# Punjab's Health Data System Practices, and its Role in Monitoring and Evaluation

Diagnostic Report of Punjab Hepatitis Control
Program Data Systems

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# List of Abbreviations

| | |
|---|---|
| **CLEAR PCA** | Center for Learning on Evaluation and Results - Pakistan and Central Asia |
| **CNIC** | Computerized National Identification Card |
| **DGHS** | Director General of Health Services |
| **DHA** | District Health Authority |
| **DHIS-2** | District Health Information System (v2) |
| **DHO** | District Health Officer |
| **DHQ** | District Headquarter Hospital |
| **EMR** | Electronic Medical Record |
| **EPI** | Expanded Program for Immunization |
| **GHSS** | Global Health System Strategy |
| **HCP** | Hepatitis Control Program |
| **HIMS** | Hospital Information Management System |
| **HIS** | Health Information System |
| **HISDU** | Health Information and Service Delivery Unit |
| **HMIS** | Health Management Information System |
| **IBTS** | Institute of Blood Transfusion Services |
| **M&E** | Monitoring and Evaluation |
| **MESA** | Monitoring and Evaluation Systems Analysis |
| **MIMS** | Medication Inventory Management System |
| **MO** | Medical Officer |
| **MoU** | Memorandum of Understanding |
| **MR** | Medical Record Number |
| **NHSF** | National Hepatitis Strategic Framework |
| **P&SHD** | Primary and Secondary Healthcare Department |
| **PBTA** | Punjab Blood Transfusion Authority |
| **PCR** | Polymerase Chain Reaction Test |
| **PHC** | Punjab Healthcare Commission |
| **PKLI** | Pakistan Kidney and Liver Institute |
| **PRISM** ` | Performance of Routine Health Information System |
| **RHC** | Rural Health Center |
| **SHC&MED** | Specialized Healthcare and Medical Education Department |
| **SVR** | Sustained Virological Response |
| **THQ** | Tehsil Headquarter Hospital |
| **WHO** | World Health Organization |

# Executive Summary

This report presents a comprehensive baseline assessment of health information management systems (HIMS) in Punjab, specifically focusing on the electronic medical records (EMR) and health management information systems (HMIS) used in hepatitis control clinics. The goal was to identify and address technical, behavioral, and organizational challenges to improve data quality and usability, enhancing monitoring and evaluation (M&E) efforts and supporting hepatitis elimination by 2030.

The assessment utilized the PRISM (Performance of Routine Information System Management) framework and included field visits to various healthcare facilities. Interviews with healthcare providers and district health officials provided insights into the current data systems, identifying gaps that hinder effective data management.

Key findings revealed several technical issues, such as the absence of comprehensive procedure manuals and standard operating procedures (SOPs). Data collection forms and software interfaces were not user-friendly, affecting efficiency and accuracy. The EMR systems lacked integration with other health information systems, limiting comprehensive health system assessments. Inconsistent quality control processes at the district level were also noted.

Organizational challenges included the lack of documented procedures for data collection, analysis, and quality assurance. Training on the EMR system was inadequate, and supportive supervision by DHOs was irregular and lacked formal documentation. Some facilities reported unreliable internet access, forcing staff to use personal devices for EMR access. Other challenges included the inability to edit screening data in the EMR, leading to inaccuracies and fragmented patient records. The system did not support long-term treatment tracking for chronic conditions like Hepatitis B. Additionally, automatic deductions in medication stocks often caused discrepancies, and high-volume clinics struggled with data entry due to the dual burden of paper-based and electronic records.

The report recommends developing comprehensive procedure manuals and SOPs and conducting regular training sessions for facility staff. Enhancing EMR capabilities to capture new screening results and expanding functionalities for long-term treatment tracking and end-stage complications are crucial. Standardizing data collection formats and integrating the EMR with other data systems will improve consistency and analysis.

To streamline data transmission, automated reporting tools within the EMR should be utilized, and data sharing over WhatsApp should be discontinued due to security concerns. Improving data integration and interoperability with population statistics and national health databases will facilitate accurate coverage rate calculations and targeted interventions. Refining the EMR's stock management system will address inventory discrepancies.

Optimizing EMR dashboards for easier data analysis, incorporating data visualization tools, and strengthening supervisory structures with standardized visit reports and compliance checklists are recommended to enhance data analysis and usage. Establishing a robust complaint management system for EMR issues will ensure timely resolution and improve system reliability.

Promoting a culture of data-driven decision-making through workshops, seminars, and policy briefs is essential. Regular feedback and coaching on data quality and usage will support facility staff in improving patient care and resource allocation. Comprehensive data analysis at the district and policy levels will inform resource distribution, program adjustments, and strategic decision-making, ensuring alignment with public health goals.

Implementing these recommendations will significantly improve HIMS in Punjab, leading to more effective M&E of hepatitis control efforts and better health outcomes. Follow-up studies and continuous assessments will be crucial to monitor progress and ensure sustained improvements, achieving hepatitis elimination by 2030.

# Introduction

## 1.1　Importance of Data Systems in Monitoring and Evaluation Systems

A Health Management Information System (HMIS) is defined as

"a combination of vital and health statistical data from multiple sources, used to derive information about the health needs, health resources, costs, use of health services, and outcomes of use by decision-makers".

A HMIS encompasses both routine and non-routine health information systems, functioning as a vital entity within the comprehensive health system framework that offers integrated curative, rehabilitative, preventive, and promotive health services.

The routine health information system (HIS), often referred to as a facility-based health information system, includes data collected at regular intervals from public and private health facilities, community-level healthcare posts, and clinics. The non-routine HIS, on the other hand, comprises population or health unit-based surveys, population censuses, and rapid assessment procedures. These systems collectively contribute to a comprehensive HMIS that supports public health monitoring and evaluation.

Robust monitoring and evaluation (M&E) systems are essential for tracking key indicators and assessing the impact of interventions in combating diseases such as viral hepatitis. This has the potential to inform decisions and actions regarding health system financing, leadership and governance, health workforce, service delivery, and essential medicines.

Effective M&E systems enable the identification and consistent tracking of relevant indicators, facilitating the evaluation of strategies over time. Key components of these systems include:

- **Identifying Relevant Indicators**

   Selecting indicators accurately reflect the health burden, service delivery, and outcomes related to disease.

- **Consistent Tracking**

   Regularly collecting and analyzing data to monitor changes and trends.

- **Participatory Data Collection Methods**

   Involving stakeholders at all levels to ensure data accuracy and relevance.

Competent institutions with strong links to decision-makers are crucial for effective M&E. Capacity-building efforts should focus on establishing feedback mechanisms that inform policymakers and stakeholders, ensuring that M&E results are utilized across various sectors. Disseminating results widely is essential for maximizing their impact and fostering a culture of data-driven decision-making.

In 2023, CLEAR PCA conducted a comprehensive Monitoring and Evaluation Systems Analysis (MESA), which highlighted several gaps and challenges within existing M&E structures. These gaps hinder the government's ability to assess project impacts and utilize evidence effectively in decision-making processes. Key challenges identified include:

- **Data Dispersal**

  Performance M&E data are often compiled from multiple sources across different projects or departments, resulting in fragmented datasets presented through various dashboards. This fragmentation makes data review and analysis challenging and can lead to inconsistencies.

- **Technical Barriers**

  The lack of integration between digital electronic record-keeping systems and population statistics from the national census hampers the calculation of coverage rates and other vital metrics.

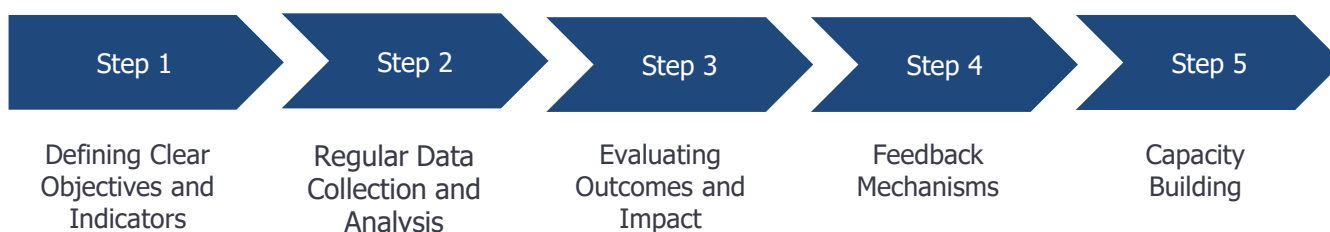- **Human Resource Constraints**

  There is an insufficient availability of trained experts to bridge data sources and ensure accurate, consistent data collection and analysis.

- **Evaluation Culture**

  M&E activities are often viewed as requirements of donor-funded projects rather than as scientific efforts to understand program impacts. This perspective limits sustained efforts to improve M&E structures.

A crucial aspect of robust M&E systems is the ability to track inputs, outputs, and how these link to program outcomes and overall health impact. Inputs refer to the resources allocated for health programs, including funding, personnel, equipment, and supplies. Outputs are the immediate results of program activities, such as the number of patients treated, vaccines administered, or health education sessions conducted. To achieve a comprehensive understanding of program effectiveness, it is essential to document how inputs are transformed into outputs and how these outputs contribute to desired outcomes and health impacts.

This involves several steps :

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 |
|--------|--------|--------|--------|--------|
| Defining Clear Objectives and Indicators | Regular Data Collection and Analysis | Evaluating Outcomes and Impact | Feedback Mechanisms | Capacity Building |

**STEP 1**

## Defining Clear Objectives and Indicators

Programs must establish clear objectives and relevant indicators that align inputs and outputs with desired health outcomes. For example, in the Hepatitis Control Program, inputs such as antiviral medications and public awareness campaigns should directly correlate with outputs like increased treatment rates and enhanced public knowledge about hepatitis prevention.

**STEP 2**

## Regular Data Collection and Analysis

Continuous monitoring of inputs and outputs is necessary to ensure that resources are being used efficiently and effectively. This requires systematic data collection and analysis to track progress towards program objectives.

**STEP 3**

## Evaluating Outcomes and Impact

Beyond immediate outputs, it is crucial to assess how these outputs translate into longer-term outcomes, such as reduced hepatitis incidence and prevalence, and ultimately, the overall health impact, such as lower morbidity and mortality rates. This can be achieved through longitudinal studies and rigorous impact evaluations.

**STEP 4**

## Feedback Mechanisms

Establishing feedback loops that provide timely information to decision-makers is essential for adjusting programs and strategies as needed. These mechanisms ensure that lessons learned from data analysis are used to improve program design and implementation.

**STEP 5**

## Capacity Building

Strengthening the skills of healthcare workers and program managers in data collection, analysis, and interpretation is vital. Training programs should focus on enhancing the capacity to track and link inputs, outputs, and outcomes effectively.

The MESA report highlights the importance of these elements to improve program performance. For instance, it highlights the issue of performance M&E data being dispersed across multiple datasets, which complicates the process of tracking how inputs and outputs correlate with outcomes. Additionally, the lack of integration between electronic record-keeping and population statistics impedes accurate assessment of coverage rates and other critical metrics.

Addressing these gaps requires targeted interventions, such as:

◉ **Integration of Data Systems**

Ensuring that various data systems are interoperable and can share information seamlessly.

◉ **Standardization of Indicators**

Developing standardized indicators that can be used across different programs and departments to ensure consistency in data collection and analysis.

◉ **Training and Capacity Building**

Providing ongoing training to improve the skills of those involved in data management and M&E processes.

By implementing these interventions, M&E systems can be strengthened to provide a clearer picture of program effectiveness and guide efforts towards achieving better health outcomes and overall impact.

These challenges and the required interventions are summarized in Table 1.

**Table 1|    Key MESA findings.**

| Current State | Intervention Required |
|---|---|
| Budding evaluation culture with limited institutionalization | ◉ Institutionalization of M&E systems through M&E ecosystem development, building capacity and streamlining resources for capacity building. |
| Absence of a national level M&E system | ◉ Formulate an M&E structure which includes guidelines for planning, implementing, and utilizing evaluations across different sectors.<br>◉ Develop basic indicators to ensure consistency, validity, and reliability of processes and findings. |
| Anti-evaluation mindset and resistance to change | ◉ Build training and advocacy initiatives for government workers to familiarize them with M&E practices, address misconceptions, and build a culture that embraces M&E as a tool for learning, improvement, and accountability. |
| Lack of M&E demand | ◉ Develop strategies to create a strong demand for evaluation by incentivizing evaluation measures.<br>◉ Institutionalize evaluation by integrating it into routine operations and decision-making processes of PC |

## 1.2     Rationale for Selecting the Hepatitis Control Program as a Test Case for M&E System Strengthening

The selection of the Hepatitis Control Program (HCP) as a test case for strengthening M&E systems through data system enhancement is a strategic decision. The choice is driven by two key factors; critical nature of hepatitis control efforts and the unique opportunities presented by the program to highlight and address data challenges in Punjab's healthcare system.

Given the size and configuration of the program, it utilizes all the various components and infrastructure of the data collection mechanisms including Apps and user interfaces available to Primary & Secondary Healthcare Department (P&SHD). This makes the HCP a well-suited model for understanding how other P&SHD programs function from a data collection and analysis perspective, including its use in M&E. By improving data collection and analysis within the HCP, we can develop a model for overcoming these issues throughout the entire system.

### I.     Program Reach and Commitment: Intersection of Various Levels of Healthcare

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**hepatitis control clinics across the three operational zones (North, Center, South) of Punjab are being managed by the program.**

135 of these Hepatitis Control Clinics are in the Central Zone of the Province, while 56 are in the South, and 46 are in the North Zone. These clinics are mapped in Figure 1, with details of composition in Table 2. A detailed list is available as part of Annexure 1.

