

# RMU MODEL OF DATA BANK OF DENGUE, DIABETES AND HEPATITIS



RMU Model of Data Bank is a centralized platform for healthcare professionals and researchers working on the three most prevalent diseases in Allied Hospitals: Dengue Fever, Diabetes Mellitus, and Hepatitis. It provides access to valuable data, guidelines, and best practices for preventing, diagnosing, and treating these diseases. This data bank aims to address the increasing burden of these diseases by collecting and curating accurate and up-to-date data, developing evidence-based Standard Operating Procedures (SOPs), facilitating research and knowledge sharing, and promoting preventive strategies.

## **Standard Operating Procedure for developing**

## Dengue, Diabetes, and Hepatitis Data Bank

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#### Message

I am pleased to report that our university has taken significant actions to implement the recommended guidelines, fostering a healthier and safer environment for all members of our community.

I am deeply moved and heartened by the overwhelming response and commitment displayed by each of you regarding the implementation of Standard Operating Procedures (SOPs) and the establishment of a comprehensive data bank for Dengue, Hepatitis, and Diabetes. Your dedication to prioritizing health and safety within our university community is truly commendable. It is through your collective efforts that we have not only embraced these guidelines but have also taken significant strides toward creating a robust data bank to enhance our understanding and management of health-related concerns

#### **Professor Muhammad Umar**

**Vice Chancellor** 

#### **Rawalpindi Medical University**





Dr. Muhammad Mujeeb



Dr. Saira Karimi

#### Message

Establishing a data bank focused on Dengue, Hepatitis, and Diabetes is a crucial step toward informed decision-making and proactive health management. Our contributions, whether in data collection, analysis, or dissemination, are shaping a valuable resource that will aid in identifying trends, implementing preventive measures, and providing timely support to those in need. Every member's dedication to these initiatives not only reflects the spirit of the community but also underscores the importance of a holistic approach to health and well-being.

As we move forward, let us foster an environment prioritizing health, mutual support, and resilience. If you have any further insights, or suggestions, or would like to contribute in any way, please feel free to reach out. Together, we are creating a healthier, safer, and more resilient community.

#### Dr. M. Mujeeb Khan

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## Section: I

## **Standard Operating Procedures (SOPs) for Developing Dengue Fever Data Bank (DDB) in a Tertiary Care Hospital**





#### Introduction

Dengue is caused by the dengue virus, primarily transmitted to humans through the bites of infected Aedes mosquitoes, particularly Aedes aegypti and Aedes albopictus. Dengue fever (DF) can manifest in various clinical forms, ranging from mild flu-like symptoms to severe and potentially life-threatening conditions such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). Patients may experience high fever, severe headache, joint and muscle pain, rash, and bleeding tendencies. Early detection and proper management are crucial in preventing the progression of severe forms of the disease.

Dengue fever is endemic in Pakistan, with seasonal outbreaks and the circulation of the four serotypes in different areas of the country. *Aedes aegypti and Aedes albopictus* are widely adapted vectors for urban and peri-urban environments. As dengue is recurrent in the country, the population may be at risk of re-infection, and therefore, serious complications may occur if not managed promptly and correctly.

Rawalpindi has been facing Dengue epidemics since long. It was 2015 when last biggest epidemic of dengue was noted here. 3917 dengue patients were diagnosed to be suffering from dengue in2015. The Dengue hit Rawalpindi, Islamabad in 2019 again. Rawalpindi division is among the regions in Punjab which has had to face 7 consecutive epidemics from 2013-2019. In 2020, 11941 patients were diagnosed to be suffering from Dengue at Rawalpindi medical University (RMU) Allied Hospitals. Yearly data from these times indicates the presence of an epidemic in the region, even before data collection started. The total number of confirmed cases in 2013 was more than 1200. The following years saw an increase in the number of confirmed cases, likely attributed to social awareness of the disease, as evidenced by the influx of patients to the OPDs. 2015 was previously the peak year for the epidemic, with nearly 4000 confirmed cases. The years following 2015, showed a sudden drop in the cases, likely due to proper surveillance, preventive and containing practices. The past year, 2018, saw a little over 650 cases, which was almost the same as 2017. The effectiveness of the measures was evidenced in 2017, when the number of patients



testing positive was about one-fifth of 2016. The Dengue hit Rawalpindi, Islamabad in 2019 again. This year 11941 patients were diagnosed to be suffering from Dengue at Rawalpindi medical University (RMU) Allied Hospitals. All efforts were employed for efficient clinical management of Dengue patients at RMU Allied Hospitals.



2015 vs 2019 Epidemic

	2015	2019
OPD	44337	87675
Admissions	6139	14876
Confirmed	3917	11941
DHF	1384	4566
DSS	84	265
Expiries	8	48
Expiry %	0.20%	0.40%
Predominant	DEN-2 (62%)	DEN 1 & 2



Trend of patients from 2013 - 2019

Dengue Confirmed & DHF & DSS







addressing the challenges posed by the increasing prevalence of dengue. In conclusion, Dengue is a complex and dynamic viral illness with far-reaching implications for global health. Efforts to control its spread and mitigate its impact require a multifaceted approach, including public health interventions, research advancements, and collaborative international efforts.



## **Dengue Research Cell**



## **Introduction:**

The Dengue Data Bank, housed within the Department of Medical Education (DME) at Rawalpindi Medical University (RMU) NTB, serves as a comprehensive repository of Dengue patient information. This Standard Operating Procedure (SOP) is designed to outline the processes and guidelines for accessing and utilizing the wealth of data available in the Dengue Data Bank.

The purpose of the Dengue Data Bank is to facilitate research, analysis, and epidemiological studies related to Dengue fever. The data bank contains detailed patient records, including clinical history, diagnostic markers (NS1, IgM, IgG), co-morbid disease information, and geographical distribution data.



