National Health Authority

Ayushman Bharat Digital Mission

Developing Health Information User (HIU) services to provide a view of patient's medical history to authorized healthcare workers with complete consent – Milestone 3

May-2022 Version-1.0 (Revision – 1)

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Purpose

The purpose of this document is to outline and demystify HIU building APIs and associated flows for the integrator. This document has the details of APIs and sequence diagrams for Milestone three/M-3 (Building Health Information User (HIU) services to provide a view of patients' medical history to authorized healthcare workers with complete consent.

Introduction

The Sandbox environment is hosted on the ABDM infrastructure, and provides a ready to use integrated environment with core/foundational services already installed and provisioned. Integrations with ABDM infrastructure recommend developing user experience in three milestones:

- Milestone 1: ABHA creation and capture & verification for seamless patient registration
- *Milestone 2: Building Health Information Provider (HIP) services to share digital records via a Personal Health Records app , linking of health record with ABHA Address and ABHA number (in case of ABHA address that is linked with ABHA number) sharing of health record with consent*
- **Milestone 3: Developing Health Information User (HIU) services to provide a view of patient's medical history (which is linked to their ABHA address) to authorized healthcare workers with complete consent of patient**

Health Information User (HIU) :

An HIU (Health Information User) is an entity that wants to access digital health information from HIPs, in order to provide services to the patient to whom the information belongs. An HIU can be a hospital, clinic, healthcare technology company, organization working on health analytics, insurers, medical researchers and government entities. These HIUs will be able to request for health records of a patient, and upon obtaining the patient's digital consent, view the health records for a limited time period.

Refer Annexure 1 for testing HIU Application for creating/view consent

The following capabilities are expected of HIU services in the federated health records context:

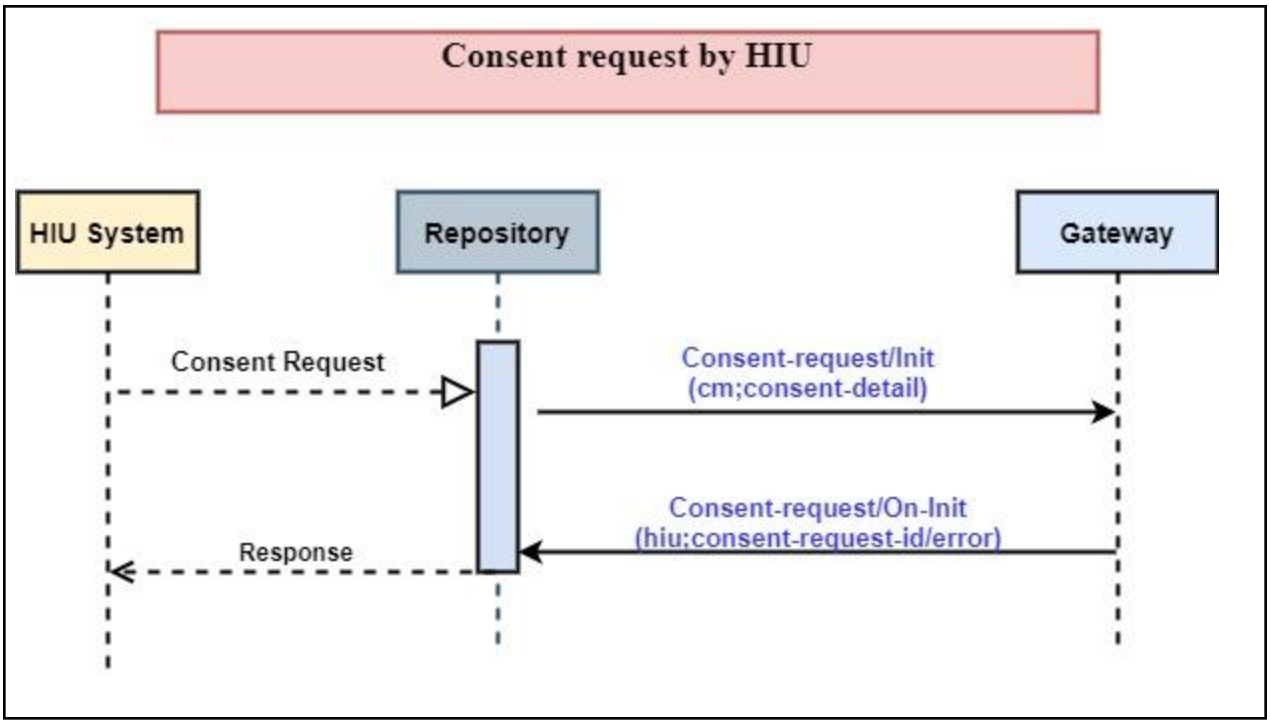
- Ability to search for and identify a patient by her ABHA Number, and seek consent to view her health records.
- Once the consent is granted, use the HIU application to view the patient's health records. This is particularly useful for verification of data formats when you as HIP are sending over a patient's health records.
- Ability to request and receive data in a safe and secure manner, manage data lifecycle, and enable secure data storage and access.

1. Creating of Consent request and notifying the patient

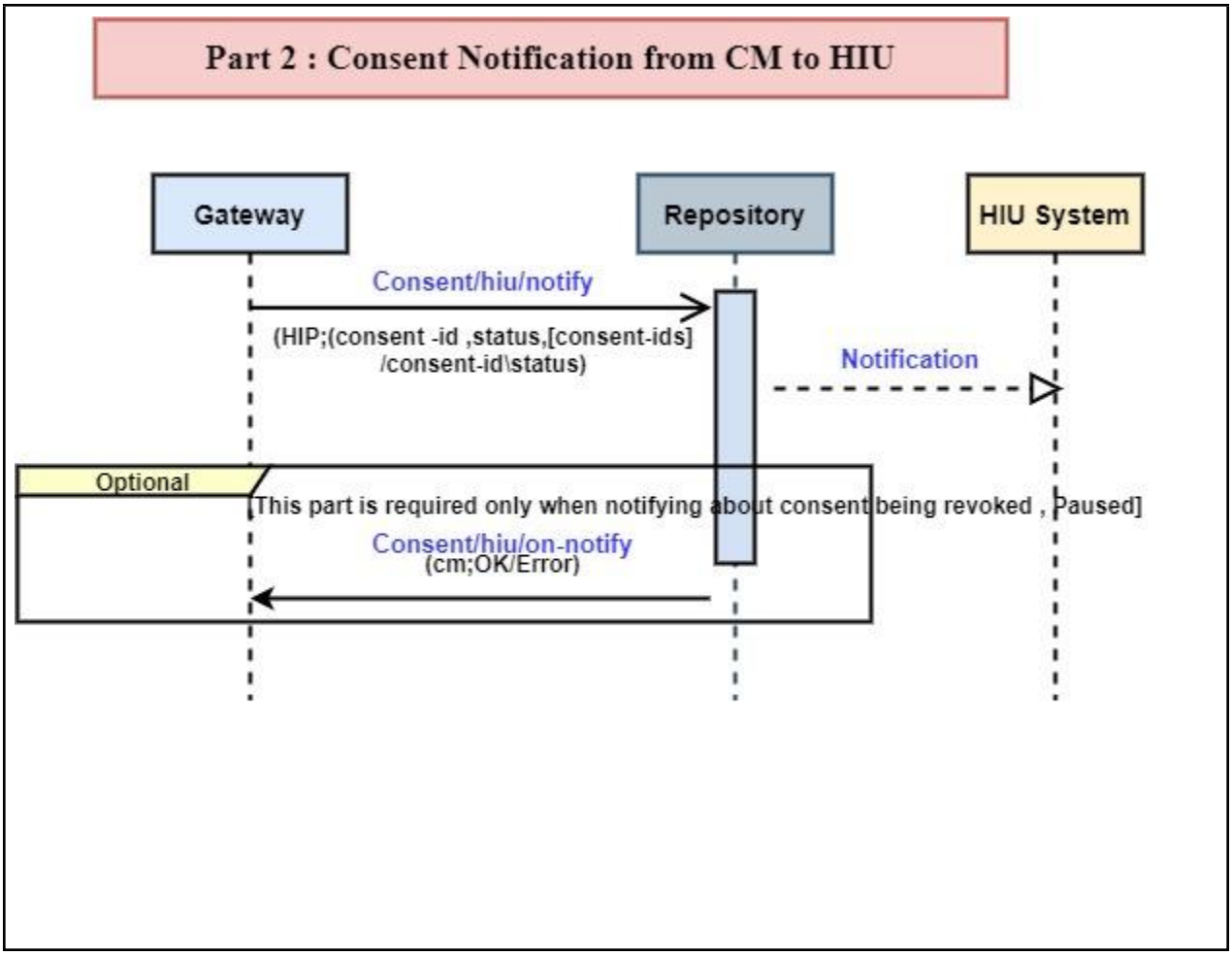
From an HIU perspective, the flow begins when the HIU (e.g., a Doctor at a Hospital) requests consent to view the patient's data. Upon receipt of such a request from Gateway, CM acknowledges and sends back a consent request ID to the HIU via the gateway. The CM then notifies the patient that an HIU has made a consent request. The patient can view the request details and choose to either grant consent or deny it.
Subsequently, the CM notifies the HIU requester of the patient's consent or denial status via the gateway.

