. Overall, almost the same percentage (67%) of the participants expressed their desire for training or refreshers in IPC, HCWM, and AEFI. AEFI was the most requested area of training. In addition to these areas, training need was also requested in applicable SOPs for CVCs and NIMS registration process.

Table 11 shows the training needs assessment by province/region. All the respondents in Balochistan requested training in the three areas proposed. However, less than half of the focal persons requested such training in Sindh province.

Table 11: Training Needs Assessment in the provinces/regions

Training Needs Assessment		Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
IPC	Yes	100.0%	72.4%	74.3%	63.8%	46.9%	66.7%
	No	0.0%	27.6%	25.7%	36.2%	53.1%	33.3%
HCWM	Yes	100.0%	69.0%	74.3%	63.8%	46.9%	66.2%
	No	0.0%	31.0%	25.7%	36.2%	53.1%	33.8%
AEFI	Yes	100.0%	65.5%	74.3%	69.6%	46.9%	67.5%
	No	0.0%	34.5%	25.7%	30.4%	53.1%	32.5%

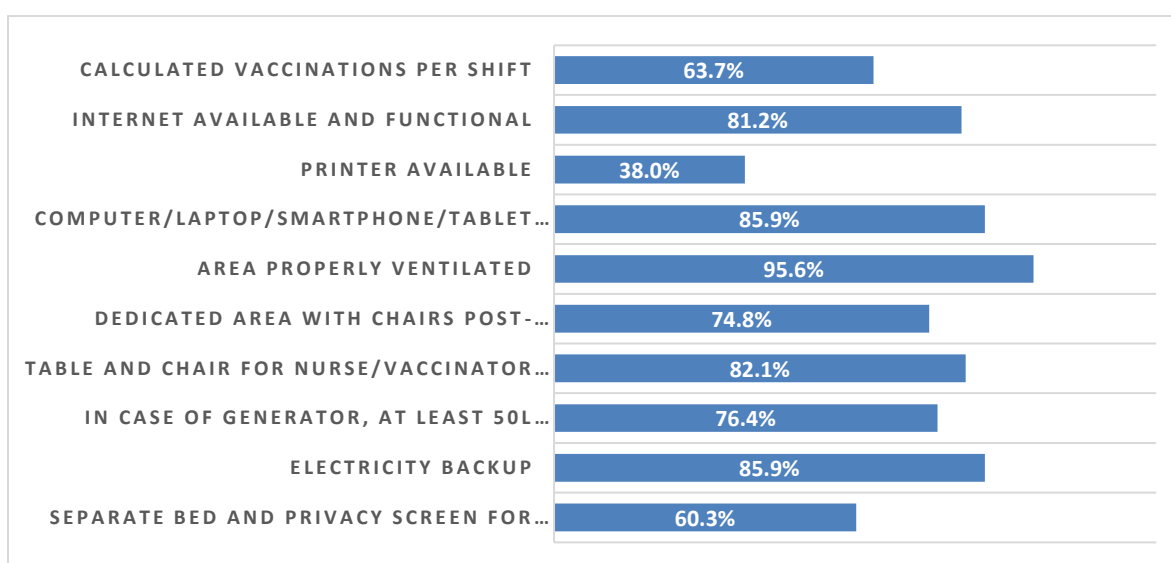
5. Infrastructure

CVCs require essential structural inputs for effective and efficient vaccine rollout (figure 7). The majority of these inputs were available (more than 60%). However, printers were found to not

be available in around two-third (62%) of the assessed CVCs. This is an essential item, which could facilitate the printing of immediate reports and materials required by the CVCs administration. Also, using the gender/equity lens, not all of the CVCs had a separate bed or privacy screen for vaccination of the females and/or disabled persons or any other client opting for privacy. In addition, only 63% of the CVCs had calculated the number of vaccinations that could be carried out per shift. This means that 37% had not yet made those calculations, indicating limited planning for a surge in vaccination as the country receives more vaccines and demand at CVCs increases.

On average, a CVC could accommodate around 20 clients, keeping in mind safe distance requirements. The maximum number goes to about 1200 and 800 in the tertiary care hospitals of Karachi (Dow University of Health Sciences and Jinnah Postgraduate Medical Center Karachi, respectively). On average, 75 (mean 75.4, median and mode 50) clients are expected to be vaccinated, per day, at CVCs. For tertiary care hospitals' settings, this may go up to 500 clients to be vaccinated per day.

Figure 7: Infrastructure characteristics at the CVCs



The infrastructure requirements are summarized in Table 12 below by province/region. KP, Sindh & ICT were assessed as having the lowest availability of a separate bed for women. Electricity backup was available in most settings, with Sindh reporting a slightly lower rate of approximately 74%, which could have implications on the cold chain. Generator fuel/funds availability was the lowest in the province of KP. Meanwhile, post-vaccination dedicated areas were least available in KP, followed by Sindh. Finally, the availability of a computer/laptop/smartphone/tablet was lowest in Balochistan, followed by Sindh province.

Table 12: Infrastructure characteristics at the CVCs in the provinces/regions

Infrastructure		Province/Region					Overall
		Punjab	Sindh	KP	Balochistan	ICT/FAA	
Separate bed and privacy screen for women		79.7%	49.0%	45.9%	92.3%	55.2%	60.3%
Electricity backup		94.2%	73.5%	82.4%	100.0%	89.7%	85.9%
In case of generator, at least 50L fuel/funds available		100.0%	94.1%	36.4%	100.0%	67.9%	76.4%
Table and chair for Nurse/vaccinator seat stool for client		91.3%	73.5%	70.3%	100.0%	96.6%	82.1%
Dedicated area with chairs available for post-vaccination observation		89.9%	67.3%	59.5%	100.0%	79.3%	74.8%
Area properly ventilated		93.5%	100.0%	95.5%	100.0%	92.0%	95.6%
Computer/laptop/smartphone/tablet available for data entry/reporting		92.8%	69.4%	90.5%	61.5%	96.6%	85.9%
Printer available		50.7%	40.8%	25.7%	61.5%	24.1%	38.0%
Internet available and functional		91.3%	71.4%	85.1%	61.5%	72.4%	81.2%
Calculated # vaccinations CVC can complete per shift	0 - 50	73.8%	4.5%	64.7%	92.3%	50.0%	60.1%
	51 - 100	18.0%	40.9%	17.6%	7.7%	27.8%	21.6%
	101 - 150	4.9%	27.3%	5.9%	0.0%	5.6%	8.1%
	> 150	3.3%	27.3%	11.8%	0.0%	16.7%	10.1%

Infrastructure inputs are summarized in Table 13 below by facility. Across all infrastructure areas, RHCs were assessed as having the lowest availability of essential inputs. This might be because RHCs are smaller facilities (first level of care) with limited infrastructure and equipment.

Table 13: Infrastructure characteristics at the CVCs in the health facilities

	Teaching hospital	DHQ	THQ	Civil hospital	RHC	Other	Overall
Separate bed and privacy screen for women	81.0%	72.4%	56.7%	53.3%	36.7%	66.7%	60.3%
Electricity backup	97.6%	100.0%	83.3%	100.0%	73.5%	76.9%	85.9%
In case of generator, at least 50L fuel/funds available	100.0%	96.3%	79.6%	50.0%	40.0%	75.0%	76.4%
Table and chair for Nurse/vaccinator and seat/stool for client	97.6%	93.1%	76.7%	80.0%	67.3%	84.6%	82.1%

Dedicated area with chairs available for post-vaccination observation	92.9%	82.8%	68.3%	80.0%	61.2%	93.3%	74.8%
Area properly ventilated	92.5%	92.6%	97.7%	100.0%	100.0%	74.4%	95.6%
Computer/laptop/smartphone/tablet available for data entry/reporting	97.6%	86.2%	80.0%	93.3%	79.6%	87.2%	85.9%
Printer available	57.1%	51.7%	41.7%	53.3%	8.2%	33.3%	38.0%
Internet available and functional	95.2%	86.2%	78.3%	93.3%	69.4%	76.9%	81.2%
Calculated # vaccinations CVC can complete per shift							
0 - 50	47.4%	48.1%	78.4%	44.4%	63.6%	69.2%	60.1%
51 - 100	31.6%	22.2%	18.9%	11.1%	27.3%	11.5%	21.6%
101 - 150	13.2%	7.4%	0.0%	22.2%	0.0%	11.5%	8.1%
> 150	7.9%	22.2%	2.7%	22.2%	9.1%	7.7%	10.1%

6. Infection Prevention & Control

IPC measures are critical to a successful vaccine rollout process. As mentioned previously, two-thirds of the CVC assessed expressed the need for training in IPC measures and best practices. Figure 8 below summarizes the status of IPC measures across CVCs. Three-fourths of the CVCs were found to have assigned IPC coordinators, and among them, 83% had been formally trained in IPC practices. However, the assessment also revealed that disinfecting the working surfaces of CVCs at the start and end of the shifts was conducted in only 68% of assessed facilities. More than 75% of the CVC focal persons responded that they had been trained in hand hygiene, correct use of face masks, face shield/eye protection, and environmental cleaning and decontamination in the last two years. The compliance to SOPs on standardized handwashing technique was found in more than 93% of assessed CVCs.

However, the availability of IEC materials for the catchment population was deficient (23%), and vaccine administration checklist compliance was observed in around half (49%) of the observed CVCs. The availability of a handwashing station or hand sanitizer was observed in 79% of the facilities, well below the target of 100%. Among those CVCs with sanitizers and handwashing stations, appropriate hand sanitization by nurses was assessed as around 90%; however, only 78% of them were able to define the importance of frequent hand hygiene per vaccination session.

Figure 8: Infection Prevention & Control measures at CVCs

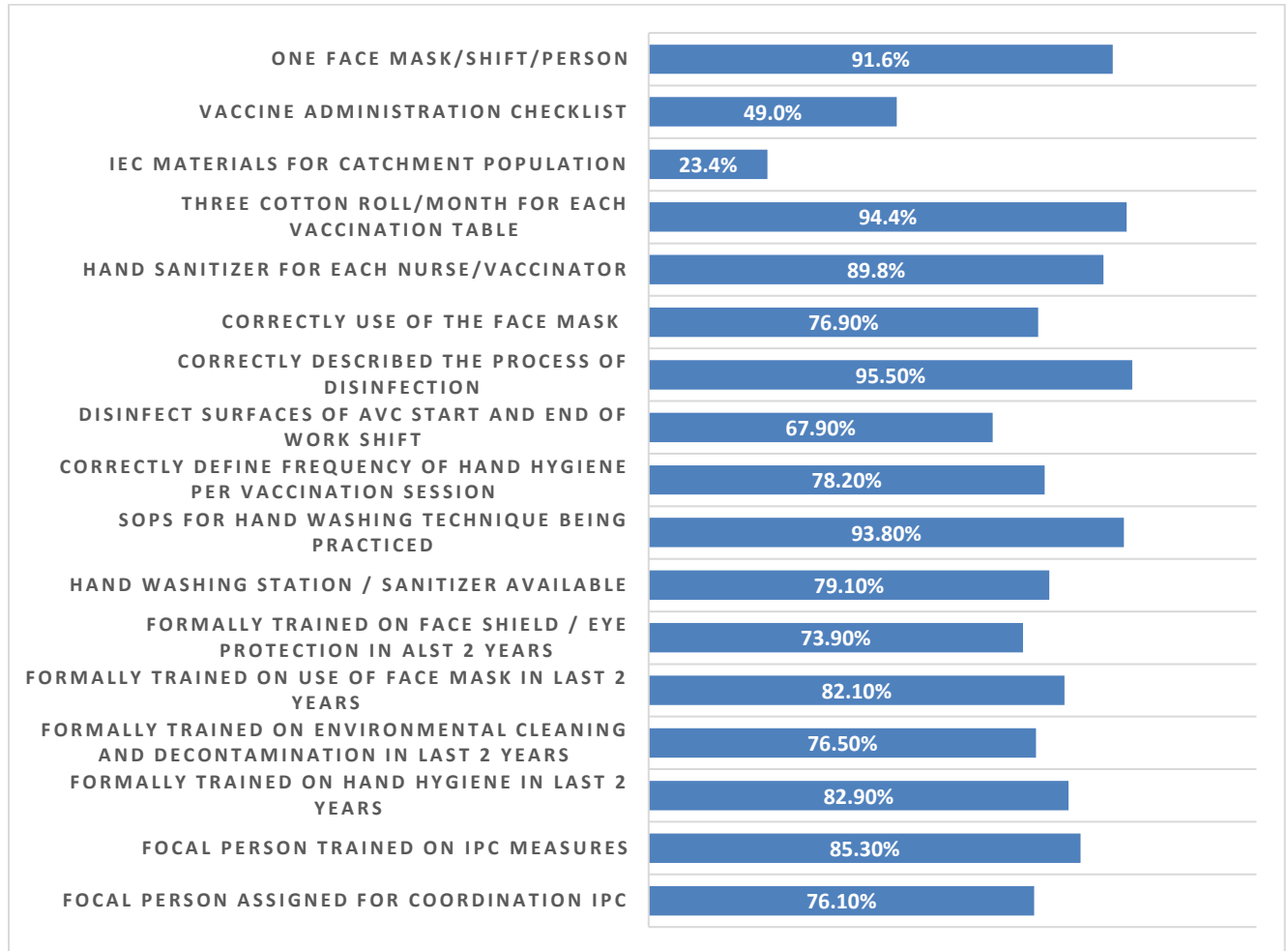


Table 14 below gives a detailed description of the IPC measures disaggregated by region/province. Assignment of a focal person for the coordination of IPC activities was the least in KP. Availability of a handwashing station/hand sanitizer was the least in Sindh province (53%), with almost only half (51%) of their staff being able to correctly define the importance of handwashing after every vaccination session. Likewise, only 53% of CVC staff were knowledgeable about the correct use of a facemask in Sindh. The percentage of facilities that practice surface disinfection was also lower, around 61% in Sindh. Formal training on hand hygiene, environmental cleaning, decontamination, and face shield eye protection was also the least in Sindh compared with other provinces/regions.