**Table 2|**    **Facility count by zone.**

| | DHQ | THQ | RHC | Disp. | Partner | Teaching |
|---|---|---|---|---|---|---|
| NORTH | 6 | 35 | 0 | 0 | 1 | 4 |
| CENTER | 13 | 51 | 51 | 3 | 5 | 12 |
| SOUTH | 7 | 36 | 9 | 0 | 0 | 4 |

**Figure 1|** **Geographic distribution of Hepatitis Control Clinics.**
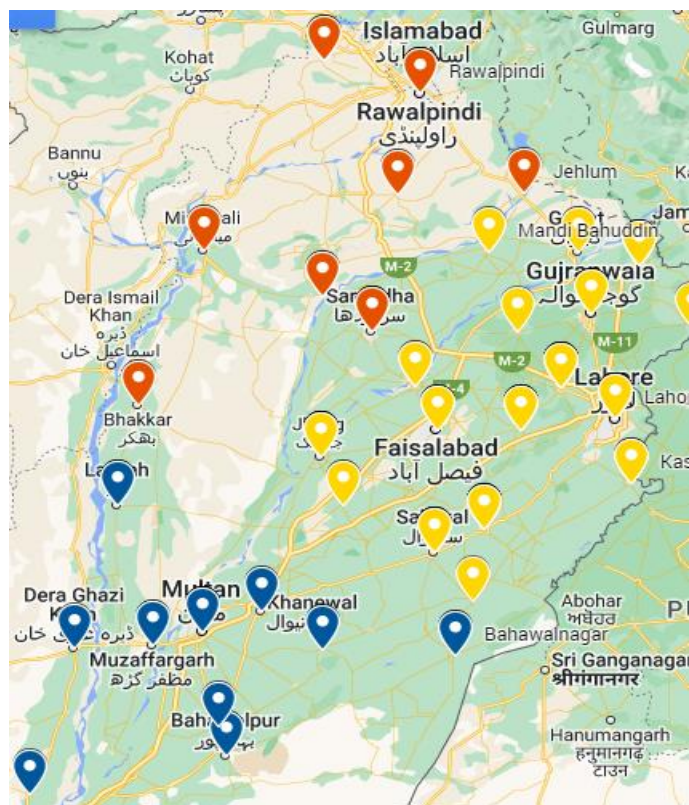


The facilities operate in a "one stop shop" manner of operation, with patient registration, screening, vaccination, and counseling. Patients who screen positive undergo screening and are provided with baseline tests and a diagnostic PCR test. The laboratory services include sample collection, transportation to a central laboratory through a courier partner, analysis, and reporting. Patients diagnosed as case confirmed are enrolled in a treatment program with monthly follow-ups. Referral services are offered to complicated cases, who are treated at the Gastroenterology units of Teaching Hospitals. A flowchart of the Service Delivery Model has been included as Annexure 2.

These clinics are operated in a one stop shop manner and are staffed by a dedicated medical officer (MO) and a charged nurse. The staff are trained and monitored by the program. The HCP operates at the intersection of the P&SHD facilities and the Specialized Healthcare and Medical Education Department (SHC&MED). Further, the private sector is represented through a Partner Facility model.

By focusing on hepatitis control, the program can highlight how data flows and coordination between these departments can be optimized.

## II.  Stated Global, National, and Provincial Targets for Hepatitis Elimination

Hepatitis elimination is a global health priority, with significant targets set at the national and provincial levels. The Global Health Sector Strategy (GHSS) on viral hepatitis sets forth the ambitious goal of eliminating viral hepatitis as a public health threat by 2030.

The strategy suggests five interventions:



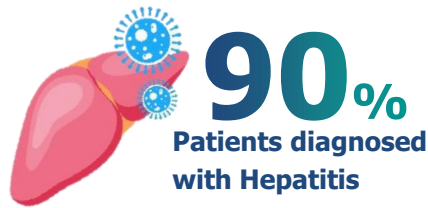| Hepatitis B immunization | Prevention of mother-to-child transmission of Hepatitis B | Blood and injection safety | Prevention of transmission among persons who inject drugs through comprehensive harm reduction services | Testing and treatment |

**Service coverage targets for 2023**

**90**% **Patients diagnosed with Hepatitis**

**80**% **Patients eligible to be treated**

Based on the GHSS the National Hepatitis Strategic Framework (NHSF) for Pakistan was developed, with a target to reduce hepatitis B and C by 10% and reduce new cases of infections by 30%. This framework has been presented as Figure 2.

The P&SHD in Punjab has committed to supporting these ends through legislative support, such as the Punjab Hepatitis Act 2018, which provides for surveillance, diagnosis, and treatment of hepatitis. Under this, the HCP was established, which collaborates with different healthcare departments to implement the following:

- Birth dose for Hepatitis B.
- Infection control services at public and private health care facilities.
- Safe blood transfusions.
- Registration and central licensing of barbers and beauticians.
- The outsourced agency for infectious waste management.

Commitments under the NHSF and Hepatitis Act of 2018 provide a clear mandate and a sense of urgency for robust M&E systems to track progress and ensure accountability. The provincial and federal alignment on hepatitis elimination goals makes this program an ideal test case to demonstrate the impact of strengthened data systems on achieving these ambitious targets.

## III.    Implementation of an Electronic Data Collection System

The HCP in Punjab has implemented an electronic data collection system, which offers a significant advantage for M&E efforts. The availability of electronic data facilitates more accurate, timely, and comprehensive data collection, enabling better tracking of inputs, outputs, and outcomes. This digital infrastructure allows for more sophisticated analyses and real-time monitoring, which are critical for effective decision-making and resource allocation. By leveraging this existing electronic system, the program can showcase the benefits of digital data management and encourage its adoption across other health programs.

The P&SHD collects service delivery-level data through the Electronic Medical Record (EMR) system, which is a module of the Health Information Management System. This system contains modules related to patient registration, medico legal case reporting, laboratory diagnostics, appointment scheduling, medication and equipment inventory, as well as laundry services. Information from the EMR is collated to a dashboard developed by Health Information and Service Delivery Unit (HISDU). This dashboard maintained by the P&SHD only displays input and output-level data and does not measure key outcomes or impact of the program.

Due to the presence of electronic data collection system, it is possible to identify and analyze performance metrics from administrative data, thereby uncovering gaps and inefficiencies in the current data systems. Addressing these challenges in the context of hepatitis control can serve as a blueprint for improving data systems across other health programs. This focused effort can instigate additional demand for M&E system development from within the department, encouraging leadership to make meaningful investments in more efficient and active M&E practices.
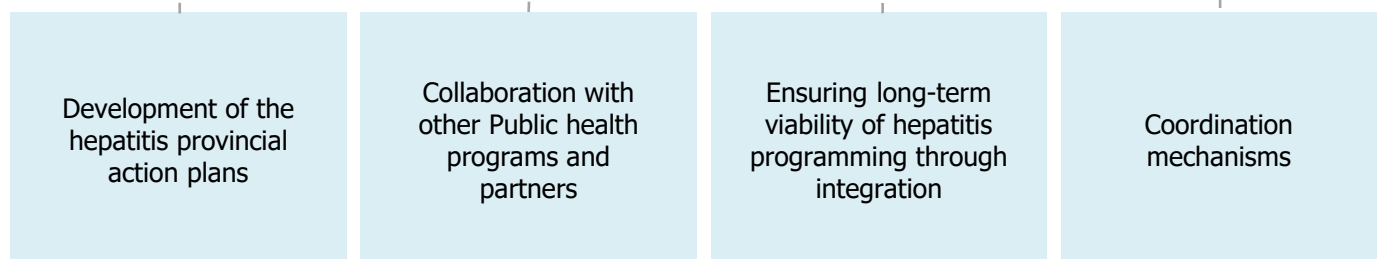
**Figure 2|** **National Hepatitis Strategic Framework (2017-2021)**

| Vision | Goal | Targets |
|---|---|---|
| The vision of the NHSF 2017-21 is "In Pakistan; viral hepatitis transmission is halted and everyone living with viral hepatitis has access to safe, affordable and effective prevention, care and treatment services." | The goal is to eliminate viral hepatitis as major public health threat by 2030 | The NHSF targets are:<br>a. Reduce viral hepatitis B and C by 10% by 2021.<br>b. New cases of chronic viral hepatitis B and C infections reduced by 30% by 2021. |

| Strategic Objectives (SO) | Expected Results |
|---|---|
| To strengthen leadership, governance and advocacy for a coordinated and integrated hepatitis response; | • Viral hepatitis coordinating body is actively fulfilling its responsibilities at federal and provincial levels.<br>• Partnership and collaboration of related hepatitis programs, private sector and NGOs/CSOs are developed.<br>• Advocates from public and private sector, civil society, professional associations have agreed on a joint awareness raising and advocacy strategy and collaborated on its implementation. |
| To increase the availability and use of strategic information that will enable the development and monitoring of the implementation of evidence based strategies | • The national health information system strengthened to measure key disease burden and service coverage indicators;<br>• Accurate, strategic information is available and accessible to all stakeholders, and used for evidence-informed policy and program, and resource allocation. |
| To improve the quality, and scale up coverage of the hepatitis B and C prevention | • National policies and practices for priority interventions are established<br>• A comprehensive hepatitis B virus immunization program is implemented.<br>• Hepatitis prevention and control measures are strengthened as an integral pert of the national infection control and prevention program in healthcare settings.<br>• Safe blood supply is guaranteed.<br>• The hepatitis transmission is minimized among people who inject drugs through main streaming hepatitis B & C prevention, diagnosis and treatment in the provision of harm reduction services. |

| Strategic Objectives (SO) | Expected Results |
|---|---|
| To improve access to the viral hepatitis B & C testing and diagnosis services | ⬤ HCV and HBV tests are available and accessible in health care settings and in the community and the HBV and HCV testing is strengthened. |
| To improve the quality, and scale up coverage and utilization of comprehensive treatment, care and support for hepatitis B and C patients | ⬤ All diagnosed chronic HCV and HBV infections are treated efficiently and safely. |

## Implementation

| Development of the hepatitis provincial action plans | Collaboration with other Public health programs and partners | Ensuring long-term viability of hepatitis programming through integration | Coordination mechanisms |
|---|---|---|---|

## Monitoring and Evaluation

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## IV.      Leveraging the Hepatitis Program for System-Wide M&E Improvements

The initial collaboration and technical assistance provided to the P&SHD on the assessment of the HCP have already demonstrated potential benefits. This collaboration has prompted the Secretary P&SHD to seek additional technical assistance to make a stronger case for increased federal funding for Hepatitis control in Punjab.

Moreover, as part of the work on analyzing Integrated Health Week and Special Needs Children Screening datasets, the Department has demonstrated a growing interest in merging various datasets, including poverty, income, and other social indicators, to perform more detailed analyses at finer geographical levels (tehsils and districts). Such analyses have not been undertaken before and can significantly enhance the tailoring of health services to local needs.

This work has the potential to influence federal and provincial health departments in their approach to program delivery, impact measurement, and resource allocation. By building M&E capacity at the provincial level, the program can foster a culture of evidence-based decision-making that permeates through to the national level.



Provincial teams involved in the HCP are also contributing to the design of the Prime Minister's Hepatitis Elimination Program, ensuring that best practices and robust M&E frameworks are adopted at a national scale.
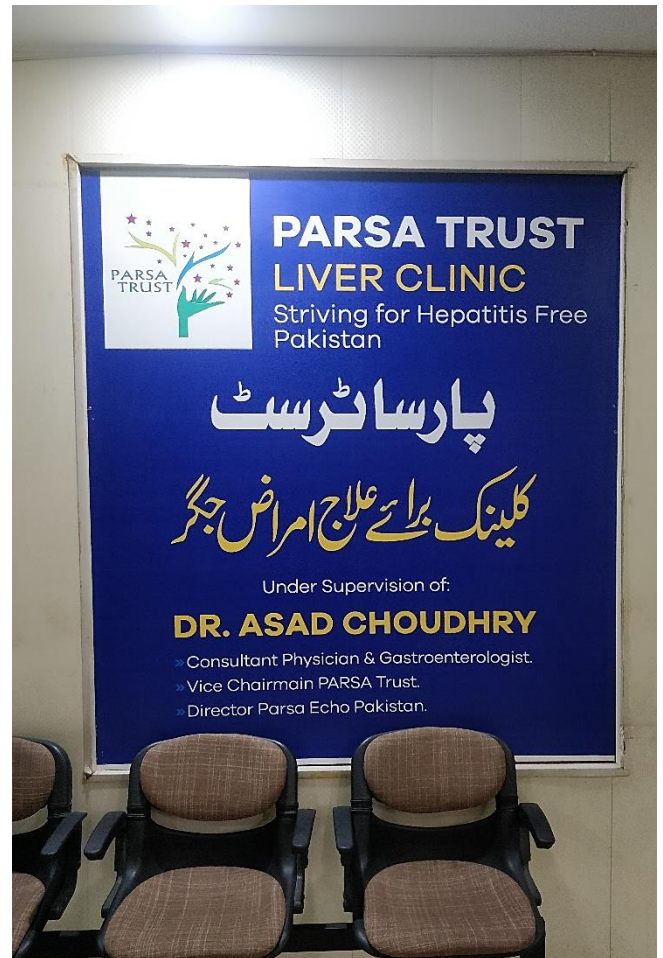
## 1.3      Long-Term Engagement and Knowledge Sharing

CERP, CLEAR PCA's host institution and P&SHD have formalized their collaboration through a Memorandum of Understanding (MoU), ensuring a long-standing engagement.

This partnership aims to develop knowledge products, such as webinars and blog posts, to communicate the vision for change and highlight the importance of building M&E capacity. This approach aims to institutionalize sound M&E practices and promote evidence-based decision-making across health-related government initiatives.

# Methods

By addressing data challenges and leveraging the strategic importance of the HCP, this diagnostic report aims to set a precedent for enhancing M&E systems across other health programs, ultimately contributing to better health outcomes and the elimination of hepatitis in Punjab and beyond.

To conceptualize challenges in the effective use of data systems in monitoring and evaluation, the Performance of Routine Health Information System (PRISM) framework identifies several challenges in the improved data quality and continuous use of information. This framework was established as part of the MEASURE Evaluation, funded by the United States Agency for International Development (USAID). The PRISM framework and the associated tools were developed for global use, and has been applied in diverse countries of Africa, Asia, Latin America, and Caribbean continents. [1]

RHIS performance is affected by three categories of determinants: technical, behavioral, and organizational (Figure 3).

