



# Case Study Assignment 01

Group ID - Y3S2-WE-19

Malabe Campus

Smart Healthcare System for Urban Hospitals.

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## Table of Contents

<b>01.Description .....</b>	<b>2</b>
<b>02.High level use case diagram. ....</b>	<b>3</b>
<b>03.Class diagram.....</b>	<b>5</b>
<b>04. Perera M.A.I- IT22206282 - Patient Account Management .....</b>	<b>6</b>
• Use case scenario.....	6
• Sequence diagram.....	8
• Storyboard .....	9
• Low-fidelity wireframes .....	10
• High-fidelity wireframes.....	13
<b>05. Dilki H.P.C - IT22111210 - Appointment Management .....</b>	<b>17</b>
• Use case scenario.....	17
• Sequence diagram.....	19
• Storyboard .....	20
• Low-fidelity wireframes .....	21
• High-fidelity wireframes.....	24
<b>06. Appuhami M.N.H - IT22140852 - Medical Record Management .....</b>	<b>27</b>
• Use case scenario.....	27
• Sequence diagram.....	29
• Storyboard .....	32
• Low-fidelity wireframes .....	33
• High-fidelity wireframes.....	39
<b>07. Nethmina W.P.R - IT22253958 - Data Analysis &amp; Reporting.....</b>	<b>44</b>
• Use case scenario.....	44
• Sequence diagram.....	47
• Storyboard .....	48
• Low-fidelity wireframes .....	49
• High-fidelity wireframes.....	50

## 01.Description

### Smart Healthcare System for Urban Hospitals

The Smart Healthcare System is a comprehensive digital platform designed to modernize healthcare delivery across both private and government hospitals in Sri Lanka. The system centers around a digital health card that serves as each patient's gateway to seamless healthcare services.

When patients first interact with the system, they undergo a complete registration process through the Patient Account Management module, where they provide personal information, upload identification documents, and receive a unique digital health card with QR codes or barcodes. This card becomes their permanent healthcare identifier across all participating hospitals.

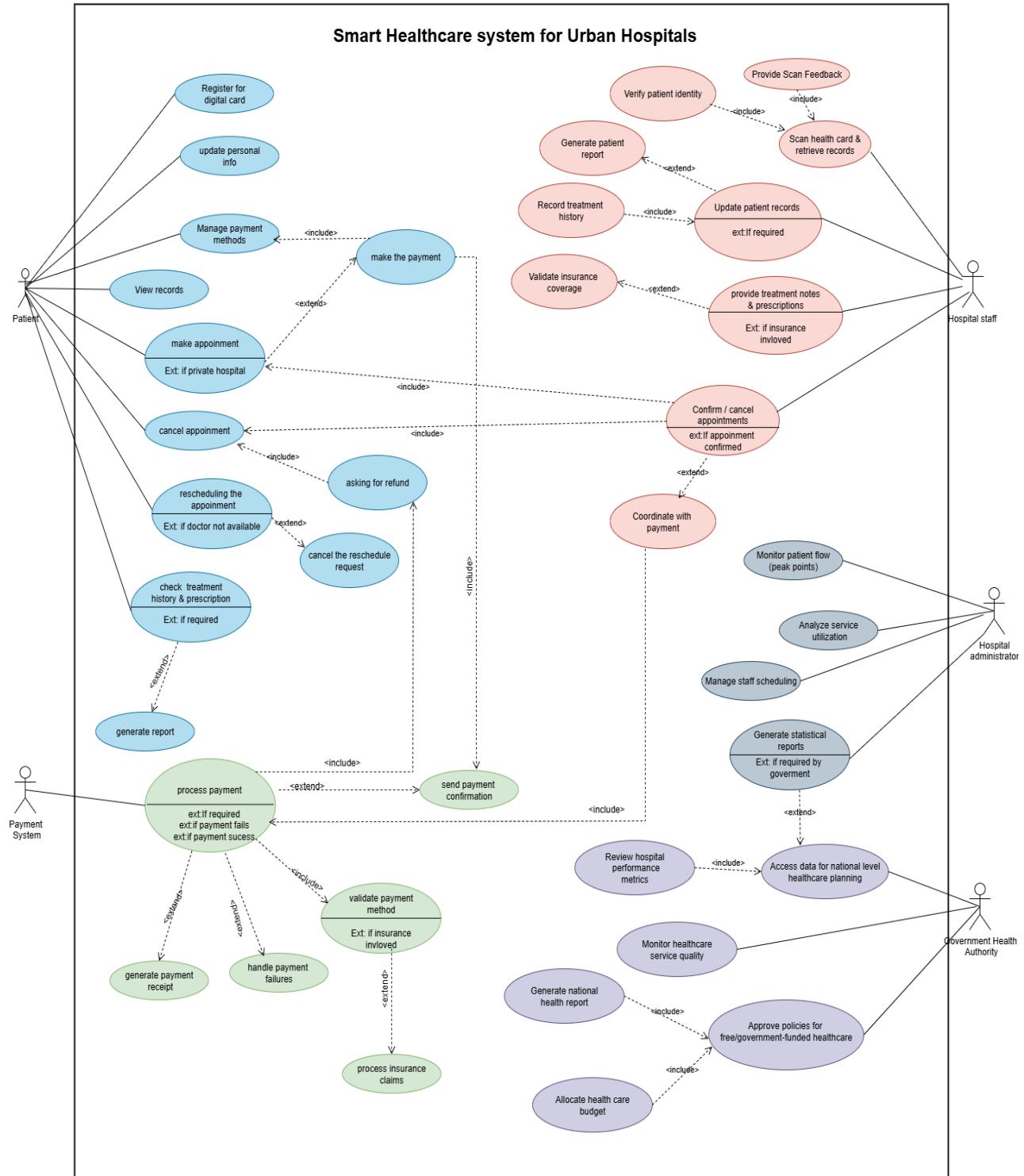
The Appointment Management component allows registered patients to schedule medical appointments by selecting hospitals, departments, doctors, and preferred time slots through web or mobile applications. The system handles both government-covered services and private hospital payments, providing real-time availability checking and automated confirmation notifications with appointment references.

At the hospital, the Medical Record Management system enables staff to instantly access complete patient histories by scanning the digital health card using barcode/QR scanners at registration desks or self-service kiosks. This eliminates manual record searches and provides healthcare providers with comprehensive medical information for informed treatment decisions, while maintaining detailed audit logs for security and compliance.

The Data Analysis and Reporting module serves healthcare managers by generating statistical reports on patient visits, service utilization, and operational patterns. It identifies peak times, staffing gaps, and capacity issues, then provides AI-driven recommendations for staffing adjustments, patient flow optimization, and resource allocation that can be automatically implemented through integrated rostering and notification systems.