#### Data Available at Dengue research Cell

SL	INFORMATION REGARDING	RED CRESCENT HOSPITAL	HOLY FAMILY HOSPTIAL	BENAZIR BHUTTO HOSPTIAL	DISTRICT HEAD QUARTERS HOSP.	TOTAL
1	Patients registered in Outdoor patient department (OPD)	3369	7441	3985	1537	16332
2	Patients admitted	932	2034	811	493	4270
3	Confirmed Patients (Dengue fever)	513	1288	505	373	2679
4	Patients currently Admitted	17	-	-	-	17
5	Patients admitted during last 24 hours	10	-	-	-	10
6	Patients discharged in last 24 hours	08	-	-	-	08
7	Patients Presented to (OPD) in last 24 hours	41	-	-	-	41
8	Confirmed Patients in last 24 hours	04	-	-		04
9	Mortality (Total)	-	-	-	-	-

#### DATA OF DENGUE PATIENTS AT ALLIED HOSPITALS 1<sup>st</sup> Aug - 4th Dec 2023

1	2425		1	
8				
5	ĸм	1		
1	Alege		1	

## CONFIRMED PATIENT TREND 2013-2023

Yea 1/ Mo mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2013	0	0	0	0	0	0	1	1	36	396	408	19	861
2014	0	0	0	0	0	0	2	2	51	907	479	15	1456
2015	0	0	1	0	2	2	0	55	813	2317	603	124	3917
2016	0	0	2	5	13	7	7	22	412	2053	770	16	3307
2017	1	0	0	0	0	0	0	6	135	386	122	1	651
2018	1	0	0	2	2	1	14	9	98	444	142	4	717
2019	0	0	0	0	1	2	27	684	4686	5581	961	0	11942
2020	0	0	0	0	0	0	1	4	16	13	0	04	38
2021	0	0	1	0	0	0	2	12	420	2126	948	17	3526
2022	0	0	2	0	0	5	9	420	<b>1912</b>	<mark>2106</mark>	565	20	5039
2023 (09-09-23)	0	0	1	1	3	9	25	148	185	-	-	-	372





#### TREND OF LAST 24 HOURS DENGUE PATIENTS OPD, ALLIED HOSPITALS, 1# Aug - 4th Dec 2023





## DENGUE EPIDEMICS COMPARATIVE DATA 2013-2023

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 (09-9-23)
OPD	25914	22126	44337	20449	9131	4516	87680	5648	32940	59223	4718
Admissions		2422	6139	5258	2116	1561	14879	350	5050	7059	904
Confirmed	1223	1571	3917	3306	651	717	11942	38	3526	5039	372
DHF	220	570	1384	992	217	120	4566	18	1714	2031	127
DSS	555	32	84	55	13	1	265	1	92	101	18
Expiries	7	2	8	3	3	2	41	0	24	23	-
Expiry %	0.57%	0.12%	0.20%	0.09%	0.46%	0.27%	0.34%	Nil	0.68%	(0.44%)	-
Predominan t Genotype	DEN-2	DEN-3 (85.9%)	DEN-2 (62%)	DEN-2 (45.16%) DEN-3 (42.18%)	DEN-2 (72%)	NA	DEN 1&2	NA	DEN-2 (23%)	DEN 1 (40%) DEN 2 (60%)	-







TREND OF LAST 24 HOURS DENGUE PATIENTS ADMISSIONS ALLIED HOSPITALS,

Dr. Saira Karimi Assistant Professor PhD, RMU

## COMPARISON OF DENGUE EPIDEMIC 2019, 2022 WITH 2023 CONFIRMED PATIENT TREND

Year/ Month	Jan	Feb	Mar	Apr	May	Jun	lut	Aug	Sep	Oct	Nov	Dec	Total
2019	0	0	0	0	1	2	27	684	4686	5581	961	0	11942
2022	0	0	2	0	0	5	9	420	1912	2106	565	20	5039
2023 (09-09-23)	0	0	1	1	3	9	25	148	185	-	-	-	372



## **Objectives**

o To facilitate research on dengue, including the investigation of risk factors, transmission dynamics, and the effectiveness of different treatment modalities.

o To develop strategies based on data insights for targeted public health interventions, including vector control measures and community awareness programs.

• To evaluate the impact of public health interventions on dengue incidence and transmission within the university's jurisdiction.

These objectives collectively aim to enhance the university's capability to manage and respond to dengue outbreaks, contribute valuable data to the broader scientific community, and improve overall public health outcomes within the university's jurisdiction.

## Methodology

Data is collected by establishing a comprehensive surveillance system for dengue cases. This involved collaboration with healthcare facilities, laboratories, and public health agencies. They have developed a robust database structure to store dengue-related data. This includes patient information, epidemiological data, laboratory results, and geographic information. For Data Security purposes implementation of measures to ensure the security and confidentiality of the stored data, complying with relevant data protection regulations. Regularly audit and assess the quality of data to identify and rectify errors or inconsistencies. Epidemiological Analysis is done to analyze trends and patterns in dengue data to identify high-risk areas, vulnerable populations, and seasonal variations.





## Total No. of Files Dengue Year-2020

Access to Dengue Data Bank



Access to the Dengue Data Bank is restricted to authorized personnel, including researchers, medical professionals, and administrators, who have obtained explicit permission from the DME department.

## **Data Request Procedure**

Researchers interested in accessing the Dengue Data Bank must submit a formal request to the DME department. The request should include the purpose of data utilization, expected outcomes, and the specific variables required for the study.

## **Approval Process**

The submitted requests will be reviewed by the Data Bank Committee to ensure compliance with ethical standards and data protection policies. Once approved, the researcher will be granted access to the designated data sets.







## Data Bank Model of Dengue

## **1. Introduction**

#### a. Purpose

To establish a comprehensive data bank for patients admitted with Dengue fever in the tertiary care hospital.

#### b. Scope

All patients, diagnosed with Dengue fever in the hospital.