**Figure 3|**   **PRISM Framework**
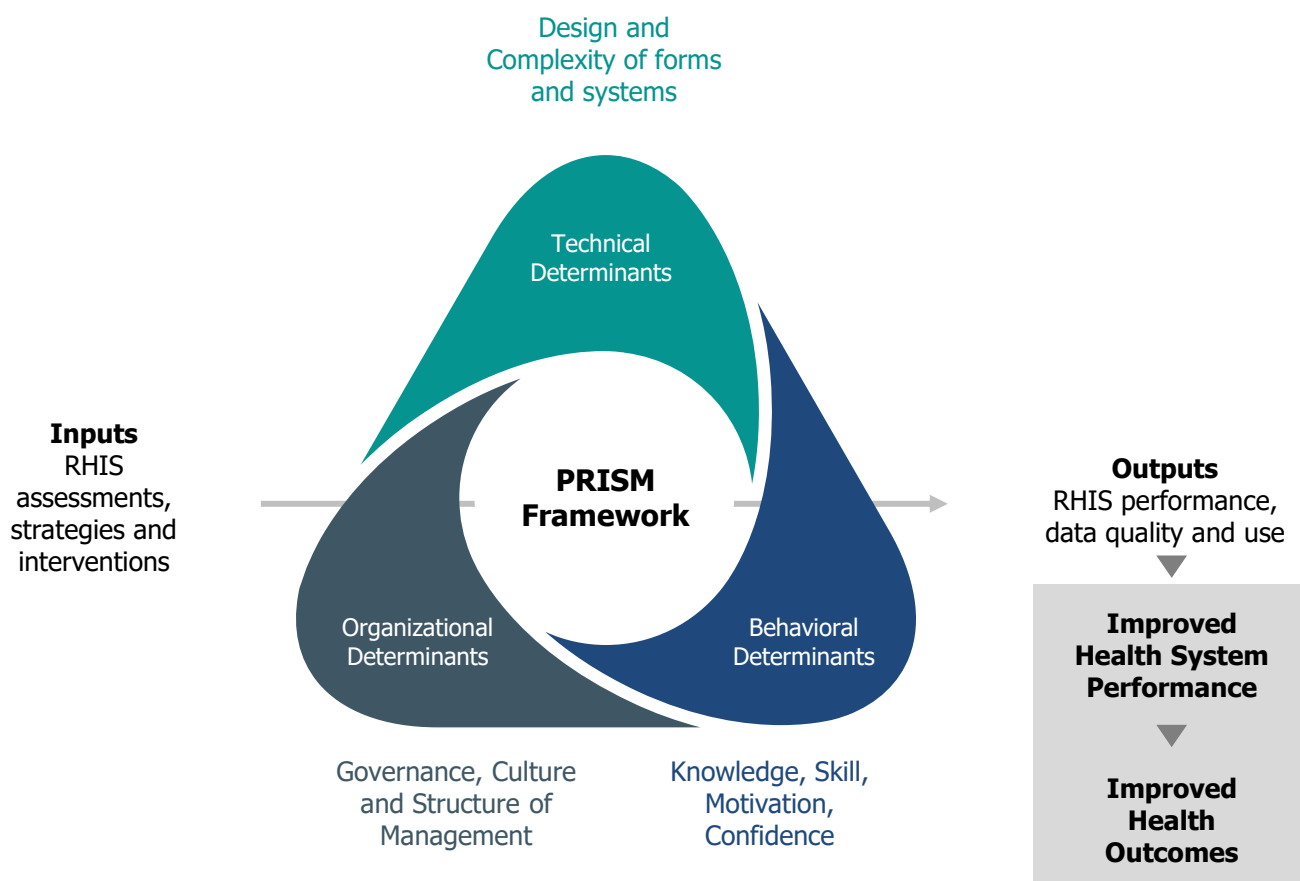


The PRISM framework assesses the impact of data system processes (including data collection, transmission, processing, analysis, display, and feedback) on its performance, while also pinpointing technical, behavioral, and organizational factors that contribute. A theory of change of how these factors contribute to the overall health impacts of a program's data system has been illustrated in Figure 4.

**Figure 4|** **PRISM Framework for HIS Evaluation**



Inputs

**RHIS Determinants**

**Technical Factors**
- Complexity of the reporting form, procedures
- HIS design
- Computer software
- IT Complexity

**Behavioral Factors**
- Level of knowledge of content of HIS forms
- Data quality checking skill
- Problem-solving for HIS tasks
- Competence in HIS tasks
- Confidence levels for HIS tasks
- Motivation

**Organizational Factors**
- Critical management functions & information needs
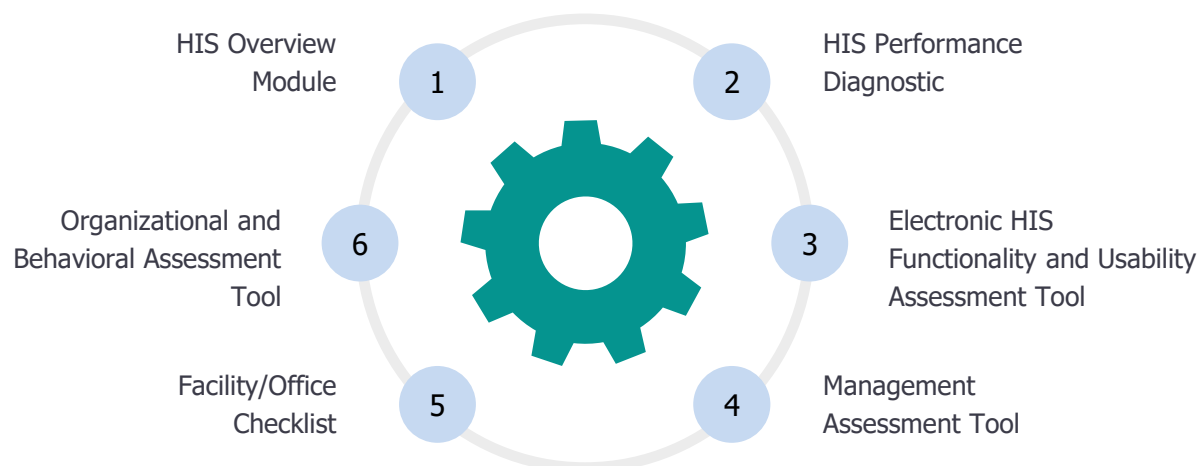- Governance
- Planning
- Training
- Supervision
- Finances
- Promotion of culture of information
- Availability of resources

Process

**RHIS Process**
- Data collection
- Data transmission
- Data processing
- Data analysis
- Data presentation
- Data check
- Feedback

Diagnostic Tool

Outputs

**Improved RHIS Performance**
- Data Quality
- Information Use

MAT

Facility/Office Checklist

Outcomes

- Improved Health System Performance

OBAT

Impact

- Improved health status

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The PRISM framework empirically examines the interplay among technical, behavioral, and organizational determinants on HMIS processes and performance. It sheds light on whether these determinants directly impact performance or operate indirectly through behavioral processes or interactions with each other.

To facilitate the application of the PRISM framework, six tools were used:

HIS Overview Module — 1

HIS Performance Diagnostic — 2

Organizational and Behavioral Assessment Tool — 6

Electronic HIS Functionality and Usability Assessment Tool — 3

Facility/Office Checklist — 5

Management Assessment Tool — 4

Surveyor-reported tools were digitized over Survey CTO, while self-reported tools were digitized over Google Forms.

Details on the assessment methods are included in Annexure 3.

Districts have been selected to account for the various information sources i.e., teaching hospitals, partner hospitals, DHQs, THQs, RHCs and Dispensaries. Given the zonal categorization of the province, and the operational demarcations between the zones, one district was selected from each zone.
Interviews were also conducted at HISDU and the HCP.

# Findings

The findings from this assessment are presented in three subsections.  The HCP Overview subsection describes   the   various   information systems and highlights the strengths and weaknesses of the HCP data systems. A summary of this information has been presented as a data flow diagram at the end of this subsection (Figure 10). The second subsection is a description of the technical, behavioral, and organizational determinants of HCP data system performance. The third highlights challenges that the facilities experience in entering electronic data.

## 3.1.    Overview of Hepatitis Control Clinic Data System

### I.    Health System

As mentioned in the Introduction, there are a total of 237 Hepatitis Control Clinics operating in Punjab. It is worth noting that the public sector for health is demarcated into the P&SHD, as well as the Specialized Healthcare and Medical Education Department (SHC&MED). The HCP falls under the Director General of Health Services (DGHS) for Vertical Programs. The DGHS reports to the Special Secretary of Operations, who reports to the Secretary, P&SHD.

While the HCP falls under the organogram of the P&SHD, 20 Teaching Hospitals are governed by the SHC&MED. These facilities do not report data to their respective District Health Authorities (DHAs), and do not fall under the management of the HCP. This demarcation means that the District Health Officers (DHOs) of relevant districts do not receive Hepatitis data from Teaching Hospitals. By contrast, the DHOs and P&SHD manage RHCs, THQs and DHQs, (along with Dispensaries and Partner Facilities).

Further, five Centers of Excellence were established as Autonomous Medical Institutes under the PC-1 for the Hepatitis Control Program (including Sheikh Zayed Medical College & Hospital, Rahim Yar Khan; Nishtar Medical University & Hospital, Multan; Rawalpindi Medical University / Holy Family Hospital, Rawalpindi; Ameer-ud-din Medical College / Lahore General Hospital, Lahore; and Pakistan Kidney & Liver Institute & Research Center, Lahore). Following their construction, however, there has been considerable uncertainty at the facility-level as to whether they fall under the hierarchy of the P&SHD or the SH&MED. As a result of this, these clinics often experience limited stocks of essential commodities (listed in Section 1.4.3). As with Teaching Hospitals, these facilities do not report data to their relevant DHOs.

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**Teaching Hospitals are governed by the SHC&MED**

Although implementation was pending as of the conduct of this assessment, seventeen facilities of the 237 Hepatitis Control Clinics (including one THQ and 16 DHQs) are being transferred to the management of the PKLI. These may also fall outside HCP organogram.

There are also six facilities which have partnered with the HCP through MoUs signed with the P&SHD. These facilities are often governed through a Trust, which manages human resources and facility maintenance. The HCP provides logistical support through the DHA, including the provision of essential medication, as well as providing user access to the EMR.

The Hepatitis Control Clinics also include three Dispensaries. These were operated by a religion-based political organization until it was banned in 2019. Following this ban, infrastructure from these facilities (such as ambulances) were co-opted by the government. The DHA manages these facilities, provides them with essential commodities, and maintains a data system through the EMR.

This fragmentation is consistent with the health systems in many countries in the world. Despite efforts to achieve functional integration in the public sector, the institutions are still vertically organized with practically no interaction between them. The same pattern is also replicated in the Health Information System, in which information is not easily shared among institutions governed under different Departments.

## II.    Data Collection

Facilities usually collect data using both paper-based records, as well as electronically through the EMR. It is notable that one district was paperless, with data collected exclusively through the EMR.

### a)    Paper-based data collection

Facilities collect information through both paper-based records and electronic systems. Register-based records are entered on a case-by-case basis, often across multiple registers.

These registers are usually categorized by function, such as:

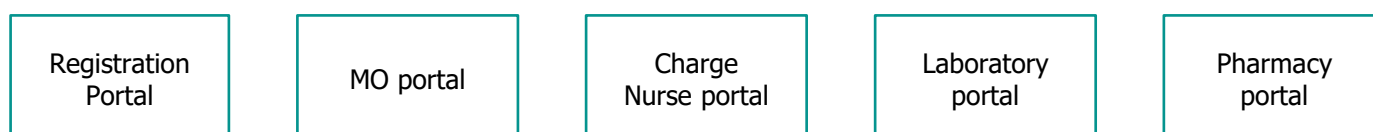| **Preventive** | **Diagnostics** | **Treatment** | **Logistics** |
|---|---|---|---|
| (vaccination and screening registers) | (PCR registers) | (OPD registers) | (inventory or stock registers) |

Some facilities also maintain lists of patients undergoing treatment and who are expected to follow up in the coming month.

### b)    Electronic Data Collection

Facilities collect information through both paper-based records and electronic systems. Register-based records are entered on a case-by-case basis, often across multiple registers.

These registers are usually categorized by function, such as:

| Registration Portal | MO portal | Charge Nurse portal | Laboratory portal | Pharmacy portal |
|---|---|---|---|---|

These portals allow entry as transactional data, i.e., the services received by the patient on a particular day.

A patient visiting a Hepatitis Control Clinic is allotted a token number at the time of registration. This token number tracks their visit. The patient is allotted a Medical Record (MR) Number, which is tied to a Computerized National Identification Card (CNIC) number. This number may either belong to the patient, or their first-degree relative (such as parent, spouse, or sibling). Demographic details are entered at the time of registration, including the patient's gender, age, telephone number and household address.

The MO or Charge Nurse then conducts a risk assessment. This risk assessment uses checkboxes in the EMR system, and includes:

- ☑ Therapeutic injections
- ☑ Blood Transfusion
- ☑ Body piercing
- ☑ HIV status
- ☑ Injectable drug user

- ☑ Hospitalization
- ☑ Dental Care
- ☑ Tattooing
- ☑ Transgendered

The MO or Charge Nurse screens the patient for Hepatitis B and C using a rapid diagnostic test kit. If the patient screens negative for Hepatitis B and C, they are provided Hepatitis B vaccine, and given a subsequent date for the next dose.

If the patient screens positive, they undergo a PCR test along with baseline investigations. Blood is collected from the patient in a serum separator tube. The EMR system generates a bar code which is printed and attached to the tube. P&SHD-run facilities send this sample to a centralized laboratory in Lahore via courier service. If they are diagnosed positive through PCR, they undergo treatment, with follow-up dates auto generated by the EMR system. Results are made available through the EMR, and treatment details are entered to the system by the MO.