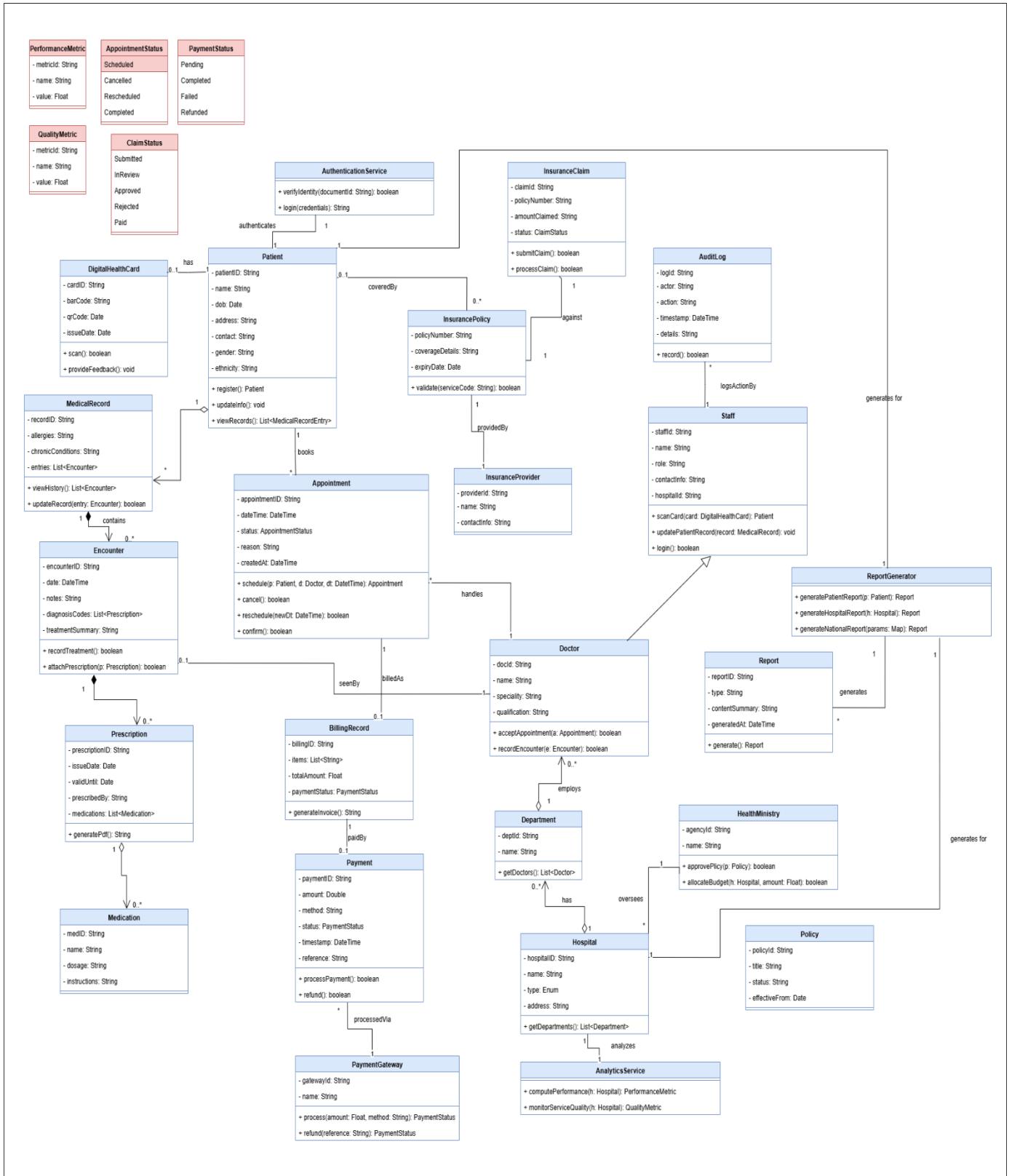
The system flow begins with patient registration and digital card creation, continues through appointment booking and hospital arrival where cards are scanned for instant record access, and culminates in data-driven operational improvements based on system analytics. This integrated approach transforms traditional healthcare delivery into an efficient, patient-centered system that reduces wait times, eliminates manual processes, supports flexible payment models, and enables proactive resource management across Sri Lanka's urban hospital network.

## 02.High level use case diagram.



Drive Link for use case diagram - [use case](https://drive.google.com/drive/folders/1WPgkEAnuOyMz90-wMxHWUaeaAf41vjEh?usp=sharing) - <https://drive.google.com/drive/folders/1WPgkEAnuOyMz90-wMxHWUaeaAf41vjEh?usp=sharing>

## 03. Class diagram.



## 04. Perera M.A.I- IT22206282 - Patient Account Management

- Use case scenario

### Patient Account Management

**Use Case:** Register for Digital Health Card

**Use Case Scenario:** Patient Registration and Digital Health Card Creation

**Description:** This use case scenario describes the process by which a new patient registers for a digital health card and creates their healthcare account in the Smart Healthcare System for Urban Hospitals.

#### Preconditions:

- The healthcare system is operational and accessible online.
- The patient is a resident of Sri Lanka who qualifies for medical care
- The patient possesses valid identification documents (NIC/Passport)
- The patient has access to internet (web browser or mobile app)
- The registration portal is accessible

#### Main Flow:

- Patient accesses the healthcare system registration portal via web or mobile app
- System displays the registration form and terms of service
- Patient enters personal information (name, NIC, address, contact details)
- Patient uploads identification documents for verification
- System validates the provided information and documents
- Patient enters initial medical history and demographic information
- Patient selects preferred communication method (SMS/Email)
- Patient creates login credentials (username/password)
- System generates unique patient ID and digital health card number
- System creates QR code/barcode for the digital health card
- System sends confirmation with digital health card details to patient
- Patient receives physical card by mail
- System stores patient account information in the database

**Alternate Flows:****Document Verification Required:**

- Hospital staff manually verifies documents and activates account

**Physical Card Request:**

- Patient requests physical card with barcode
- Card is mailed to patient's registered address

**Postconditions:**

- Patient account is created in the healthcare system
- Digital health card is generated with unique QR code/barcode
- Patient receives access credentials and card information
- Patient can access healthcare services across participating hospitals
- System maintains complete registration audit trail

**Exception Flows:****Invalid Documentation:**

- System rejects uploaded documents
- Patient is notified of specific issues
- Registration process is halted until valid documents are provided