- If the request is granted, the CM sends across the Ids of the consent artefacts that were created against the request, to the HIU.
- If the request is denied, the CM simply notifies the HIU of the denial of the request;

The following diagram explains the consent request creation flow of forwarding the request to the gateway so that gateway can forward it to respective CM

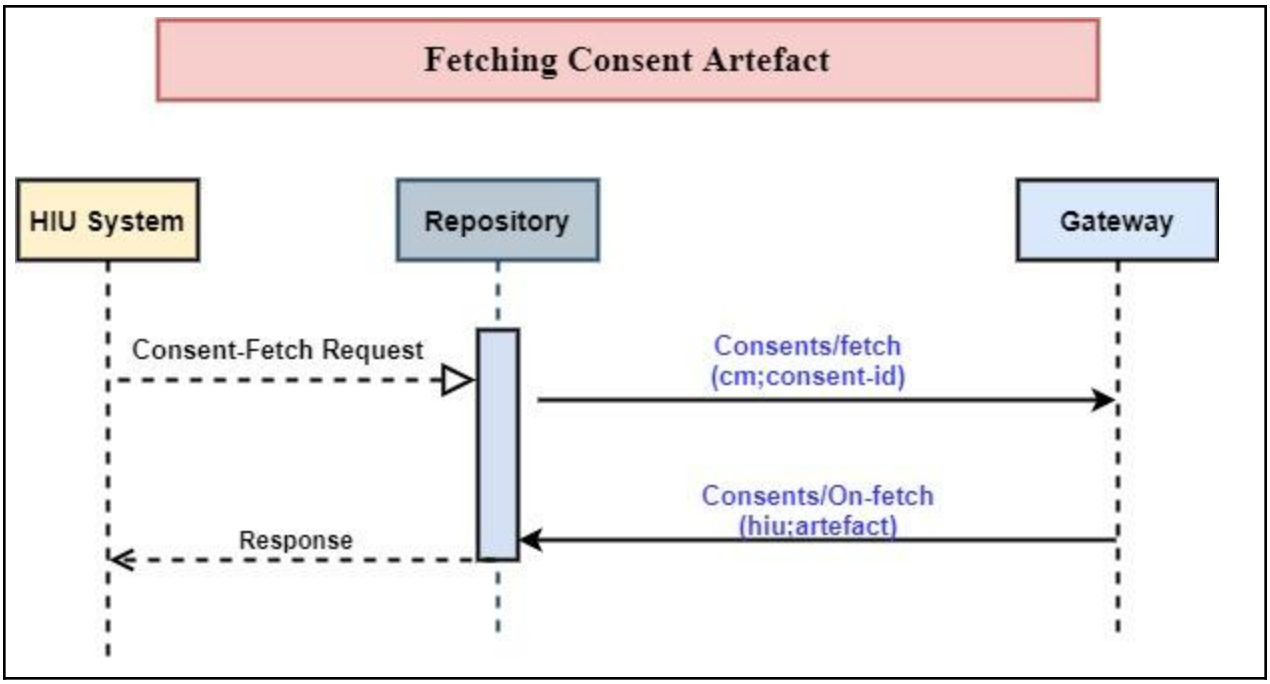

Consent request by HIU
HIU System
Repository
Gateway
Consent Request
Consent-request/Init
(cm;consent-detail)
Consent-request/On-Init
(hiu;consent-request-id/error)
Response

2. Patient Consent Notification from CM to HIU



3. Fetching the Consent artefact

Once the patient grants consent to the HIU, the CM notifies the HIU system of the consent grant via the gateway. If the patient grants for multiple HIPs, then multiple consent artefacts are generated - one for each HIP. The HIU now first fetches all the consent-artefacts that were generated for its request.



4. Data request and transfer

The data request and transfer process between the HIU, CM and HIP passes through the following three stages:

First Stage

- The HIU system initiates data requests for a patient's health information to the HIP against the relevant consent-artefact, through the CM.
- As part of the data request, the HIU's health repository embeds three key elements within the health information request:
    - The consent ID corresponding to the consent artefact against which the information request is being made.
    - A data push URL, which is a callback URL that indicates where the information can be pushed by the HIP's health repository. This URL can be different from the HIU's access URL, provided at the time of registration with the gateway. The HIU can specify a

different URL for the data flow, in order to keep its identity secret to the extent possible.

    - Several parameters such as the date-time range for the requested and a set of encryption parameters for the HIP repository to encrypt the information. The Elliptic-curve Diffie–Hellman based encryption standard is used for encrypting health information.

- Upon receipt of the data-request, CM assigns a transaction ID (txn-id) for the entire data flow and communicates this Id to the health repositories of the HIU and the HIP.

The HIU's health repository relays all this information to the CM through the gateway. From the CM, the information is relayed to the respective HIP's health repository (via the gateway).

Second Stage

Once the HIP repository receives the information, it first validates the information request, as follows:

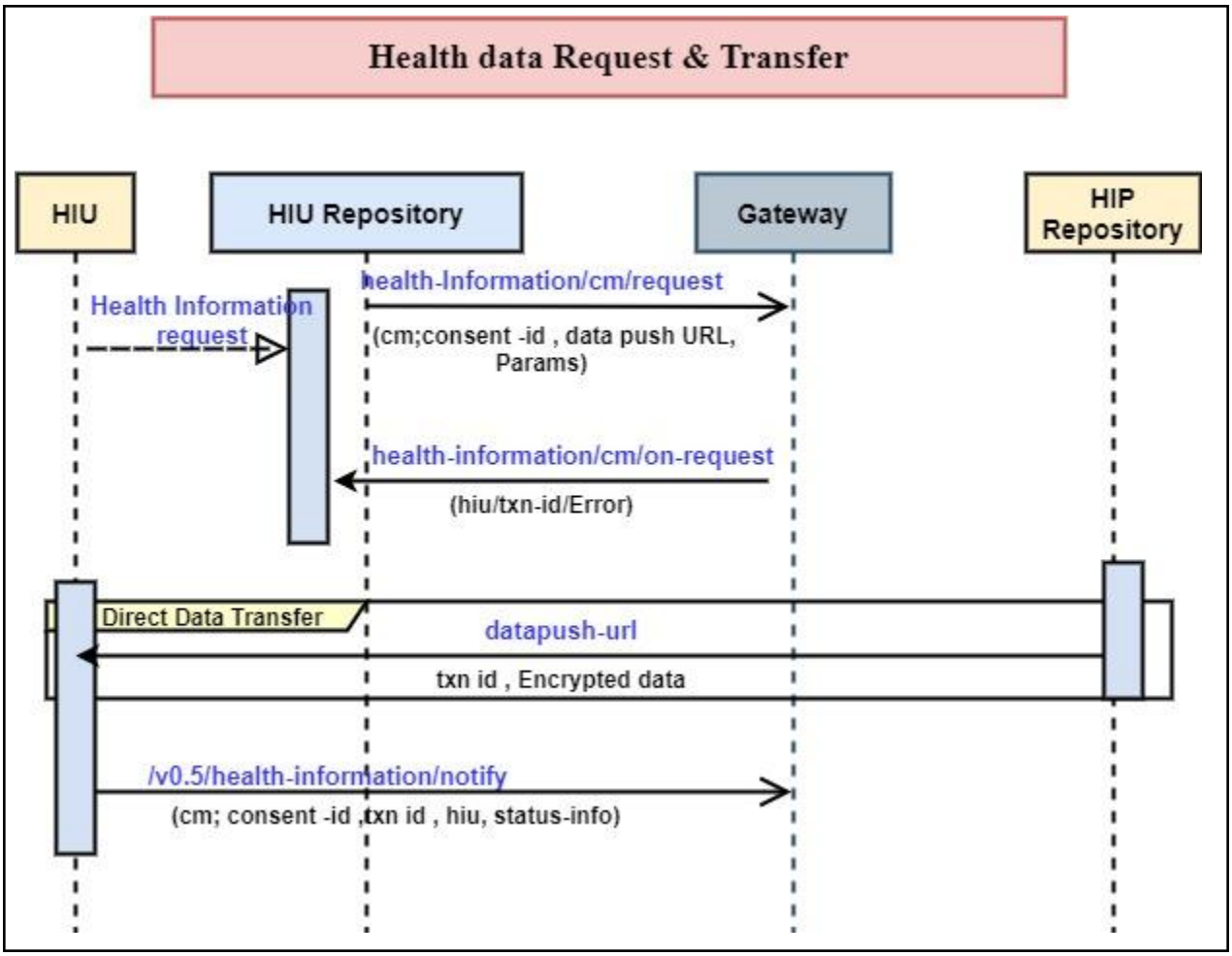
- The HIP finds out if the consent ID corresponds to an expired, paused or revoked artefact.
- It then checks if the request for which the date-time range corresponds to the range for which the consent artefact allows information access. It also ensures that the encryption parameters are correctly defined.
- Once the above checks are made and validated, the HIP health repository encrypts the requested health records and forwards it along with the

transaction ID to the HIU's data push URL, after signing the encrypted data with its long-term private key.

Third Stage

Finally, the CM receives notifications from both the HIP and the HIU. The HIP's health repository notifies the CM that the requested information was transmitted to the HIU. The HIU's health repository sends a notification that the requested information was successfully received, or that the request failed.

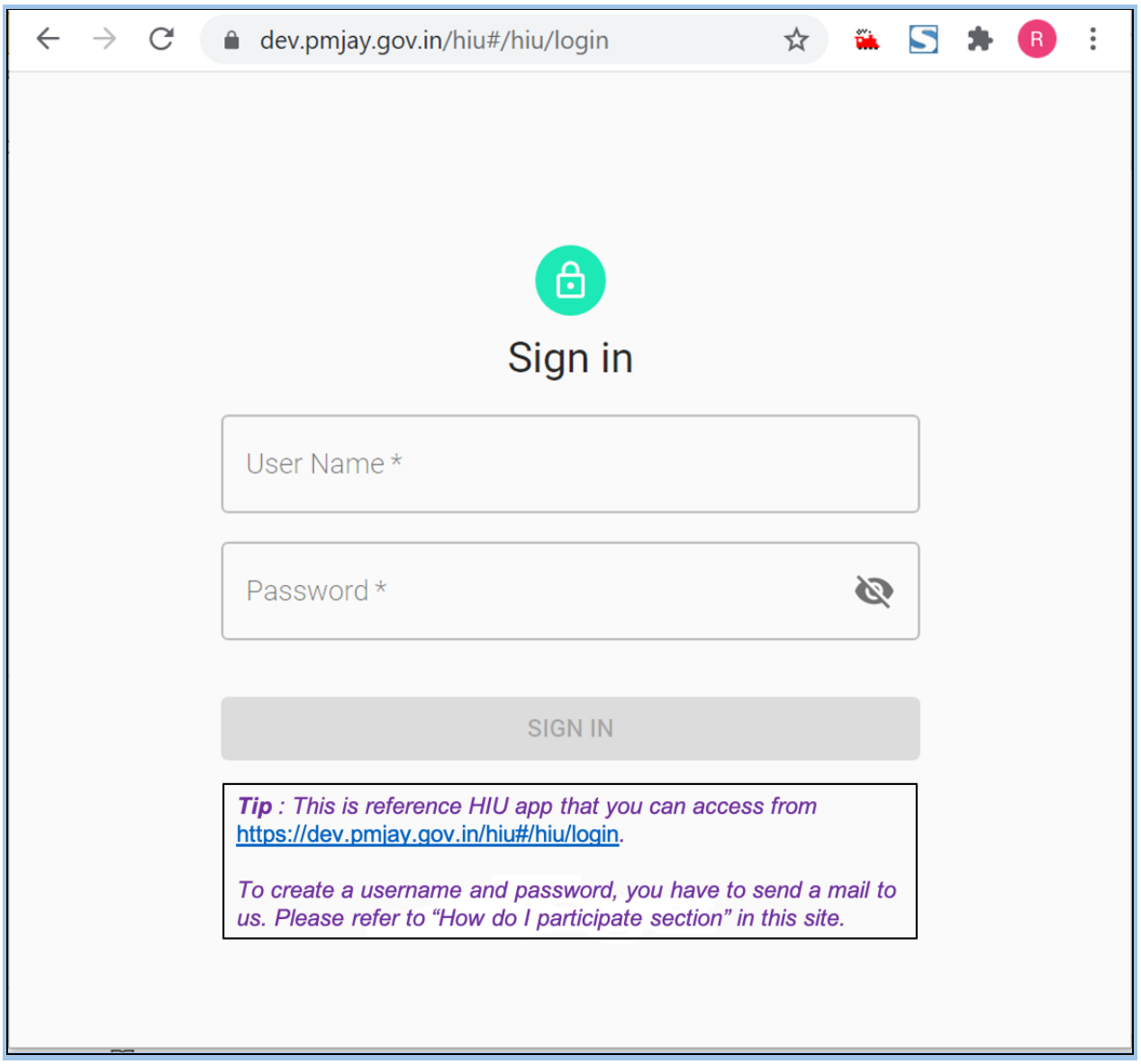
All above 3 stages that pertains to HIU are shown in the following diagram:

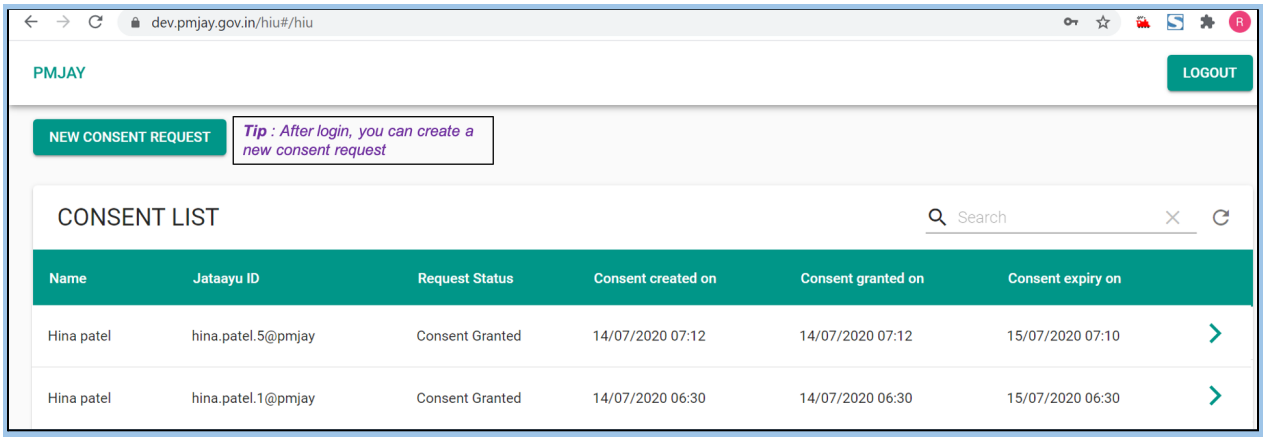


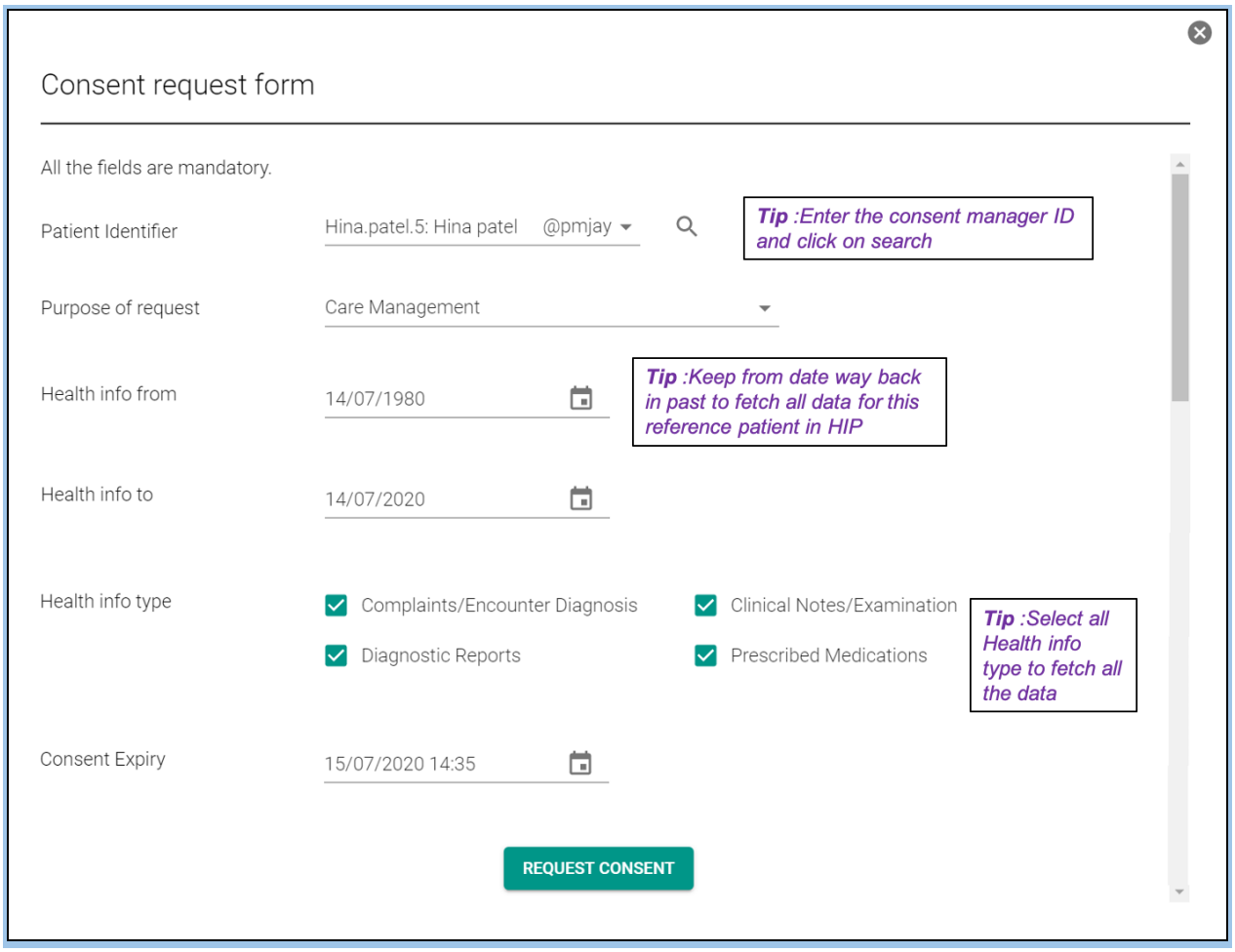
5. Annexure 1 : Testing HIU app

Step 1: Create a consent request (Action as HIU)

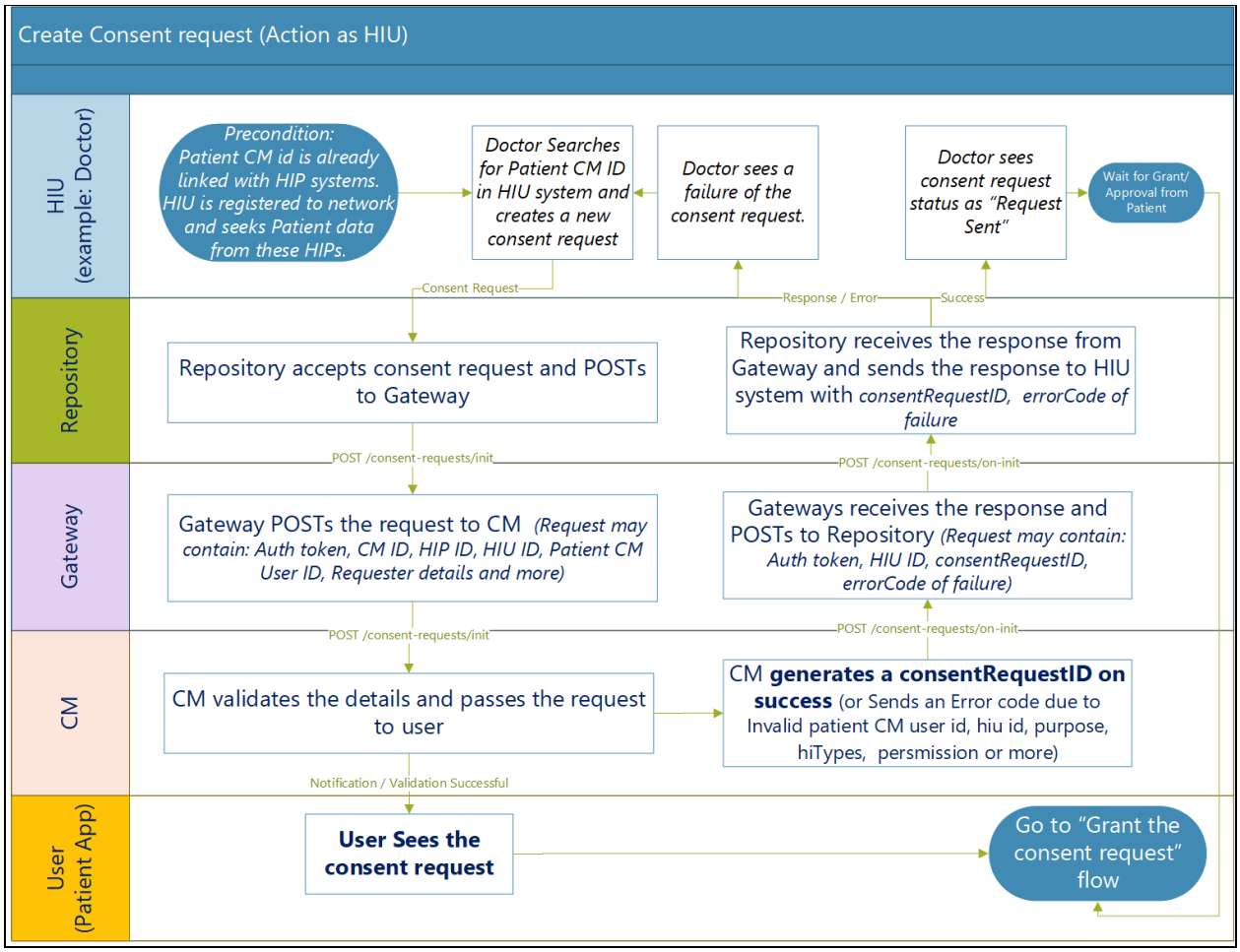
1. Open the HIU application on your mobile phone.
2. Login with your credentials. You will find the credentials in the email sent to you by the ABDM support team. If you don't have login credentials, Send a Request to Integrate Your Test Environment. NHA will revert along with your login credentials.
3. Click on the consent request and provide the patient's CM ID. Search for the CM ID within the system.
4. Select a purpose for creating a consent request from the options displayed.
5. Select a HI (Health Information) date range for which the test patient has records in the system.
6. Select the HI types from the list displayed, for all the data present in your test environment for the test patient.
7. Set an expiry date for the consent request; you will be able to access test patient data only until the date of expiry.