Following a year of treatment, the system automatically selects a date for PCR to assess the patient's sustained virologic response (SVR), which indicates that they are no longer disease positive.

A flow-chart of how data pertaining to these services are entered to the HIMS EMR has been presented in Figure 5.
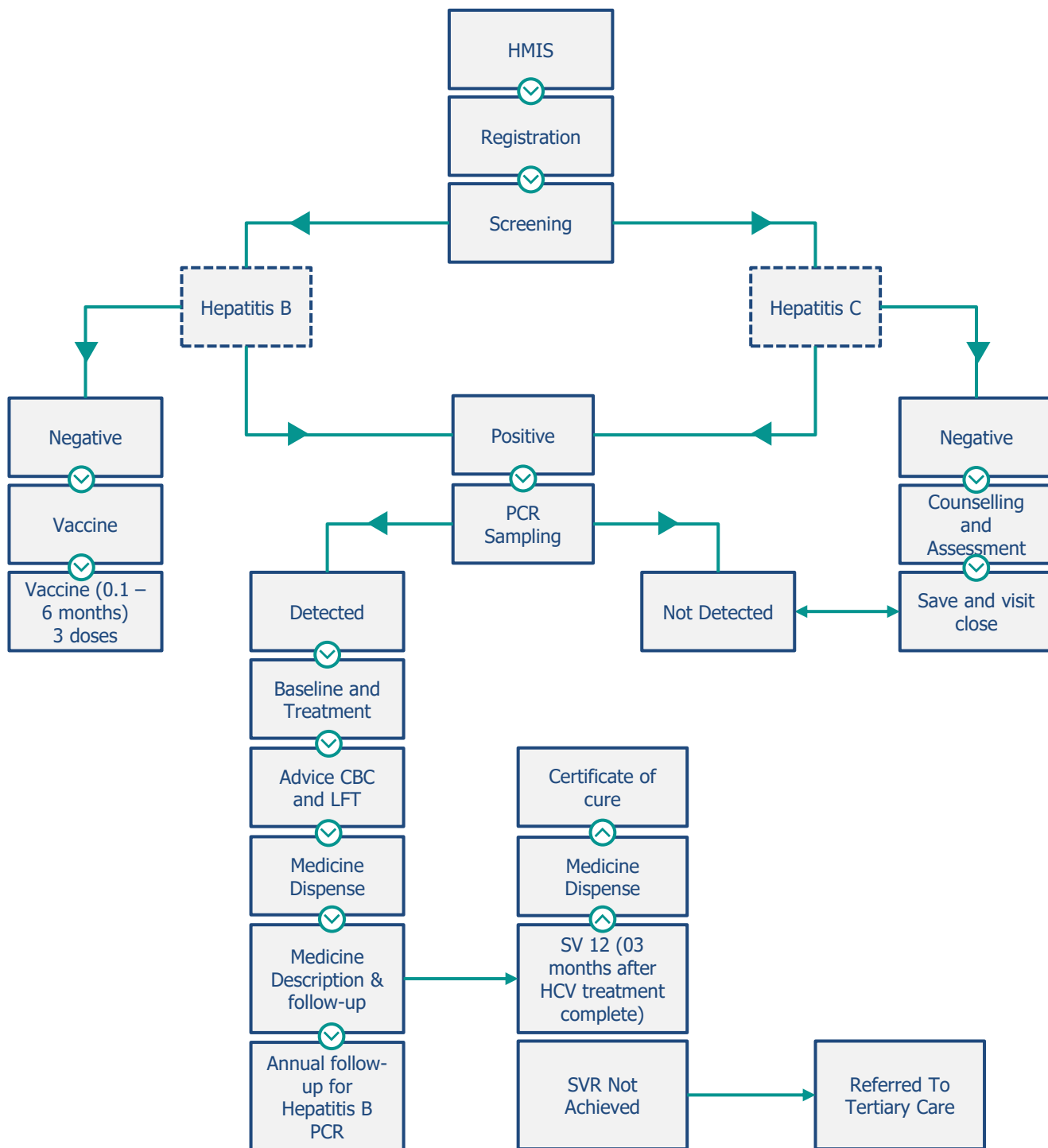
Screenshots of each have been provided as part of Annexure 4.

Based on this service delivery package, the HMIS enters the information to the following flowchart:

Often, facilities record entries to the EMR from their paper-based records. In some instances, this takes place after clinic hours.
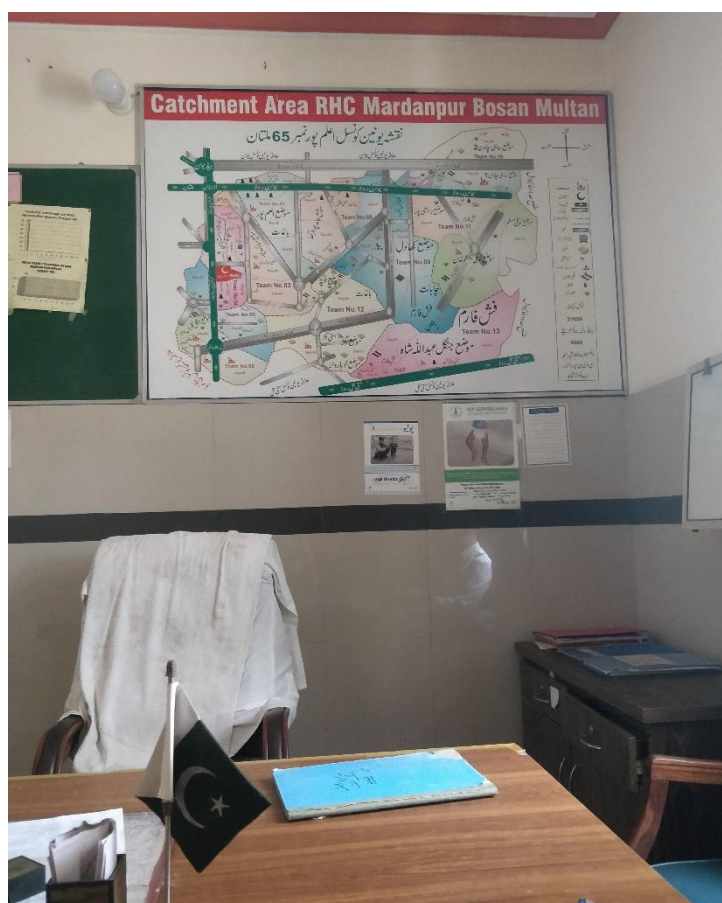
**Figure 5 |**   **Flowchart of the information entered to the EMR system**

```
                        HMIS
                         ⌄
                     Registration
                         ⌄
                      Screening
        ┌────────────────┴────────────────┐
   [Hepatitis B]                      [Hepatitis C]
   ┌────┘    └──────────┐          ┌──────────┘    └────┐
 Negative              Positive                      Negative
   ⌄                     ⌄                              ⌄
 Vaccine              PCR Sampling              Counselling and
   ⌄              ┌──────┴──────┐                 Assessment
 Vaccine       Detected    Not Detected  ◄──►          ⌄
 (0.1 –           ⌄                         Save and visit
 6 months)     Baseline and                     close
 3 doses       Treatment
                  ⌄
               Advice CBC
               and LFT        Certificate of
                  ⌄              cure
               Medicine            ⌃
               Dispense        Medicine
                  ⌄            Dispense
               Medicine            ⌃
               Description &   SV 12 (03
               follow-up ───► months after
                  ⌄            HCV treatment
               Annual follow-  complete)
               up for
               Hepatitis B     SVR Not      ───► Referred To
               PCR             Achieved           Tertiary Care
```

## III.      Data Transmission

Data transmission is a critical step in the data lifecycle, ensuring that collected information is communicated efficiently from healthcare facilities to central authorities. This subsection details the current practices and challenges in data transmission within the hepatitis control program in Punjab.

### a)      Daily Logistics Reporting to the HCP

Facilities report logistics information, such as the amount of vaccines, medications and testing kits in stock and comparisons between on-site stocks and EMR records. This information is reported daily via Google Forms. This method aims to streamline the reporting process and ensure that the HCP receives timely and accurate stock information.

### b)      Monthly Reporting to DHOs

Facilities governed by the P&SHD, including RHCs, THQs, DHQs, dispensaries and partner facilities, are required to send monthly reports. These reports include stock information, screenings performed, and the number of positive patients. It is notable that some facilities enter the monthly report as hand-written tallies on a printed sheet, which lists the various domains of the DHO's interest. Some facilities extract this information from paper-based records, while others use the EMR for this purpose. which can introduce delays and errors in data transmission. Facility visits are also conducted by the Secretary's Operations Monitoring Unit (SOMU).

Facilities typically send their reports as attachments via WhatsApp, which, while convenient, may not be the most secure or reliable method for transmitting sensitive health data.
Facilities that fail to comply with reporting requirements are issued show-cause notices. This measure is intended to enforce accountability and ensure that all facilities adhere to reporting standards.

Data, as it flows through the HCP, has been included as Figure 6.

### c)      Communication Channels

WhatsApp Groups: Medical Officers (MOs) at each facility are included in multiple WhatsApp groups to facilitate communication and coordination. These groups include:

- **District HCP**

  MOs from every facility in a district, along with district staff and HCP personnel

- **MO groups**

  For general communication among medical officers.

- **IT groups**

  For technical support and troubleshooting related to data systems. This group typically includes personnel from HISDU, and staff lodge complaints regarding their difficulties with the EMR.

○ **Logistics**

Staff request for logistics and restocking essential commodities through these WhatsApp groups.
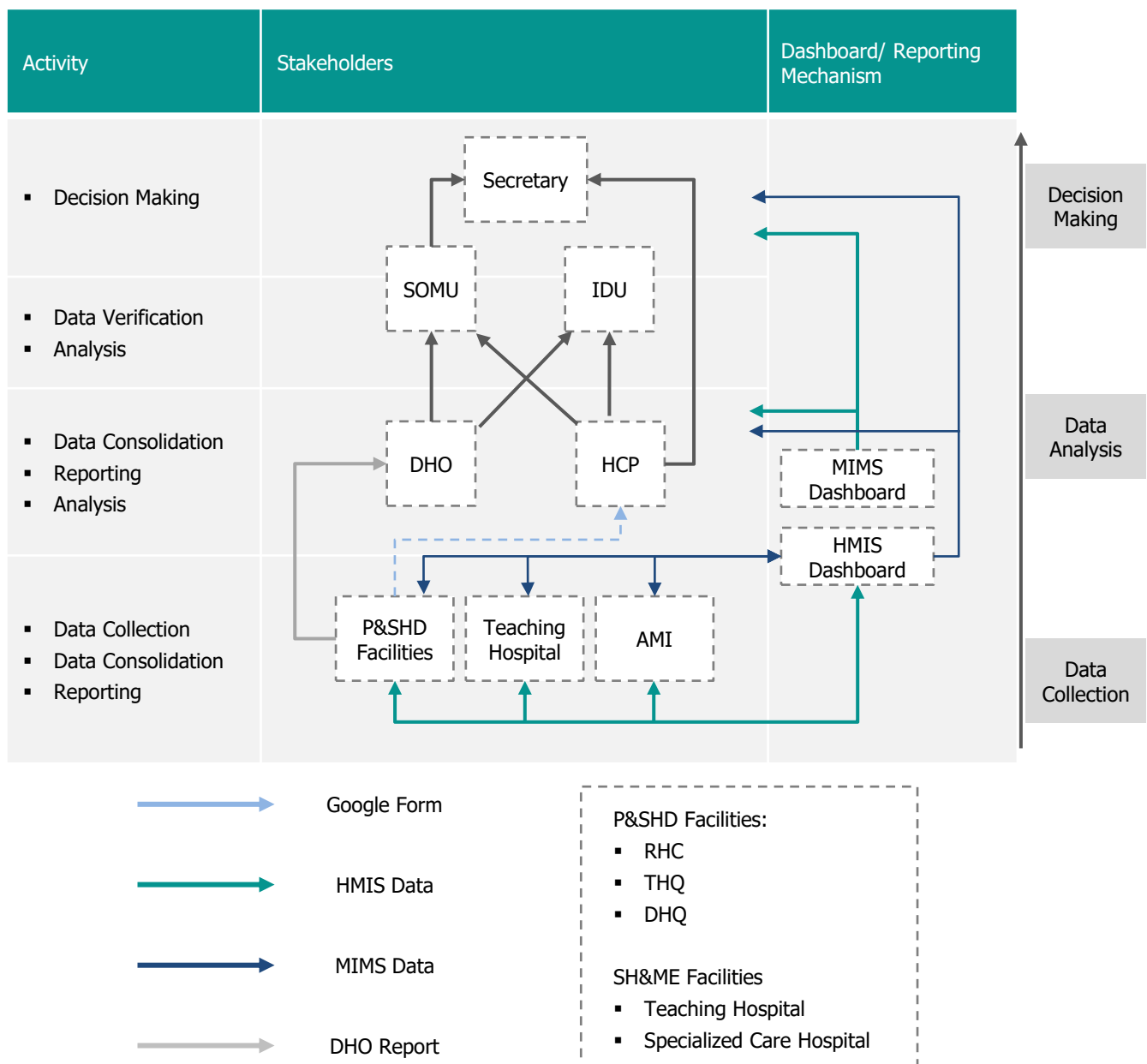
○ **MO groups**

For general communication among medical officers.

○ **HISDU / HIMS update**

Announcement group.

**Figure 6|  Data Flow through the HCP**

## IV.    Data Processing and Analysis

### a)    Data processing at a facility-level

Some of the facilities sampled, including a large THQ, DHQs and Teaching Hospitals, employed a Statistical Officer, whose job was to compile data tables and to fulfill reporting requirements.

Throughout, data was reported in table format. No analytics or visualizations were performed by the health facilities.

### b)    Punjab's Dashboards

Service delivery-level data collected through the EMR are collated to a dashboard developed by Health Information and Service Delivery Unit (HISDU). This dashboard only displays input and output-level data and does not measure key outcomes or impact of the program.