## 2. Data Collection

#### a. Patient Information

- Name: The full name of the patient, crucial for identification and medical records.
- Age: The patient's chronological age is important in assessing the severity and potential complications associated with Dengue Fever.
- **Gender:** Dengue Fever affects individuals regardless of gender; however, certain studies suggest that the severity of symptoms may vary between males and females.
- **Contact Information:** The patient's phone number and/or email address are vital for communication regarding test results, treatment updates, and any follow-up care.
- Address: The patient's current residential address is needed for contact purposes and may be important if there's a need for home visits or community health measures.
- **Date of Admission:** This refers to the specific date when the patient was admitted to the healthcare facility due to Dengue Fever symptoms. Dengue can have sudden and severe manifestations, so tracking the timeline is essential.
- **Clinical History:** In the case of Dengue Fever, the clinical history would include information about the onset of symptoms, such as high fever, severe headache, pain behind



the eyes, joint and muscle pain, rash, and bleeding tendencies. Details about any recent travel to dengue-endemic areas may also be relevant. Additionally, any pre-existing medical conditions or medications the patient is taking should be considered in the clinical history to guide appropriate treatment strategies.

#### b. Clinical Parameters

- Laboratory Test Results
  - Complete Blood Count (CBC): Dengue Fever is characterized by a drop in platelet count. The CBC helps assess platelet levels, white blood cell count, and hematocrit.
  - NS1 Antigen Test: This test detects the presence of the dengue virus in the early stage of the illness.
  - IgM and IgG Antibody Tests: These tests help determine the stage of infection and whether it's a primary or secondary infection.

Meth	od			ELISA	
	Results	Positi	ve	Negative	
Dengue Rapid Test Cassette			IgM	lgG	
(Whole Blood/Serum/Plasma)	Desitive	lgM	20	0	0
	POSitive	lgG	4	0	0
	Negative		0	0	0
Relative Sensitivity			83.3%	1	1
Dengue Secon	dary Infection	for IgM/IgG	test results		
Meth	od			ELISA	
	Results		Positi	Negative	
Dengue Rapid Test Cassette			lgM	lgG	- Negative
(Whole Blood/Serum/Plasma)	Positive	IgM	46	1	0
	1 OSICIVE	lgG	18	63	0
	Negative		0	0	0
Relative Sensitivity			71.9%	98.4%	1
Non-Dengu	e Infection for I	gM/lgG test	results		
Meth	od			ELISA	
	Results		Positive		Magating
Dengue Rapid Test Cassette			IgM	IgG	INCEGUIVE
(Whole Blood/Serum/Plasma)	Positive	IgM	0	0	1
	rositive	lgG	0	0	3
	Negative	Negative		0	429
Relative Sensitivity		1	1	99.1%	



#### • Severity of Dengue (according to WHO classification)

- Dengue Fever (DF): Mild flu-like symptoms, including fever, headache, joint, and muscle pain.
- Dengue Hemorrhagic Fever (DHF): Severe symptoms, increased vascular permeability, tendency to bleed, and low platelet count.
- Dengue Shock Syndrome (DSS): Characterized by shock due to plasma leakage, leading to organ failure.

#### • Treatment Administered

- Fluid Replacement: Intravenous fluids are often administered to prevent dehydration, especially in cases of DHF or DSS.
- Pain and Fever Management: Acetaminophen is typically recommended over nonsteroidal anti-inflammatory drugs (NSAIDs) to reduce the risk of bleeding.
- Monitoring and Supportive Care: Regular monitoring of vital signs, platelet count, and hematocrit is essential. Transfusions may be considered in severe cases.

## 3. Data Storage

#### Electronic Health Record (EHR) System

- Ensure Secure Storage Compliance with Healthcare Data Protection Standards
  - Utilize robust encryption methods to safeguard patient data during storage and transmission.
  - Adhere to healthcare data protection standards such as HIPAA (Health Insurance Portability and Accountability Act) or other relevant regulations in the respective jurisdiction.
  - Regularly conduct security audits and assessments to identify and address vulnerabilities in the EHR system.



- Regularly Backup Data to Prevent Loss
  - Implement automated and regular backup procedures to prevent data loss in case of system failures, disasters, or cyberattacks.
  - Store backups in secure, offsite locations to ensure data availability even in the event of physical damage to the primary storage infrastructure.
- Implement Access Controls to Restrict Unauthorized Access
  - Establish role-based access controls (RBAC) to restrict access to patient data based on the user's role and responsibilities.
  - Enforce strong authentication measures, such as multi-factor authentication, to ensure that only authorized personnel can access and modify patient records.
  - Monitor and audit user activities within the EHR system to detect and respond to any unauthorized access or suspicious behavior promptly.

## 4. Data Retrieval

#### **Query Mechanism**

- Develop a User-Friendly Interface for Authorized Personnel
  - Design an intuitive and user-friendly interface that allows authorized healthcare personnel to easily interact with the query system.
  - Ensure that the interface is accessible and requires minimal training for users to effectively utilize the query mechanism.
- Enable Search Based on Patient Demographics, Admission Date, Severity, etc.
  - Implement a comprehensive search functionality that enables authorized users to query patient data based on various parameters, including
    - **Patient Demographics:** Allow searches by patient name, age, gender, and contact information.



- Admission Date: Facilitate searches based on the date of admission, enabling users to retrieve records for a specific timeframe.
- Severity of Dengue: Implement a search criterion for the severity of Dengue, such as distinguishing between Dengue Fever, Dengue Hemorrhagic Fever (DHF), and Dengue Shock Syndrome (DSS).
- Implement Filters to Refine Search Results
  - Provide filtering options to refine search results and obtain specific information. Filters may include:
    - **Clinical Parameters:** Allow filtering based on laboratory test results, such as platelet count or NS1 antigen presence.
    - **Treatment Administered:** Enable filtering based on the type of treatment administered, facilitating analysis of the effectiveness of different interventions.
    - **Outcome:** Implement filters to identify patient outcomes, such as recovery, complications, or mortality.

#### b. Reporting System

- Generate Standardized Reports for Research Purposes
  - Develop a system that can automatically generate standardized reports containing key data related to Dengue Fever cases.
  - These reports can serve as valuable resources for research purposes, helping researchers analyze trends, outcomes, and contributing factors.
- Provide Options for Customizing Reports Based on Specific Criteria



- Implement a flexible reporting system that allows users to customize reports based on specific criteria such as patient demographics, clinical parameters, or treatment outcomes.
- This customization ensures that healthcare professionals and researchers can extract the most relevant information for their specific needs.
- Ensure Data Integrity in Retrieval Processes
  - Implement robust data integrity measures to guarantee the accuracy and reliability of information retrieved from the system.
  - Regularly validate and verify data during the retrieval process to prevent errors or inconsistencies in the generated reports.