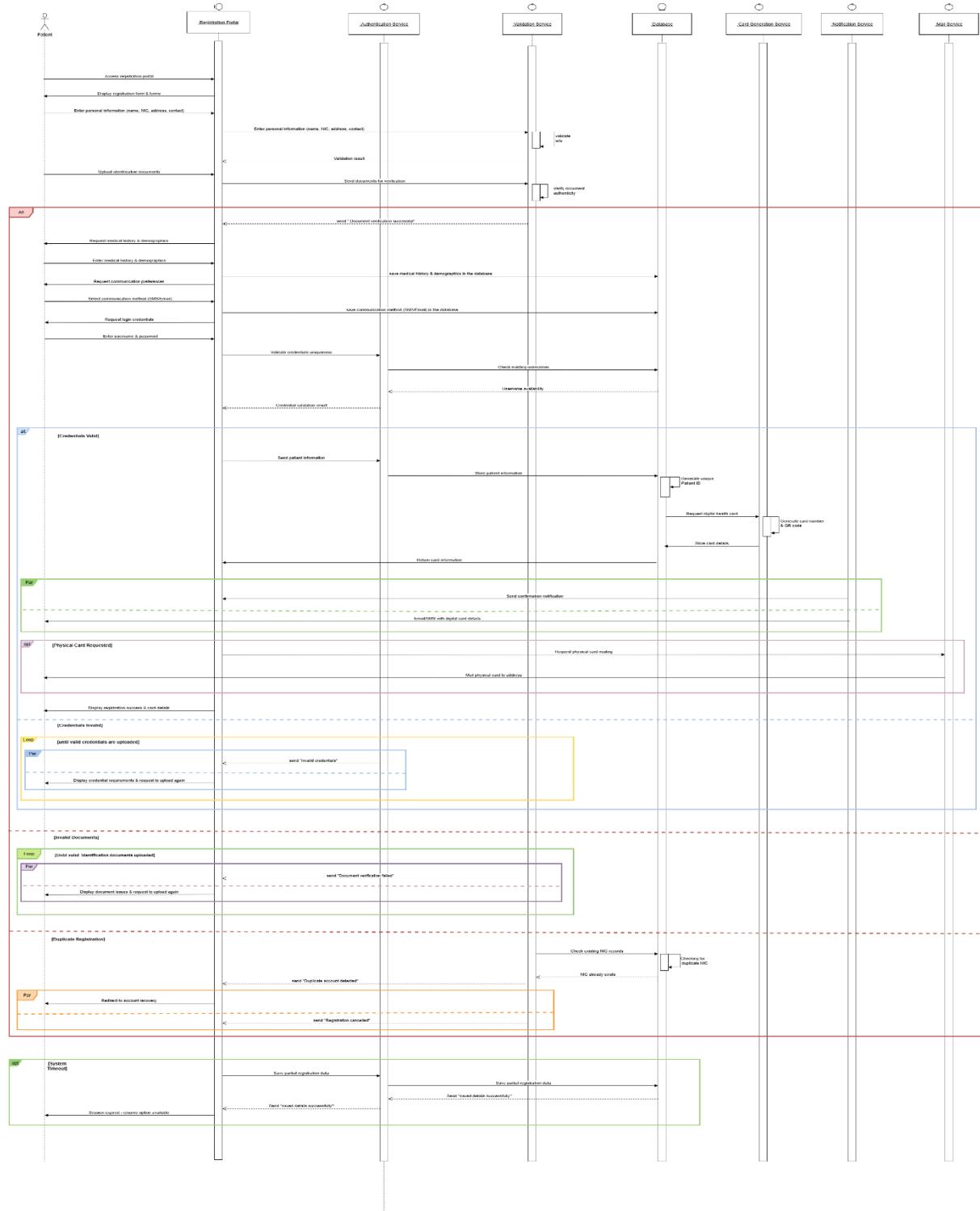
**Duplicate Registration:**

- The system recognizes an existing account with the same NIC
- Patient is directed to account recovery process
- Registration is cancelled

**System Timeout:**

- Registration session expires during process
- System saves partial information if possible
- Patient can resume registration from saved point

- Sequence diagram



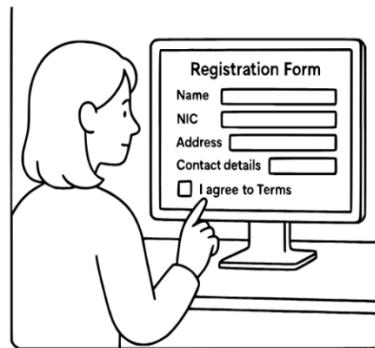
Drive Link to Sequence diagram - <https://mysliit->

[my.sharepoint.com/:f/g/personal/it22206282\\_my\\_sliit\\_llk/EvqcFZ7YWM1Ogz16DKTL4P0BVyz4Xh4INTaeqmYxReMj0g?e=2iy4PO](https://my.sharepoint.com/:f/g/personal/it22206282_my_sliit_llk/EvqcFZ7YWM1Ogz16DKTL4P0BVyz4Xh4INTaeqmYxReMj0g?e=2iy4PO)

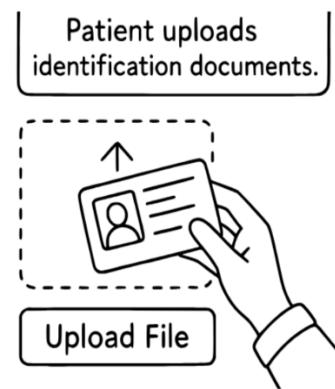
- Storyboard



Patient accesses Smart Healthcare registration portal via web or mobile app.



System displays registration form and terms of service.



Upload File

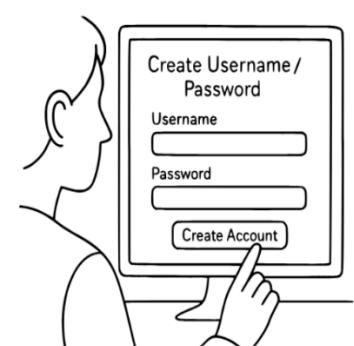


System verifies patient details and documents

Validating documents...



Patient provides medical history and selects SMS/Email notifications



Patient creates login credentials.



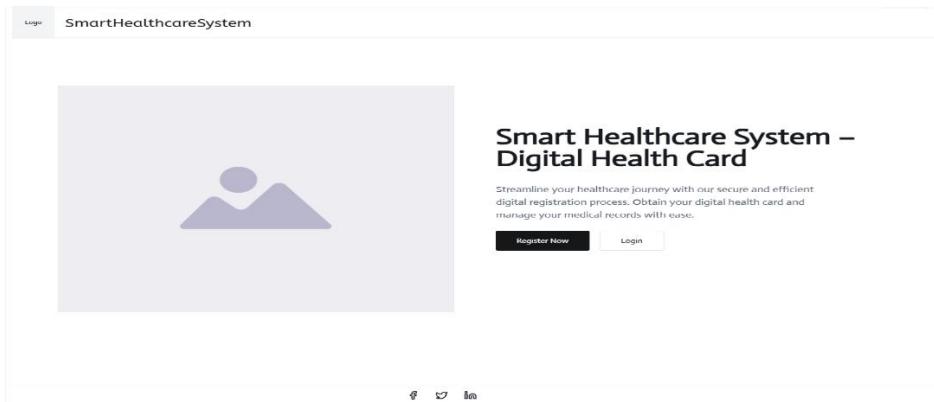
System generates unique patient ID and digital health card with QR code.



Patient receives confirmation message and later physical health card by mail.