Facility-level information is collated to a Health Facility Dashboard, while Hepatitis-specific information is collated to the Hepatitis Control Program Dashboard. Information displayed can be disaggregated by division, district, tehsil, healthcare facility types and dates. Information displayed include the number of patients registered (new and revisits), patients served, screened, diagnosed by PCR, and vaccinated, and medications prescribed. This information can be viewed through a map of the province. A screenshot of this dashboard has been included as Figure 7.

**Figure 7|    Hepatitis Control Program Dashboard**



This dashboard is one of over 90 maintained by HISDU, a screenshot of which has been attached as Figure 8. Broadly, these dashboards collate information from health facilities, and can be categorized as:

- **Administrative and Monitoring dashboards**

    Finance, Health Facility Admin, IT, Local Purchase and Procurement, and Logistics

- **Vital statistics**

    Birth/Death/Fitness, Electronic Medical Certificate dashboards

- **Clinical and Surgical Services**

    Ear Nose and Throat, Eye Infection dashboards, Operation Theater and Anesthesia Management dashboards

**○  Specialized Programs**

Sehat Sahulat Card claims and verification, tuberculosis management and HCP-related dashboards.

**○  Diagnostic and Imaging**

Medical Imaging, Ultrasonography, X-Ray etc.

### c)  Federal-Level Dashboards

Some DHOs entered Hepatitis Data to the District Health Information System (DHIS-2) dashboard, made available through the Ministry of National Health Services Regulation and Coordination (Federal-Level).

It is to be noted that not every DHO entered data on the DHIS-2 system, and that information for Hepatitis usually pertained to the in-patient case load rather than those coming through out-patient services. DHIS-2 comes equipped with a variety of built-in tools for visualizing data, such as pivot tables, charts, maps, and other visualizations, which can then be shared with others in pdf or image format. These images are usually imported to presentations, based on the need of the DHO. A screenshot of the DHIS-2 has been included as Figure 9.

**Figure 8|**  **Dashboards maintained by HISDU**
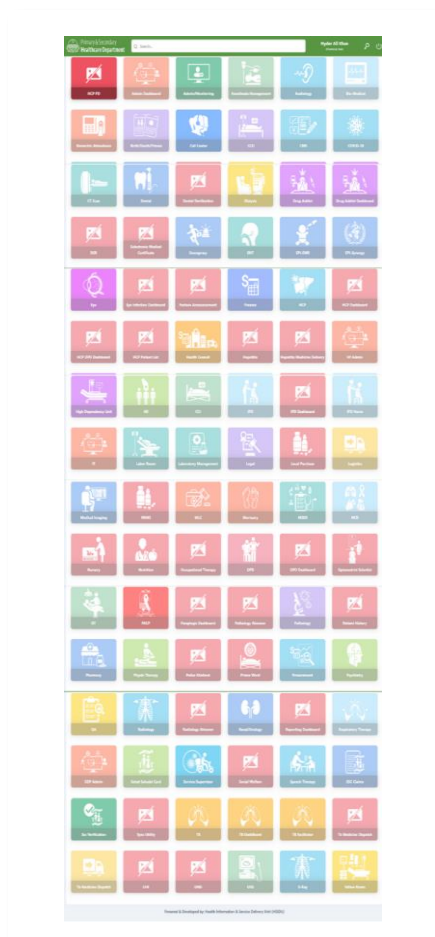


**Figure 9|**  **Ministry of National Health Services Regulation and Coordination's Health Information System.**
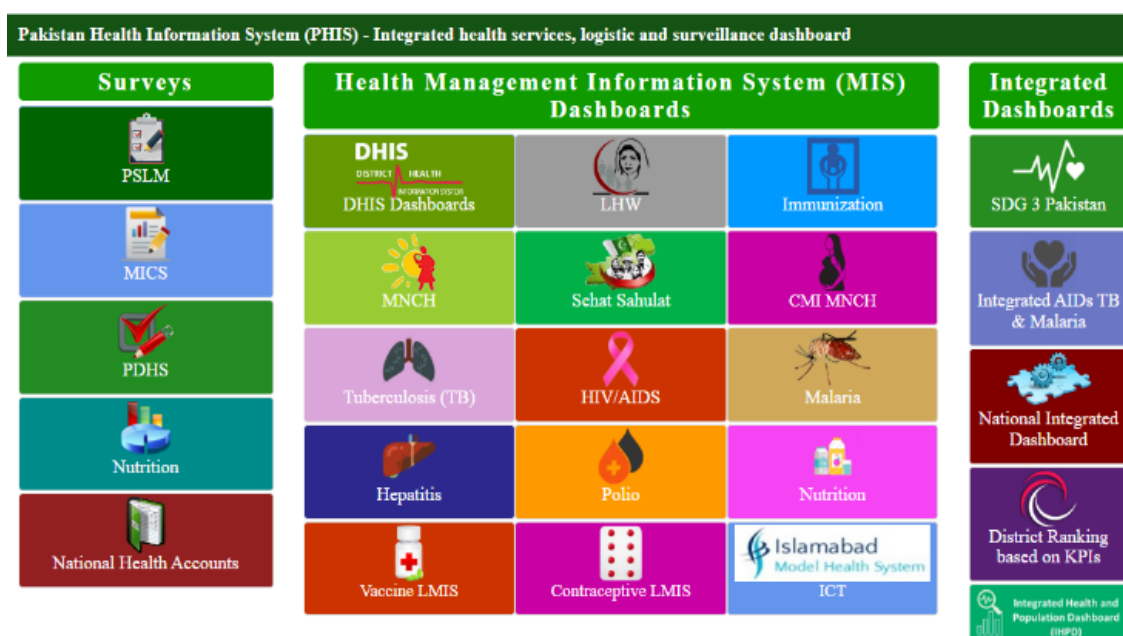
## 3.2.    Determinants of Data System Performance

Determinants of data system performance have been reported under Technical, Behavioral and Organizational determinants.

### I.        Technical Determinants

The PRISM framework identifies many technical issues which can affect electronic data system performance.

These technical issues include:

| | |
|---|---|
| The absence of the procedure manual and standard operating procedures. | User-friendliness of data collection forms and software, management of information technology. |
| Inability of software integrating information from other information systems, limiting its ability to provide a comprehensive picture of a health system performance. | EMR data is only downloadable as a pdf format, reducing the ability to conduct analysis. |

Respondents reported an absence of procedure manuals and standard operating procedures. The absence of guidelines was especially pertinent with data quality checks.

On the District-Level, there was a designated Data Officer for compiling reports from health facilities. Quality control processes were lacking, however. One district mentioned that they conduct year-on-year trend analysis to assess discrepancies in data, but there was no evidence that this has been institutionalized. Most districts mentioned that they engage in quality checks by comparing paper-based records against EMR data. Data entry staff had not received any on-job training on data entry/compilation or data review and quality control.

While aggregated/summary HIS reports for the past three months were available, these lacked rate calculations for facility catchment areas in the district and comparisons with targets for hepatitis elimination. Data was not sex-disaggregated, and lacked comparisons of service coverage (e.g. screened, diagnosed, treated, achieving SVR).

EMR data outputs are in pdf format, which makes it difficult to conduct secondary analysis. Staff conducting analysis bypass this by seeking information from facilities over Google Forms. Further, EMR output needs to be in a form which can directly be exported to reports.

## II.   Behavioral Determinants

The PRISM framework hypothesizes that behavioral factors are important determinants of health information system performance.

High self-efficacy or confidence levels to complete a task ensure that the task will be done correctly. Similarly, if one feels that performing a task will bring about a positive outcome, one is more likely to perform that task.

There is empirical evidence that people perform more those behaviors which are meaningful and have value for them. Problem solving is another skill that is necessary to use data for identifying and solving the problem.

The two ways that this was assessed were through field notes and a self-assessment by stakeholders (OBAT tool, detailed in Methods and Annexure 2). Given the small number of facilities and districts included the statistics from this cannot be reasonably extrapolated.

Our findings suggest a high level of confidence in entering data to the EMR, but lower for checking data quality. Staff at the facilities report that calculations and data interpretation were not a part of their responsibilities. Staff were confident in the quality of data, though health workers who first entered data to paper-based records before transcribing it to the EMR reported a perception that there was a higher likelihood of errors during data entry.

In general respondents also believed that entering data to the EMR brings about positive outcomes, although some felt that they are unaware of the impact of their work in managing the burden of hepatitis.

## III.   Organizational Determinants

The PRISM framework categorizes organizational determinants as:

| | |
|---|---|
| Presence of written guidelines standardized operating procedures and plans. | Training plans and capacity building |
| Supportive supervision | Availability of resources |

### a)    Lack of Standard Operating Procedures, Written Guidelines on HIS, and Plans

DHOs and the HCP did not have written documents describing the EMR mission, roles, and responsibilities that are related to strategic and policy decisions at the district and higher levels.

These stakeholders, along with facilities, also lacked written standard operating procedures and procedural guidelines for the HIS, such as:

| Data definitions | Data collection and reporting | Data aggregation, processing, and transmission | Data analysis, dissemination, and use |
|---|---|---|---|

| Data quality assurance | Data security | Data storage | Performance improvement processes |
|---|---|---|---|
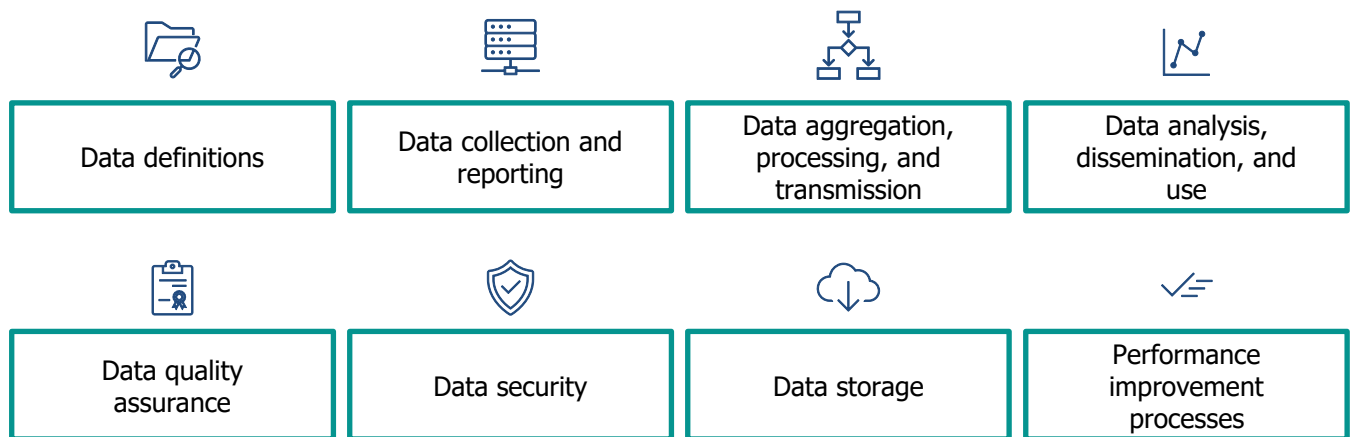
Similarly, no DHA had HIS performance targets or tracking on data accuracy, although every facility was sending complete data in a timely manner.

### b)    Lack of Training Plans

While facility staff interviews suggested that some had received training on the latest version of the EMR upon its launch, training manuals were not present at any DHA office, or in the HCP. Indeed, interviews suggested that the training was a demonstration of EMR usage, so it is likely that no training manual was developed.

### c)    Supportive Supervision

Every DHO conducted visits to the Health Facilities, with at least four visits in the past three months. These visits were not logged, as no DHO had visit reports. Feedback is either given verbally on-the-spot during visits or is shared over WhatsApp if feedback is generalized to every facility.

### d)    Availability of Resources

All of the facilities surveyed had a computer, located in an air-conditioned room. However, 25% of facilities reported that they do not have reliable internet access from the facility. In such facilities, staff reported that they use their own internet devices to use the EMR.
All of the clinics had access to a generator, and none reported electricity interruptions. The facilities also reported the availability of selected registers and forms, suggesting that supplies for paper-based data systems are quite good.