In Punjab, which had the highest number of CVCs assessed, the overall status of IPC measures was better; 15 out of the 17 IPC measures scored an average of about 90% or higher. In Balochistan, 14 out of 17 measures were assessed as being 100%. The lowest scoring measures

were IEC materials (15%) and vaccine administration checklist (0%), which were not available in Balochistan.

Table 14: Infection Prevention & Control measures at CVCs in the provinces/regions

IPC Measures	Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Focal person assigned for coordination IPC	84.60%	82.80%	63.50%	88.40%	71.40%	76.10%
Focal person trained on IPC measures	100.00%	66.70%	76.10%	90.20%	97.10%	85.30%
Formal training on hand hygiene in last 2 years	100.00%	82.80%	79.70%	92.80%	69.40%	82.90%
Formal training on Environmental Cleaning and Decontamination in last 2 years	100.00%	69.00%	67.60%	91.30%	67.30%	76.50%
Formal training on use of face mask in last 2 years	100.00%	82.80%	78.40%	92.80%	67.30%	82.10%
Formal training on face shield /eye protection in last 2 years	100.00%	82.80%	73.00%	91.30%	38.80%	73.90%
Hand washing station /sanitizer available	100.00%	86.20%	77.00%	92.80%	53.10%	79.10%
SOPs for hand washing technique practiced	100.00%	89.30%	91.70%	98.50%	88.90%	93.80%
Correctly define frequency of hand hygiene per vaccination session	100.00%	82.80%	75.70%	94.20%	51.00%	78.20%
Disinfect surfaces of CVC at start and end of work shift	100.00%	69.00%	44.60%	91.30%	61.20%	67.90%
Correctly describe disinfection process	100.00%	85.70%	93.50%	98.40%	96.30%	95.50%
Correct use of face mask	100.00%	93.10%	68.90%	91.30%	53.10%	76.90%
Hand sanitizer for each nurse/vaccinator	100.0%	85.7%	90.2%	100.0%	67.7%	89.8%
Three cotton rolls/month for each vaccination table	100.0%	100.0%	90.3%	98.4%	86.2%	94.4%
IEC materials for catchment population	15.4%	17.9%	14.1%	34.9%	29.4%	23.4%
Vaccine administration checklist	0.0%	46.4%	26.1%	73.0%	80.0%	49.0%
One Face Mask/shift/person	100.0%	96.3%	81.7%	98.4%	89.3%	91.6%

7. Adverse Events Following Immunization

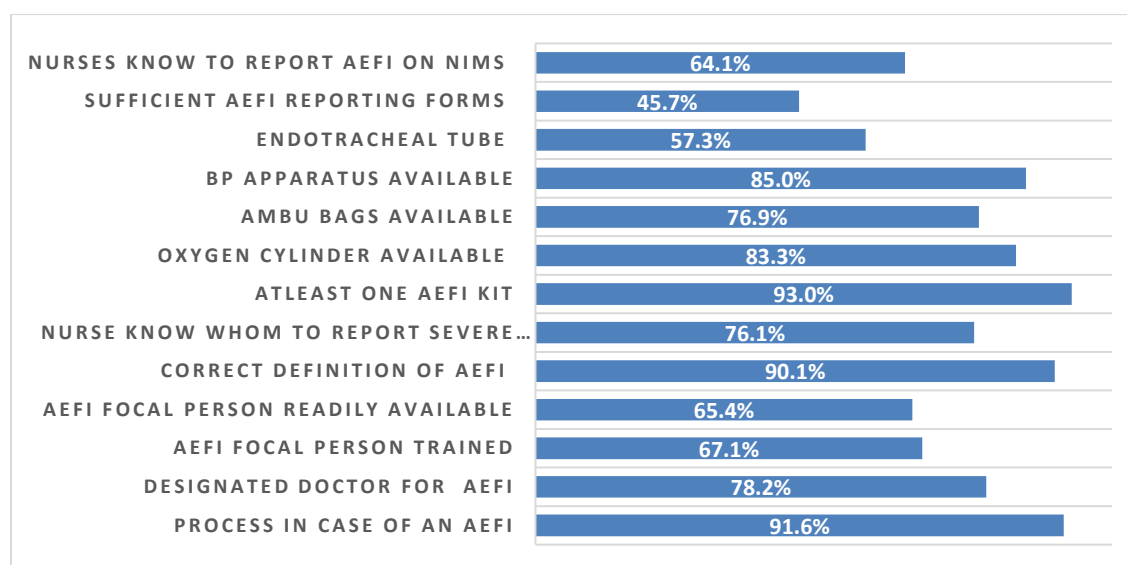
AEFI is a critical component of the vaccination rollout process and is vital for building public confidence. Figure 9 below summarizes AEFI reporting and management among assessed CVCs. As can be seen, AEFI reporting forms were quite deficient at more than half of the facilities. In the pre-COVID-19 scenario, pharmacovigilance reporting was conducted through manual reporting using paper-based AEFI forms. However, for quick follow-up and early reporting of AEFI during COVID 19 vaccinations rollout, the digital reporting of AEFI through NIMS has been

introduced and declared mandatory, along with the paper-based AEFI reporting. The NIMS AEFI dashboard should be able to capture and summarize information on reported AEFIs.

The paper-based forms are usually routed through provincial health departments and take a longer time; however, the NIMS software has enabled centralized reporting of AEFI, nationwide location tracking of these AEFI daily, and quick follow-up. Functional NIMS software should be available at every CVC; the assessment validated its presence in up to 80% of the facilities.

As AEFI reporting is critical, and with this operational transition, it is essential that AEFI information is entered daily as per declared protocols for vaccine rollout. The knowledge of a nurse to report AEFI using NIMS software was around 64% across assessed CVCs. The assessment also revealed that around one in four nurses were unaware of the mechanism involved in reporting severe AEFI, although the process for AEFI management was known in more than 90% of the CVCs assessed. Less than one-fourth (22%) of the CVCs did not designate a doctor for AEFI management, whereas, in a third (35%) of assessed CVCs, the AEFI focal person was neither trained nor readily available at the health facility at the time of the field visit. More than 75% of the CVCs had oxygen cylinders, ambu bags, and BP apparatus available. More than 90% had at least one kit for AEFI management available. Endotracheal tubes were the least available item; it was found in only approximately 57% of CVCs.

Figure 9: AEFI reporting and management status in the CVCs



The status of AEFI measures, disaggregated by province/region, is shown in Table 15 below. As can be seen, the training of AEFI focal persons had not taken place in almost one-third of the CVCs assessed, with the least level of training in ICT/FAA, KP, and Sindh. Similarly, in one-third of

CVCs, the AEFI focal person was not available; the numbers were lowest in Sindh, followed by KP. The knowledge of nurses to report severe AEFI (49%) and reporting AEFI on NIMS (29%), together with the availability of items required for emergency resuscitation, was also the lowest in Sindh; some items like the endotracheal tube had less than one-third of the required stock. As elaborated above, the AEFI reporting forms were quite deficient overall, but the status was very poor in KP, Sindh & Balochistan. Additional details are outlined in Table 15.

Table 15: AEFI reporting and management status in the provinces/regions

AEFI reporting and management	Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Process in case of an AEFI	100.0%	100.0%	79.7%	95.3%	100.0%	91.6%
Designated doctor for managing AEFI	100.0%	93.1%	70.3%	81.2%	71.4%	78.2%
AEFI focal person trained	100.0%	51.7%	56.8%	78.3%	67.3%	67.1%
AEFI focal person readily available	100.0%	72.4%	54.1%	82.6%	44.9%	65.4%
Correct definition of AEFI	100.0%	100.0%	80.6%	89.2%	100.0%	90.1%
Nurse knows to whom to report severe AEFI	100.0%	93.1%	70.3%	89.9%	49.0%	76.1%
At least one AEFI kit	100.0%	89.3%	88.5%	95.4%	97.0%	93.0%
Oxygen cylinder available	100.0%	93.1%	81.1%	88.4%	69.4%	83.3%
Ambu Bags available	100.0%	75.9%	71.6%	91.3%	59.2%	76.9%
BP apparatus available	100.0%	93.1%	85.1%	92.8%	65.3%	85.0%
Endotracheal tube	92.3%	55.2%	33.8%	92.8%	34.7%	57.3%
Sufficient AEFI reporting forms	38.5%	55.2%	31.1%	63.8%	38.8%	45.7%
Nurses know to report AEFI on NIMS	84.6%	79.3%	60.8%	82.6%	28.6%	64.1%

8. Vaccine Operations

Figure 10 below shows the administration of COVID-19 vaccines in the assessed CVCs. As already elaborated, vaccines were administered in around 68% of the CVCs, whereas the remaining CVCs were functional but did not have supplies of COVID-19 vaccines. In almost two-thirds of the operational CVCs, the vaccine was administered by a designated nurse, while in around one-third of CVCs, vaccines were administered by vaccinators instead of nurses.

Figure 10: Vaccine administration

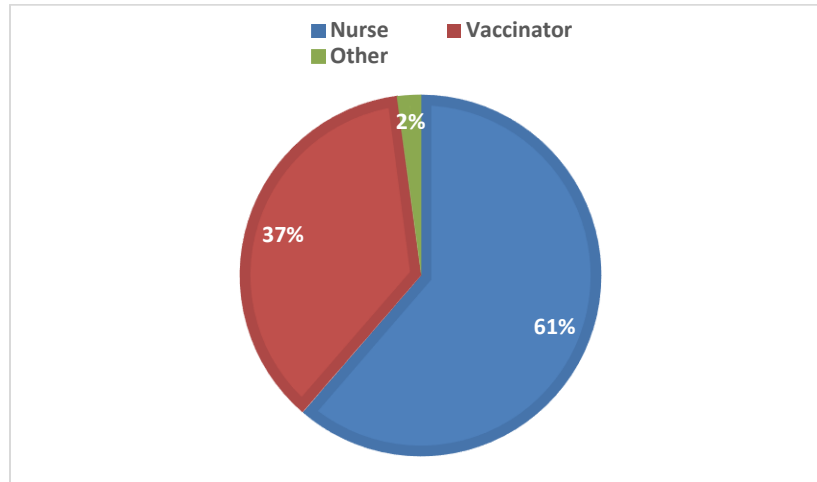


Figure 11 below summarizes vaccine operational parameters at assessed CVCs. As can be seen, most of the 17 indicators pertaining to vaccine operations were assessed as being around 80-90%. Nine of these indicators scored 90% or above, and five indicator scores ranged from 80% to 89%. Meanwhile, three indicators scored less than 80%: staff trained to identify AEFI (74%), counseling the client to report any AEFI observed after leaving the facility (76%), and completion of the tally sheet after each vaccination session (79%).

Figure 11: Vaccine Operations in the CVCs

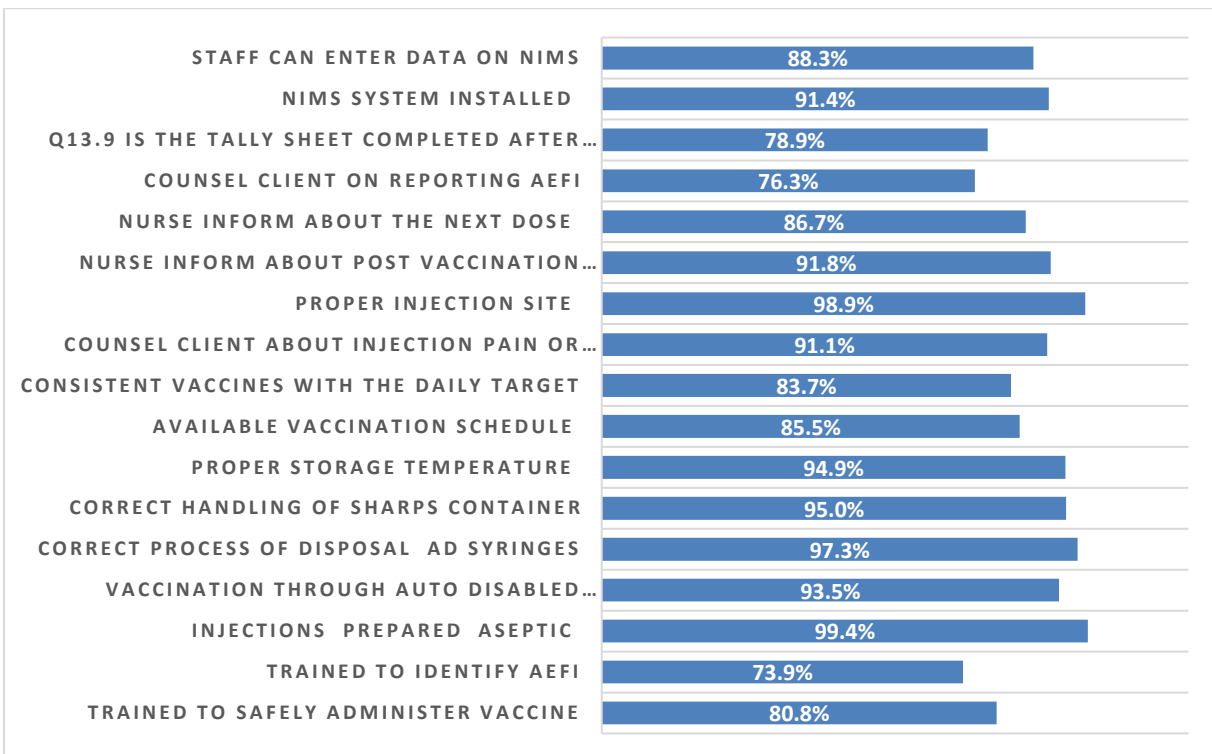


Table 16 summarizes vaccine operations by province/region. Variations were observed in staff training to safely administer vaccines in Sindh (49%) and identify AEFI (45%). KP had the lowest percentage (56%) in counseling clients to report AEFI. In comparison, Balochistan was assessed as having the weakest performance in filling tally sheets after a vaccination session (39%) and installing the NIMS system (62%) in the smartphone/laptop/computer/tablets.