## 5. Research Potential

- Epidemiological Studies
  - Analyze trends in Dengue cases over time: Examine the incidence and prevalence of Dengue Fever to understand how it evolves.
  - Identify high-risk demographics and geographical areas: Pinpoint groups and regions more susceptible to Dengue, aiding targeted interventions.
  - Inform public health interventions: Provide data to shape preventive strategies, such as vaccination campaigns or vector control measures.

## • Treatment Efficacy

• Evaluate the effectiveness of different treatment protocols: Assess the outcomes of various treatment approaches for Dengue Fever.



- Identify patterns in recovery and complications: Understand factors influencing patient recovery and the occurrence of complications.
- Contribute to evidence-based medical practices: Provide insights for healthcare professionals to optimize treatment strategies.
- Outcomes Analysis
  - Assess long-term outcomes and complications: Examine the impact of Dengue Fever on patients over an extended period.
  - Contribute to the development of better prognostic indicators: Identify factors predicting outcomes, aiding in prognosis and patient management.
  - Support ongoing improvement in patient care: Use findings to enhance care protocols, improving the quality of Dengue Fever patient treatment.

## 6. Provisional Strategies

- Provisional Strategies
  - Data Anonymization
    - Ensure patient confidentiality by removing identifiable information: Strip personal details to safeguard patient privacy.
    - Assign unique identifiers to each case: Replace identifiable data with unique codes to maintain data integrity while preserving anonymity.
  - Quality Assurance
    - Implement regular audits to ensure data accuracy: Conduct routine checks to identify and rectify any inaccuracies in the Dengue Fever data.



- Establish protocols for correcting errors in the data: Develop standardized procedures for addressing and correcting data errors to enhance overall data quality.
- Data Sharing
  - Collaborate with research institutions and public health agencies: Foster partnerships to pool resources and knowledge in the fight against Dengue Fever.
  - Facilitate responsible data sharing for broader research initiatives: Share data responsibly to contribute to larger-scale research efforts, promoting collaboration and the advancement of scientific understanding.

## 7. Security Measures

- Encryption
  - Encrypt sensitive data during transmission and storage: Safeguard patient information by converting it into unreadable code, ensuring confidentiality.
  - Utilize secure communication channels: Transmit data through secure channels to prevent unauthorized access during transfer.
- Access Control
  - Grant access only to authorized personnel based on their role: Implement role-based access controls to restrict data access to individuals with specific responsibilities.



• Monitor and log data access for auditing purposes: Keep a record of who accesses patient data and when, aiding in the detection of any unauthorized or suspicious activities.

## 8. Training and Awareness

- Staff Training
  - Conduct training sessions for staff involved in data management: Ensure that personnel handling Dengue Fever data are well-trained in data management practices, including data entry, storage, and retrieval protocols.

#### Awareness Promotion

• Promote awareness of data protection and ethical considerations: Emphasize the importance of maintaining patient confidentiality and adhering to ethical standards in data management related to Dengue Fever.

## 9. Continuous Improvement

- a. Regularly review and update SOPs based on emerging best practices.
- b. Seek feedback from users to identify areas for improvement.

## **10.** Compliance

- a. Ensure compliance with relevant data protection laws and healthcare regulations.
- b. Obtain necessary approvals from the institutional review board (IRB) for research activities.

These SOPs are designed to establish a robust system for collecting, storing, retrieving, and utilizing Dengue fever patient data for research and healthcare improvement purposes. Regular review and adherence to ethical guidelines are crucial for the success of the data bank.

## Significance of Data Bank of Dengue



#### **Data Collection and Surveillance**

The Dengue Data Bank is designed to systematically gather information on diagnosed cases of Dengue within our hospital. This includes patient demographics, clinical manifestations, laboratory results, treatment modalities, and outcomes. Real-time data entry ensures accurate and up-to-date information.

#### **Epidemiological Insights**

By maintaining a comprehensive database, our hospital aims to contribute valuable epidemiological insights into Dengue fever. This includes the identification of trends, seasonal variations, and the prevalence of specific Dengue virus serotypes within our catchment area.

#### **Clinical Decision Support**

The Dengue Data Bank serves as a valuable tool for healthcare professionals, providing them with access to historical patient data, treatment outcomes, and complications. This information aids clinical decision-making, especially in managing severe cases and anticipating potential complications.

#### **Research and Innovation**

Our tertiary care hospital is committed to advancing medical knowledge related to Dengue. The data bank facilitates research initiatives, allowing our medical and research teams to explore new treatment modalities, assess the effectiveness of interventions, and contribute to the global understanding of Dengue.

#### **Public Health Initiatives**

In collaboration with public health authorities, the Dengue Data Bank supports initiatives aimed at preventing and controlling Dengue outbreaks. The insights derived from the data contribute to targeted mosquito control measures, public awareness campaigns, and vaccination strategies.

#### **Continuous Improvement**



Regular analysis of the Dengue Data Bank enables our hospital to identify areas for improvement in Dengue management. This includes refining treatment protocols, enhancing diagnostic capabilities, and implementing evidence-based practices to optimize patient outcomes.

#### Security and Confidentiality

The security and confidentiality of patient information within the Dengue Data Bank are of utmost importance. The hospital strictly adheres to ethical guidelines and data protection standards, ensuring that patient privacy is maintained at all times.

In conclusion, the Dengue Data Bank serves as a dynamic resource that not only supports patient care within our tertiary care facility but also contributes to research, public health initiatives, and the continuous improvement of Dengue management strategies. We are committed to leveraging this repository to benefit our patients and the broader community.

#### Conclusion

By compiling and analyzing comprehensive data on dengue within our tertiary care hospital, we aim to strengthen our understanding of the disease, improve patient care, and contribute valuable insights to the broader scientific and medical community. This data bank serves as a dynamic resource to inform evidence-based practices, foster collaborative research, and enhance our preparedness to address the challenges posed by dengue. The management of dengue in a tertiary care hospital involves a multidisciplinary approach, combining clinical expertise, advanced diagnostics, and research initiatives. These hospitals are crucial in addressing the challenges posed by dengue, providing comprehensive care to patients, and contributing to the global efforts to control and prevent the spread of this infectious disease.