## 3.3.    Challenges in Data Management

Despite the implementation of an EMR system to streamline data collection and management, facilities face several challenges that impact the accuracy, efficiency, and comprehensiveness of data entry and management. These challenges can hinder the effectiveness of monitoring and evaluation efforts for hepatitis control. In most instances, facilities have developed workarounds to help overcome these challenges.

| I.    Inability to Add Fresh Screening Over Time | |
| --- | --- |
| **Issue** | **Workaround** |
| The EMR system does not allow for editing the screening section once initial data is entered. This poses a problem when a patient who initially screened negative for Hepatitis B or C later tests positive. The inability to edit screening information does not account for possible human errors during data entry. Mistakes cannot be corrected, leading to potential inaccuracies in patient records and treatment plans. | Facilities report generating a new Medical Record (MR) number using a first-degree family member's CNIC to include the updated disease status. This workaround can lead to fragmented patient records and data inaccuracies. |

| II.    Continued Treatment for Hepatitis B | |
| --- | --- |
| **Issue** | **Workaround** |
| After a year of treatment, particularly for Hepatitis B, the EMR does not permit continued dispensation of medication. Hepatitis B often requires lifelong treatment, and this limitation disrupts continuity of care. | To continue treatment, a new MR number may be generated, or the patient is logged as a "relapse" case if this is not feasible. Both solutions can distort patient histories and treatment tracking. |

| III.    Logging End Stages of Viral Hepatitis | |
| --- | --- |
| **Issue** | **Workaround** |
| The EMR does not track end-stage complications of viral hepatitis, such as liver cirrhosis, liver failure, or hepatocellular carcinoma. This gap hinders the ability to monitor treatment failures and measure reductions in morbidity and mortality due to hepatitis interventions. | None |

## IV.  Medication and Stock Mismatches:

| Issue | Workaround |
|---|---|
| Medication and stock levels are automatically deducted by the EMR, even inappropriately. For instance, when a pre-diagnosed hepatitis patient does not require a rapid diagnostic test kit, the stock is still deducted, causing discrepancies in inventory records. | Facilities send logistic information to the HCP via google form and use their stock registers to enter data to monthly reports to the DHO. |

## V.  Patient Triage Limitations

| Issue | Workaround |
|---|---|
| Tokens allocated during patient registration do not account for the severity of the patient's condition. This limitation prevents effective triage and prioritization of patients based on their medical urgency. | None |

## VI.  Unserved Patients in EMR

| Issue | Workaround |
|---|---|
| Patients visiting for laboratory tests or counseling without receiving medication may be logged as "unserved" in the EMR. This misclassification can affect the accuracy of service delivery records. | None |

## VII.  Challenges with Demographic Data Entry

| Issue | Workaround |
|---|---|
| Entering demographic information can be problematic. Some patients lack mobile phones, and small towns often use landmarks and PO Boxes instead of street numbers, complicating accurate data entry. | None |

## VIII.  Data Entry Burdens in High-Volume Clinics

| Issue | Workaround |
|---|---|
| High-volume clinics struggle with data entry into the EMR, especially when maintaining concurrent paper-based records. This dual system increases the workload and potential for errors and omissions. | These clinics enter data in the EMR after clinic hours. This delayed entry potentially increases the likelihood of typographical errors in data entry. |

### IV.     Medication and Stock Mismatches:

| Issue | Workaround |
|---|---|
| Medication and stock levels are automatically deducted by the EMR, even inappropriately. For instance, when a pre-diagnosed hepatitis patient does not require a rapid diagnostic test kit, the stock is still deducted, causing discrepancies in inventory records. | Facilities send logistic information to the HCP via google form and use their stock registers to enter data to monthly reports to the DHO. |

### IX.     Unachievable Monthly Screening Targets

| Issue | Workaround |
|---|---|
| Smaller tehsils often struggle to meet monthly screening targets. | To compensate, they conduct health camps to boost screening numbers, which can be logistically challenging and resource intensive. |

### X.     Overloaded EMR Dashboards:

| Issue | Workaround |
|---|---|
| EMR dashboards may display all patients across all verticals, making it difficult to parse information needed for monthly DHO reports. This is especially true for MOs who have current charge for other functions, such as overseeing medicolegal cases, or other verticals. This overload complicates data analysis and reporting. | None |

### XI.     Focus on Screening Over Treatment:

| Issue | Workaround |
|---|---|
| Current targets emphasize the number of screenings conducted rather than the number of patients receiving treatment. This focus can lead to an imbalance in resource allocation and a lack of comprehensive care for diagnosed patients. | None |

### XII.     Difficulties in registering complaints to HISDU

| Issue | Workaround |
|---|---|
| Facilities log complaints or difficulties in using the EMR to a WhatsApp group. There are no standard operating procedures regarding the handling of complaints, including turnaround time. This results in clinic operators perceiving that their complaints remain unresolved. | None |

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# RECOMMENDATIONS

Based on the comprehensive analysis of the data systems used in hepatitis control clinics, several recommendations have been identified to enhance the quality, accuracy, and usability of the collected data. These recommendations aim to address the challenges faced during data collection, transmission, processing, and usage. Implementing these recommendations can strengthen the overall M&E framework and contribute to the successful elimination of hepatitis by 2030.

By implementing these recommendations, the Punjab Department of Primary and Secondary Healthcare can significantly improve its data systems, leading to more effective monitoring, evaluation, and ultimately, better health outcomes for the population.

## 4.1. Training and Personnel Capability Guidelines

### a) Developing Written Guidelines

- Create and distribute comprehensive procedure manuals and SOPs covering data definitions, collection and reporting, aggregation, processing, transmission, analysis, dissemination, quality assurance, and data security.

### b) Build Capacity through Training

- Conduct regular training sessions for facility staff on EMR system use, data entry best practices, and the importance of accurate data collection.
- Include training on M&E, indicator development, and data analysis techniques to enhance capabilities at facilities, DHOs, and provincial departments.
- Provide induction training for new staff to standardize data entry and ongoing training for updates and refresher courses.

### c) Improve Entry of Demographic Data

- Simplify demographic data entry by allowing flexible address fields and alternative contact methods.
- Integrate the EMR system with NADRA to automatically populate demographic information using CNICs, helping to standardize difficult variables such as address and age.

Although implementation was pending as of the conduct of this assessment, seventeen facilities of the 237 Hepatitis Control Clinics (including one THQ and 16 DHQs) are being transferred to the management of the PKLI. These may also fall outside HCP organogram.

There are also six facilities which have partnered with the HCP through MoUs signed with the P&SHD. These facilities are often governed through a Trust, which manages human resources and facility maintenance. The HCP provides logistical support through the DHA, including the provision of essential medication, as well as providing user access to the EMR.

The Hepatitis Control Clinics also include three Dispensaries. These were operated by a religion-based political organization until it was banned in 2019. Following this ban, infrastructure from these facilities (such as ambulances) were co-opted by the government. The DHA manages these facilities, provides them with essential commodities, and maintains a data system through the EMR.

This fragmentation is consistent with the health systems in many countries in the world. Despite efforts to achieve functional integration in the public sector, the institutions are still vertically organized with practically no interaction between them. The same pattern is also replicated in the Health Information System, in which information is not easily shared among institutions governed under different Departments.

## 4.2.    Systems Improvement Guidelines

### d)        Standardize Data Collection Formats

- Develop and mandate standardized data collection formats across all districts for both paper-based and electronic records. Implement these formats as part of the existing system or use Google Forms, with DHOs having access to collected data, reducing reporting burdens.

### e)        Enhance EMR Functionalities for Improved Disease Monitoring and Planning

#### i.        Streamline EMR Capture of New Screening Data

- Implement an addendum feature that allows data entry personnel including healthcare providers to easily add new screening data to existing patient records. This approach would prevent the unnecessary creation of new MR numbers and ensure all patient information is centralized.

#### ii.        Incorporate function for Chronic Disease Management

- Modify the EMR system to allow for continuous documentation of treatment plans, medication adjustments, and clinical encounters beyond a one-year timeframe. This is crucial for chronic conditions like Hepatitis B, where long-term management is essential.

#### iii.        Expand Indicator Lists

- Introduce new indicators within the EMR to capture data on end-stage complications (e.g., liver cirrhosis, liver failure, hepatocellular carcinoma) and other relevant indicators based on specific disease profiles.
- Expand the "gender" category to include transgender individuals for developing gender-inclusive healthcare plans and interventions.

### f)        Optimize Data Entry Workflows for High-Volume Clinics

- Provide additional support and resources for high-volume clinics, such as employing additional staff for data entry tasks or utilizing advanced data entry technologies such as speech recognition software and scannable forms where pre-populated forms and templates with relevant fields can be scanned and integrated into the EMR, reducing manual data entry and ensuring efficient data management.

## 4.3. Setting Realistic and Effective Goals

### g) Adjust Screening Targets

- Set realistic and achievable screening targets based on tehsil capacities, integrating EMR data with census data to set targets as proportions of the tehsil population. This approach ensures that screening efforts are tailored to the capacity of each local area

### h) Incorporate Treatment Metrics into Targets

- Expand performance metrics to include not only the number of patients identified through screening but also the number who receive and complete necessary treatment. These targets should also be established as proportions of the tehsil population. This shift in focus ensures that the program prioritizes not just identification but also successful treatment outcomes.

## 4.4. Data Transmission and Processing

### i) Streamline Reporting Processes

- Utilize automated reporting tools within the EMR to generate monthly reports directly, reducing manual data extraction and entry. Automate report distribution to specific stakeholders on set dates.

- Enable the export of raw data in multiple formats (e.g., Excel) from the EMR for further analysis and reporting flexibility.

- Customize the HISDU dashboard to allow users to view reports in various formats, enhancing usability.

### j) Implement Secure Data Sharing Practices

- To safeguard sensitive patient information, gradually transition away from WhatsApp-based data sharing and adopt secure, automated data transfer tools. This will ensure data remains protected throughout the reporting process.

- Implement automated reporting processes to streamline data sharing and minimize manual intervention. This will not only improve efficiency but also strengthen data security by reducing the risk associated with manual data transfer through unsecured channels.

### k)    Improve Data Integration and Interoperability

- Integrate the EMR with other relevant data systems, including population statistics and national health databases, to enable accurate coverage rate calculations and targeted interventions.

### l)    Address Stock Management Issues

- Refine the EMR's stock management system to prevent inappropriate deductions and ensure accurate inventory records.

## 4.5.    Data Analysis and Information Use

### m)    Optimize EMR Dashboards

- Customize EMR dashboards for filtering patient data by specific verticals or criteria, facilitating easier data analysis and reporting. Enable data export in multiple formats, including Excel, for further analysis.

### n)    Leverage Data Visualization for Enhanced Analysis

- Utilize data visualization tools such as PowerBi to simplify complex datasets through charts and graphs, aiding in data comprehension, retention, and trend identification. This will make it easier for stakeholders at all levels to understand the information. If technical limitations exist, consider exporting data to a user-friendly platform like Excel for visualization purposes.

## 4.6.    Information Use at Different Levels

### o)    Facility Level

- Foster a culture of data-driven decision-making through workshops and seminars to equip staff with data analysis skills.

- Implement a system for providing regular feedback and coaching on data quality and usage for the staff. This ongoing support will ensure accurate data collection and analysis, leading to better informed decisions.

- Develop SOPs for how data should be used in daily operations, promoting optimal patient care and resource management.

## p)     District Level

- Strengthen supervisory structures by equipping them with standardized visit reports and compliance checklists. This will facilitate data-driven oversight and support for facilities.

- Use district-level data to identify trends, areas requiring intervention, and resource needs. This information can then be used to inform resource distribution and program adjustments for maximum impact.

## q)     Policy/Program Level

- Promote data-driven policymaking by actively disseminating program findings through policy briefs and stakeholder meetings to ensure data-informed decision making at all levels.

- Utilize comprehensive data analysis to evaluate program effectiveness and adjust targets and strategies as needed, ensuring alignment with public health goals and optimal program outcomes.

- Establish a robust complaint management system for EMR issues, logging and documenting complaints, along with clear resolution procedures and defined turnaround times. This ensures prompt and transparent issue resolution, fostering trust in the data management system.

# Annexure 1| List of Hepatitis Control Clinics

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| CENTER | Chiniot | DHQ Hospital, Chiniot | DHQ |
| CENTER | Chiniot | THQ Hospital Bhowana | THQ |
| CENTER | Chiniot | THQ Hospital Lalian | THQ |
| CENTER | Chiniot | Ulfat Trust Hospital, Chiniot | Partner |
| CENTER | Faisalabad | THQ Hospital Chak Jhumra | THQ |
| CENTER | Faisalabad | THQ Hospital Jaranwala | THQ |
| CENTER | Faisalabad | THQ Hospital Samanabad | THQ |
| CENTER | Faisalabad | THQ Hospital Samundri | THQ |
| CENTER | Faisalabad | THQ Hospital Tandlianwala | THQ |
| CENTER | Faisalabad | Allied Hospital, Faisalabad | Teaching |
| CENTER | Faisalabad | Govt. General Hospital Ghulam Muhammad Abad, Faisalabad | Teaching |
| CENTER | Gujranwala | THQ Hospital Kamoke | THQ |
| CENTER | Gujranwala | THQ Hospital Noshehra Virkan | THQ |
| CENTER | Gujranwala | THQ Hospital Wazirabad | THQ |
| CENTER | Gujranwala | Govt. Khadijatul Kubra Hospital, Gujranwala | Dispensary |
| CENTER | Gujranwala | Govt. Taiba Welfare Hospital, Qila Dildar Singh | Dispensary |
| CENTER | Gujranwala | Parsa Trust Gujranwala | Partner |
| CENTER | Gujranwala | DHQ Hospital, Gujranwala | Teaching |
| CENTER | Gujrat | THQ Hospital Civil Hospital Jalal Pur Jattan, Gujrat | THQ |
| CENTER | Gujrat | THQ Hospital Civil Hospital Kotla Arab Ali Khan | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| CENTER | Gujrat | THQ Hospital Kharian | THQ |
| CENTER | Gujrat | THQ Hospital Kunjah | THQ |
| CENTER | Gujrat | THQ Hospital Lalamusa | THQ |
| CENTER | Gujrat | THQ Hospital Sara-e-Alamgir | THQ |
| CENTER | Gujrat | Aziz Bhatti Shaheed Hospital, Gujrat | Teaching |
| CENTER | Hafizabad | DHQ Hospital, Hafizabad | DHQ |
| CENTER | Hafizabad | THQ Hospital Pindi Bhattian | THQ |
| CENTER | Jhang | DHQ Hospital, Jhang | DHQ |
| CENTER | Jhang | THQ Hospital 18-Hazari | THQ |
| CENTER | Jhang | THQ Hospital Ahmed Pur Sial | THQ |
| CENTER | Jhang | THQ Hospital Shorkot | THQ |
| CENTER | Jhang | RHC, Bagh | RHC |
| CENTER | Jhang | RHC, Garh Maharaja | RHC |
| CENTER | Jhang | RHC, Haveli Bahadur Shah | RHC |
| CENTER | Jhang | RHC, Haveli Sheikh Rajoo | RHC |
| CENTER | Jhang | RHC, Kot Shakir | RHC |
| CENTER | Jhang | RHC, Mochiwala | RHC |
| CENTER | Jhang | RHC, Mukhiana | RHC |
| CENTER | Jhang | RHC, Rodu Sultan | RHC |
| CENTER | Jhang | RHC, Shah Jewana | RHC |