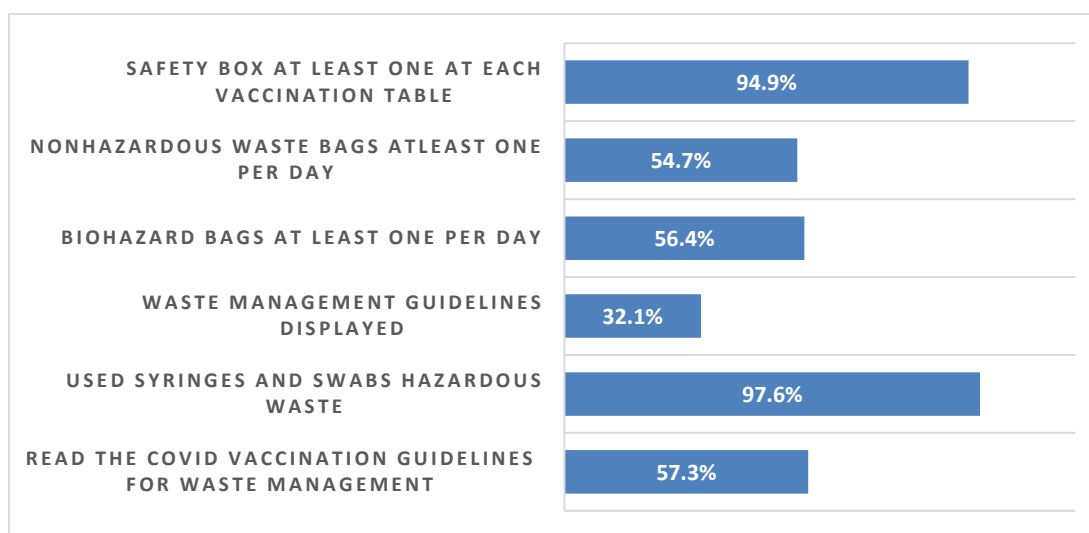
Table 16: Vaccine Operations in the provinces/regions

Vaccines Operations	Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Trained to safely administer vaccine	100.0%	93.1%	81.1%	94.2%	49.0%	80.8%
Trained to identify AEFI	92.3%	82.8%	74.3%	87.0%	44.9%	73.9%
Injections prepared aseptic	100.0%	100.0%	98.0%	100.0%	100.0%	99.4%
Vaccination through Auto Disabled syringe	92.3%	92.3%	92.5%	98.4%	86.2%	93.5%
Correct process for disposal of AD syringes	100.0%	96.2%	93.4%	100.0%	100.0%	97.3%
Correct handling of sharps container	100.0%	92.3%	86.5%	100.0%	100.0%	95.0%
Proper storage temperature	100.0%	100.0%	86.3%	98.5%	100.0%	94.9%
Available vaccination schedule	84.6%	81.5%	80.0%	95.4%	75.0%	85.5%
Consistent vaccines with the daily target	100.0%	84.6%	78.6%	83.1%	84.6%	83.7%
Counsel client about injection pain or fever	100.0%	84.0%	88.7%	96.9%	83.3%	91.1%
Proper Injection site	100.0%	100.0%	98.4%	100.0%	95.7%	98.9%
Nurse inform about post vaccination observation	100.0%	96.0%	87.9%	95.3%	83.3%	91.8%
Nurse inform about the next dose	100.0%	88.0%	82.1%	89.2%	82.6%	86.7%
Counsel client on reporting AEFI	100.0%	73.1%	55.8%	84.4%	82.6%	76.3%
Tally sheet completed after each vaccination session	38.5%	53.6%	83.3%	92.3%	87.0%	78.9%
NIMS system installed	61.5%	85.7%	94.8%	98.5%	87.0%	91.4%
Staff can enter data on NIMS	84.6%	96.2%	80.3%	96.9%	82.6%	88.3%

9. Healthcare Waste Management

Figure 12 and figure 13 below show the HCWM and disposal types, and their availability, at assessed CVCs. The availability of safety boxes (95%) and knowledge regarding used syringes and swabs as hazardous waste (98%) were high. Biohazards bags and non-hazardous waste bags were available in around half of the CVCs assessed. Only a third of the CVCs, however, displayed HCWM guidelines.

Figure 12: Availability of HCWM equipment, tools, and guidelines



The incinerator, waste disposal method, was used in around half (55%) of the CVCs, with less than half (42%) using the pit burial method. Daily waste disposal was being practiced by 61% of the CVCs. Waste disposal by type and frequency are detailed in figure 13.

Figure 13: Mode of waste disposal by type and frequency

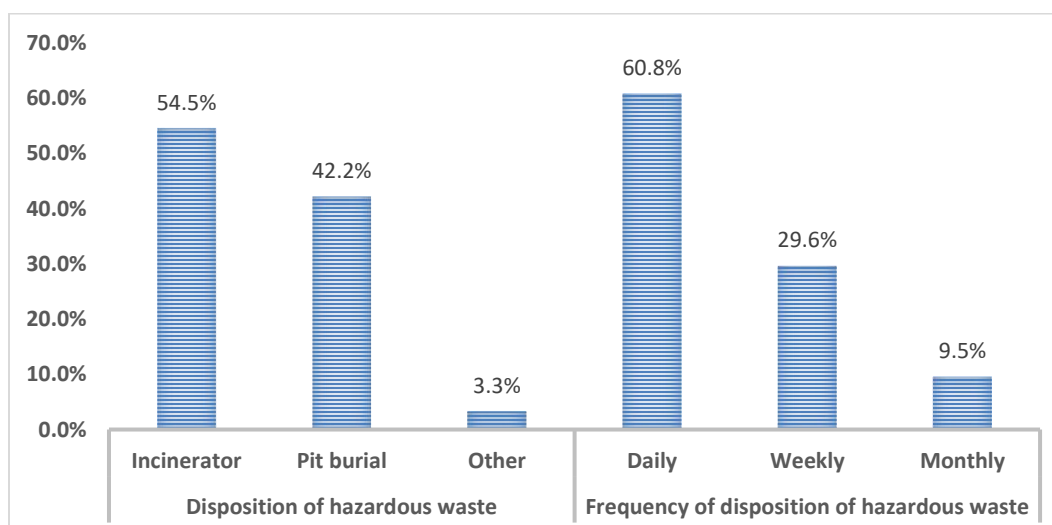


Table 17 below summarizes HCWM by province/region. The display of HCWM guidelines was the least in KP and ICT/FAA regions. Similarly, the availability of biohazard bags and non-hazardous bags was the least in the province of KP. Additional details are provided below.

Table 17: HCWM at the provinces/regions

Waste management		Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Read the COVID vaccination guidelines for HCWM	Yes	100.0%	44.8%	35.1%	84.1%	49.0%	57.3%
	No	0.0%	55.2%	64.9%	15.9%	51.0%	42.7%
Disposal of hazardous waste	Incinerator	38.5%	53.6%	25.4%	85.9%	62.9%	54.5%
	Pit burial	61.5%	46.4%	71.8%	6.3%	37.1%	42.2%
	Other	0.0%	0.0%	2.8%	7.8%	0.0%	3.3%
Frequency of disposition of hazardous waste	Daily	15.4%	36.0%	52.3%	68.3%	100.0%	60.8%
	Weekly	69.2%	48.0%	35.4%	23.8%	0.0%	29.6%
	Monthly	15.4%	16.0%	12.3%	7.9%	0.0%	9.5%
Used syringes and swabs hazardous waste	Yes	100.0%	96.4%	98.6%	95.4%	100.0%	97.6%
	No	0.0%	3.6%	1.4%	4.6%	0.0%	2.4%
HCWM guidelines displayed	Yes	69.2%	13.8%	12.2%	65.2%	16.3%	32.1%
	No	30.8%	86.2%	87.8%	34.8%	83.7%	67.9%
Biohazard bags at least one per day	Yes	61.5%	42.9%	21.4%	93.8%	69.0%	56.4%
	No	38.5%	57.1%	78.6%	6.3%	31.0%	43.6%
Nonhazardous waste bags at least one per day	Yes	69.2%	51.9%	24.3%	85.9%	55.2%	54.7%
	No	30.8%	48.1%	75.7%	14.1%	44.8%	45.3%
Safety box at least one at each vaccination table	Yes	100.0%	92.9%	93.8%	98.4%	89.7%	94.9%
	No	0.0%	7.1%	6.3%	1.6%	10.3%	5.1%

10. Cold Chain Management

Figure 14 below summarizes responsibility for cold chain management at the national and at the regional/provincial levels. Overall, in 71% of CVCs, responsibility for cold chain management was assigned to the vaccinators, and in around 15% of CVCs, to the storekeeper. In KP and ICT/FAA, almost 90% of the responsibility for cold chain management was borne by the vaccinator. Meanwhile, in Punjab, responsibility for cold chain management was fairly distributed amongst the vaccinator/storekeeper and others (all other staff besides vaccinator & storekeeper, e.g., medical technician).

Figure 14: Cold Chain Management responsibility

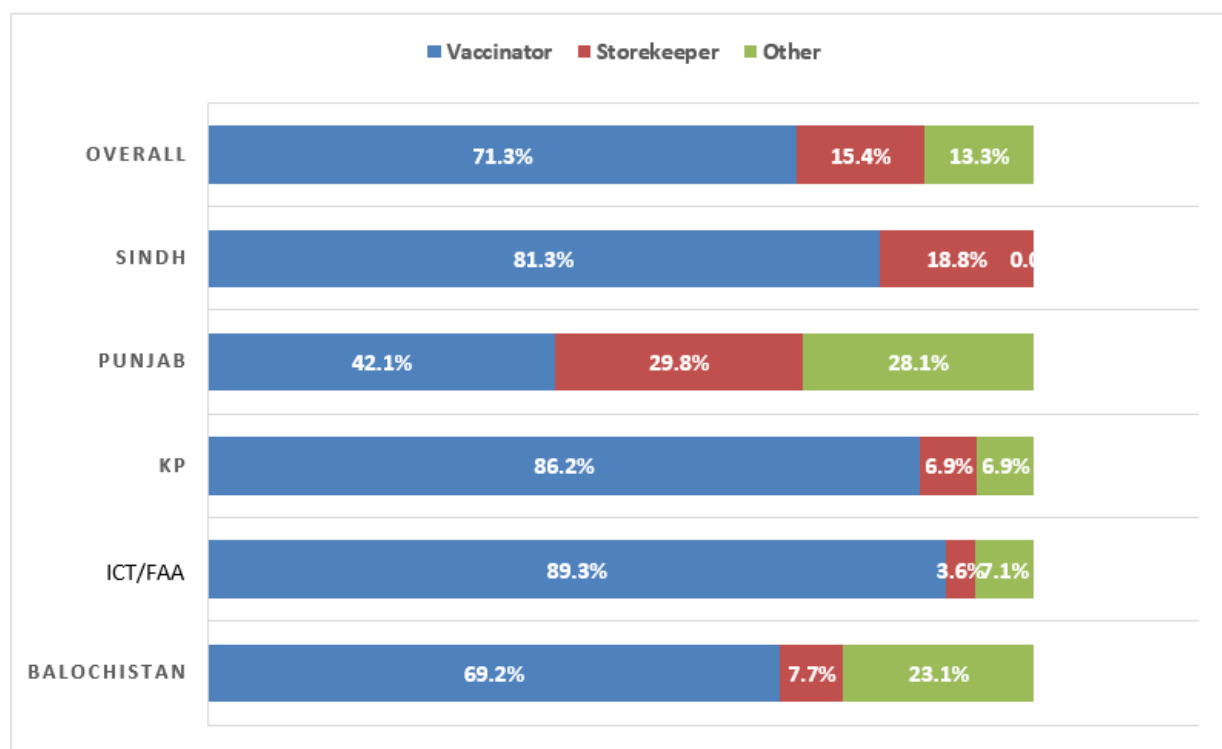


Figure 15 below summarizes the Cold Chain Management indicators across assessed facilities. Most of the indicators were assessed as being above 90%. Only 5.5% of the CVCs had expired vaccines, while in around 36% of the CVCs, there were other items besides vaccines in the ILRs.

Figure 15: Cold Chain Management in the CVCs

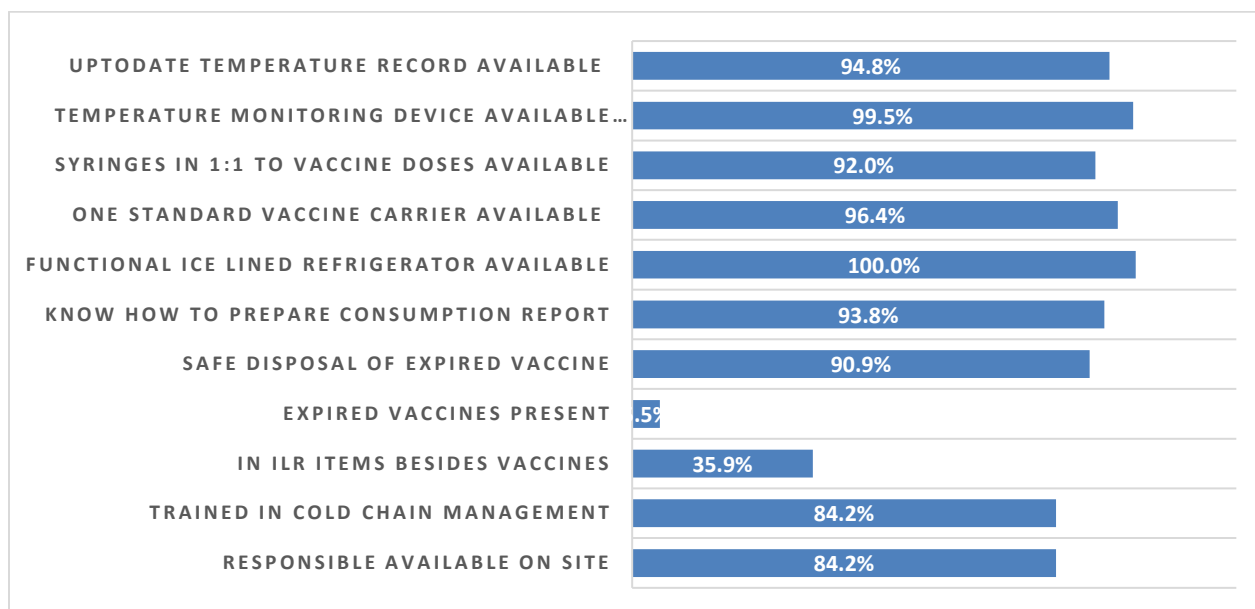


Table 18 below summarizes the Cold Chain Management indicators by province/region. Most of the indicators were assessed as being above 90%. However, in Sindh presence of the responsible person on site (71%) and trained in the cold chain management (67%) was the lowest across the seven regions.