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## **Section: II**

Standard Operating Procedures (SOPs) for Developing Hepatitis Data Bank in a Tertiary Care Hospital







#### Introduction

Hepatitis is a medical condition characterized by inflammation of the liver. It can be caused by a variety of factors, including viral infections, alcohol consumption, autoimmune diseases, and certain medications or toxins. The most common types of viral hepatitis are hepatitis A, B, and C, each caused by different viruses and with different modes of transmission. Hepatitis A is typically transmitted through contaminated food or water, while hepatitis B and C are primarily spread



through blood and bodily fluids, often through activities such as unprotected sex, sharing needles, or from mother to baby during childbirth.

Chronic hepatitis B and C infections can lead to serious complications such as liver cirrhosis, liver failure, and liver cancer. Hepatitis B and C are major global health problems, with millions of people chronically infected and at risk of these severe outcomes. Vaccines are available to prevent hepatitis A and B, but there is currently no vaccine for hepatitis C. Treatment for hepatitis depends on the underlying cause and may include antiviral medications, lifestyle changes, and supportive care. Effective prevention and control measures for hepatitis include vaccination, proper sanitation and hygiene practices, safe injection practices, and screening and treatment of infected individuals. Hepatitis represents a significant public health challenge globally, and efforts to address and reduce its impact are ongoing in many countries.

The prevalence of hepatitis varies depending on the type of hepatitis and the geographical region. According to the World Health Organization (WHO), an estimated 325 million people worldwide are living with chronic hepatitis B or C, which can lead to liver cirrhosis and liver cancer. Hepatitis A is more common in areas with poor sanitation and hygiene, and outbreaks can occur in areas with inadequate water supply or sanitation facilities. Hepatitis B is more prevalent in Asia and sub-Saharan Africa, while hepatitis C is more common in North Africa and the Middle East. The prevalence of hepatitis can also be influenced by risk factors such as injection drug use, unprotected sex, and healthcare-associated exposures. Overall, hepatitis is a significant public health concern that requires effective prevention, screening, and treatment strategies to reduce the burden of disease.

The data bank for hepatitis is a crucial resource for collecting, storing, and managing information related to hepatitis, including epidemiological data, clinical records, research findings, and public health interventions. This SOP (Standard Operating Procedure) aims to provide guidelines for the proper use and management of the data bank to ensure the security, accuracy, and confidentiality of the data.



# Hepatitis C Data (HFH)

S.No.	Year	Files
1	2006	127
2	2007	644
3	2008	89
4	2009	347
5	2010	691
6	2011	554
7	2012	690
8	2013	748
9	2014	652
10	2015	650
11	2016	249
12	2017	161
13	2018	1451
14	2019	2341
Total No	9394	

## Significance of Data Bank of Hepatitis

## **Disease Surveillance**



Enables real-time monitoring and tracking of hepatitis cases, aiding public health authorities in understanding the prevalence and distribution of the disease.

#### **Epidemiological Research**

Facilitates epidemiological studies to identify risk factors, patterns of transmission, and demographic trends associated with different types of hepatitis.

#### **Clinical Decision Support**

Assists healthcare professionals in making informed decisions regarding diagnosis, treatment, and patient management based on a comprehensive understanding of patient data and treatment outcomes.

#### **Treatment Optimization**

Provides a platform for analyzing treatment responses, adverse reactions, and outcomes, aiding in the optimization of therapeutic strategies for different forms of hepatitis.

#### **Public Health Planning**

Informs public health policies and interventions by providing data on the burden of hepatitis, helping authorities allocate resources and developing targeted prevention and awareness campaigns.

#### **Research Advancements**

Supports scientific research by providing a rich source of data for researchers studying the genetic, molecular, and immunological aspects of hepatitis. This can lead to the development of new therapies and vaccines.

#### **Genetic and Molecular Insights**

Facilitates the study of genetic factors associated with hepatitis susceptibility or resistance, contributing to a better understanding of the disease at a molecular level.

#### **Surveillance of Viral Strains**



Helps in monitoring the prevalence of different viral strains, including any emerging or drugresistant strains, which is crucial for adapting treatment strategies and vaccine development.

#### **Longitudinal Patient Care**

Supports the continuity of patient care by maintaining a longitudinal record of individual patient histories, enabling healthcare providers to track disease progression and treatment outcomes over time.

#### **Resource Allocation**

Assists in the efficient allocation of healthcare resources by identifying high-risk populations and areas with a higher prevalence of hepatitis, allowing for targeted interventions.

#### **Global Collaboration**

Facilitates collaboration and information sharing among healthcare professionals, researchers, and public health agencies at a national and international level.

#### **Early Detection and Intervention**

Enables early detection of cases, leading to timely intervention and the prevention of further transmission, complications, and progression of the disease.

#### **Monitoring the Impact of Vaccination Programs**

Provides a means to evaluate the effectiveness of hepatitis vaccination programs by tracking vaccination coverage and the subsequent reduction in hepatitis incidence.





## **Data Bank Model of Hepatitis 1. Purpose**

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for the development and maintenance of a Hepatitis Data Bank in a tertiary care hospital

#### 2. Scope

This SOP applies to all hospital staff involved in the collection, management, and utilization of hepatitis data.

#### 4. Data Collection



- i. All suspected and confirmed cases of hepatitis should be promptly reported to the Infection Control Department.
- ii. The Infection Control Department should maintain a centralized database for recording and tracking hepatitis cases.

#### a. Patient Information

The information of patient's name, age, gender, contact information, address, date of admission, and the clinical history should be mentioned.

#### **b.** Clinical Parameters

- Results of the hepatitis laboratory tests i.e Hepatitis A IgM antibody, Hepatitis B surface antigen (HBsAg), Hepatitis B core antibody (anti-HBc), Hepatitis B surface antibody (anti-HBs), Hepatitis C antibody, Hepatitis C viral load, Liver function tests (LFTs), Prothrombin time (PT) and international normalized ratio (INR) and the Liver biopsy, should be mentioned.
- Severity of Hepatitis (according to WHO classification) i.e Acute Hepatitis, Chronic Hepatitis, Fulminant Hepatitis should be included.
- iii. Treatment that is administered by direct acting antiviral drugs or interferon injections etc depending upon the type of hepatitis should be noted.