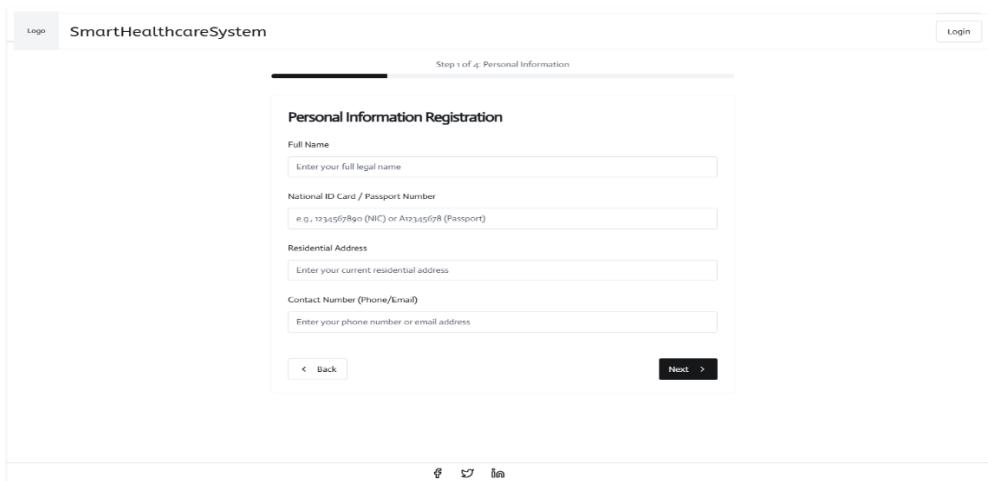
- Low-fidelity wireframes

## Landing Page



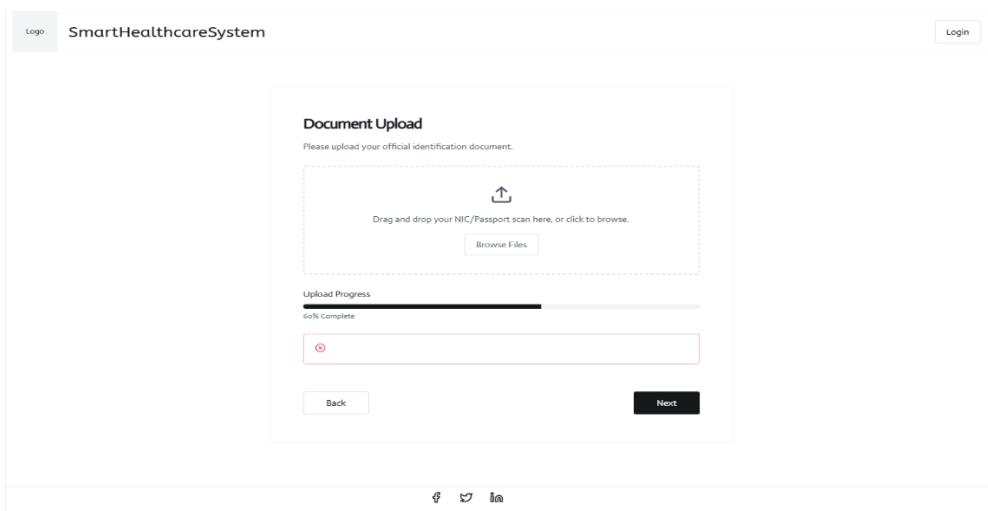
The landing page features a logo and the text "SmartHealthcareSystem". On the left is a placeholder for a user profile picture. To the right, the title "Smart Healthcare System – Digital Health Card" is displayed above a subtitle: "Streamline your healthcare journey with our secure and efficient digital registration process. Obtain your digital health card and manage your medical records with ease." Below the subtitle are two buttons: "Register Now" and "Login". At the bottom of the page are social media sharing icons.

## Registration Form



This registration form is titled "Personal Information Registration" and is labeled as "Step 1 of 4: Personal Information". It includes fields for "Full Name", "National ID Card / Passport Number", "Residential Address", and "Contact Number (Phone/Email)". Navigation buttons "Back" and "Next" are at the bottom, along with a "Login" button in the top right corner. Social media sharing icons are at the very bottom.

## Document Upload Page



The document upload page is titled "Document Upload" and instructs users to "Please upload your official identification document." It features a dashed box for dragging files or a "Browse Files" button. An "Upload Progress" bar shows "60% Complete". Navigation buttons "Back" and "Next" are at the bottom, along with a "Login" button in the top right corner. Social media sharing icons are at the very bottom.

## Medical History Page

SmartHealthcareSystem

**Medical History & Demographics**  
Please provide your medical background and demographic information. All details are kept confidential.

Age

Gender  
 Male  
 Female  
 Other  
 Prefer not to say

Medical Conditions / Allergies

Common Conditions (Optional)  
 Hypertension       Asthma  
 Diabetes       Food Allergies  
 Seasonal Allergies       Migraines

Your information is securely stored and used only for healthcare purposes as outlined in our [Privacy Policy](#).

[Back](#) [Next](#)

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## Communication & Credentials Page

**Communication Preferences**  
Select how we can best reach you for important updates and notifications.

Email Notifications  
Receive important updates and digital health card details via email.

SMS Notifications  
Get urgent alerts and critical information sent directly to your phone.

**Create Your Credentials**  
Set up your secure username and password for future access.

Username

Password  
  
Minimum 8 characters, including uppercase, lowercase, numbers, and symbols.

Confirm Password

Password Strength:

[Back](#) [Next](#)

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## Registration confirmation Page

SmartHealthcareSystem



**Your registration is successful.**  
Welcome to the Smart HealthCare System! Your digital health card is ready.

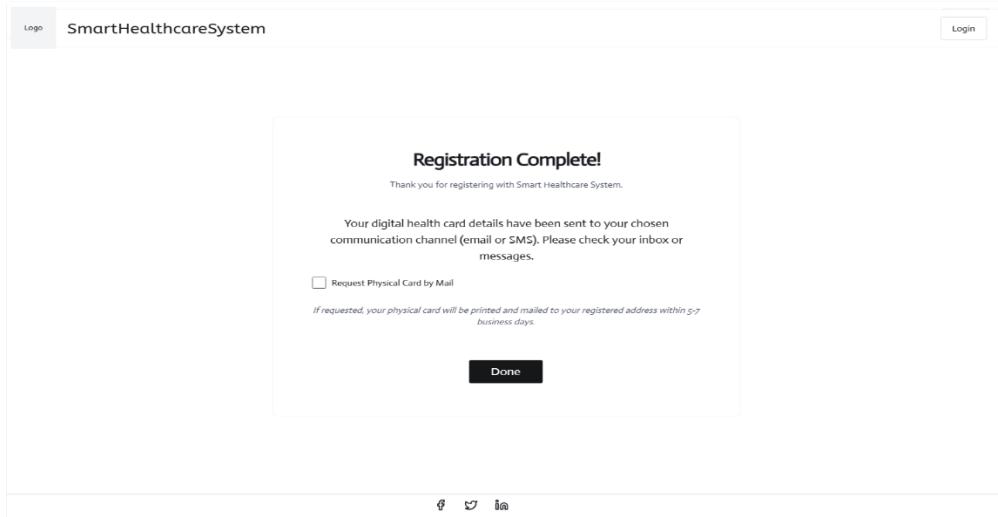
Patient ID:  
**SHC-2024-001234**  
Digital Health Card Number:  
**DHC-9876-5432-1238**



[Continue](#)

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## Notification & Card Request Page



## Error Handling Page

This section displays three error handling pages from the Smart Healthcare System:

- Invalid Document:** The document uploaded is invalid. It should be a clear scan or photo of your NIC/Passport in supported formats (PDF, JPEG, PNG). Buttons for "Retry Upload" and "Back" are present.
- Duplicate Registration:** An account with these details already exists. It suggests logging in or proceeding with account recovery if credentials are forgotten. Buttons for "Login to Existing Account" and "Account Recovery" are shown.
- Session Timeout:** The registration session has expired due to inactivity. It advises resuming the process from the beginning. Buttons for "Resume Registration" and "Restart" are available.