Table 18: Cold Chain Management items in the provinces/regions

Cold Chain Management	Balochistan	ICT/FAA	KP	Punjab	Sindh	Overall
Responsible person on site	100.0%	93.1%	81.1%	89.9%	71.4%	84.2%
Trained in cold chain management	100.0%	96.6%	81.1%	91.3%	67.3%	84.2%
In ILR items besides vaccines	23.1%	14.3%	34.6%	60.0%	7.7%	35.9%
Expired vaccines present	0.0%	3.7%	5.9%	9.2%	0.0%	5.5%
Safe disposal of expired vaccine	100.0%	84.6%	89.8%	88.9%	97.1%	90.9%
Knowledge on how to prepare consumption report	100.0%	92.6%	92.9%	96.9%	88.6%	93.8%
Functional ice lined refrigerator available	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
one standard vaccine carrier available	100.0%	96.2%	95.2%	96.9%	96.7%	96.4%

syringes in 1:1 to vaccine doses available	100.0%	85.2%	82.9%	98.5%	93.1%	92.0%
Temperature monitoring device available ILR	100.0%	100.0%	100.0%	98.5%	100.0%	99.5%
Up-to-date Temperature record available	76.9%	92.9%	97.2%	93.8%	100.0%	94.8%

11. Costing CVCs

Understanding the costs associated with operationalizing a CVC (within an existing health facility) is critical in allowing the MONHSRC, at the federal and provincial levels, to plan for and manage the associated costs strategically. It can also reveal financing gaps that can improve the effectiveness of vaccination campaigns and rollout. This will be particularly important for strategically planning the scale-up of CVCs from a few hundred to more than a thousand in the subsequent phases of the COVID-19 vaccine rollout.

As elaborated in the methodology, the additional cost for each facility was calculated based on the estimated costs for a fully functional CVC- as detailed in Table 19 below. Based on this, provincial costs were estimated for health facilities included in the assessment. Facility-level additional costs are included in Annex-4.

Table 19: Costing details of ONE CVC

Cost Type	Description	Cost Category	Unit	Unit Price	QTY	Frequency monthly	Amount/ Month	Frequency Annually	Amount/ Anum
Recurrent Cost	Vaccinator (male/female)	HR	Person	22,011	1	1	22,011	12	264,132
Recurrent Cost	Nurse (female)	HR	Person	27,126	1	1	27,126	12	325,512
Recurrent Cost	Nurse (Male)	HR	Person	27,126	1	1	27,126	12	325,512
Recurrent Cost	Security personnel (security guards)	HR	Person	16,980	1	1	16,980	12	203,760
Recurrent Cost	Support staffs (Assistant)	HR	Person	22,011	1	1	22,011	12	264,132
Recurrent Cost	AEFI/IPC trained focal persons	HR	Person	57,573	1	1	57,573	12	690,876
Recurrent Cost	Receptionist /Data entry operator	HR	Person	22,011	1	1	22,011	12	264,132
Recurrent Cost	Waste dumpers/Waste bins (Pit burial)	HR	Person	16,980	1	1	16,980	12	203,760
Recurrent Cost	sweepers (for disinfection of surfaces)	HR	Person	16,980	1	1	16,980	12	203,760
Capital Cost	Internet connection	IT	No.	10,000	1	1	10,000	1	10,000
Recurrent Cost	Internet connection monthly charges	Operational Cost		2,500	1	1	30,000	12	30,000
Capital Cost	Reception counter/Table (table)	Furniture	No.	30,000	1	1	30,000	1	30,000
Capital Cost	Reception counter (chairs)	Furniture	No.	10,000	2	1	20,000	1	20,000
Capital Cost	Electricity Backup (UPS with Battery)	Operational Cost	No.	50,000	1	1	50,000	1	50,000
Recurrent Cost	Alcohol-based hand Sanitizer	PPE	No.	250	32	1	8,000	12	96,000
Recurrent Cost	Facemask	PPE	No.	25	100	1	2,500	12	30,000
Capital Cost	Bed	Furniture	No.	15,000	3	1	45,000	1	45,000
Capital Cost	Separator/privacy screen	Furniture	No.	7,000	1	1	7,000	1	7,000
Capital Cost	Table for nurses/injection counter	Furniture	No.	20,000	2	1	40,000	1	40,000
Capital Cost	chairs for vaccinator and nurses	Furniture	No.	12,000	4	1	48,000	1	48,000

Capital Cost	Seat Stool for clients	Furniture	No.	3,500	5	1	17,500	1	17,500
Capital Cost	Devices for data entry (laptop/Desktop)	IT Equipment	No.	50,000	1	1	50,000	1	50,000
Capital Cost	Devices for data entry (smartphone)	IT Equipment	No.	30,000	2	1	60,000	1	60,000
Capital Cost	Printers	IT Equipment	No.	15,000	1	1	15,000	1	15,000
Capital Cost	Chairs for waiting area (post and pre-vaccination, separately as the area would be different)	Furniture	No.	3,000	10	1	30,000	1	30,000
Recurrent Cost	Face shield	PPE	No.	100	90	1	9,000	12	108,000
Recurrent Cost	Eye protection(goggles)	PPE	No.	100	90	1	9,000	12	108,000
Recurrent Cost	Surface disinfectant	PPE	No.	250	32	1	8,000	12	96,000
Recurrent Cost	Biohazards bags	PPE	No.	50	120	1	6,000	12	72,000
Recurrent Cost	Non-hazardous waste bags	PPE	No.	25	120	1	3,000	12	36,000
Recurrent Cost	Safety box	Supplies	No.	100	16	1	1,600	12	19,200
Recurrent Cost	Cotton roll	Supplies	No.	140	8	1	1,120	12	13,440
Recurrent Cost	AEFI kit (inclusive of IV cannula, drip sets, adrenalin & hydrocortisone injections)	Supplies	No.	2,900	1	1	2,900	12	34,800
Recurrent Cost	Oxygen cylinder	Supplies	No.	15,000	1	1	15,000	12	180,000
Recurrent Cost	Ambu Bag	Supplies	No.	1,000	1	1	1,000	12	12,000
Capital Cost	BP Apparatus	Medical Equipment	No.	8,640	1	1	8,640	1	8,640
Recurrent Cost	Endotracheal tube	Supplies	No.	5,040	2	1	10,080	12	120,960
Capital Cost	A temperature monitoring device (for storage facility temperature monitoring)	Medical Equipment	No.	10,000	1	1	10,000	1	10,000
Capital Cost	Ice lined refrigerators along with a temperature monitoring device	Medical Equipment	No.	255,750	1	1	255,750	1	255,750
Capital Cost	Vaccine carrier (100 doses capacity)	Medical Equipment	No.	17,369	2	1	34,738	1	34,738
Recurrent Cost	Syringes	Supplies	No.	7	3000	1	21,000	12	252,000

Recurrent Cost	Ice/cool packs	Supplies	No.	300	5	1	1,500	12	18,000
Capital Cost	Extension Boards	Medical Equipment	No.	1,500	1	1	1,500	1	1,500
Capital Cost	Banner (indicate vaccine counter)	Printing	No.	1,700	1	1	1,700	1	1,700
Capital Cost	Standee (COVID-SOPs)	Printing	No.	1,290	1	1	1,290	1	1,290
Capital Cost	Charts (HCWM SOPs for COVID-19 vaccine)	Printing	No.	1,000	1	1	1,000	1	1,000
Recurrent Cost	Vaccine Administration Checklist	Printing	No.	5	1000	1	5,000	12	60,000
Recurrent Cost	IEC material (pamphlets available for the catchment population registered in NIMS).	Printing	No.	50	1000	1	50,000	12	600,000
Recurrent Cost	AEFI reporting forms	Printing	No.	5	100	1	500	12	6,000
Recurrent Cost	Case investigation forms	Printing	No.	5	12	1	60	12	720
Recurrent Cost	Pen	Printing	No.	5	36	1	180	12	2,160
Recurrent Cost	Paper rim	Printing	No.	790	2	1	1,580	12	18,960
Grand Total							1,152,936		5,396,934

Chapter 4: Discussion and Recommendations

This report provides an in-depth and comprehensive assessment of the status of CVCs across Pakistan. It reflects the challenges on the ground, the areas in which immediate capacity building is needed, and specific measures that require strengthening across the 12 key domains assessed, which are essential for the effective and cost-efficient roll-out of COVID vaccination services in Pakistan. Along with identifying the operational challenges, the report also provides cost estimates which are critical to strategic planning and vaccine roll-out, particularly as the GOP considers options for scaling up vaccine service delivery mechanisms.

Overall readiness of the CVCs across the country varied by province and region. However, it is commendable that the existing system, through support from the already well-established EPI system, showed a satisfactory level of services across most of the domains assessed, notwithstanding the very short period since the start of COVID-19 vaccine delivery. NIMS and the EPI together were able to capitalize on the country's existing immunization capacity for COVID-19 vaccination in phase 1. Nonetheless, there is a need to address several gaps in readiness across the domains assessed, to improve system robustness and efficiency. Most of the domains were assessed as being below 80%, including critically essential areas like IPC, HCWM, and AEFI. Specific conclusions and recommendations across the assessed domains are summarized below.

(i) Operational status

- Almost one-third (32%) of CVCs were not operational, specifically in Sindh and KP. The majority of these non-operational centers were in RHCs (> 70%).
- Smaller hospitals may be constrained in offering vaccinations due to their limited space/facilities, including the management of AEFI.
- Monitoring and supervision from higher authorities (district/provincial and federal levels) were assessed as being sub-optimal and needed to be strengthened to improve and ensure quality, accountability, and compliance.

(ii) Entrance/registration

- There is a considerable lag in KP and Sindh, compared to the other regions/provinces, in this domain. In particular, inputs such as reception counters, banners, and standee/charts are urgently required in KP and Sindh.
- NIMS functionality and registration were found to be relatively low in Sindh. While NIMS registration was around 50% lower in KP (compared with Sindh), functionality was higher. These findings point to the need for increased staff training in these regions on NIMS in order to maximize the benefits of this system in the online management of COVID-19 related vaccine data and information.

(iii) Human Resources

- Around 80% of CVCs were assessed as having the staff needed to run vaccine operations.
- Dry runs were carried out in around half of the assessed CVCs, although this was the lowest in Balochistan. Pre-planning of dry runs, even before supply comes in, is critical in limiting bottlenecks, identifying critical risks, and ensuring smooth administration.
- The number of female staff needs to be increased (particularly in KP) to ensure that the vaccination of females can occur smoothly, with due cognizance for the importance of adherence to gender and cultural norms.

(iv) Training Needs Assessment

- Across all the designated CVCs assessed, most of the staff expressed the need for structured training. Around two-thirds of focal persons, for example, requested training/refresher in IPC, HCWM, and AEFI. As such, there is a need to ensure that adequate resources are allocated for a refresher and regular training to ensure that staff has the knowledge and capacities for safe and effective vaccinations.

(v) Infrastructure

- From a geographical perspective, KP and Sindh were found to be underperforming in almost all infrastructure measures compared with other provinces/regions.
- Availability of internet, computer/laptop/smart smartphone, post-vaccination observation, and electricity backup was found to be more than 75% in assessed CVCs. This was lowest in Balochistan, followed by Sindh. Universal access to these essential devices across all CVCs is critical in ensuring timely registration and data entry.
- Notwithstanding high levels of cold chain management across assessed CVCs, Sindh was found to have a slightly lower capacity in maintaining a cold chain due to electricity cuts, which can directly compromise cold chain continuity.
- Only 60% of assessed CVCs had calculated the number of vaccinations they could do in a shift, with only 40-45% in KP and Sindh. Not having precise calculations and planning for the number of vaccinations that can be done in a shift could lead to critical bottlenecks in vaccine administration, particularly as the rollout ramps up and higher volumes of vaccines, and people, need to be properly managed to match supply with demand. Developing a clear understanding of daily shift capacity at the level of health facilities is, therefore, an urgent and critical next step. This should be reported to the distribution centers to ensure that the correct number of vaccines are provided to each CVC to manage spoilage and mitigate against mismatch between supply and demand.
- About 40% of CVCs did not have a separate bed and privacy screen for women. This is a critical concern, as noted above, in ensuring adherence to gender and cultural norms.

(vi) Infection Prevention & Control

- Most of the IPC measures were assessed as being higher than 75% across assessed CVCs. One lagging measure, however, was the assignment of a focal person for the management and coordination of all IPC-related activities. This was particularly low in KP and Sindh and should be addressed as a matter of urgency.
- To halt the spread of COVID-19, hand hygiene is an important intervention. Overall, there is a need to increase handwashing stations and hand sanitizer availability and compliance, particularly in Sindh.
- IEC materials for the catchment population (23%) and vaccine administration checklist (49%) were very low overall. These are urgently needed in all the regions/provinces and specifically in Balochistan. Increased budgeting, printing, and improvement of IEC materials to ensure local contextualization are required. Additionally, there is a need to ensure engagement with local community elders, print, and electronic media, to drive the awareness of the catchment population, and increase the uptake and confidence in COVID-19 vaccination.
- Developing quality IEC materials related to good IPC practices, removing misconceptions, and ensuring clean CVC premises will increase the confidence of the population to return to the facility. This is particularly important for two-dose vaccines.