#### 3. Data Storage

#### a. Electronic Health Record (EHR) System

Here are some (SOPs) that can be implemented when using an electronic health record (EHR) system for managing hepatitis

i. Ensure proper training: Healthcare providers and staff should receive proper training on how to use the EHR system for managing hepatitis. This includes understanding the specific modules and features available for managing infectious diseases such as hepatitis.



- ii. Develop specific templates and workflows: The EHR system should be customized to include specific templates and workflows for managing hepatitis. This can include templates for documenting patient history, ordering tests, and tracking treatment outcomes
- iii. Use decision support tools: The EHR system should include decision support tools, such as alerts and reminders, to help healthcare providers manage hepatitis more effectively. This can include alerts for abnormal lab results or reminders for follow-up appointments.
- iv. Ensure proper documentation: Healthcare providers should ensure that all patient encounters related to hepatitis are properly documented in the EHR system. This includes documenting test results, treatment plans, and follow-up care.
- v. Monitor patient progress: The EHR system should be used to monitor patient progress over time, including tracking lab results and treatment outcomes. This can help healthcare providers adjust treatment plans as needed and ensure that patients are receiving appropriate care.
- vi. Ensure privacy and security: The EHR system should be used in compliance with privacy and security regulations, such as HIPAA. This includes ensuring that patient information is properly protected and that only authorized individuals have access to the EHR system.

By implementing these SOPs, healthcare organizations can use EHR systems more effectively for managing hepatitis and improving patient outcomes.





## 4. Data Retrieval

## a. Query Mechanism

A query mechanism standard operating procedure (SOP) for hepatitis can be designed to ensure that healthcare providers have efficient access to relevant patient information and can make informed decisions.



- i. Developing a user-friendly interface for authorized personnel can help streamline patient care and improve outcomes for individuals with hepatitis.
- Enabling search capabilities based on patient demographics, admission date, severity, and other relevant criteria within the interface for authorized personnel is crucial for efficient and targeted patient care.
- iii. Implementing filters to refine search results for hepatitis within the user interface for authorized personnel is essential for facilitating targeted patient care and efficient data retrieval.

#### b. Reporting System

- i. Generating standardized reports of hepatitis for research purposes is crucial for aggregating and analyzing data to advance understanding, treatment, and prevention of hepatitis.
- ii. Providing options for customizing reports based on specific criteria is essential for meeting the diverse needs of healthcare providers, researchers, and public health agencies.
- iii. Ensuring the integrity of data during retrieval processes is critical for maintaining the accuracy, consistency, and reliability of information used in healthcare, research, and public health initiatives

#### 5. Research Potential

#### a. Epidemiological Studies

- i. Analyzing trends in hepatitis cases over time is essential for understanding the epidemiology of the disease, identifying patterns of transmission, and evaluating the impact of interventions.
- ii. The risk of hepatitis varies depending on several demographic and geographical factors.Understanding these high-risk populations and geographic regions is important for



developing targeted prevention and screening strategies, as well as for informing public health policies and resource allocation.

iii. Public health interventions for hepatitis can play a crucial role in preventing and controlling the spread of the disease. These interventions can encompass a wide range of strategies aimed at raising awareness, promoting vaccination, improving access to testing and treatment, and reducing the risk of transmission.

#### **b.** Treatment Efficacy

- i. Evaluating the effectiveness of different treatment protocols for hepatitis involves assessing their impact on virological response, clinical outcomes, safety profile, and long-term benefits.
- ii. Patterns in recovery and complications in individuals can be identified which can vary based on the specific type of hepatitis (e.g., hepatitis B, hepatitis C), the stage of the disease, individual patient characteristics, and the effectiveness of treatment.
- iii. Contribute to evidence-based medical practices.

#### c. Outcomes Analysis

- i. Long-term outcomes and complications i.e cirrhosis, liver failure, and hepatocellular carcinoma. of hepatitis especially B and C can have significant impacts on patients' health.
- ii. Contributing to the development of better prognostic indicators for hepatitis B and C is crucial for improving patient care and outcomes.
- Supporting ongoing improvement in patient care for individuals with hepatitis involves a multi-faceted approach aimed at enhancing treatment, management, and overall wellbeing.

#### **6.** Provisional Strategies

#### a. Data Anonymization



- i. Patient confidentiality is indeed ensured by removing identifiable information. When discussing patient cases or medical scenarios, it is crucial to remove any details that could potentially reveal a patient's identity. This includes removing or de-identifying information such as names, addresses, dates of birth, and any other personal identifiers.
- ii. It is important to assign unique identifiers to each case to ensure patient protection against their personal information. This can be done by assigning a unique code or number to each case that is not linked to any identifiable information such as the patient's name, address, or social security number.

#### **b.** Quality Assurance

- i. By implementing regular audits to ensure data accuracy in hepatitis-related reports, healthcare organizations and research institutions can enhance the reliability and trustworthiness of data used for clinical decision-making, epidemiological studies, and public health interventions.
- ii. Establish protocols for correcting errors in the data.

#### c. Data Sharing

- i. Collaborate with research institutions and public health agencies.
- ii. Facilitate responsible data sharing for broader research initiatives.

#### 7. Security Measures

#### a. Encryption

- i. Encrypt sensitive data during transmission and storage.
- ii. Utilize secure communication channels.

#### **b.** Access Control

i. Grant access only to authorized personnel based on their role.

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ii. Monitor and log data access for auditing purposes.

#### 8. Training and Awareness

- i. Conduct training sessions for staff involved in data management.
- ii. Promote awareness of data protection and ethical considerations.

#### 9. Continuous Improvement

Use audit results to drive continuous improvement efforts, such as refining data retrieval processes, enhancing data quality controls, and implementing training programs to address data accuracy challenges.