- High-fidelity wireframes

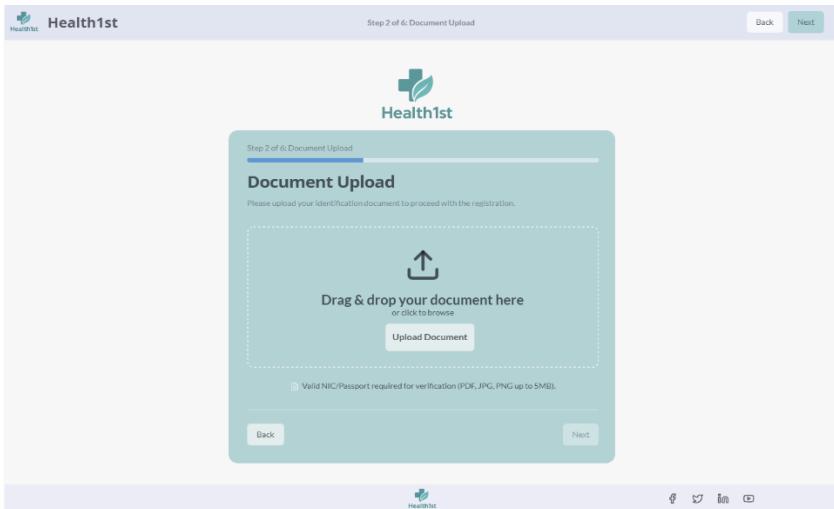
## Logo



## Landing Page

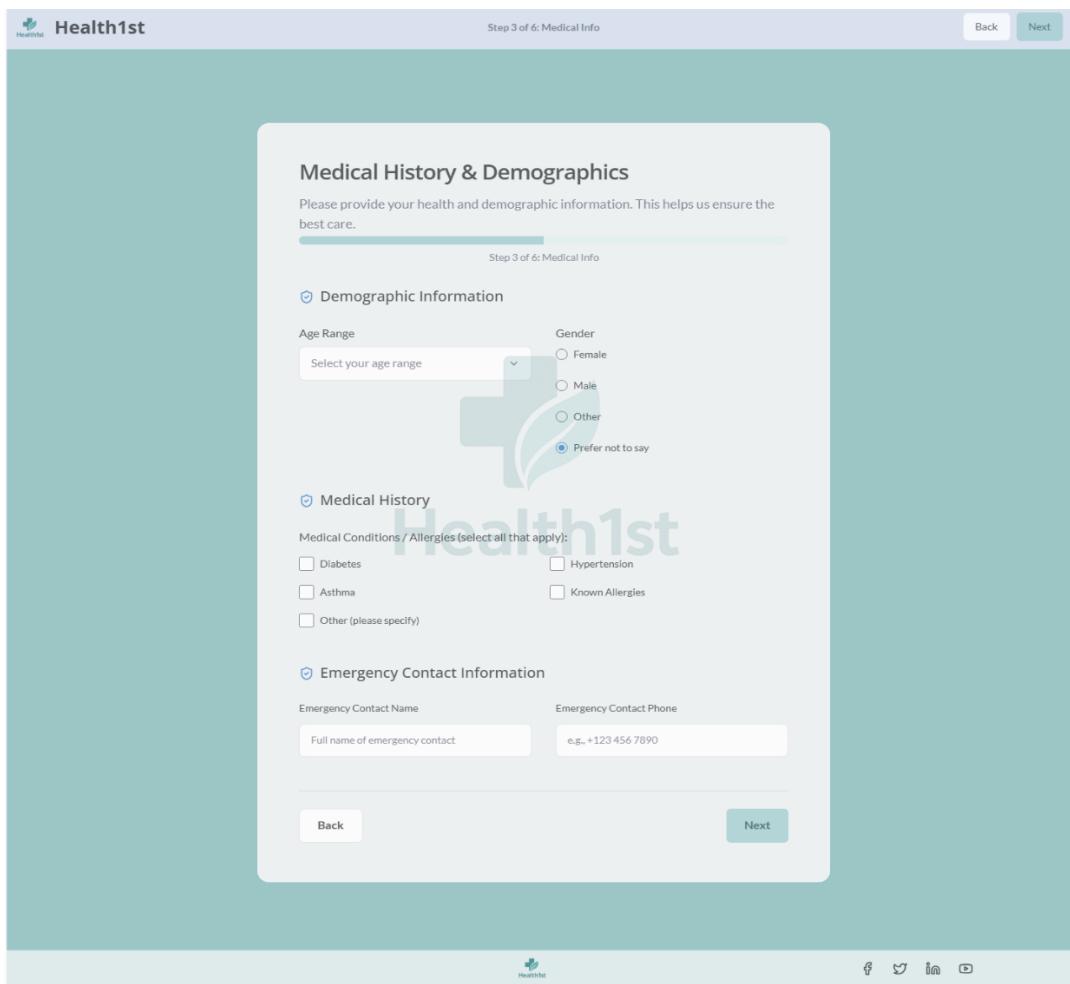
## Registration Form

## Document Upload Page



The screenshot shows the 'Step 2 of 6: Document Upload' page. At the top, there's a 'Health1st' logo and navigation buttons for 'Back' and 'Next'. Below this is a large central area titled 'Document Upload' with the sub-instruction 'Please upload your identification document to proceed with the registration.' It features a dashed box for dragging and dropping files, with the placeholder text 'Drag & drop your document here or click to browse'. A 'Upload Document' button is located below the box. A note at the bottom states 'Valid NIC/Passport required for verification (PDF, JPG, PNG up to 5MB)'. At the very bottom are 'Back' and 'Next' buttons.

## Medical History Page



The screenshot shows the 'Step 3 of 6: Medical Info' page. At the top, there's a 'Health1st' logo and navigation buttons for 'Back' and 'Next'. The main content area is titled 'Medical History & Demographics' with the sub-instruction 'Please provide your health and demographic information. This helps us ensure the best care.' Below this is another header 'Step 3 of 6: Medical Info'. The page is divided into sections: 'Demographic Information' (with dropdown menus for age range and gender), 'Medical History' (with a list of medical conditions like Diabetes, Asthma, Hypertension, and Known Allergies), and 'Emergency Contact Information' (with fields for name and phone number). A large 'Health1st' watermark is centered over the form. At the bottom are 'Back' and 'Next' buttons.