(vii) Adverse Events Following Immunization

- KP and Sindh were found to be underperforming in the area of AEFI management, specifically with regards to the availability of an AEFI focal person. This is critical because serious adverse events would need a trained designated doctor to manage the event in a rapid manner.
- Essential items needed for emergency resuscitation should be provided to all CVCs; this was particularly low in Sindh.
- Reporting of AEFI has been done largely through the NIMS. However, all the CVCs were relatively deficient in the availability and use of reporting forms (particularly in KP, Sindh, and Balochistan), which can be easily corrected and provided. These forms are needed for detailed investigation and reporting of an AEFI in the health facility.

(viii) Vaccine Operations

- Vaccine operations are going well in most operational CVCs, with all related measures assessed as being around 90%, with minimal variation among provinces and regions. In Sindh, vaccine operations were identified as a top priority; in particular, staff training on safe vaccine administration and identification of AEFI. Meanwhile, in Balochistan, improvement is needed in filling tally sheets and installing NIMS on devices.

(ix) Healthcare Waste Management

- This is a crucial area that can be easily improved across most CVCs. In general, the availability of safety boxes and knowledge of HCWM was good overall. Improvement, however, is needed in areas such as the display of HCWM guidelines and the availability of biohazard bags and non-hazardous waste bags.

(x) Cold Chain Management

- The overall cold chain was very well maintained in all CVCs assessed.
- Responsibility for cold chain management rested with the vaccinator throughout the country, except in Punjab, where due to better HR availability at facilities, this responsibility was distributed amongst the vaccinator/storekeeper and other staff. The Punjab model may be a good practice that should be replicated across other provinces/regions since it would ensure that cold chain management responsibilities are more evenly distributed amongst the vaccinator/storekeeper and other staff, thereby removing over-reliance on one person. On the flip side, however, given that cold chain management was very well maintained, in general, the vaccinator's involvement might be good as they are routinely doing this and hence are more experienced in this regard.

(xi) Costing of CVCs

- The total additional cost required on the recurrent side is Rs. 27.46 million per month, and the capital cost required is Rs. 42.68 million one time. The additional cost requirement, disaggregated by province, is outlined in Table 20 below.

Table 20: Summary of additional costs in the provinces/regions

Province/Region	Recurrent Cost /Month	%	Capital Cost	%
BALUCHISTAN	1,168,680	19%	1,905,908	17%
FAA	1,303,065	21%	1,791,858	17%
ICT	1,441,629	25%	2,375,972	23%
KP	10,844,312	34%	13,653,590	24%
PUNJAB	5,840,419	19%	11,186,946	20%
SINDH	6,863,107	32%	11,766,158	31%
Total	27,461,212	25%	42,680,432	21%

Recommendations

This report provides a snapshot of the status of CVCs in Pakistan. It provides critical information of immediate significance to the GOP as it attempts to scale up its vaccination capacity to meet the expected surge in demand. Data collected through this study can also serve as a baseline for

future repeat assessments of CVCs in Pakistan. Key recommendations which emerge from the study findings are presented below.

- Given the urgent need to rapidly increase vaccination capacity, CVCs need to be operationalized with the necessary logistics and equipment in order to meet expected increases in demand.
- Monitoring and supervision from higher authorities need to be strengthened to ensure compliance, accountability, and quality.
- Essential devices, i.e., smartphone/tablet/computer/laptop, equipped with NIMS functionality, should be placed in each of the CVCs to ensure centralized registration and live data entry capabilities.
- Every CVC should have at least one female staff member to facilitate the vaccination of female clients.
- Adequate resources should be assigned to support training and refresher courses for CVC staff in the areas of AEFI, IPC, HCWM, NIMS installation/use, safe and aseptic vaccine preparation and administration, and client counseling.
- An adequate waiting area for pre- and post-vaccination at each CVC is needed to ensure compliance with COVID-19 prevention SOPs and observation of immediate AEFI.
- There is a need to increase awareness regarding COVID-19 vaccination through both print and electronic media. In this regard, IEC materials that are locally contextualized, and target the local community, can play an important role. The study revealed a general lack of IEC materials across CVCs.
- AEFI investigation forms, HCWM guidelines, and vaccine administration checklists were found to be lacking across CVCs. This can be easily remedied to improve the vaccination process across the country.
- Overall, the cold chain seemed to be well-managed. There is, however, a need to ensure electricity backup, particularly in remote areas, to ensure cold chain maintenance for vaccines.

Annex 1: Scope of work

TERMS OF REFERENCE

VACCINE READINESS ASSESSMENT- ADULT VACCINATION COUNTERS

December 2020

I. BACKGROUND

Pakistan has, thus far, managed to respond effectively to COVID-19, and in so doing, mitigate the more egregious effects of the pandemic on its health system, despite being sandwiched between multiple epicentres of the pandemic. The first cases of COVID-19 were reported in Pakistan on 26th February. Since then, and as of October 29th, the country has had 330,200 confirmed cases with 6,759 deaths.⁴ With no formal emergency, preparedness and response structure in the country at the time of the outbreak, the duties of centralizing the response were placed with the National Command and Operations Centre (NCOC). This body was tasked to bring a “whole of government” approach to managing the crisis and brought together representation from responding federal ministries, provincial governments and other relevant stakeholders to ensure a consistent response across the country. While this arrangement was “ad hoc” to begin with, it has managed to achieve a coordinated and effective response, particularly as it relates to the COVID-19 health implications. Notwithstanding this, the pandemic has also brought various socio-economic concerns to the fore, particularly for vulnerable and at-risk populations.

COVID-19 vaccine procurement is a priority for the GOP. Pakistan, being lower-middle income country, is in preparatory “GAVI Transition Phase 2020”, and listed among 92 COVAX Advance Marketing Commitment (AMC) countries that could possibly receive doses for an average of 20% of the country’s population, focused on health care workers and the most vulnerable group, in Q3 or Q4 of 2021. As per GAVI Board Meeting held on 29-30 September 2020, GAVI would offer cost-sharing to AMC 92 economies up to \$1.6-2 per dose⁵, considering a 2-dose regimen. The GOP has submitted an expression of interest to obtain access to COVID-19 vaccines through the GAVI COVAX⁶ Access to COVID-19 tools (ACT) Accelerator. In addition, the MONHSRC is planning to contact potential manufacturers to discuss direct purchasing.

Purchasing vaccines is one step in a complex, multidimensional effort that will involve detailed planning and implementation of vaccine deployment programs. A “National Expert Committee for COVID 19 Vaccine” has been commissioned by the National Command and Control Centre (NCOC) for COVID 19 and

⁴Pakistan: COVID Pandemic Country Profile.

<https://ourworldindata.org/coronavirus/country/pakistan?country=~PAK>

⁵This excludes the estimated delivery cost of \$0.96 which includes labor, supply chain, service delivery and capital cost, keeping estimated coverage at 90%, and wastage rate at 20% which results in wastage multiplication factor of 1.25, the total GAVI financed cost would be \$338 million to cover 20% of population. Costs are taken from recent study conducted by Harvard in collaboration with ThinkWell and Management Sciences for Health (funded by Bill & Melinda Gates Foundation) <http://immunizationeconomics.org/recent-activity/2020/10/2/immunization-delivery-cost-estimates-for-136-lmics>

⁶Gavi, the Coalition for Epidemic Preparedness Innovations (CEPI) and WHO. Its aim is to accelerate the development and manufacture of COVID-19 vaccines, and to guarantee fair and equitable access for every country in the world.

has developed a National COVID Vaccine Strategy for Pakistan. Based on the WHO Allocation framework⁷, 20% of Pakistan's population (i.e. more than 45 million) would be targeted for priority vaccination. This includes workers in health and social care settings, and elderly individuals prioritized by presence of comorbidities. Ensuring that there is a comprehensive and effective deployment strategy underpinning the roll-out of these vaccines, will require: effective microplanning; functional, end-to-end supply chain and logistics management systems for effective vaccine storage, handling, and stock management (including safe and appropriate transportation); rigorous cold chain control; robust service and coverage tracking systems; well-trained, motivated and supervised vaccinators; tailored large-scale communication and outreach campaigns at household, community and national level (to address demand-side barriers, and foster confidence and promote the early take-up of vaccines); people-centered service delivery models that reach different target populations effectively; and effective political leadership. This should be accompanied by, as needed, institutional frameworks for regulatory standards for vaccine quality; guidelines for acceptable minimum standards for vaccine management including cold chain infrastructure; and policies to ensure robust governance, accountability, and citizen engagement mechanisms.

The Expanded Program for Immunization (EPI) is responsible for routine immunization of children in Pakistan. The EPI program has been providing vaccination services since 1978 and covers diseases such as Tuberculosis, Diphtheria, Pertussis, Measles and Hepatitis B among others. These services are provided free of cost through fixed sites, community outreach and mobile services to protect the target population of around 7 million children (0-11 months of age). In addition, EPI also provides vaccinations against Neonatal Tetanus to approximately the same number of pregnant mothers and women of childbearing age. The EPI program possesses strong links with provincial health departments and maintains a pooled procurement mechanism for vaccines and logistics, under which provincial governments pay for their respective vaccine share while Federal EPI procures vaccines on behalf of the provinces and federally administered areas. In addition, the EPI program also conducts disease surveillance and monitoring activities. The EPI program with its extensive experience in immunization, vaccine introduction and handling and delivery (including cold chains) as well as macro and micro planning for vaccination campaigns, will be an important actor for rolling out COVID-19 vaccines. It is already involved in the COVID-19 response, by lending its vLMIS system to track COVID commodities logistics and distribution, assisting in COVID-19 reporting and data management as well as conducting outreach activities to cover children who missed their vaccinations due to lockdowns.

The EPI Program has also a very strong vaccine and logistics supply chain and cold chain system which is further enhanced through the deployment of more than 15,000 WHO pre-qualified cold chain equipment's at district and health facility levels through Cold Chain Equipment Optimization Platform. The current cold chain system of EPI has capacity to conduct mass scale nationwide vaccination campaigns which requires storage conditions at 2 to 8° C e.g. Measles campaign (Covered 34 million children from 9 months to 5 years of age), Polio Campaigns (Covering 40 million children in each NIDs) and TCV campaign in Sindh through which children from 9 months to 15 years of age were covered in urban areas of Sindh in 2019. In context of the COVID the EPI program has also presented the readiness in term of supply chain management if the COVID 19 vaccine would be introduced in campaign mode at fixed sites. However, some passive containers (Cold Boxes and Standard Vaccine Carriers) would be required to manage the supply

⁷ WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination. https://apps.who.int/iris/bitstream/handle/10665/334299/WHO-2019-nCoV-SAGE_Framework-Allocation_and_prioritization-2020.1-eng.pdf?ua=1

chain of vaccine at service delivery level. Moreover, if the Ministry decides to go for DNA or mRNA-based vaccine which requires -80°C storage requirement different supply chain strategy would be developed to manage that vaccine considering other characteristics of vaccine as well.

Given EPI's focus on childhood vaccination, the GOP is considering the development of a hybrid system for COVID-19 vaccine roll-out. Specifically, in order to mitigate against any disruption to childhood vaccination and considering the target population, adult vaccination counters (AVCs) at tertiary-level teaching hospitals and selected secondary-level health facilities are being considered for COVID-19 phase one vaccine roll-out. Vaccinators available at these facilities may also be enrolled in supporting the vaccine roll-out. Assessing the capacity of the adult vaccination counters to support vaccine roll-out is the key objective and deliverable under this assignment.

II. SCOPE OF WORK

In support of the GOP's effort to ensure vaccine readiness, this assignment will assess the capacity of AVCs to provide adult vaccination services. AVCs at public secondary and tertiary level facilities will be assessed, together with private tertiary care hospitals and private teaching hospitals that are already involved in the COVID response.

To the extent possible, the assessment will take a “gap-filling approach”, drawing on other assessments and vaccine readiness tools that have already been developed to ensure synergy and mitigate against duplication. This includes the “Vaccine Introduction Assessment” supported by GAVI, and the joint assessment tool development by WHO, UNICEF, GAVI and the World Bank. The joint tool integrates the Vaccine Introduction Readiness Assessment Tool (VIRAT) which has been endorsed by GAVI for use in AMC participating countries, and the Vaccine Readiness Assessment Framework (VRAF) which has been developed by the World Bank. The VRAF aims to assess vaccine readiness capacities, and financing requirements in the following areas: (a) planning and management; (b) supply and distribution; (c) program delivery; and (d) support systems and infrastructure.

A detailed assessment will cover the following domains and core capacities and should include recommendations for improvement as needed. Indicative sub-areas are included in Annex 1.⁸ Most of the data required is expected to be collected through national reports, and national-level databases and surveys, supplemented with (primary) phone survey data collection where needed.

- (i) Mapping of AVCs sites
- (ii) Human Resource Requirements
- (iii) Targeting & Deployment
- (iv) Infrastructure, Commodities & Supplies (as identified by EPI/MoH)
- (v) Recording & Reporting
- (vi) Waste management

Mindful that AVC capabilities is also linked to, and influenced by, overall health system vaccine readiness, an assessment of the following key broader domain areas will also be included:

- (i) Active AEFI monitoring system, beyond AVCs and EPI

⁸ EPI has assessed the cold chain capability to be adequate for deployment of vaccines through community campaigns; with their rapid assessment covering the national, provincial and district levels. Should another modality be used for vaccine deployment- namely AVCs- then another rapid assessment would be needed to assess capabilities at the health facility level. This would be led by EPI, with support from GAVI.