dev.pmjay.gov.in/hiu#/hiu/login
Sign in
User Name *
Password *
SIGN IN
Tip : This is reference HIU app that you can access from https://dev.pmjay.gov.in/hiu#/hiu/login.
To create a username and password, you have to send a mail to us. Please refer to "How do I participate section" in this site.


dev.pmjay.gov.in/hiu#/hiu
PMJAY
LOGOUT
NEW CONSENT REQUEST
Tip : After login, you can create a new consent request
CONSENT LIST
Search
Name
Jataayu ID
Request Status
Consent created on
Consent granted on
Consent expiry on
Hina patel
hina.patel.5@pmjay
Consent Granted
14/07/2020 07:12
14/07/2020 07:12
15/07/2020 07:10
Hina patel
hina.patel.1@pmjay
Consent Granted
14/07/2020 06:30
14/07/2020 06:30
15/07/2020 06:30



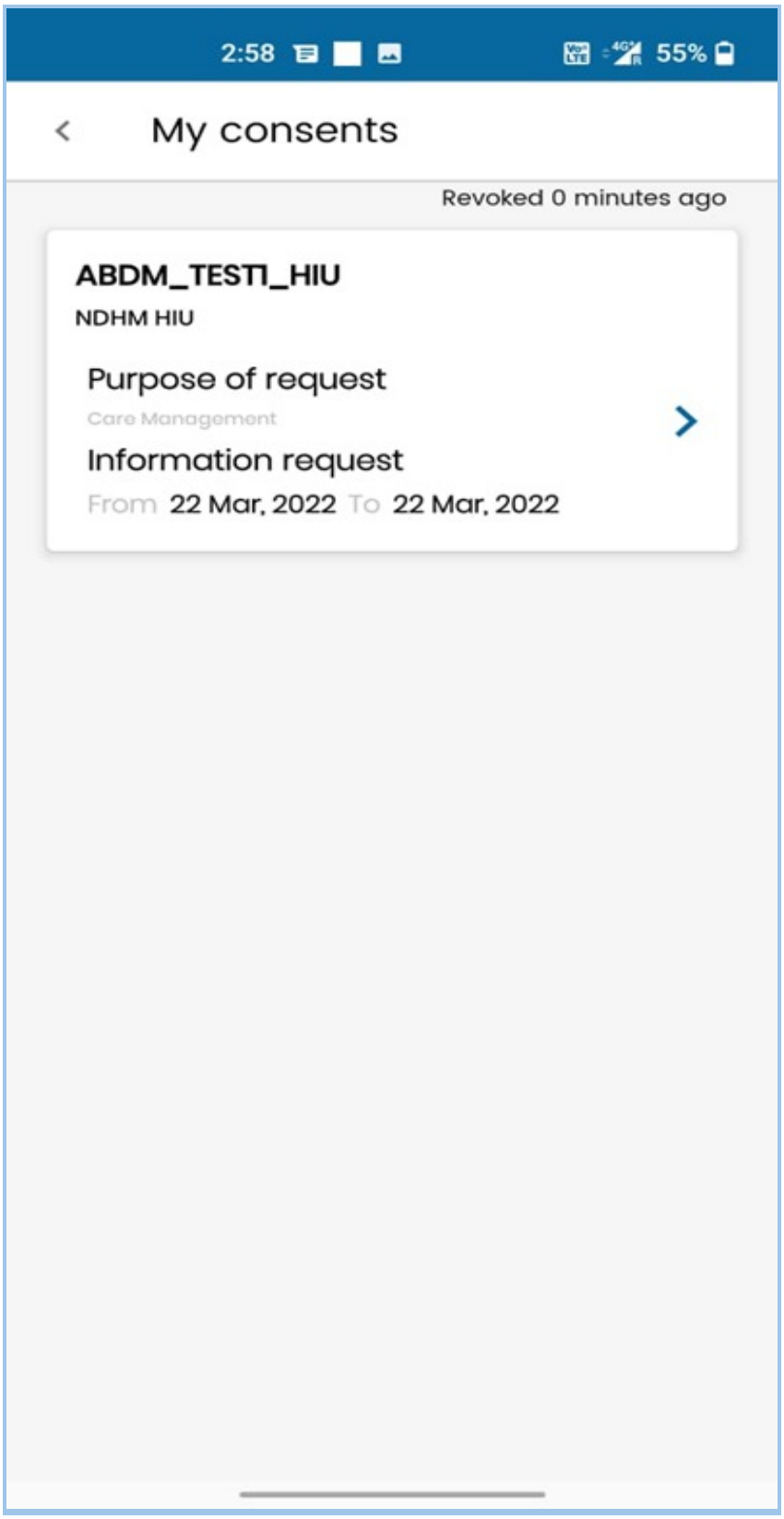
Flow Diagram: Create a consent request

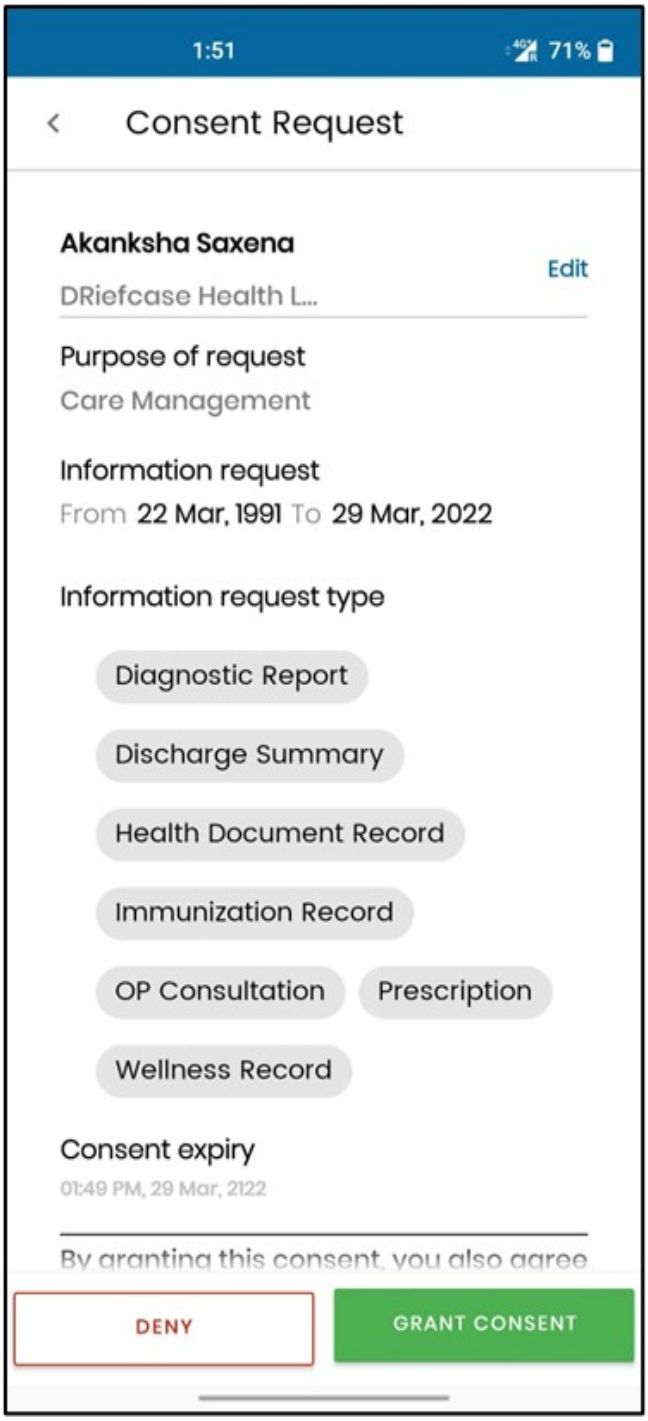


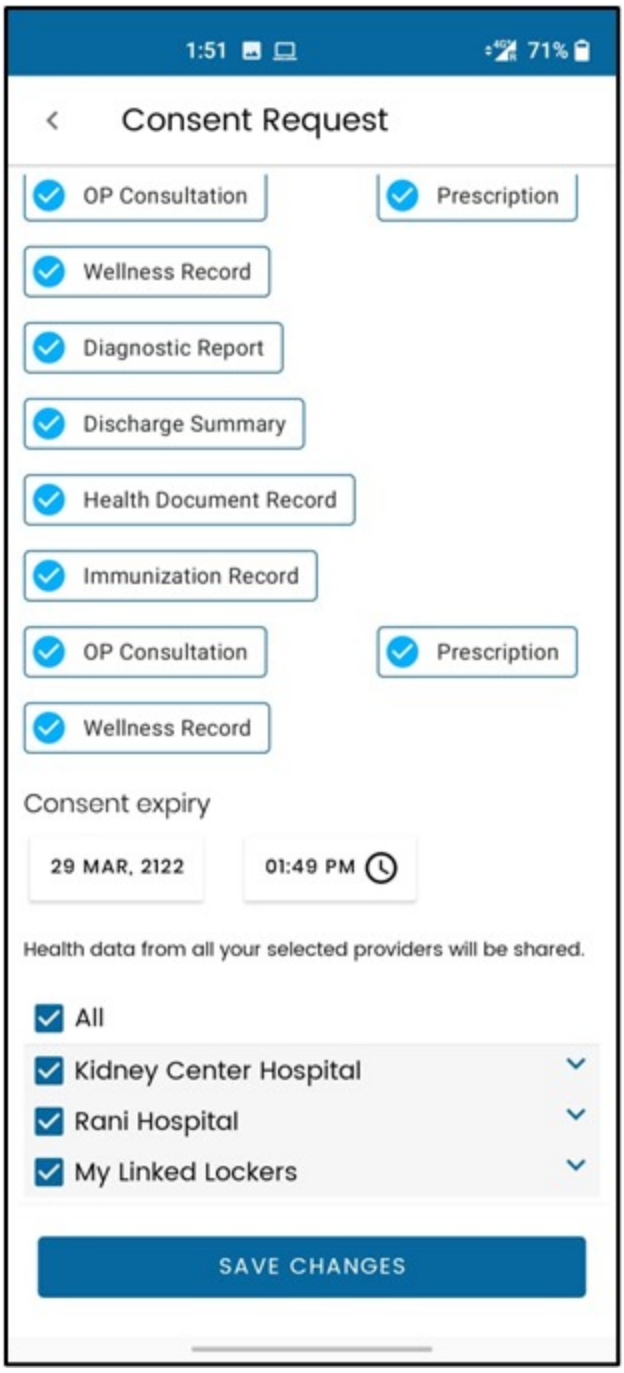
Process Flow Diagram: Create consent request

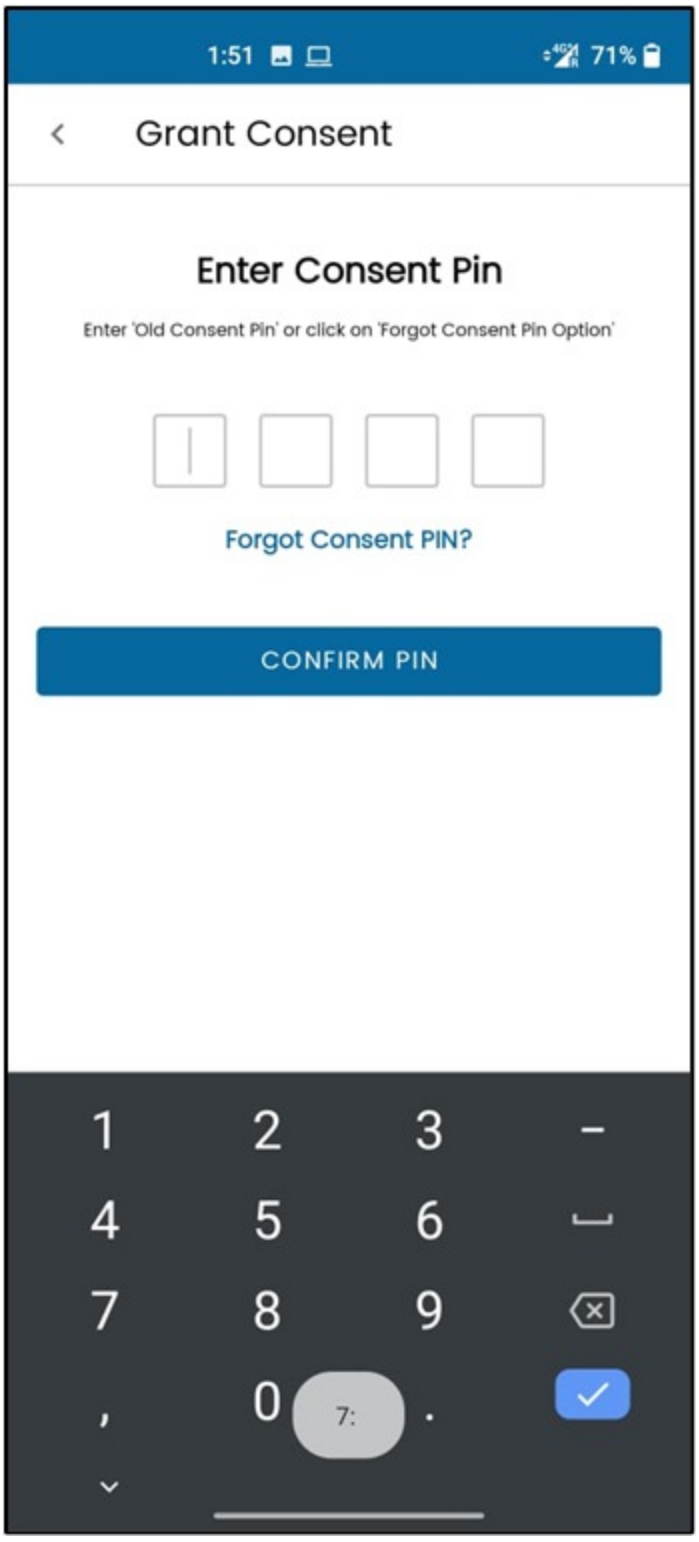
Step 2: Grant the consent request (Action by test patient)

1. Open the Consent Manager app again and navigate to the consent requests tab.
2. You will see the consent request which you created in the previous step.
3. To grant the consent request, create a consent PIN. Confirm it; after successful PIN validation, the consent will be granted.