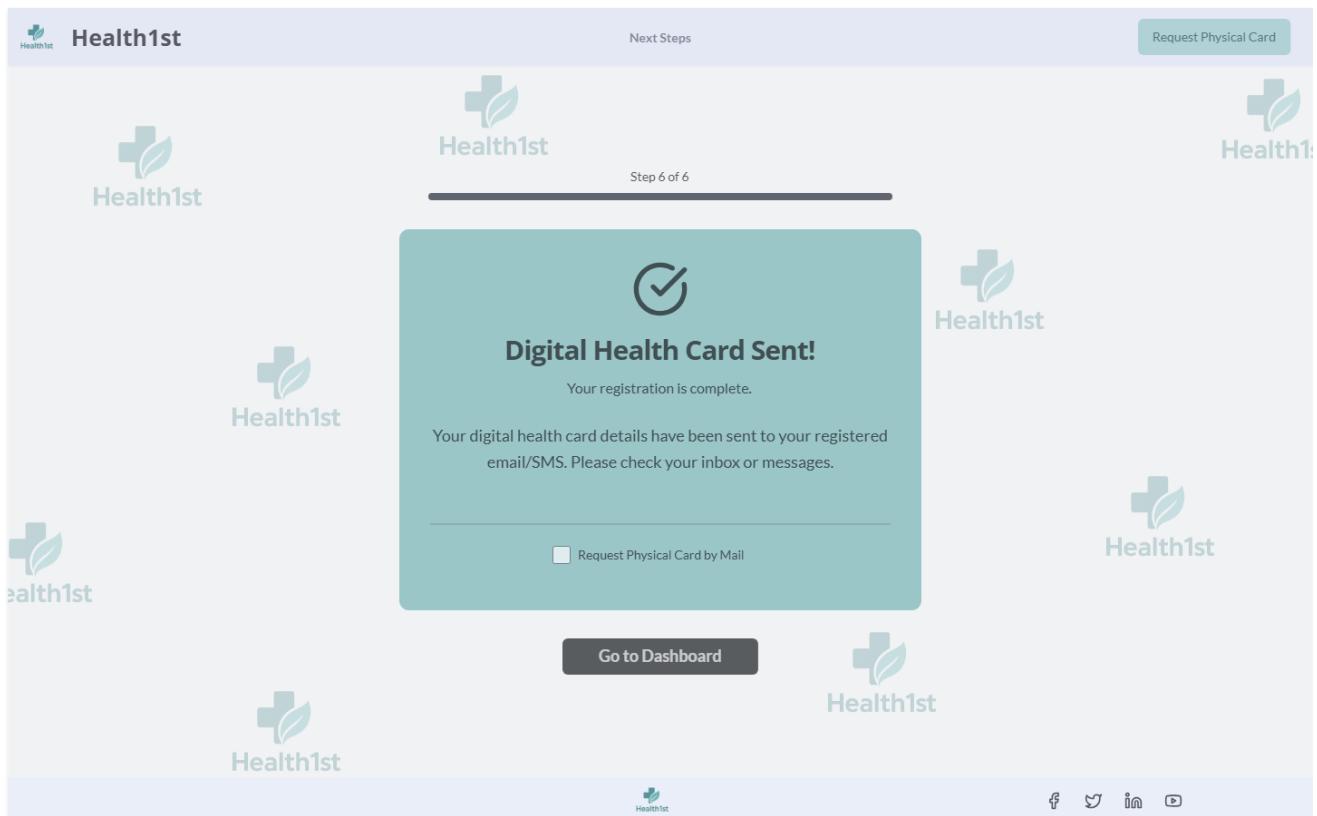
## Communication & Credentials Page

The screenshot shows the 'Step 4 of 6: Communication & Credentials' page. At the top, there's a 'Back' button and a 'Next' button. The main title is 'Communication & Account Setup'. Below it, a note says 'Please select your preferred communication methods and create your secure account credentials.' A progress bar indicates 'Step 4 of 6: Communication & Credentials'. Under 'Preferred Communication Methods', there are two buttons: 'SMS Notifications' (unchecked) and 'Email Notifications' (checked). Below this, the 'Create Your Account Credentials' section asks for a unique username and a strong password. It includes a 'Username' field ('Enter your desired username'), a 'Password' field ('Create a strong password'), and a 'Enter password' field. 'Password Tips' are listed: 'At least 8 characters long', 'Contains uppercase and lowercase letters', 'Includes a number', and 'Includes a special character (e.g., !@#\$%)'. At the bottom are 'Back' and 'Next' buttons.

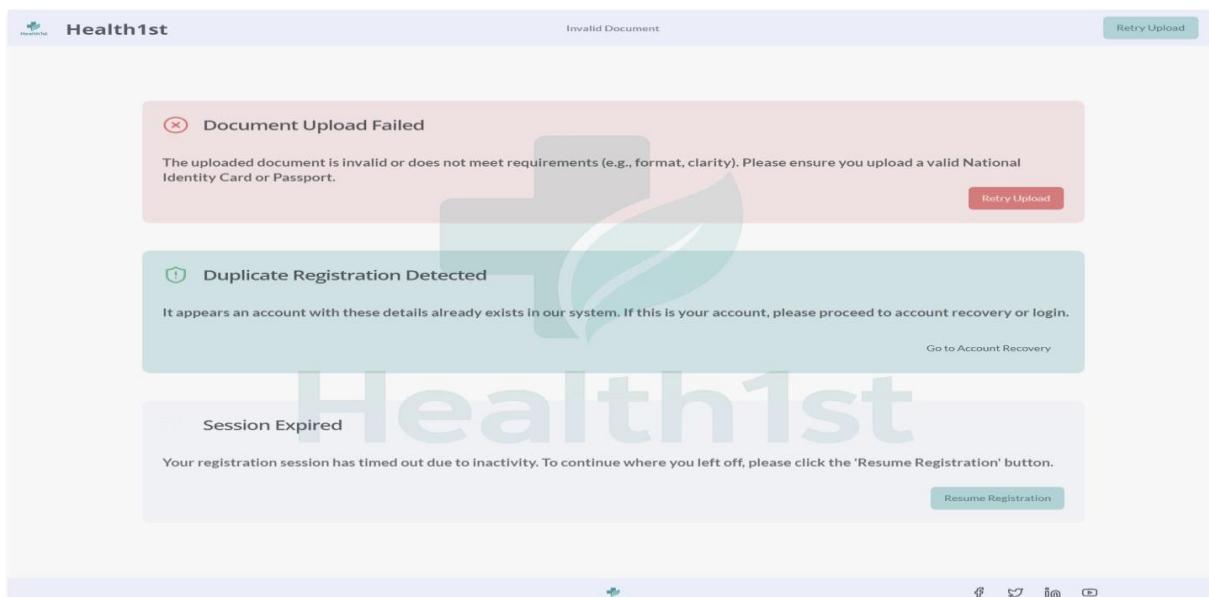
## Registration confirmation Page

The screenshot shows the 'Registration Complete' page. At the top, there's a 'Continue' button. The main area features the Health1st logo with a green cross and leaf. Below it, a large blue checkmark icon is followed by the text 'Registration Successful'. A message says 'Congratulations! Your account has been successfully created. You are now part of the Smart Healthcare System.' It lists the 'Patient ID: SHC-789012' and 'Digital Health Card Number: DHC-5678901234'. A 'Your Digital Health Card' section shows a QR code. Below the QR code, a note says 'Scan the code for quick access' and a 'Continue' button is present. At the bottom, there's a footer with social media icons for Facebook, Twitter, LinkedIn, and YouTube.

## Notification & Card Request Page



## Error Handling Page



## 05. Dilki H.P.C- IT22111210 - Appointment Management

- Use case scenario

### Appointment Management

**Use Case:** Make Appointment

**Use Case Scenario:** Schedule Medical Appointment at Hospital

**Description:** This use case scenario describes the process by which a registered patient schedules a medical appointment at a participating hospital using their digital health card account.

#### Preconditions:

- Patient has a valid digital health card and active account
- Patient is logged into the healthcare system (web/mobile app)
- Hospital has available appointment slots
- The selected healthcare service is available at the chosen hospital

#### Main Flow:

- Patient logs into healthcare system using digital health card credentials
- System displays patient dashboard with available options
- Patient selects "Make Appointment" option
- System displays list of participating hospitals near patient's location
- Patient selects preferred hospital
- System displays available departments and services
- Patient selects required medical service/department
- System shows available doctors and their specializations
- Patient selects preferred doctor
- System displays available time slots for the selected doctor
- Patient selects preferred date and time
- System prompts for appointment reason and additional notes
- Patient enters appointment details and confirms selection
- System checks doctor availability and confirms appointment slot
- System generates appointment confirmation with details
- System sends appointment confirmation to patient via SMS/email
- System updates hospital's appointment schedule
- Patient receives appointment reference number

### **Alternate Flows:**

#### **Private Hospital with Payment:**

- System detects appointment is at private hospital
- System displays estimated costs for the service
- Patient proceeds to payment process
- Payment is processed before appointment confirmation

#### **Rescheduling Required:**

- Selected time slot becomes unavailable during booking
- System suggests alternative available slots
- Patient selects new time slot and continues

#### **Insurance Coverage Check:**

- Patient has health insurance
- System validates insurance coverage for selected service
- Insurance details are attached to appointment

#### **Postconditions:**

- Appointment is confirmed and scheduled in hospital system
- Patient receives appointment confirmation with reference number
- Hospital staff can view scheduled appointment in their system
- Payment is processed (if applicable for private hospital)
- Appointment reminder notifications are scheduled

#### **Exception Flows:**

#### **No Available Slots:**

- System shows no available appointments for selected criteria
- Patient is offered waiting list option
- System suggests alternative doctors or hospitals