- (ii) Population-wide patient recording and reporting system to monitor COVID vaccination (AEFI and dosage tracking), and recommendations on potential scalable digital technology solutions that could potentially be rolled out in the short- medium term

III. SCHEDULE OF DELIVERY

Outputs	Date
Deliverable 1: Draft Assessment Framework and Checklists	2 weeks after contract signing
Deliverable 2: Draft Report	4 weeks after receipt of deliverable 1
Deliverables 3: <ul style="list-style-type: none">• Final report• Power point presentations on relevant findings and recommendations	2 weeks after receipt deliverable 2

The contract will be valid from **Dec 28, 2020 to April 30, 2021**. The Contractor will be paid, contingent upon timely submission of agreed deliverables.

VI. REQUIRED QUALIFICATIONS

The selected Contractor shall possess the following qualifications:

- Extensive experience in health system research in Pakistan.
- Collaborative experience with the MONHSRC, Pakistan.
- Experience working with international organizations such as the WHO, UNICEF and the World Bank would be an asset.
- Expertise in national and field-based health surveys.
- Strong capacity and experience in planning and organizing study logistics.
- Good network of experienced on-the-ground staff in the provinces preferred.
- Strong capacity in data management and statistics including data analysis software (e.g. NVivo, STATA or similar).

VII. FUTURE USE OF THE DATA

The outputs from this assignment will be the property of the World Bank and the Government of Pakistan.

Annex I: Domains and sub-domains for Assessing AVCs

- (i) ***Mapping***
 - Geographical mapping of all public health facilities with possible adult vaccination counters.
- (ii) ***Human Resources***
 - Estimate human resources needed (including surge capacity requirements) from all cadres /departments at district level, as identified by EPI /MoH, to conduct the deployment and vaccination operations
 - Assessment of the capacity of AVC health workers in adverse effect following immunization (AEFI); this should form the basis of a training/capacity building plan
 - Assessment of training requirements for safe injection practices by vaccinators at designated health facilities
- (iii) ***Targeting & Deployment***
 - Estimation of population to be targeted by the specific health facility in the phase 1 roll-out: health workers disaggregated by cadre, and the over-65 population.
 - Assessment of existing logistic plans for supplying vaccines to AVCs from National/Provincial/Divisional/District level stores
 - Assessment of standardized operating procedures for vaccination workflow at designated health facilities against EPI defined checklist
- (iv) ***Infrastructure, Commodities & Supplies***
 - Assessment of infrastructure for energy (primary and back-up power), communications (including connectivity) and water
 - Designated area for storage of dry logistics in secure place.
 - Identification of Personal Protective Equipment needs for staff at AVCs
 - Identification of ancillary supplies (syringes, safety boxes etc.) as defined by EPI/MoH needed for vaccine deployment at AVCs
 - Assessment of protocols for infection prevention and control measures to minimize exposure risk during immunization sessions
 - Review of existing Information Education and Communications (IEC) materials developed by MoH to be deployed at health facilities and quantification of requirements of same for Phase1 vaccine deployment
- (v) ***Recording & Reporting***
 - Assess existing capacity for recording and reporting on vaccinations at designated facilities
 - Identify the training requirements for recording and reporting of vaccinations and AEFI at AVCs
 - Identify the printing requirements for recording and reporting tools or drafts of the same developed by the MoH /concerned departments for vaccine deployment
- (vi) ***Waste management***
 - Assess the existing waste disposal mechanism available at designated health facilities or arrangements for same if not on site

Annex 2: IDI Field Guide- NIMS

(i) Data Capture, Transfer & Storage

1. Do you think all essential data related to COVID-19 is being captured? What data elements may be added to add value?
2. Which data elements are the most useful from a policy perspective in your opinion?
3. What data will be used by facility for operational management?
4. What are the data transfer challenges you are facing, possibly in terms of internet connectivity?
5. Do you believe that all planned data is captured in NIMS? Are there any entries which are missed to be entered in NIMS? If yes, what are the possible reasons for this?

(ii) Data Analytics

6. What are the most useful analytics in terms of policy and operational relevance in the NIMS?
7. What in your opinion are the gaps in analytics?

(iii) Capacity Issues

8. Do you think that current capacity is sufficient for staff to enter data correctly in NIMS?
9. If there are capacity gaps, can you mention the areas and reveal the reasons behind these?
10. What, in your opinion, should be done to address the capacity gaps?

(iv) AEFI reporting

11. Do you think all or most of the AEFI are reported in NIMS? If not, what are the reasons?
12. Do you feel that the AEFI reporting mechanism is user friendly? Is it able to capture information from vaccinating staff and clients?
13. What are the various analytics related to AEFI? How can they possibly be used to extract and analyze information which can be used for vaccine safety?

Annex 3: Vaccine Readiness Assessment Tool- Adult Vaccination Counters

The Health Services Academy is tasked by the Ministry of National Health Services Regulations & Coordination to perform an assessment of Adult Vaccination Counters (AVCs) for their readiness to deliver quality immunization services for COVID-19. Our team will be asking questions on various aspects related to AVCs. Your cooperation in this regard will be immensely valuable and useful. Kindly provide truthful responses to questions so improvements can be brought about in weaker areas.

The information you provide will only be used for assessment/research purpose and will remain anonymous. This study does not carry any benefits or harms, whatsoever, to you in any case.

_____ (sign) **I Agree**

_____ (sign) **I Do Not Agree**

Names of Respondent (Focal person/AVC staff):

1. Facility Name & Address: _____.

2. Facility ownership: 1. Public

2. Private

3. District: _____ **4. Province/region:** b. Balochistan c. FAA d. ICT e. KPK f. Punjab g. Sindh

5. Facility Type: i). Teaching hospital. ii). DHQ iii). THQ iv). Civil Hospital v). RHC vi). Other (please specify) _____

6. Location: i). Urban ii). Rural **7. Interviewer Name:** _____ **8. Date:** /

/2021

9. Facility ID **Province ID** **Site ID**

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Entrance /Registration					
Observe these directly while you enter the facility					
1.1	Is there any visible banner indicating COVID-19 vaccination counter?	Observe	Yes	No	
1.2	Are there standee /charts in place providing basic information on COVID-19 (at least one standee or chart)?	Observe	Yes	No	
1.3	Is there a reception counter for registration of clients in the health facility and further guidance on vaccination?	Observe	Yes	No	
1.4	Is there a functional National Immunization Management System (NIMS) registration system for verification of clients? (functional means staff is able to register clients, and is equipped with a computer connected to the internet)	Ask and Observe	Yes	No	
1.5	Is the registration in NIMS through National ID Card (NIC) and one-time password verification taking place?	Observe	Yes	No	
1.6	Is there a dedicated waiting area adequate (adequate means a space for 6 to 8 clients to wait while keeping a distance of six feet) for clients to wait, implementing social distancing?	Observe	Yes	No	
Ask the below questions from AVC Focal Person					
Human Resource					
2.1	Have you been visited for monitoring by higher authorities from district/province/national since the start of vaccination?	Ask	Yes	No	
2.2	Is there female staff available at AVC to vaccinate females? If yes, how many female Nurses are available during a shift to vaccinate females?	Observe	Yes if yes, #_____	No	
2.3	Are there any security personnel available? (guard/chowkidar) (Mark 'Yes' even if security guard available at gate)	Observe	Yes	No	
2.4	How many nurses (for COVID-19 vaccination) are on duty for a given shift?	Ask	#_____		

2.5	How many support staff (e.g., to prep doses and Clients) are on duty for a given shift? (support staff: Assistant(s) specially assigned to AVC)	Ask	# _____		
2.6	How many shifts per day are there?	Ask	# _____		
2.7	How many days a week will the AVC?	Ask	# _____		
2.8	Have you conducted dry runs at your AVC for vaccine rollout?	Ask	Yes	No	
2.9	Is there an escalation (reporting to higher authorities for action) process for any issues that come up?	Ask	Yes	No	
Waste Management					
3.1	Have you read the COVID-19 vaccination guidelines for waste management on AVC released by EPI?	Ask	Yes	No	
3.2	How do you dispose the hazardous waste?	Ask	Incinerator	Pit burial	Others specify
3.3	How frequent you will dispose off hazardous waste.	Ask	Daily/Week	# _____	Details
3.4	Is used syringes and swabs considered as hazardous waste	Ask	Yes	No	
3.5	Are there waste management guidelines/SOPs displayed?	Observe	Yes	No	
Training Needs					
4.1	Which are the areas you and your staff require training/refreshers?				
4.1a	Infection Prevention and Control	Ask	Yes	No	
4.1b	Waste management	Ask	Yes	No	
4.1c	Adverse Events Following Immunization	Ask	Yes	No	
4.1d	Other	Ask	Name(1) _____	Name(2) _____	
Infrastructure					

5.1	Is there a separate bed and privacy screen (for vaccinating women, disabled etc. if required)?	Ask and Observe	Yes	No	
5.2	Is there electricity backup (generator/solar powered Ice Lined Refrigerators (ILRs)?	Ask and Observe	Yes	No	
5.3	In case of generator, is there at least 50L fuel/funds available?	Ask and Observe	Yes	No	
5.4	Is there a table and chair for Nurse/vaccinator at each vaccination counter and seat stool for the client available?	Observe	Yes	No	
5.5	Is there a dedicated area with chairs available for post-vaccination observation?	Observe	Yes	No (skip to 5.7)	
5.6	If yes, is the area properly ventilated?	Observe	Yes	No	
5.7	Is there a computer/laptop/smartphone/tablet (anyone of these) available for data entry/reporting?	Observe	Yes	No	
5.8	Is there a printer available?	Observe	Yes	No	
5.9	Is there internet available and functional? (functional means data transfer and entry in NIMS can be done)	Ask/Observe	Yes	No	
5.10	How many clients can the AVC accommodate at a given time? (after accounting for social distancing requirements; space needed for waiting/observation rooms; and space needed for non-COVID-19 vaccination services)	Observe	Pre _____	Post _____	Total _____
5.11	Have you calculated how many vaccinations the AVC can complete per shift?	Ask	Yes	No (skip to 6.1)	
5.12	If the answer to 5.11 is yes, how many?	Ask	# _____		
Infection Prevention & Control					
6.1	Is there any focal person assigned for coordination of all activities including Infection Prevention and Control (IPC)?	Ask	Yes	No (Skip to 6.3)	
6.2	If yes, is the focal person trained on IPC measures?	Ask	Yes	No	

6.3	Have you been formally trained on the following aspects in the past two years)				
6.3a	a) hand hygiene	Ask/Observe	Yes	No	
6.3b	b) Environmental Cleaning and Decontamination	Ask	Yes	No	
6.3c	c) Use of face Mask	Ask/Observe	Yes	No	
6.3d	d) Face shield /eye protection	Ask	Yes	No	
	Hand Hygiene				
7.1	Is there a hand washing station /sanitizer available?	Observe	Yes	No (Skip to 7.3)	
7.2	Are the SOPs for hand washing technique being practiced?	Ask	Yes	No	
7.3	How frequently should hand hygiene be performed per vaccination session? (Match with description: hand hygiene /hand sanitization should be performed before & after vaccinating each individual)	Ask	Correct	Incorrect	
	Cleaning of surfaces				
8.1	Do you disinfect surfaces of AVC counter and related premises at the start and end of work shift? (verify from schedule)	Observe/Ask	Yes	No (skip to 9.1)	
8.2	If Yes, describe the process (all horizontal surfaces should be cleaned at least twice daily with chlorine solution or other disinfectant)	Ask	Correct	Incorrect	
	Use of PPE				
9.1	Do the staff know how to correctly use the face mask as per given standards	Ask	Yes	No	
Supplies Availability at each AVC					
10.1	Biohazard bags (at least one per day, check if stock of at least 30 is available)	Observe & verify	Yes	No	# _____
10.2	Nonhazardous waste bags (for disposal of noninfectious waste (at least one per day, check if stock of at least 30 is available)	Observe & verify	Yes	No	# _____
10.3	Safety box (at least one) at each vaccination table in AVC. If AVC has three vaccination tables, then three boxes in total.	Observe & verify	Yes	No	# _____

10.4	Alcohol based hand sanitizer for each nurse/vaccinator (one sanitizer bottle for each nurse/vaccinator per week)	Observe & verify	Yes	No	# _____
10.5	Cotton roll (three rolls of cotton in one month) for each vaccination table	Observer & verify	Yes	No	# _____
10.6	IEC material (pamphlets available for the catchment population registered in NIMS).	Ask and Observer	Yes	No	# _____
10.7	COVID-19 vaccine administration checklist form	Ask and Observer	Yes	No	# _____
10.8	Does AVC has ample stock of Face Mask. Each staff should have one masks per shift (Check to confirm from stock register if facility has next four weeks of stock available)	Ask, Observe & verify	Yes	No	# _____
Adverse Events Following Immunization (knowledge & practice check) Ask preferably from AEFI focal person or Facility Focal Person. In most cases the facility focal person is also an AEFI focal person					
11.1	What process should be followed in case of an AEFI? (reassurance, referral and reporting)	Ask	Correct	Incorrect	
11.2	Is there a designated doctor (AEFI focal person) for managing AEFI?	Observe	Yes	No	
11.3	Is the AEFI focal person trained in the management of AEFI?	Ask	Yes	No	
11.4	Is the AEFI focal person readily available during vaccination process at the AVC?	Observe present in premises	Yes	No	
11.5	Please define AEFI (Adverse Events Following Immunization)	Ask	Correct	Incorrect	
11.6	Does the Nurse know whom to report in case of severe AEFI?	Ask and Observe	Yes	No	
11.7	Is there at least ONE AEFI kit (inclusive of IV canula, drip set, adrenalin & hydrocortisone injections) ready for use while administering vaccine (at least one kit should be available)	Observe	Yes	No If no indicate missing items	
11.8	Are the following items available for emergency resuscitation?				
11.8a	Oxygen cylinder	Observe	Yes	No	