| Zone | Districts | Health Facility Name | Category |
|---|---|---|---|
| CENTER | Jhang | RHC, Waryam Wala Chak No. 492/B | RHC |
| CENTER | Kasur | DHQ Hospital, Kasur | DHQ |
| CENTER | Kasur | THQ Hospital Chunian | THQ |
| CENTER | Kasur | THQ Hospital Govt. Aziz Bibi, Roshan Bheela | THQ |
| CENTER | Kasur | THQ Hospital Kot Radha Kishan, Kasur | THQ |
| CENTER | Kasur | THQ Hospital Pattoki | THQ |
| CENTER | Lahore | DHQ Mian Meer | DHQ |
| CENTER | Lahore | THQ Hospital Bilal Gunj, Lahore | THQ |
| CENTER | Lahore | THQ Hospital Chohan Road | THQ |
| CENTER | Lahore | THQ Hospital LH Samanabad | THQ |
| CENTER | Lahore | THQ Hospital Pathiground | THQ |
| CENTER | Lahore | THQ Hospital Police Line, Qila Gujjar Singh, Lahore | THQ |
| CENTER | Lahore | THQ Hospital Swaminagar | THQ |
| CENTER | Lahore | THQ Hospital Sodiwal | THQ |
| CENTER | Lahore | Al Mustafa Trust Hospital Lahore | Partner |
| CENTER | Lahore | Aap Ka Clinic, Lahore | Partner |
| CENTER | Lahore | Ganga Ram Hospital, Lahore | Teaching |
| CENTER | Lahore | Govt. Teaching Hospital, Shahdara | Teaching |
| CENTER | Lahore | ,Jinnah Hospital | Teaching |
| CENTER | Lahore | Lahore General Hospital, Lahore | Teaching |

| Zone | Districts | Health Facility Name | Category |
|---|---|---|---|
| CENTER | Lahore | Mayo Hospital, Lahore | Teaching |
| CENTER | Lahore | Services Hospital, Lahore | Teaching |
| CENTER | Mandi Bahauddin | DHQ Hospital, Mandi Bahauddin | DHQ |
| CENTER | Mandi Bahauddin | THQ Hospital Malakwal | THQ |
| CENTER | Mandi Bahauddin | THQ Hospital Phalia | THQ |
| CENTER | Nankana Sahib | DHQ Hospital, Nankana Sahib | DHQ |
| CENTER | Nankana Sahib | THQ Hospital Sangala Hill | THQ |
| CENTER | Nankana Sahib | THQ Hospital Shahkot | THQ |
| CENTER | Nankana Sahib | RHC, Syed Wala | RHC |
| CENTER | Nankana Sahib | RHC, Bara Ghar | RHC |
| CENTER | Nankana Sahib | RHC, Bucheki | RHC |
| CENTER | Nankana Sahib | RHC, More Khunda | RHC |
| CENTER | Nankana Sahib | RHC, Muhammad Pur | RHC |
| CENTER | Nankana Sahib | RHC, Rehanwala | RHC |
| CENTER | Nankana Sahib | RHC, Warburton | RHC |
| CENTER | Narowal | DHQ Hospital, Narowal | DHQ |
| CENTER | Narowal | THQ Hospital Shakargarh | THQ |
| CENTER | Okara | DHQ Hospital Okara | DHQ |
| CENTER | Okara | DHQ Hospital South City | DHQ |
| CENTER | Okara | THQ Hospital Depalpur | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| CENTER | Okara | THQ Hospital Haveli Lakha | THQ |
| CENTER | Okara | RHC, Akhterabad | RHC |
| CENTER | Okara | RHC, Bama Bala | RHC |
| CENTER | Okara | RHC, Basir Pur | RHC |
| CENTER | Okara | RHC, Battak | RHC |
| CENTER | Okara | RHC, Gogera | RHC |
| CENTER | Okara | RHC, Hujra Shah Muqeem | RHC |
| CENTER | Okara | RHC, Mandi Ahmedabad | RHC |
| CENTER | Okara | RHC, Renala Khurd | RHC |
| CENTER | Okara | RHC, Shahbore | RHC |
| CENTER | Okara | RHC, Wasaway Wala | RHC |
| CENTER | Pakpattan | DHQ Hospital, Pakpattan | DHQ |
| CENTER | Pakpattan | THQ Hospital Arifwala | THQ |
| CENTER | Sahiwal | THQ Hospital Chichawatni | THQ |
| CENTER | Sahiwal | RHC 112/9L, Sahiwal | RHC |
| CENTER | Sahiwal | RHC 185/9L, Sahiwal | RHC |
| CENTER | Sahiwal | RHC 45/12L, Sahiwal | RHC |
| CENTER | Sahiwal | RHC 55/5L, Sahiwal | RHC |
| CENTER | Sahiwal | RHC 8/11L, Sahiwal | RHC |
| CENTER | Sahiwal | RHC 96/12L, Sahiwal | RHC |

| Zone | Districts | Health Facility Name | Category |
|---|---|---|---|
| CENTER | Sahiwal | RHC Ghaziabad, Sahiwal | RHC |
| CENTER | Sahiwal | RHC Harappa, Sahiwal | RHC |
| CENTER | Sahiwal | RHC Kameer, Sahiwal | RHC |
| CENTER | Sahiwal | RHC Kassowal, Sahiwal | RHC |
| CENTER | Sahiwal | RHC Noor Shah, Sahiwal | RHC |
| CENTER | Sahiwal | Haji Abdul Qayyum Hospital, Sahiwal | Teaching |
| CENTER | Sheikhupura | DHQ Hospital, Sheikhupura | DHQ |
| CENTER | Sheikhupura | THQ Hospital Ferozewala | THQ |
| CENTER | Sheikhupura | THQ Hospital Muridkay | THQ |
| CENTER | Sheikhupura | THQ Hospital Safdarabad | THQ |
| CENTER | Sheikhupura | THQ Hospital Sharaqpur | THQ |
| CENTER | Sheikhupura | RHC, Farooqabad | RHC |
| CENTER | Sheikhupura | RHC, Jandiala Sher Khan | RHC |
| CENTER | Sheikhupura | RHC, Kala Shah Kaku | RHC |
| CENTER | Sheikhupura | RHC, Khanka Dogran | RHC |
| CENTER | Sheikhupura | RHC, Kharian Wala | RHC |
| CENTER | Sheikhupura | RHC, Manawala | RHC |
| CENTER | Sheikhupura | RHC, Narang Mandi | RHC |
| CENTER | Sheikhupura | Govt. Al-Aziz Hospital, Nangal Shahdan | Dispensary |
| CENTER | Sialkot | THQ Hospital Daska | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| CENTER | Sialkot | THQ Hospital Kotli Loharan | THQ |
| CENTER | Sialkot | THQ Hospital Pasrur | THQ |
| CENTER | Sialkot | THQ Hospital Sambrial | THQ |
| CENTER | Sialkot | RHC, Bagowala | RHC |
| CENTER | Sialkot | RHC, Chawinda | RHC |
| CENTER | Sialkot | RHC, Jamke Cheema | RHC |
| CENTER | Sialkot | RHC, Kahlian | RHC |
| CENTER | Sialkot | RHC, Kalaswala | RHC |
| CENTER | Sialkot | RHC, Satrah | RHC |
| CENTER | Sialkot | Chirag Din Community Health Centre, Sialkot | Partner |
| CENTER | Sialkot | Allama Iqbal Memorial Hospital, Sialkot | Teaching |
| CENTER | T.T Singh | DHQ Hospital, Toba Tek Singh | DHQ |
| CENTER | T.T Singh | THQ Hospital Gojra | THQ |
| CENTER | T.T Singh | THQ Hospital Kamalia | THQ |
| CENTER | T.T Singh | THQ Hospital Peer Mahal, T.T. Singh | THQ |
| NORTH | Attock | DHQ Hospital, Attock | DHQ |
| NORTH | Attock | THQ Hospital Fatehjang | THQ |
| NORTH | Attock | THQ Hospital Hassanabdal | THQ |
| NORTH | Attock | THQ Hospital Hazro | THQ |
| NORTH | Attock | THQ Hospital Jand | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| NORTH | Attock | THQ Hospital Pindi Gheb | THQ |
| NORTH | Bhakkar | DHQ Hospital, Bhakkar | DHQ |
| NORTH | Bhakkar | THQ Hospital Darya Khan | THQ |
| NORTH | Bhakkar | THQ Hospital Kalurkot | THQ |
| NORTH | Bhakkar | THQ Hospital Mankera | THQ |
| NORTH | Chakwal | DHQ Hospital, Chakwal | DHQ |
| NORTH | Chakwal | THQ Hospital Choasaiden Shah | THQ |
| NORTH | Chakwal | THQ Hospital Kallar Kahar | THQ |
| NORTH | Chakwal | THQ Hospital Talagang | THQ |
| NORTH | Jhelum | DHQ Hospital, Jhelum | DHQ |
| NORTH | Jhelum | THQ Hospital Pind Dadan Khan | THQ |
| NORTH | Jhelum | THQ Hospital Sohawa | THQ |
| NORTH | Khushab | District Headquarter Hospital (Jauharabad) | DHQ |
| NORTH | Khushab | THQ Hospital Khushab | THQ |
| NORTH | Khushab | THQ Hospital Noor Pur Thall | THQ |
| NORTH | Khushab | THQ Hospital Noshehra | THQ |
| NORTH | Khushab | THQ Hospital Qaidabad | THQ |
| NORTH | Mianwali | DHQ Hospital, Mianwali | DHQ |
| NORTH | Mianwali | THQ Hospital Isakhel | THQ |
| NORTH | Mianwali | THQ Hospital Kalabagh | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| NORTH | Mianwali | THQ Hospital Piplan | THQ |
| NORTH | Rawalpindi | THQ Hospital Gujjar Khan | THQ |
| NORTH | Rawalpindi | THQ Hospital Hosp. Kotli Sattian | THQ |
| NORTH | Rawalpindi | THQ Hospital Kahuta | THQ |
| NORTH | Rawalpindi | THQ Hospital Kallar Syedan | THQ |
| NORTH | Rawalpindi | THQ Hospital Murree | THQ |
| NORTH | Rawalpindi | THQ Hospital Taxila | THQ |
| NORTH | Rawalpindi | Municipal Medical Centre Satellite Town, Rawalpindi | Partner |
| NORTH | Rawalpindi | Benazir Bhutto Hospital, Rawalpindi | Teaching |
| NORTH | Rawalpindi | DHQ Teaching Hospital, Rawalpindi | Teaching |
| NORTH | Rawalpindi | Holy Family Hospital, Rawalpindi | Teaching |
| NORTH | Sargodha | THQ Hospital Bhagtanwali | THQ |
| NORTH | Sargodha | THQ Hospital Bhalwal | THQ |
| NORTH | Sargodha | THQ Hospital Bhera | THQ |
| NORTH | Sargodha | THQ Hospital Chak No.46/SB | THQ |
| NORTH | Sargodha | THQ Hospital Chak No.90/SB | THQ |
| NORTH | Sargodha | THQ Hospital Kot Momin | THQ |
| NORTH | Sargodha | THQ Hospital Sahiwal | THQ |
| NORTH | Sargodha | THQ Hospital Shahpur | THQ |
| NORTH | Sargodha | THQ Hospital Sillanwali | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| NORTH | Sargodha | DHQ Hospital, Sargodha | Teaching |
| SOUTH | Bahawalnagar | DHQ Hospital, Bahawalnagar | DHQ |
| SOUTH | Bahawalnagar | THQ Hospital Chishtian | THQ |
| SOUTH | Bahawalnagar | THQ Hospital Fort Abbas | THQ |
| SOUTH | Bahawalnagar | THQ Hospital Haroonabad | THQ |
| SOUTH | Bahawalnagar | THQ Hospital Minchinabad | THQ |
| SOUTH | Bahawalpur | THQ Hospital Ahmedpur East | THQ |
| SOUTH | Bahawalpur | THQ Hospital Hasilpur | THQ |
| SOUTH | Bahawalpur | THQ Hospital Kher Pur Tamewali | THQ |
| SOUTH | Bahawalpur | THQ Hospital Yazman | THQ |
| SOUTH | Bahawalpur | Bahawal Victoria Hospital, Bahawalpur | Teaching |
| SOUTH | Dera Ghazi Khan | THQ Hospital Kot Chutta (RHC) | THQ |
| SOUTH | Dera Ghazi Khan | THQ Hospital Taunsa | THQ |
| SOUTH | Dera Ghazi Khan | DHQ Teaching Hospital | Teaching |
| SOUTH | Khanewal | DHQ Hospital, Khanewal | DHQ |
| SOUTH | Khanewal | THQ Hospital Jahanian | THQ |
| SOUTH | Khanewal | THQ Hospital Kabirwala | THQ |
| SOUTH | Khanewal | THQ Hospital Mian Channu | THQ |
| SOUTH | Layyah | DHQ Hospital, Layyah | DHQ |
| SOUTH | Layyah | THQ Hospital Chaubara | THQ |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|----------------------|----------|
| SOUTH | Layyah | THQ Hospital Chowk Azam | THQ |
| SOUTH | Layyah | THQ Hospital Fatehpur | THQ |
| SOUTH | Layyah | THQ Hospital Karor | THQ |
| SOUTH | Layyah | THQ Hospital Kot Sultan | THQ |
| SOUTH | Layyah | THQ Hospital Thal (MNS) | THQ |
| SOUTH | Lodhran | DHQ Hospital, Lodhran | DHQ |
| SOUTH | Lodhran | THQ Hospital Duniapur | THQ |
| SOUTH | Lodhran | THQ Hospital Kahroor Pakka | THQ |
| SOUTH | Multan | THQ Hospital Civil Hospital Multan | THQ |
| SOUTH | Multan | THQ Hospital Mastang Lal, Jalalpur Pirwala | THQ |
| SOUTH | Multan | THQ Hospital Shujaabad | THQ |
| SOUTH | Multan | RHC, Ayyazabad Maral | RHC |
| SOUTH | Multan | RHC, Kotli Nijabat | RHC |
| SOUTH | Multan | RHC, Makhdoom Rashid | RHC |
| SOUTH | Multan | RHC, Mardan Pur Bosan | RHC |
| SOUTH | Multan | RHC, Matotli | RHC |
| SOUTH | Multan | RHC, Meeran Mallan | RHC |
| SOUTH | Multan | RHC, Qadirpur Rawan | RHC |
| SOUTH | Multan | RHC, Sher Shah | RHC |
| SOUTH | Multan | Nishtar Hospital, Multan | Teaching |

| Zone | Districts | Health Facility Name | Category |
|------|-----------|---------------------|----------|
| SOUTH | Muzaffargarh | DHQ Hospital, Muzaffargarh | DHQ |
| SOUTH | Muzaffargarh | THQ Hospital Alipur | THQ |
| SOUTH | Muzaffargarh | THQ Hospital Jatoi | THQ |
| SOUTH | Muzaffargarh | THQ Hospital Kot Addu | THQ |
| SOUTH | Muzaffargarh | THQ Hospital Sarwar Shaheed Hospital, Muzaffargarh | THQ |
| SOUTH | Rahim Yar Khan | THQ Hospital Khan Pur | THQ |
| SOUTH | Rahim Yar Khan | THQ Hospital Liaqat Pur | THQ |
| SOUTH | Rahim Yar Khan | THQ Hospital Sadiq Abad | THQ |
| SOUTH | Rahim Yar Khan | THQ Hospital Mianwali Qureshian | THQ |
| SOUTH | Rahim Yar Khan | Sheikh Zayed Hospital, Rahim yar Khan | Teaching |
| SOUTH | Rajanpur | DHQ Hospital, Rajanpur | DHQ |
| SOUTH | Rajanpur | THQ Hospital Jampur | THQ |
| SOUTH | Rajanpur | THQ Hospital Rojhan | THQ |
| SOUTH | Vehari | DHQ Hospital, Vehari | DHQ |
| SOUTH | Vehari | THQ Hospital Burewala | THQ |
| SOUTH | Vehari | THQ Hospital Mailsi | THQ |
| SOUTH | Vehari | RHC, Garha More, Mailsi | RHC |