#### **Doctor Unavailable:**

- Selected doctor becomes unavailable during booking process
- System notifies patient and suggests alternative doctors
- Patient can choose new doctor or cancel booking

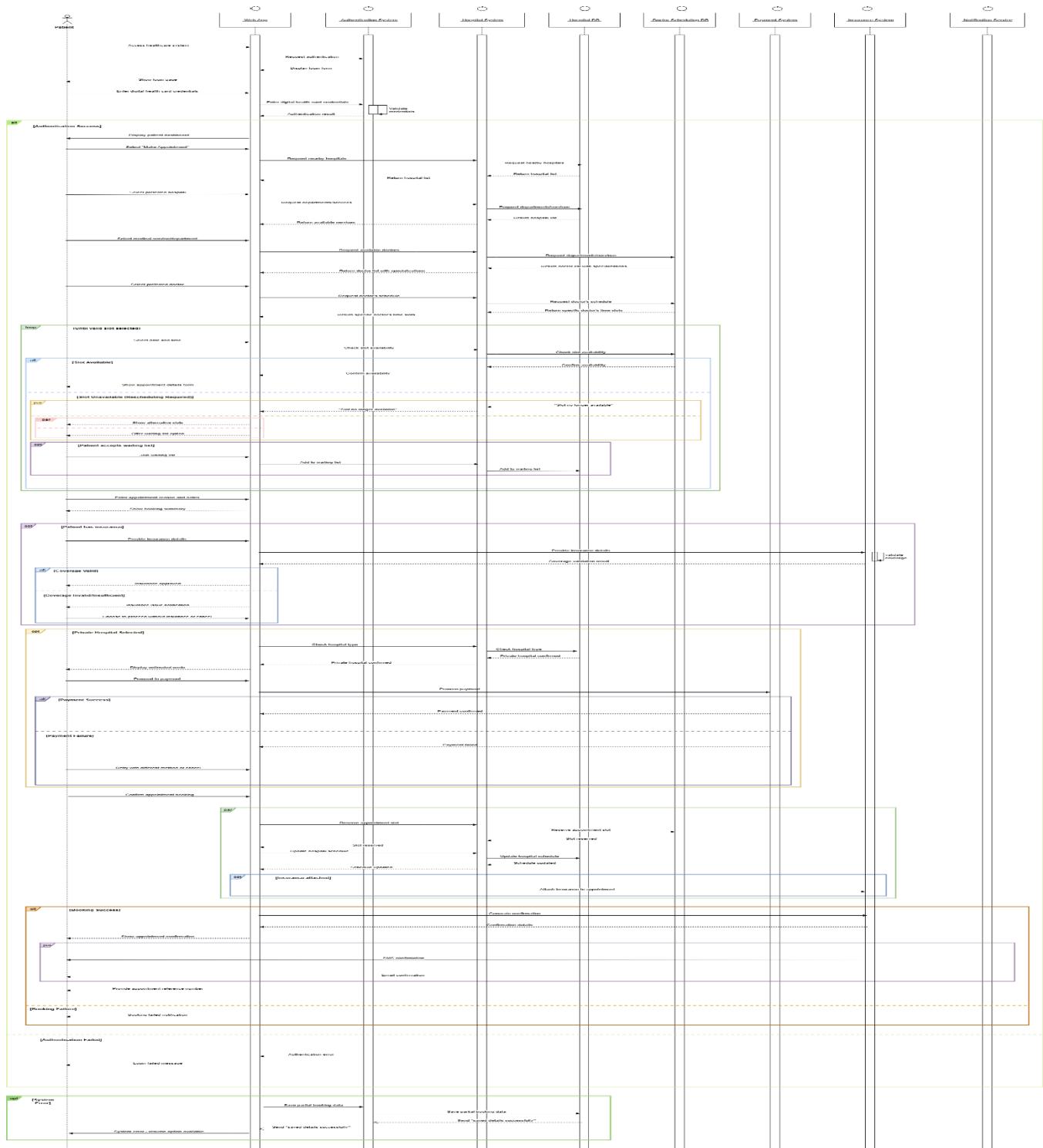
#### **Payment Failure (Private Hospital):**

- Payment processing fails during appointment booking
- System cancels appointment reservation
- Patient is notified and can retry with different payment method

#### **System Connectivity Issues:**

- System loses connection during appointment booking
- Partial booking information is saved
- Patient can resume booking process when connection is restored

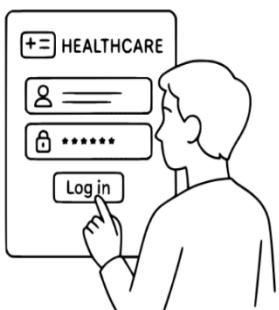
- Sequence diagram



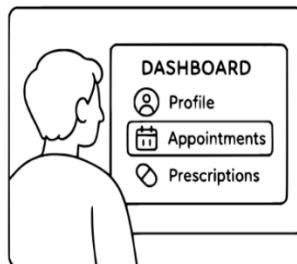
## Drive Link to Sequence diagram -

[https://drive.google.com/drive/folders/1\\_GoeG7uX754M3HupbrZSYbuctVPkjQbP?usp=sharing](https://drive.google.com/drive/folders/1_GoeG7uX754M3HupbrZSYbuctVPkjQbP?usp=sharing)

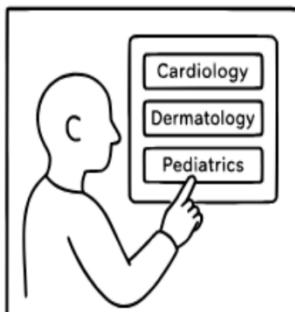
- Storyboard



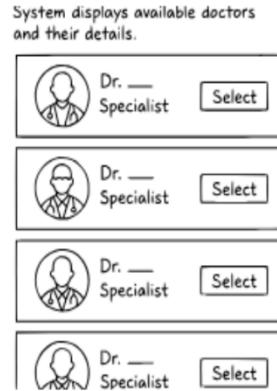
Patient logs in using digital health card credentials



System displays dashboard with options like Profile, Appointments, Prescriptions

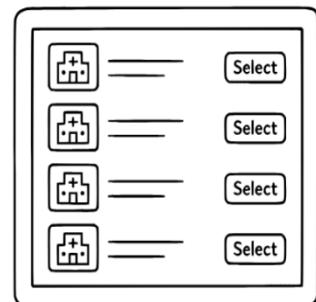


Patient selects required medical service or department

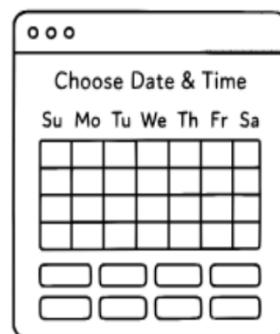


System displays available doctors and their details.

System displays list of participating hospitals near patient's location.



System displays available time slots for the selected doctor.



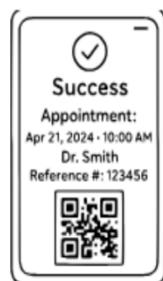
#### Appointment Details

##### Reason for visit

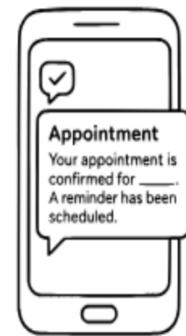
Follow-up on blood test results

##### Additional notes

Confirm Appointment



System confirms doctor's availability.