11.8b	Ambu Bags	Observe	Yes	No	
11.8c	BP apparatus	Observe	Yes	No	
11.8d	Endotracheal tube	Obverse	Yes	No	
11.9	Are sufficient AEFI reporting forms (at least 05/HF) & case investigation forms available at AVC? (sufficient = forms available for approximately 10% of the total scheduled vaccinations)	Ask	Yes (skip to 11.12)	No	
11.11	If forms are not available at facility, are they available at district health office	Ask	Yes	No	
11.12	Do nurses /vaccinators know how to report AEFI on the NIMS system?	Ask	Yes	No	
Ask the below questions from AVC Nurse, or the person who is responsible for giving vaccine. (in case of more than one AVC Nurse, randomly select one by drawing lots)					
	Safe injection practices				
12.1	Who is responsible for giving vaccine in this AVC	Ask	Nurse	Vaccinator	Other_____
12.2	Are you trained to safely administer Intramuscular COVID-19 vaccine	Ask	Yes	No	
12.3	Are you trained to identify Adverse Events Following Immunization (AEFI)	Ask	Yes	No	
12.4	Injections are prepared using aseptic technique in a clean area free from contamination or contact with blood, body fluids, or contaminated equipment.	Observe	Correct	Incorrect	
12.5	COVID-19 vaccination is conducted using Auto Disabled syringe	Observe	Yes	No	
12.6	Demonstrate the process of disposal of used AD syringes	Observe	Correct	Incorrect	
12.7	Demonstrate the handling of sharps container. (Match with description: Do not fill beyond 3/4, seal sharps container/safety box to prevent access, transport safely to disposal site)	Observe	Correct	Incorrect	
	Observe the following for the vaccination session				

13.1	Proper storage temperature through temp monitoring device is available	Observe	Yes	No	
13.2	Existence of a vaccination schedule (Schedule is available in NIMS)	Observe	Yes	No	
13.3	Receipt of vaccines from EPI consistent with the daily vaccination target	Observe	Yes	No	
13.4	Does AVC Nurse counsel client about injection pain or fever?	Observe	Yes	No	
13.5	Proper Injection site /technique (intramuscular injection, preferably in deltoid)	Observe	Correct	Incorrect	
13.6	Does the AVC Nurse inform the client about waiting for 30 minutes for observation?	Observe	Yes	No	
13.7	Does the AVC nurse or AVC staff inform the client about the next dose of vaccine, including that an SMS will be sent to the client for the next visit?	Observe	Yes	No	
13.8	Does the AVC nurse counsel the client on the mechanism to report AEFI if experienced by client?	Observe	Yes	No	
13.9	Is the tally sheet completed after each vaccination session?	Observe	Yes	No	
13.11	Is the NIMS system installed in device (computer/laptop/smartphone/tablet) used to record the data?	Observe	Yes	No	
13.12	Does the Nurse/vaccinator/Storekeeper/AVC staff know how to enter the data through NIMS?	Observe	Yes	No	
<p align="center">Supply & Cold Chain Management (Ask the below questions from person responsible for vaccine cold chain management, who is usually a vaccinator or storekeeper)</p>					
14.1	Who is responsible for vaccine storage & cold chain management at AVC? (Ask below questions from person responsible)	Ask	Vaccinator	Storekeeper	Other____
14.2	EPI Vaccinator/storekeeper/others responsible for cold chain, available on site?	Ask	Yes	No	
14.3	Are you trained in cold chain management?	Ask	Yes	No	
14.4	Are there other items besides vaccines in the ILR	Observe	Yes	No	
14.5	Are there expired vaccines present?	Ask/Observe	Yes	No	

14.6	Are there COVID-19 vaccine protocols for safe disposal of vaccine being implemented? (pit burial of vaccines)	Ask/Observe	Yes	No	
14.7	Does vaccinator/storekeeper know how to make and format a consumption report? (EPI-MIS)	Observe/Ask	Yes	No	
14.8	Functional Ice lined refrigerator (ILR) available at each AVC	Observe	Yes	No (skip to 14.11)	
14.9	If yes, how much is the available volume in liters? (combined for all ILRs)	Observe	_____liters		
14.10	Is there at least one standard vaccine carrier available for each 100 doses of vaccine at AVC?	Observe	Yes	No	
14.11	Are syringes in ratio of 1:1 to vaccine doses available?	Observe	Yes	No	Skip for Prefilled syringe vaccine
14.12	Are there Ice/cool packs (numbers) at each AVC?	Observe	#_____		
14.13	Is a Temperature monitoring device (Fridge Tag) available for each ILR?	Observe	Yes	No	
14.14	Is the temperature record for morning and evening available and up to date on temp. monitoring sheet?	Observe	Yes	No	

Annex 4: Facility wise cost

Facility Name	District	Province/Region	Recurrent Cost /Month	%	Capital Cost	%
BBS (DHQ) Hospital	Abbottabad	FAA	50,000	12%	125,500	17%
THQ Hospital Talash	Dir (Lower)	FAA	72,011	17%	155,500	21%
DHQ Kotli FAA	Kotli	FAA	64,500	16%	165,500	22%
THQ Hospital charhoi	Kotli	FAA	55,500	13%	75,500	10%
THQ Koi Ratta	Kotli	FAA	63,480	15%	80,500	11%
THQ Sehansa	Kotli	FAA	65,080	16%	65,500	9%
New city teaching hospital	Mirpur	FAA	152,084	37%	83,490	11%
DHQ Mirpure	Mirpur	FAA	64,000	15%	80,500	11%
DHO Office, Mirpur	Mirpur	FAA	147,653	36%	167,200	23%
THQ Hospital Dadyal	Mirpur FAA	FAA	69,000	17%	170,238	23%
CMH Muzaffarabad	Muzaffarabad	FAA	77,011	19%	155,500	21%
AIMS Muzaffarabad	Muzaffarabad	FAA	91,091	22%	134,140	18%
THQ Hospital Patikka	Muzaffarabad	FAA	97,091	23%	125,500	17%
DHQ Jaffarabad	Jaffarabad	Balochistan	86,511	21%	140,500	19%
DHQ Hospital Khuzdar	Khuzdar	Balochistan	113,073	27%	65,500	9%
DHQ Hospital Uthal	Lasbella	Balochistan	55,000	13%	65,500	9%
Jam Ghulam Qadir Hospital Hub	Lasbella	Balochistan	83,011	20%	140,500	19%
Helper eye hospital	Quetta	Balochistan	64,000	15%	141,790	19%
SPH Civil Hospital Quetta	Quetta	Balochistan	55,000	13%	185,500	25%
Children Hospital Quetta	Quetta	Balochistan	113,073	27%	140,500	19%
Trauma Center	Quetta	Balochistan	257,921	62%	567,618	77%
SKBZ Quetta	Quetta	Balochistan	55,500	13%	65,500	9%
Mufti Mehmood Hospital	Quetta	Balochistan	77,511	19%	65,500	9%
Muhtarma Shaheed Benazir Hospital	Quetta	Balochistan	5,500	1%	65,500	9%
BMC Hospital	Quetta	Balochistan	74,580	18%	65,500	9%
Fatima Jinnah Chest Hospital	Quetta	Balochistan	6,500	2%	65,500	9%
Binuq Quetta	Quetta	Balochistan	57,000	14%	65,500	9%
DHQ Ziarat	Ziarat	Balochistan	64,500	16%	65,500	9%
DHQ Hospital Gilgit	Gilgit	FAA	170,064	41%	126,790	17%
The City Hospital Gilgit	Gilgit	FAA	64,500	16%	80,500	11%
BHU Shah Allah Ditta	Islamabad	ICT	97,080	23%	115,238	16%

Social Security Dispensary I-10	Islamabad	ICT	291,881	70%	567,618	77%
CDA Dispensary I-8	Islamabad	ICT	230,879	56%	567,618	77%
RMC Barakahu	Islamabad	ICT	51,571	12%	115,238	16%
Federal General Hospital	Islamabad	ICT	62,500	15%	68,490	9%
RHC Sihala	Islamabad	ICT	101,160	24%	90,500	12%
Poly Clinic Islamabad G-6/2	Islamabad	ICT	50,000	12%	65,500	9%
BHU Rawat	Islamabad	ICT	66,460	16%	90,500	12%
PIMS G-8 Islamabad	Islamabad	ICT	55,000	13%	65,500	9%
CDA Hospital G-6	Islamabad	ICT	56,000	13%	110,500	15%
CDA Medical Center F-11/4	Islamabad	ICT	86,717	21%	138,490	19%
BHU Tumair	Islamabad	ICT	243,201	58%	216,790	29%
National Institute of Rehabilitation Medicine	Islamabad	ICT	30,100	7%	83,490	11%
RHC Tarlai	Islamabad	ICT	19,080	5%	80,500	11%
RHC Nathiagali	Abbottabad	KP	77,080	19%	155,500	21%
RHC Khairagali	Abbottabad	KP	145,728	35%	81,790	11%
Type D Hospital Lora	Abbottabad	KP	9,500	2%	80,500	11%
Type D Hospital Havelian	Abbottabad	KP	9,500	2%	80,500	11%
RHC Khanaspur	Abbottabad	KP	123,717	30%	83,490	11%
RHC Mohri Bedbdhen	Abbottabad	KP	53,000	13%	155,500	21%
RHC Kalapani	Abbottabad	KP	60,500	15%	258,490	35%
Type D Hospital Boi	Abbottabad	KP	59,000	14%	208,490	28%
DHQ Haripur	DHQ	KP	-	0%	65,500	9%
RHC Asbarn	Dir (Lower)	KP	174,301	42%	158,490	22%
DHQ Hospital Timergara	Dir (Lower)	KP	87,148	21%	110,500	15%
RHC Lal Qila	Dir (Lower)	KP	110,217	27%	165,500	22%
RHC Khall	Dir (Lower)	KP	166,628	40%	128,490	17%
CAT D-Mayar Lower Dir	Dir (Lower)	KP	167,748	40%	155,500	21%
THQ Hospital Samarbagh	Dir (Lower)	KP	105,168	25%	80,500	11%
CAT-D Munda	Dir (Lower)	KP	147,617	36%	155,500	21%
RHC Ouch	Dir (Lower)	KP	239,781	58%	128,490	17%
RHC GulAbad	Dir (Lower)	KP	250,401	60%	198,490	27%
THQ Hospital Chakdara	Dir (Lower)	KP	24,011	6%	141,790	19%
THQ Khanpur	Haripur	KP	77,560	19%	65,500	9%
Ootnajibullah	Haripur	KP	75,580	18%	80,500	11%
RHC Kallinger	Haripur	KP	75,580	18%	93,490	13%
RHC Sirikot	Haripur	KP	147,228	35%	83,490	11%
Type D Hospital	Haripur	KP	74,080	18%	80,500	11%

Ch Rehana	Haripur	KP	92,560	22%	83,490	11%
Ch Khalbat Township	Haripur	KP	123,717	30%	80,500	11%
RHC Naraamazai	Haripur	KP	134,717	32%	93,490	13%
Typ D Hospital Ghazi	Haripur	KP	97,491	23%	110,500	15%
RHC Halli	Haripur	KP	121,217	29%	91,790	12%
RHC Gumhat	Kohat	KP	138,197	33%	125,500	17%
RHC Bilitang	Kohat	KP	148,228	36%	128,490	17%
Type-D Hospital Shkardara	Kohat	KP	115,717	28%	125,500	17%
RHC Chulaki	Kohat	KP	207,010	50%	128,490	17%
Type-D Hospital Lachi	Kohat	KP	115,071	28%	98,490	13%
KDA Hospital	Kohat	KP	65,500	16%	65,500	9%
RHC Ustazai	Kohat	KP	238,701	57%	215,500	29%
Ch Dara Adam Khel	Kohat	KP	123,217	30%	128,490	17%
Police Hospital Kohat	Kohat	KP	145,228	35%	80,500	11%
Type D Toru	Mardan	KP	257,921	62%	496,328	67%
Type D Hundkhwar	Mardan	KP	257,921	62%	496,328	67%
RHC Shergarh	Mardan	KP	257,921	62%	496,328	67%
DHQ Mardan	Mardan	KP	120,122	29%	182,200	25%
RHC Khazana	Mardan	KP	220,690	53%	293,228	40%
RHC	Mardan	KP	146,180	35%	364,628	49%
BHU Bakhshali	Mardan	KP	217,328	52%	497,688	68%
TDH Rhstam	Mardan	KP	257,921	62%	411,328	56%
Type D Shahbaz Garhai	Mardan	KP	200,348	48%	496,328	67%
RHC Dalo Dheri	Mardan	KP	257,921	62%	494,628	67%
MMC	Mardan	KP	500	0%	65,500	9%
THQ Takht Bhai	Mardan	KP	257,921	62%	496,328	67%
Hayat Medical Complex Peshawar	Peshawar	KP	1,500	0%	110,238	15%
Khyber Teaching Hospital Peshawar	Peshawar	KP	56,500	14%	65,500	9%
	Peshawar	KP	153,584	37%	110,238	15%
Lady Reading Hospital Peshawar	Peshawar	KP	80,000	19%	75,500	10%
Naseer Ullah Babar Memorial Hospital	Peshawar	KP	150,653	36%	115,430	16%
RHC Regi Peshawar	Peshawar	KP	188,808	45%	93,490	13%
Sarhad Hospital for psychiatric disease	Peshawar	KP	176,164	42%	555,918	75%
Emergency satellite Hospital Nahaqi	Peshawar	KP	211,675	51%	91,790	12%
RHC Takhtabad	Peshawar	KP	291,881	70%	567,618	77%
CAT-D Hospital Gara Tajak	Peshawar	KP	177,290	43%	148,490	20%
RHC Patasar Bala	Peshawar	KP	180,208	43%	138,490	19%
Cat-D Hospital Mattani	Peshawar	KP	150,553	36%	68,490	9%