Registration on HMIS

↓

Assessment/ Risk Factors

↓

Screened Negative for Hepatitis B & C ← Screening for Hepatitis B & C → Screened Negative for Hepatitis B

| | | |
|---|---|---|
| Hepatitis B Vaccination (0,1,6 months) | PCR Sample Collection | Hepatitis B Vaccination (0,1,6 months) |
| Counselling and Discharge | PCR Positive | |

↓

Baseline Investigations

↓

Complications (APRI>2, Jaundice, Ascites, Ecenphalopathy, Coinfection with HIV, Deranged Liver Function, Associated NAFLD/ Alcoholic Liver Disease etc.) → No → Medicine Perciption and Follow-up → Annual Follow-up PCR for Hepatitis B

↓

Referral to Tertiary Care

SVR 12 (3 months after HCV treatment completion)

SVR 12 not Achieved

SVR 12 Achieved → Certificate of Cure

## V.        Aims of the Rapid Evaluation

Based on the request of the Secretary P&SHD, this assessment aims to:

● Map existing resource allocation on hepatitis elimination.

● Strengthen the M&E system and performance monitoring routines of the Hepatitis Control Program.

Through these efforts, we aim to improve the evaluation culture in the Government department, boost M&E demand and institutionalization, and to improve staff skill and capacity for conducting evaluations. We also hope to improve the anti-evaluation mindset and resistance to change through exposing government workers to the process of creating an effective M&E framework, to examine if facilities across which hepatitis data is compiled have resource, technical or logistical challenges in delivering accurate data.

Through the input of these activities, we aim for this diagnostic report on the data systems to highlight M&E practices and role of M&E in decision making, and to highlight potential gaps in data quality and utilization. Through this Action Plan to strengthen data systems, including the improvement of data collection through new indicators and analysis types, and data use; making supervisory structures robust; and suggesting areas for human resource (HR) capacity building/ training.

Identifying gaps in current M&E practices and performance monitoring routines at the P&SHD across technical, behavioral, and organizational domains may yield recommendations to strengthen data systems that can improve data quality, evidence-based decision making and eventually M&E practices at P&SHD.

## VI.        Tools Methods

The PRISM framework includes modules to Health Information System (HIS) performance and involves assessing various indicators across different domains.  There are a total of six modules. Five are in checklist-form for evaluators, who will checkmark relevant items based on interviews with key stakeholders (details provided in Table 2), and through direct observation, and record review. One review takes the form of a self-assessment which can be orally administered by the data collector.

The Tool will be electronically implemented through Google Forms on the data collector's cellular devices, and will include a close-ended interview component, direct observations, and a record review.

A summary of the data collection methods is tabulated in Table 4.

A summary of the data collection methods is tabulated in Table 4.

| Module | Collection Methods |
|---|---|
| **Health Information System Overview** | <ul><li>Review of SOPs.</li><li>FGDs with the HISDU and HCP staff at the provincial level.</li><li>FGDs with district health officers and facility staff..</li></ul> |
| **Health Information System Performance Diagnostic** | <ul><li>KIIs with DHO and district data officer.</li><li>Document review and observation of HIS reports, electronic database, planning documents, meeting minutes, feedback reports/notes, guidelines.</li><li>KIIs with Hepatitis Control Clinic staff</li><li>Document review and observation, if available, of recording tools/source documents, health information reports, electronic database, planning documents, meeting minutes</li></ul> |
| **Electronic RHIS Functionality & Usability Assessment Tool** | <ul><li>The functionality of the EMR will be assessed against the functions desired/intended by the HCP and HISDU</li><li>The usability of the EMR and HIMS will be assessed at the provincial level</li></ul> |
| **Management Assessment Tool** | <ul><li>Desk review of<ul><li>Plans and reports, if available, including meeting minutes)</li><li>Paper-based records.</li></ul></li></ul> |
| **Facility Checklist** | <ul><li>KIIs involving the district data staff, health facility in-charge.</li></ul> |
| Organizational And Behavioral Assessment Tool | <ul><li>Self-assessment to be conducted among:<ul><li>Health facility</li><li>District-level health program staff or focal persons</li></ul></li></ul> |

# VII.    Data Collection

Data collectors include a Program Manager (PM) and Senior Research Associate (SRA). The tool includes three steps, namely interviews with key informants, direct observations, and a record review. Each step of this process include:

Districts have been selected to account for the various information sources i.e. teaching hospitals, partner hospitals, DHQs, THQs, RHCs and Dispensaries. Given the zonal categorization of the province, and the operational demarcations between the zones, one district will be selected from each zone.

These Districts are Chakwal in the North Zone, Gujranwala in the Center, and Multan in the South. These districts were selected to represent each of Punjab's operational zones, and to include each type of facility. These districts have 2 Teaching Hospitals, 1 Partner Clinics, 2 Dispensaries, 1 DHQ, 6 THQs and 4 RHCs (totaling 16 facilities). For each of the selected Districts, interviews were also conducted with the District Health Officer and/or the Program's District Focal Person. Interviews were also conducted at the HCP Office and HISDU.

**Figure 10|  Mapping locations of facilities visited.**

**Figure 11|   Registration Screen**
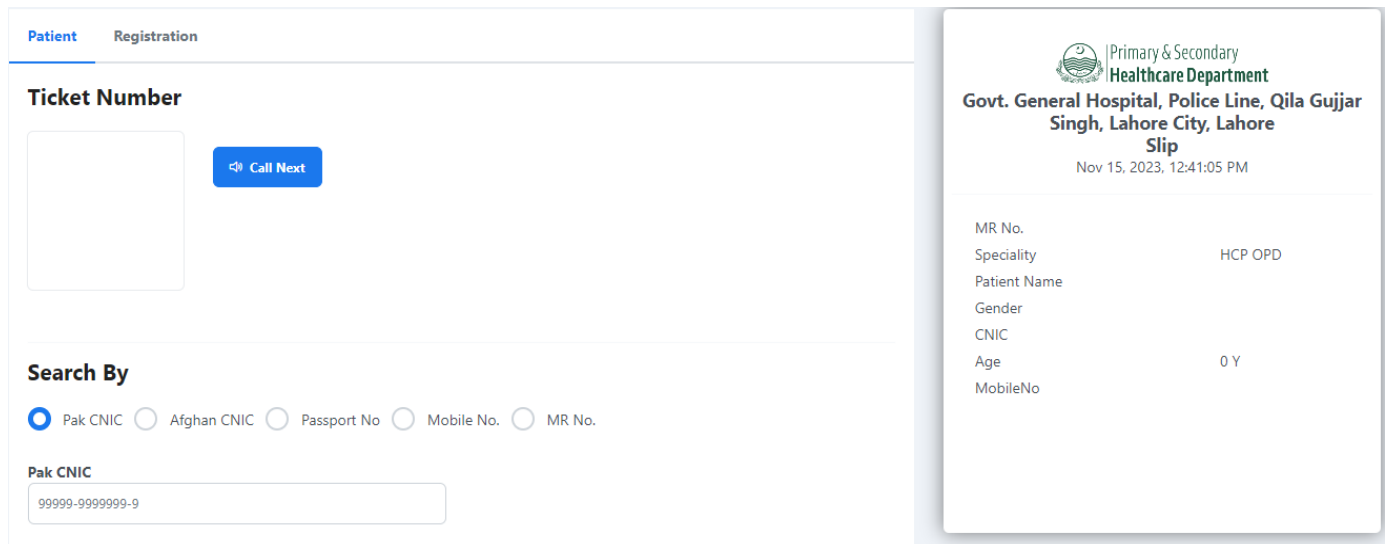


**Figure 12|   Queue Management System**
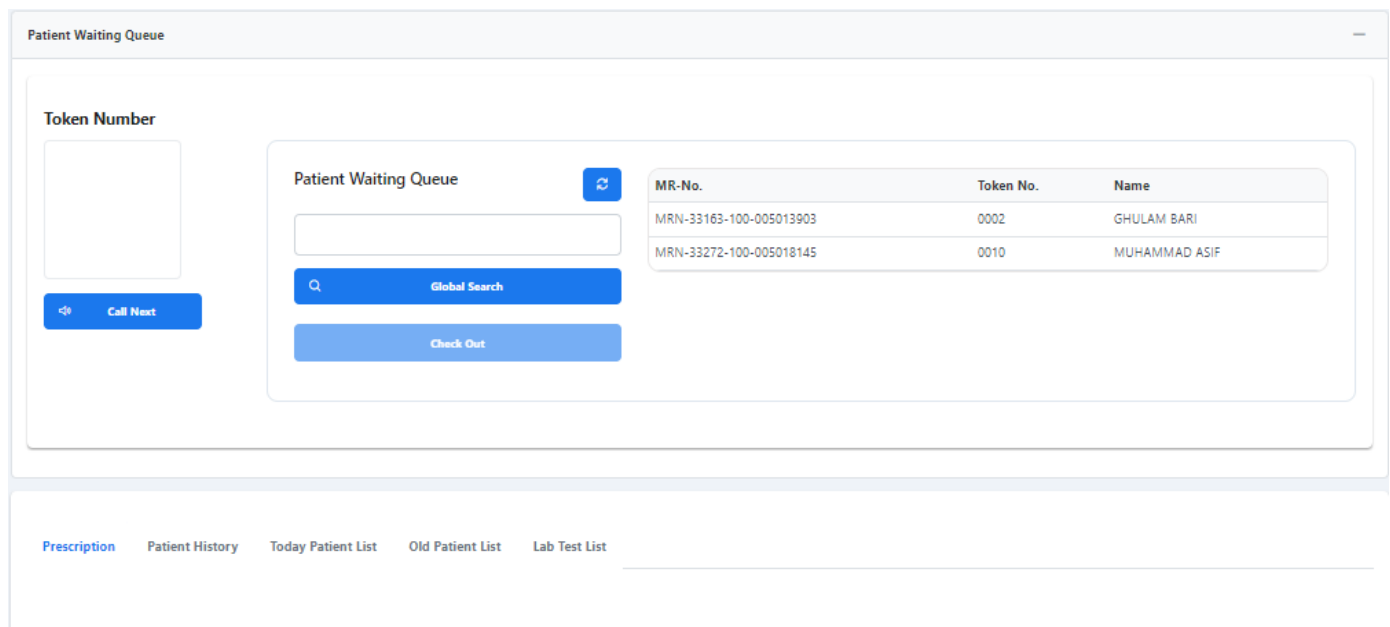
## Figure 13| Patient Screening

## Figure 14| Patient Assessment Screen

## Figure 15| Patient Vaccination Screen

## Figure 16| Laboratory Tests Screen

## Figure 17| PCR HCV RNA Report



**Primary & Secondary Healthcare Department**

### Govt. General Hospital, Police Line, Qila Gujjar Singh, Lahore City, Lahore

**Department Of Pathology**

Print Date: Nov 15, 2023, 12:38:35 PM

#### Personal Information

| | | | |
|---|---|---|---|
| Patient Name: | tahir | MR No. | MRN-33163-100-001599802 |
| Gender/Age: | Male / 36 Y | Barcode No: | LHK-23-002767 |
| Mobile Number: | 0302-4732892 | CNIC: | 35201-5693798-7 |
| Address: | pl | Consultant / Doctor: | Dr. M Sharam Gull |
| Collected By | Komal Cristropher | Collection Date/Time: | Nov 6, 2023, 11:11:53 AM |
| Report Added By | KIRAN SHAHZADI | Report Date/Time: | Nov 14, 2023, 12:39:54 PM |

| TEST NAME | RESULT | REFERENCE VALUE |
|---|---|---|
| | HCP Lab | |
| **PCR for HCV RNA** | | |
| Viral Load | 0  IU/mL | IU/mL |
| Result | NOT DETECTED | |

HCV RNA isolation and amplification are performed on Cobas ® 6800/8800, a fully integrated and automated system for sample preparation and real-time PCR that use Cobas ® 6800/8800 HCV 96T CE-IVD kits. Cobas ® HCV is an in vitro nucleic acid amplification test for both detection and quantitation of Hepatitis C RNA in both human EDTA plasma and serum sample. The analytical sensitivity of Cobas ® 6800/8800 HCV kit is 12 IU/mL in case of EDTA Plasma sample & 13.7 IU/mL in case of Serum. The Linear detection range of the essay is from 15 IU/mL to 1.0 a 108 IU/mL. Cobas ® 6800/8800 HCV test is specific for HCV genotypes 1-6.

کسی بھی ریلمانی کی صورت میں ہیلپ لائن 1033 پر رابطہ کریں۔ شکریہ۔

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**Figure 18| Medication Prescription Screen**