- i. Regularly review and update SOPs based on emerging best practices.
- ii. Seek feedback from users to identify areas for improvement.

#### **10.** Compliance

- i. Ensure compliance with relevant data protection laws and healthcare regulations.
- ii. Obtain necessary approvals from the institutional review board (IRB) for research activities.

These SOPs are designed to establish a robust system for collecting, storing, retrieving, and utilizing data of hepatitis patients for research and healthcare improvement purposes. Regular review and adherence to ethical guidelines are crucial for the success of the data bank.



## **Section III**

## Standard Operating Procedures (SOPs) for Developing Diabetes Mellitus Data Bank in a Tertiary Care Hospital







#### Introduction

Diabetes Mellitus, commonly referred to as diabetes, is a chronic metabolic disorder characterized by persistently elevated levels of blood glucose (sugar). It is caused by either insufficient production of insulin or the body's inability to utilize insulin effectively. Insulin, a hormone produced by the pancreas, is crucial for the body to utilize glucose for energy.

There are two main types of diabetes. Type 1 diabetes: This autoimmune disease occurs when the body's immune system attacks and destroys the insulin-producing cells in the pancreas. The exact cause of type 1 diabetes is unknown, but it is believed to be a combination of genetic and environmental factors. Type 2 diabetes: This is the most common type of diabetes, accounting for over 90% of cases. It is typically caused by a combination of genetics and lifestyle factors, such as physical inactivity, unhealthy diet, and excess weight.

Pakistan is facing a growing diabetes epidemic. According to the International Diabetes Federation, an estimated 33 million adults in Pakistan have diabetes, and this number is projected to rise to 53 million by 2045. This translates to a prevalence of 10.2% in adults aged 20-79 years.

While there is no cure for diabetes, effective management through combined lifestyle modifications and medication can significantly improve quality of life. Lifestyle modifications include maintaining a healthy diet, engaging in regular physical activity, managing weight, and controlling stress levels. Medications commonly used in diabetes management include insulin, oral medications, and injections of glucagon-like peptide-1 (GLP-1) receptor agonists.

Early diagnosis and proper management are crucial to preventing or delaying the development of serious complications associated with diabetes, such as heart disease, stroke, blindness, kidney failure, and nerve damage.

Diabetes is a major public health concern in Pakistan, with significant individual and societal impacts. Effective prevention and management strategies are essential to address this growing challenge and improve the health outcomes of individuals living with diabetes. Early diagnosis and intervention are crucial to prevent or delay the development of diabetes complications, improving quality of life and long-term health outcomes. Effective diabetes management requires



a multidisciplinary approach, including lifestyle modifications, pharmacological interventions, and regular monitoring. Public awareness campaigns, targeted screening programs, and accessible healthcare services are essential to combat the diabetes epidemic in Pakistan.

## **Study Details**

Rawalpindi Medical University Model of Data Bank of Diabetes Mellitus

## **Objectives**

The specific objectives are to

- Determine the prevalence of diabetes among the Pakistani population.
- Identify the major risk factors associated with diabetes
- Assess the association between diabetes and various complications, including cardiovascular diseases, nephropathy, retinopathy, and neuropathy.

## Study design

A cross-sectional study design was employed to collect data. The study participants were recruited from a diverse range of geographical locations and socioeconomic backgrounds.

## **Place of study**

Rawalpindi Medical University and Allied Hospitals

## Methodology

A structured questionnaire was administered to gather detailed information on participants' demographic characteristics, lifestyle habits, medical history, and family history of diabetes. Additionally, blood glucose levels were measured for all participants using standardized protocols.

## Conclusion

The findings of this study underscore the alarming prevalence of diabetes in Pakistan. The study identified significant risk factors associated with diabetes, including obesity, physical inactivity, unhealthy diet, and family history. Moreover, the study demonstrated a strong association between



diabetes and various complications, highlighting the need for comprehensive preventive and management strategies to address this growing health concern in Pakistan.



## (Symptoms of Diabetes Mellitus)

## Significance of Data Bank of Diabetes Mellitus

#### 1. Comprehensive Data Collection and Curation

The Diabetes Data Bank serves as a centralized repository for accurate and up-to-date information on diabetes, including epidemiology, transmission dynamics, diagnosis, management, and research.



#### 2. User-Friendly Interface and Access

The data bank features an intuitive search functionality, advanced data visualization tools, and downloadable data sets to facilitate user access and data analysis.

#### 3. Regular Updates and Expansions

The data bank is continuously updated with new data, emerging research findings, and information on diverse aspects of diabetes to ensure its relevance and comprehensiveness.

#### 4. Public Health Impact and Dissemination

The data bank provides evidence-based support for policy formulation, public awareness campaigns, and community engagement initiatives to address the diabetes epidemic.

#### 5. Empowering Healthcare Professionals and Researchers

The Diabetes Data Bank equips healthcare professionals with evidence-based guidelines and protocols for effective diabetes management, while providing researchers with resources and data for in-depth studies.

#### 6. Improving Diabetes Outcomes in Pakistan

The Diabetes Data Bank plays a crucial role in understanding, preventing, and managing diabetes in Pakistan, contributing to improved health outcomes for individuals and communities.

## **Data Bank Model of Diabetes Mellitus**

#### 1. Introduction

#### a. Purpose

The Diabetes Data Bank (DDB) is a centralized repository of comprehensive patient data aimed at enhancing the understanding, prevention, and management of diabetes. This data bank serves as a valuable resource for healthcare professionals, researchers, and policymakers to gain insights into the prevalence, risk factors, complications, and treatment outcomes of diabetes in the Pakistani population.

#### b. Scope



This Data Bank encompasses a wide range of data elements related to diabetes including patient demographics, medical history, clinical data and treatment outcomes.