Cat-D Hospital Badaber	Peshawar	KP	158,553	38%	93,490	13%
Ch Kabal	Swat	KP	195,330	47%	197,200	27%
Ch Madian	Swat	KP	193,710	47%	188,228	26%
THQ Matta	Swat	KP	101,511	24%	120,500	16%
RHC Khazana	Swat	KP	187,095	45%	208,490	28%
RHC Darmai	Swat	KP	222,201	53%	168,490	23%
RHC Devlai	Swat	KP	201,710	49%	83,490	11%
Saidu Group of Teaching Hospital	Swat	KP	125,073	30%	65,500	9%
THQ Khwazakhaila	Swat	KP	141,742	34%	183,490	25%
Nawaz Sharif Kikney Hospital Monglour	Swat	KP	64,500	16%	83,490	11%
RHC Bar Shawar	Swat	KP	197,664	48%	248,490	34%
Ch Barikot	Swat	KP	101,511	24%	183,490	25%
RHC Chuprial	Swat	KP	224,421	54%	198,490	27%
Ch Kalam	Swat	KP	128,637	31%	80,500	11%
Ayyub Teaching Chanzeb Hospital	Abbottabad	KP	1,500	0%	65,500	9%
Br. Hospital Bahawalpur	Bahawalpur	Punjab	291,881	70%	567,618	77%
THQ Hospital Ahmad Pur Fast	Bahawalpur	Punjab	53,000	13%	80,500	11%
THQ Yazman	Bahawalpur	Punjab	3,500	1%	80,500	11%
Civil Hospital Bahawalpur	Bahawalpur	Punjab	-	0%	65,500	9%
THQ Hospital Hasil Pur	Bahawalpur	Punjab	67,480	16%	80,500	11%
THQ Hospital Khairpur	Bahawalpur	Punjab	291,881	70%	567,618	77%
THQ Hospital Jaranwala	Faisalabad	Punjab	50,000	12%	65,500	9%
Children Hospital	Faisalabad	Punjab	-	0%	68,490	9%
Govt General Hospital Samanabad	Faisalabad	Punjab	50,000	12%	80,500	11%
THQ Hospital Sumundre Faisalabad	Faisalabad	Punjab	50,000	12%	105,500	14%
DHQ Hospital	Faisalabad	Punjab	50,000	12%	80,500	11%
Faisalabad Institute of Cardiology	Faisalabad	Punjab	50,000	12%	65,500	9%
Govt General Hospital RB (THQ)	Faisalabad	Punjab	65,000	16%	65,500	9%
THQ Hospital Chak Jhumar	Faisalabad	Punjab	50,000	12%	65,500	9%
General Hospital Gulam Muhammad	Faisalabad	Punjab	16,000	4%	65,500	9%
THQ Hospital Tandilianwala	Faisalabad	Punjab	-	0%	65,500	9%
Allied Hospital Faisalabad	Faisalabad	Punjab	65,000	16%	65,500	9%
THQ Hospital Nowshehra Vihran	Gujranwala	Punjab	50,000	12%	95,500	13%
THQ Hospital Wazirabad	Gujranwala	Punjab	51,500	12%	65,500	9%

THQ Hospital Kamoke	Gujranwala	Punjab	50,000	12%	65,500	9%
DHQ Hospital Gujrawala	Gujranwala	Punjab	72,011	17%	110,500	15%
THQ Hospital Sarai Alamgir	Gujrat	Punjab	55,000	13%	125,500	17%
THQ Hospital Kharian	Gujrat	Punjab	60,500	15%	80,500	11%
THQ Hospital Lalamusa	Gujrat	Punjab	86,011	21%	125,500	17%
Aziz Bhatti Teaching Hospital	Gujrat	Punjab	59,000	14%	125,500	17%
DHQ Hospital Kasur	Kasur	Punjab	51,500	12%	65,500	9%
Govt Aziz Bibi Hospital Roshan Bheela	Kasur	Punjab	50,000	12%	65,500	9%
THQ Hospital Radha Kishan	Kasur	Punjab	113,073	27%	80,500	11%
THQ Hospital Chunnean	Kasur	Punjab	60,600	15%	65,500	9%
THQ Hospital Pattoki	Kasur	Punjab	50,500	12%	65,500	9%
Sir Ganga Ram Hospital	Lahore	Punjab	55,500	13%	80,500	11%
SIMS Services Institute of medical Sciences	Lahore	Punjab	-	0%	65,500	9%
Sheikh Zaid Hospital	Lahore	Punjab	55,500	13%	65,500	9%
Mayo Hospital	Lahore	Punjab	50,000	12%	65,500	9%
Jinnah Hospital LHR	Lahore	Punjab	50,000	12%	125,500	17%
Lady acthin Hospital	Lahore	Punjab	52,000	13%	125,500	17%
Lady Wallingdon Hospital Lahore	Lahore	Punjab	52,900	13%	165,500	22%
Punjab Dental Hospital	Lahore	Punjab	291,881	70%	567,618	77%
Said Mitha Hospital Lahore	Lahore	Punjab	291,881	70%	567,618	77%
Govt. M. Nawaz Sharif teaching hospital	Lahore	Punjab	1,500	0%	80,500	11%
Mazong Teaching Hospital	Lahore	Punjab	291,881	70%	564,628	77%
General Hospital	Lahore	Punjab	64,573	16%	80,500	11%
Kahna No Indus Hospital	Lahore	Punjab	291,881	70%	567,618	77%
Mian Munsh DHQ Lahore	Lahore	Punjab	50,500	12%	80,500	11%
THQ Indus sabzazar	Lahore	Punjab	291,881	70%	567,618	77%
Institute of mental Health	Lahore	Punjab	291,881	70%	567,618	77%
Punjob Institute of cardiology	Lahore	Punjab	51,500	12%	65,500	9%
THQ Que Guttar singh lahore	Lahore	Punjab	291,881	70%	567,618	77%
Govt. Eye Hospital	Lahore	Punjab	291,881	70%	567,618	77%
Govt. Hospital Shehdara	Lahore	Punjab	113,073	27%	116,938	16%
Govt. Khawsa Saeed Hospital	Lahore	Punjab	109,573	26%	80,500	11%
Govt Teaching Hospital	Lahore	Punjab	67,520	16%	213,490	29%
Raiwind Indus Hospital	Lahore	Punjab	21,500	5%	116,938	16%

Manawan Hospital Lahore	Lahore	Punjab	5,500	1%	80,500	11%
Childern Hospital	Lahore	Punjab	5,500	1%	65,500	9%
Ch. Pervaiz illahi Cardiology	Multan	Punjab	-	0%	65,500	9%
Nishter Hospital Multan	Multan	Punjab	-	0%	80,500	11%
Children Hospital Complex Multan	Multan	Punjab	-	0%	80,500	11%
Pak Italian Modern Burn Centre Multan	Multan	Punjab	55,500	13%	80,500	11%
Govt Shabaz Shareef DHQ	Multan	Punjab	8,500	2%	80,500	11%
Nishter Institue of Dentistry	Multan	Punjab	95,991	23%	80,500	11%
Govt THQ Hospital Shujabad	Multan	Punjab	3,000	1%	80,500	11%
Govt Mushtaq Lang THQ Hospital	Multan	Punjab	500	0%	80,500	11%
DHQ Hosptial Rawalpindi	Rawalpindi	Punjab	72,011	17%	67,200	9%
Banazir bhutto Hospital Rawalpindi	Rawalpindi	Punjab	8,000	2%	65,500	9%
RIC Rawalpindi	Rawalpindi	Punjab	57,500	14%	68,490	9%
Holy Family Hospital Rawalpindi	Rawalpindi	Punjab	78,720	19%	65,500	9%
THQ kallar Sayedan	Rawalpindi	Punjab	3,000	1%	67,200	9%
THQ Hospital Gujar Khan	Rawalpindi	Punjab	27,011	6%	67,200	9%
THQ Hospital Kahuta	Rawalpindi	Punjab	56,600	14%	113,490	15%
THQ Hospital Kotli Sattayan	Rawalpindi	Punjab	140,451	34%	77,130	10%
Wah General Hospital Wah cant	Rawalpindi	Punjab	27,011	6%	67,200	9%
THQ Hospital Taxila	Rawalpindi	Punjab	50,000	12%	65,500	9%
Syed Muhmmad Hussain Govt. T.B institution	Rawalpindi	Punjab	1,500	0%	125,500	17%
THQ Hospital Murree	Rawalpindi	Punjab	50,000	12%	123,490	17%
S.G.H New karachi	Central Karachi	Sindh	92,846	22%	80,500	11%
Sindh Government Hospital Liaqabad	Central Karachi	Sindh	116,117	28%	65,500	9%
Taluqa Hospital Malir	Dadu	Sindh	235,910	57%	497,618	68%
Taluqa Hospital Joni	Dadu	Sindh	203,753	49%	565,918	77%
Taluqa Hospital Kahirpur	Dadu	Sindh	274,901	66%	567,618	77%
RHC Radnan	Dadu	Sindh	274,901	66%	567,618	77%
Civil Hospital Dadu	Dadu	Sindh	73,000	18%	81,790	11%
Hepatitis Hospital Dadu	Dadu	Sindh	274,901	66%	567,618	77%
RHC Arif Bala	Dadu	Sindh	274,901	66%	567,618	77%

Dow University of Health Science	East Karachi	Sindh	51,500	12%	65,500	9%
RHC Ghotki Khuda Bux	Ghotki	Sindh	274,901	66%	567,618	77%
District Headquarter Hospital Mirpur Mathdo	Ghotki	Sindh	78,080	19%	158,490	22%
Taluka Head quarter Hospital Ubauro	Ghotki	Sindh	80,811	19%	186,868	25%
Taluka HeadQuarter Hospital Beharki	Ghotki	Sindh	119,317	29%	143,490	19%
Taluka Head Quarter Hospital Ghotki	Ghotki	Sindh	134,437	32%	176,790	24%
Taluka Head Quarter Hospital Khanpur	Ghotki	Sindh	114,717	28%	111,790	15%
LUMHS Hyderabad	Jamshoro	Sindh	-	0%	65,500	9%
Civil Hospital (SIUT) Karachi	Karachi	Sindh	49,137	12%	65,500	9%
Agha Khan University Hospital, Karachi	Karachi East	Sindh	-	0%	65,500	9%
Sindh Govt. Korangi Number 05	Korangi Karachi	Sindh	60,600	15%	65,500	9%
RHC Gerello	Larkana	Sindh	274,901	66%	567,618	77%
Taluka Hospital Ratodoro	Larkana	Sindh	274,901	66%	567,618	77%
Taluka Hospital Dokri	Larkana	Sindh	274,901	66%	567,618	77%
Taluka Hospital Bakram	Larkana	Sindh	274,901	66%	567,618	77%
RHC Badah	Larkana	Sindh	274,901	66%	567,618	77%
RHC Bangul dero	Larkana	Sindh	274,901	66%	567,618	77%
Civil Hospital Larkana	Larkana	Sindh	274,901	66%	567,618	77%
Chandka Medical College Hospital Larkana	Larkana	Sindh	22,011	5%	65,500	9%
Urban Health Center 36 Beled Hospital Malir	Malir Karchi	Sindh	69,720	17%	65,500	9%
district Headquarter Mirpur Khan	Mirpur Khas	Sindh	22,011	5%	65,500	9%
Rural Health Clinic Tando Jan Mohammad	Mirpur Khas	Sindh	160,868	39%	268,228	36%
Taluka Head Quarter Digri	Mirpur Khas	Sindh	64,980	16%	81,790	11%
Rural Health Clinic Mirwah	Mirpur Khas	Sindh	114,717	28%	198,490	27%
THQ Kot Ghulam Muhammad	Mirpur Khas	Sindh	108,700	26%	118,228	16%
Rural Health clinic Tundo	Mirpur Khas	Sindh	124,980	30%	92,130	12%
Rural Health Clinic	Mirpur Khas	Sindh	104,811	25%	81,790	11%
Mother Care Hospital Nawabshah	Nawabshah	Sindh	-	0%	65,500	9%
Sindh Govt. Children Hospital North Karachi	North Karachi	Sindh	57,620	14%	80,500	11%

Rural Health Center Lakhi	Shikarpur	Sindh	93,091	22%	126,790	17%
Rural Health Center Khanpur	Shikarpur	Sindh	121,717	29%	137,130	19%
Rural Health Center Chak	Shikarpur	Sindh	131,717	32%	67,200	9%
District Healthquarter Shikarpur	Shikarpur	Sindh	11,580	3%	10,500	15%
Rural Health Center Sultan Kot	Shikarpur	Sindh	142,628	34%	125,500	17%
Rural Health Center Rahimabad	Shikarpur	Sindh	144,217	35%	163,228	22%
Rural Health Center Mianjo Goth	Shikarpur	Sindh	118,228	28%	101,528	14%
Rural Health Center Garhi Yasin	Shikarpur	Sindh	149,217	36%	148,228	20%
Rural health Center Hira Nand Ganga Bhai	Shikarpur	Sindh	157,717	38%	118,228	16%
Service Hospital Khalid line Hall	South karachi	Sindh	71,220	17%	65,500	9%
JPMC, Karachi	South Karachi	Sindh	95,700	23%	65,500	9%
Integrated Health Services Center Sukkur	Sukkur	Sindh	2,500	1%	65,500	9%
Qatar Charity Hospital West Karachi	West Karachi	Sindh	64,120	15%	80,500	11%

Annex 5: Cost categories across the different items

Cost Category	Sum of Amount/Month	Sum of Amount/Anum
Capital Cost	737,118	737,118
Furniture	237,500	237,500
IT	10,000	10,000
IT Equipment	125,000	125,000
Medical Equipment	310,628	310,628
Operational Cost	50,000	50,000
Printing	3,990	3,990
Re-Current Cost	415,818	4,659,816
HR	228,798	2,745,576
Operational Cost	30,000	30,000
PPE	45,500	546,000
Printing	57,320	687,840
Supplies	54,200	650,400
Grand Total	1,152,936	5,396,934