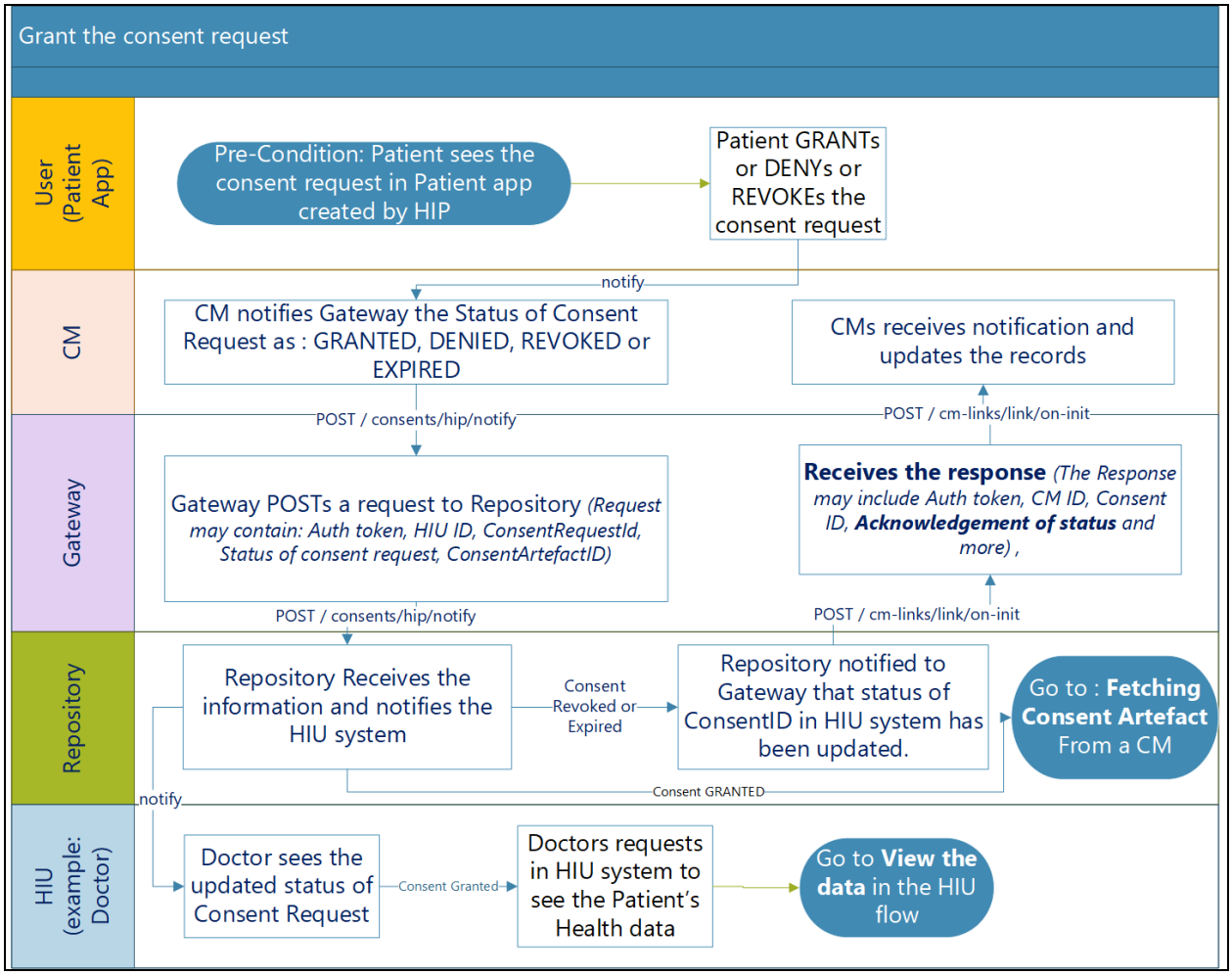

2:58
55%
My consents
Revoked 0 minutes ago
ABDM_TESTI_HIU
NDHM HIU
Purpose of request
Care Management
Information request
From 22 Mar, 2022 To 22 Mar, 2022


1:51
71%
Consent Request
Akanksha Saxena
Edit
DRiefcase Health L...
Purpose of request
Care Management
Information request
From 22 Mar, 1991 To 29 Mar, 2022
Information request type
Diagnostic Report
Discharge Summary
Health Document Record
Immunization Record
OP Consultation
Prescription
Wellness Record
Consent expiry
01:49 PM, 29 Mar, 2122
By granting this consent, you also agree
DENY
GRANT CONSENT


1:51
71%
Consent Request
OP Consultation
Prescription
Wellness Record
Diagnostic Report
Discharge Summary
Health Document Record
Immunization Record
OP Consultation
Prescription
Wellness Record
Consent expiry
29 MAR, 2122
01:49 PM
Health data from all your selected providers will be shared.
All
Kidney Center Hospital
Rani Hospital
My Linked Lockers
SAVE CHANGES