## 2. Data Collection

#### a. Patient Information

- i. Patient Name: [Full Name]
- ii. **Patient Gender:** [Male, Female]
- iii. Patient Age: [in Years]
- iv. **Patient Address:** [Complete Address, including City, Province, and Postal Code]
- v. Patient Contact Information: [Phone Number, Email Address]
- vi. Clinical history



#### **b.** Clinical Parameters

- i. Laboratory test results
  - Blood glucose levels
  - Blood Glucose Levels: [Fasting Blood Glucose, Postprandial Blood Glucose, HbA1c]
- ii. Body Mass Index (BMI): [Calculate BMI based on Height and Weight Measurements]



- iii. Date of Diabetes Diagnosis: [Date of Initial Diagnosis or Self-Reported Diagnosis]
- iv. Family History of Diabetes: [Yes/No]
- v. Comorbid Conditions: [List of Existing Medical Conditions]
- vi. Medications: [List of Current Diabetes Medications and Dosage]
- vii. Treatment Adherence: [Self-Reported Adherence to Medication Regimen]
- viii. Glycemic Control: [Overall Assessment of Blood Glucose Management]
- ix. Diabetic Complications: [Presence of Diabetic Retinopathy, Nephropathy, Neuropathy, or Foot Complications]
- x. Lifestyle Factors: [Smoking Status, Physical Activity Levels, Dietary Habits]

## 3. Data Storage

The Diabetes Data Bank requires a robust and secure data storage infrastructure to safeguard sensitive patient information and maintain the integrity of the data for research and clinical purposes.

## a. Electronic Health Record System

Electronic health records (EHRs) play a crucial role in this process, providing a centralized platform for storing, managing, and accessing patient data.

- Ensure compatibility between DDB data elements and EHR data fields to facilitate seamless data integration.
- Establish clear mappings between DDB data elements and corresponding EHR fields to ensure accurate data transfer and synchronization.
- Implement automated data transfer mechanisms to extract relevant diabetesrelated data from EHRs and populate the DDB.
- Implement data integrity checks to verify the accuracy and completeness of transferred data.
- Establish regular data synchronization processes to maintain consistency between the DDB and EHRs.

## b. Secure Data Storage Practices



- Encrypt data at rest and in transit to safeguard against unauthorized access and data breaches.
- Implement strict access control measures, including multi-factor authentication and role-based access control, to restrict access to authorized users based on their roles and responsibilities.
- Implement regular and secure data backup procedures to ensure data recovery in case of system failures or data loss.
- Maintain audit trails to track data access, modifications, and usage patterns for accountability and security purposes.

## 4. Data Retrieval

#### a. Query Mechanism

i. Develop a user-friendly interface for authorized personnel.

ii. Enable search based on patient demographics, admission date, severity, etc.

iii. Implement filters to refine search results.

## b. Reporting System

i. Generate standardized reports for research purposes.

- ii. Provide options for customizing reports based on specific criteria.
- iii. Ensure data integrity in retrieval processes.

## 5. Research Potential

#### a. Epidemiological Studies:

- i. Analyze trends in Dengue cases over time.
- ii. Identify high-risk demographics and geographical areas.
- iii. Inform public health interventions.

#### b. Treatment Efficacy:

- i. Evaluate the effectiveness of different treatment protocols.
- ii. Identify patterns in recovery and complications.
- iii. Contribute to evidence-based medical practices.

#### c. Outcomes Analysis:





- i. Assess long-term outcomes and complications.
- ii. Contribute to the development of better prognostic indicators.
- iii. Support ongoing improvement in patient care.

## 6. Provisional Strategies

#### a. Data Anonymization:

- i. Ensure patient confidentiality by removing identifiable information.
- ii. Assign unique identifiers to each case.

#### **b.** Quality Assurance:

- i. Implement regular audits to ensure data accuracy.
- ii. Establish protocols for correcting errors in the data.

#### c. Data Sharing:

- i. Collaborate with research institutions and public health agencies.
- ii. Facilitate responsible data sharing for broader research initiatives

## 7. Security Measures

## a. Encryption:

- i. Encrypt sensitive data during transmission and storage.
- ii. Utilize secure communication channels.

#### **b.** Access Control:

- i. Grant access only to authorized personnel based on their role.
- ii. Monitor and log data access for auditing purposes.

#### c. Regular Security Assessments:

Conduct regular risk assessments and vulnerability scans to identify and address potential security weaknesses.

## d. Physical Security:

Implement physical security measures to protect the data storage infrastructure from unauthorized physical access.

## 8. Training and Awareness



- **a.** Conduct regular training sessions for healthcare professionals, researchers, and administrative staff to familiarize them with the data bank and its usage guidelines.
- b. Promote awareness of data protection and ethical considerations.
- c. **Promote** data literacy among staff by encouraging participation in workshops, seminars, and online learning opportunities.
- d. **Raise public awareness by e**ducating the public about the importance of the Diabetes Data Bank and its role in improving diabetes care and research.



Facilitators and Barriers to Uptake of Community-Based Diabetes Prevention Program Among Multi-Ethnic Asian Patients With Prediabetes



## 9. Continuous Improvement

### a. Establish Data Quality Metrics:

Develop and implement data quality metrics to monitor the accuracy, completeness, and consistency of data within the data bank.

#### b. Conduct Regular Data Reviews:

Regularly review data quality metrics and identify areas for improvement in data collection, storage, and retrieval processes.

## c. Gather User Feedback:

Solicit feedback from data users to identify areas for improvement in data accessibility, usability, and research support.

## d. Implement Data Improvement Strategies:

Based on data reviews and user feedback, develop and implement strategies to enhance data quality, accessibility, and usability.

## **10.Compliance**

## a. Develop Data Privacy Policies

Establish clear data privacy policies that adhere to applicable data protection regulations, such as GDPR and HIPAA.

## b. Ethical Approval for Research

Require researchers to obtain ethical approval from an Institutional Review Board (IRB) for studies involving data from the data bank.

## c. Ensure Informed Consent

Obtain informed consent from patients before their data is used for research purposes.

## d. Maintain Data Integrity

Implement measures to protect data integrity and prevent unauthorized modifications or data loss.

#### e. Conduct Regular Compliance Audits



Conduct regular audits of data management practices to ensure compliance with data privacy regulations, ethical guidelines, and institutional policies.

These SOPs are designed to establish a robust system for collecting, storing, retrieving, and utilizing Diabetic patient data for research and healthcare improvement purposes. Regular review and adherence to ethical guidelines are crucial for the success of the data bank.