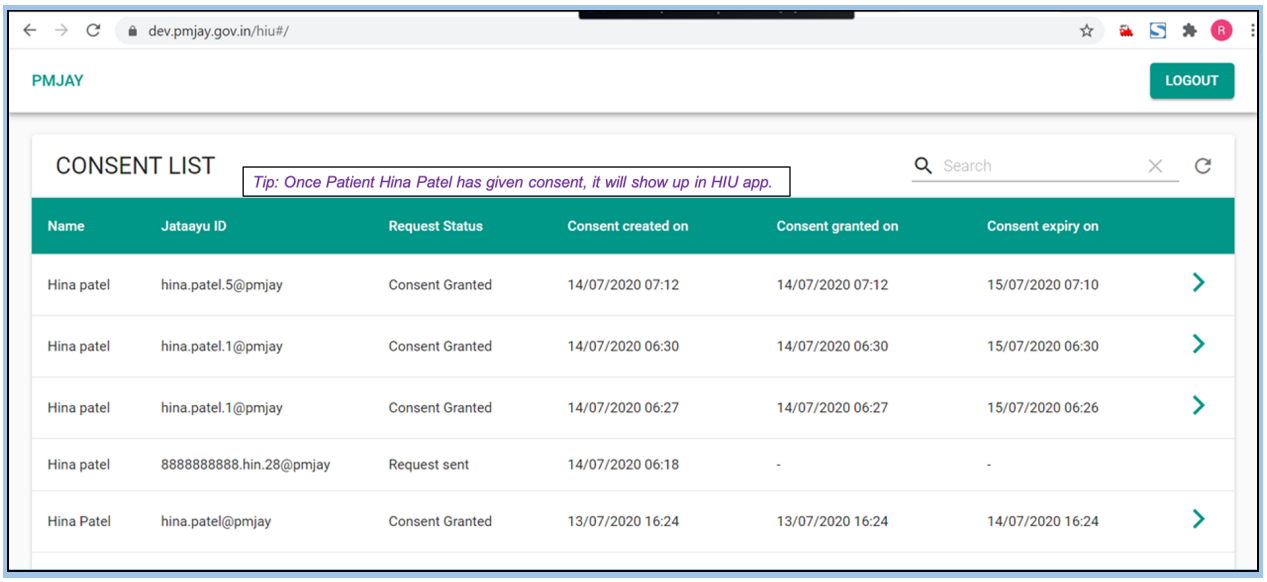
Flow Diagram: Grant the consent request

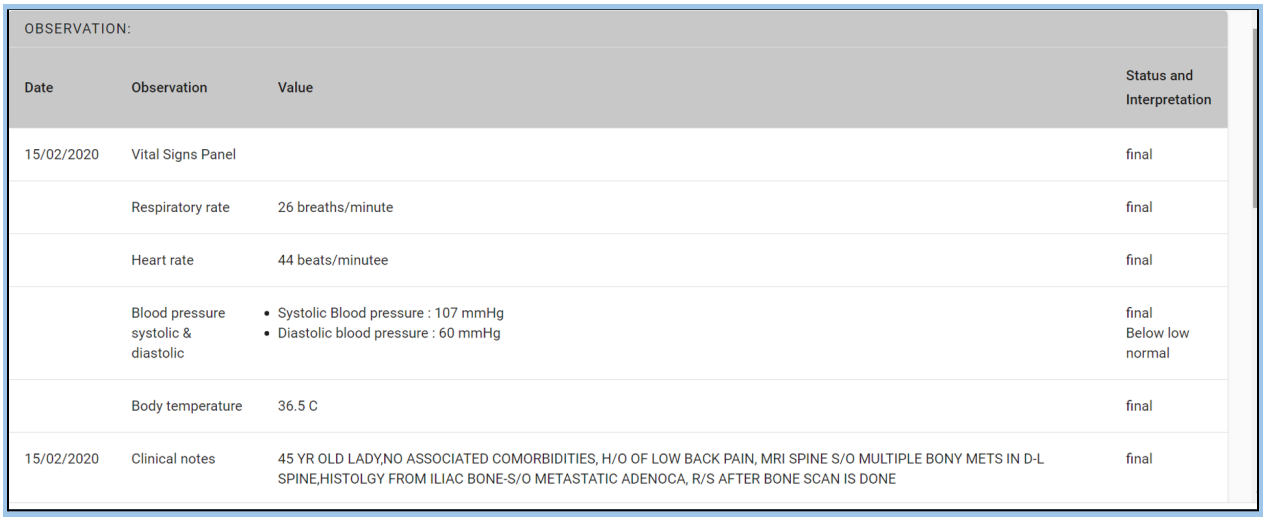


Process Flow Diagram: Grant the consent request

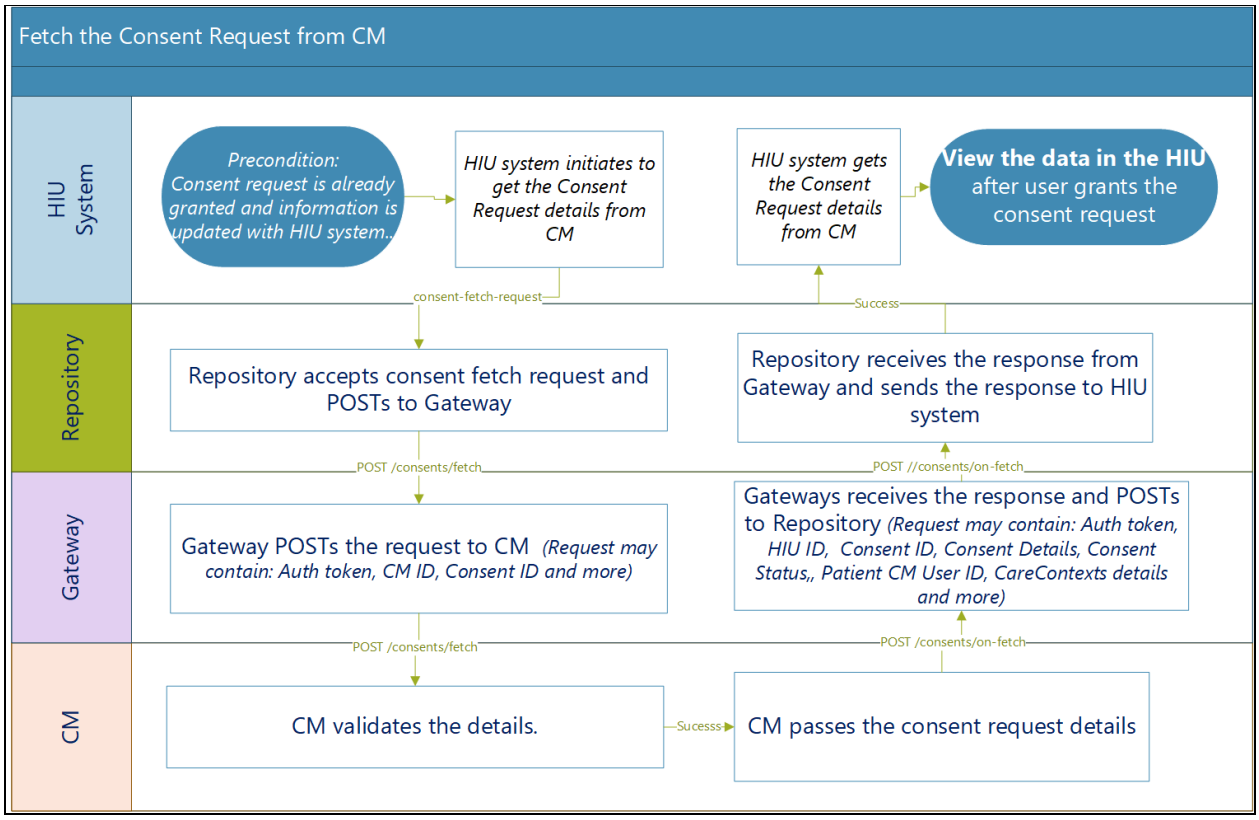
Step 3: View the data in the HIU after user grants the consent request (Action as HIU)

1. Login into the HIU application again.
2. Search for the consent request you created previously and click on it.
3. You should be able to see the data sent by HIP for the test patient.





Flow Diagram: View the data in the HIU after user grants the consent request



Process Flow Diagram: Fetch the consent request from CM

6. Annexure 2 : API Summary

The following table lists down all the rest APIs rolled out by the ABHA system for consumption by the integrators. The same APIs can be used to develop system specific user flows by the integrators.

Milestone 3: Developing Health Information User (HIU) services to provide view of patient's medical history to authorized				
1	Session Api	{{GATEWAY_HOST}}/v0.5/sessions		
		API		**Callback API**
2	**Subscription**			
2.1	Subscription request against PHR address	{{GATEWAY_HOST}}/v0.5/subscription-requests/cm/init		{HIU_HOST}/v0.5/subscription-requests/hiu/on-init
2.2	Subscription Request appoval Notification to HIU	{HIU_HOST}/v0.5/subscription-requests/hiu/notify		{GATEWAY_HOST}/v0.5/subscription-requests/hiu/on-notify
2.3	Whenever new data is available the HIU will be notified if there is an active subscription.	{HIU_HOST}/v0.5/subscriptions/hiu/notify		{{GATEWAY_HOST}}/v0.5/subscriptions/hiu/on-notify
2	**Consent Flow**			
2.1	Identify Patient using PhrAddress or Health id number	{{GATEWAY_HOST}}/v0.5/patients/find		{{HIU_HOST}}/v0.5/patients/on-find
2.2	Creating consent request for patient based on subcription notification The consent request should be approved If the auto approval policy is setup properly then consent request should be auto-approved. If not then consent request can be manually approved by patient.	{{GATEWAY_HOST}}/v0.5/consent-requests/init		{{HIU_HOST}}/v0.5/consent-requests/on-init
2.3	Check status of Consent Request	{{GATEWAY_HOST}}/v0.5/consent-requests/status		{{HIU_HOST}}/v0.5/consent-requests/on-status
2.4	Health information user will get notified about the consent request granted or denied, consent revoked, consent expired.	{HIU_host}/v0.5/consents/hiu/notify		{Gateway_HOST}/v0.5/consents/hiu/on-notify
2.5	Fetching the consent artefact Once the patient grants consent to the HIU, the CM notifies the HIU system of the consent grant via the gateway. If the patient grants for multiple HIPs, then multiple consent artefacts are generated - one for each HIP. The HIU now first fetches all the consent-artefacts that were generated for his request.	{GATEWAY_HOST}/v0.5/consents/fetch		{HIU_HOST}/v0.5/consents/on-fetch
3	**Data request**			
3.1		{GATEWAY_HOST}/v0.5/health-information/cm/request		{HIU_HOST}/v0.5/health-information/hiu/on-request
3.2	Data Received on Data Push URL This API is directly called by HIP Data Bridge and is not mediated via CM, and hence not routed through the Gateway.	{Data_push_url}/v0.5/health-information/transfer		
3.3	HIU Notify Gateway HIU on receipt of data would send sessionStatus - one of [TRANSFERRED, FAILED]. For example, FAILED when if data was not sent or if invalid data was sent HIU would also send hiStatus for each careContextReference - one of [OK, ERRORED]"	{GATEWAY_HOST}/v0.5/health-information/notify		{HIU_HOST}/}/v0.5/health-information/on-notify
4	**Status Notification (ACTIVE/DEACTIVATED/DELETED)**			
4.1	send patient's status (ACTIVE/DEACTIVATED/DELETED) to the HIP	{GATEWAY_HOST}}/v0.5/patients/status/on-notify		{HIP_HOST}/v0.5/patients/status/notify
5	**JWT Certificate Verification**			
5.1		{GATEWAY_HOST}}/v0.5/.well-known/openid-configuration		
5.2		{GATEWAY_HOST}}/v0.5/certs		
6	**Monitoring**			
6.1		{GATEWAY_HOST}}/v0.5/heartbeat		