- Low-fidelity wireframes

## Login Page

## Patient Dashboard

## Hospital Selection Page

## Department & Service selection Page

Select Department & Service

Choose a Department:

Select a department... ▾

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## Doctor Selection Page

HealthCareSystem

Select Your Doctor

Filter by Specialization ▾ Sort by Availability

 Dr. Eleanor Vance Cardiology Available Today <input type="button" value="Select Doctor"/>	 Dr. Marcus Thorne Dermatology Next Available Tue, Dec 5 <input type="button" value="Select Doctor"/>	 Dr. Olivia Ren Pediatrics Next Available Mon, Dec 4 <input type="button" value="Select Doctor"/>
 Dr. Julian Hayes Orthopedics Fully Booked <input type="button" value="View Alternatives"/>	 Dr. Sarah Chen Neurology Available Today <input type="button" value="Select Doctor"/>	 Dr. Ben Carter Ophthalmology Next Available Wed, Dec 6 <input type="button" value="Select Doctor"/>

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## Appointment Slot Selection Page

HealthCareSystem

Select Your Appointment Slot

Choose a Date and Time

Tuesday, October 26, 2024

09:00 AM	09:30 AM	10:00 AM	10:30 AM	11:00 AM
11:30 AM	12:00 PM	01:00 PM	01:30 PM	02:00 PM
02:30 PM	03:00 PM	03:30 PM	04:00 PM	04:30 PM
05:00 PM				

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# Appointment Details Page

HealthCareSystem

## Appointment Details and Confirmation

### Reason & Notes

Reason for Visit  
e.g., Annual check-up, Consultation

Additional Notes  
Any specific symptoms or concerns you'd like to share?

### Insurance

Use my health insurance for this appointment

### Payment

Estimated Cost:	\$150.00
This is an estimated cost. Final charges may vary based on services received.	
Select Payment Method	
<input checked="" type="radio"/> Credit Card	
<input type="radio"/> Bank Transfer	
<input type="radio"/> Cash on Arrival	

### Confirm Appointment

Doctor:	Dr. Alex Johnson
Specialization:	Cardiology
Hospital:	City General Hospital
Date:	October 26, 2024
Time:	10:00 AM - 10:30 AM
Estimated Cost:	\$150.00
Payment Method:	Credit Card

[Cancel Booking](#) [Confirm Appointment](#)

# Appointment Confirmation Page

HealthCareSystem

## Appointment Confirmed

Reference Number: HC-20240726-58321

### Appointment Details

Doctor <b>Dr. Alice Smith</b> Pediatrics	Hospital <b>General City Hospital</b>
Date <b>July 26, 2024</b>	Time <b>10:00 AM - 10:30 AM</b>

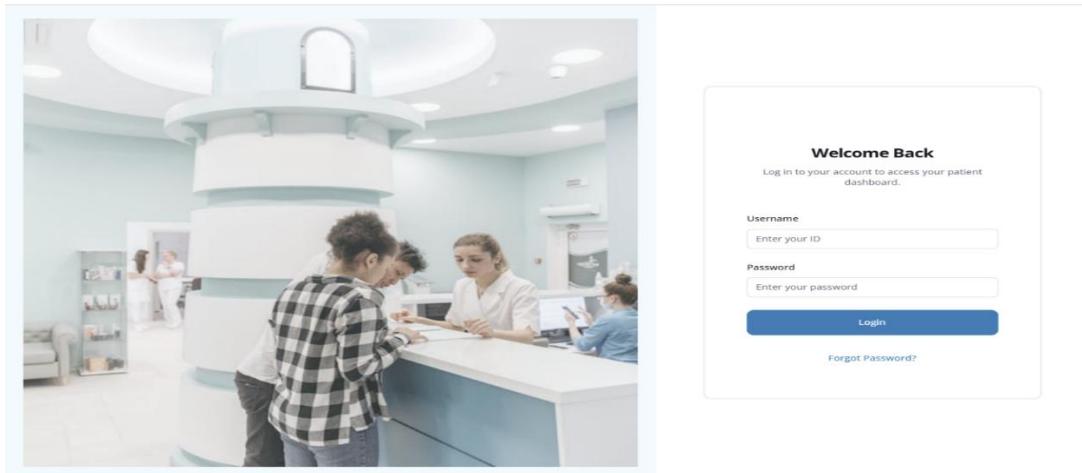
### Check-in QR Code



Confirmation sent to your registered mobile number and email address.

[Back to Dashboard](#) [View My Appointments](#)

- High-fidelity wireframes



This high-fidelity wireframe represents a patient dashboard. On the left, a sidebar menu lists "Dashboard", "Make Appointment", "View Appointments", and "Medical Records". The main content area features a "Welcome, Chamodi Dilki!" message and a sub-headline: "Your health journey starts here. Quickly access your medical information and manage your appointments." Below this are three cards: "Make New Appointment" (with a "Schedule Now" button), "My Appointments" (with a "View Details" button), and "Medical Records" (with a "View Details" button). At the bottom, a "Recent Activity" section lists four items: an appointment reminder, lab results, a prescription refill, and a check-up reminder. The footer includes links for "Company", "Resources", "Legal", and social media icons.

This high-fidelity wireframe shows a "Select Hospital" interface. The sidebar menu is identical to the one in the previous dashboard. The main content area has a "Search for hospitals..." input field and filters for "Any Distance" and "Any Specialty". Below this is a section titled "Available Hospitals" showing six options in a grid. Each option includes a thumbnail image, the hospital name, address, phone number, and a "Select Hospital" button. The footer is identical to the previous dashboard.

**Select Service & Department**

Hospital > Department & Service > Doctor > Slot > Details > Confirm

**Select Department**

Department: Cardiology

**Available Services**

Select a service from the chosen department to proceed.

- Cardiac Consultation**: Initial assessment and diagnosis of cardiovascular health. [Select Service](#)
- Echocardiogram**: Ultrasound imaging of the heart to assess its structure and function. [Select Service](#)
- Stress Test**: Evaluates heart function during physical activity to detect abnormalities. [Select Service](#)
- ECG / EKG**: Records electrical signals of the heart to detect heart conditions. [Select Service](#)

[Back](#) [Next](#)

**Select Your Doctor**

Filters: All Specializations | Any Availability | Sort By: Recommended

Doctor Profile	Specialization	Rating	Availability	Action
Dr. Elena Petrova	Cardiology Specialist	4.9 (128 Reviews)	Available Today	<a href="#">Select Doctor</a>
Dr. David Kim	Pediatric Consultant	4.8 (95 Reviews)	Next Available: Mon, May 20	<a href="#">Select Doctor</a>
Dr. Anya Sharma	Dermatology Expert	4.7 (110 Reviews)	Next Available: Tue, May 21	<a href="#">Select Doctor</a>
Dr. Mark Johnson	Neurology Specialist	4.6 (88 Reviews)	Available Today	<a href="#">Select Doctor</a>
Dr. Sarah Chen	Orthopedic Surgeon	4.9 (152 Reviews)	Next Available: Wed, May 22	<a href="#">Select Doctor</a>
Dr. Robert Garcia	General Practitioner	4.5 (130 Reviews)	Available Today	<a href="#">Select Doctor</a>

[Settings](#) [Logout](#)

**Select Appointment Slot**

Doctor Selection: Dr. David Kim | Slot Selection: September 2025 | Details & Confirmation

Mon 1	Tue 2	Wed 3	Thu 4	Fri 5	Sat 6	Sun 7
9:00 AM						
9:30 AM						
10:00 AM						
10:30 AM						
11:00 AM						
11:30 AM						
12:00 PM						
12:30 PM						
1:00 PM						
1:30 PM						
2:00 PM						
2:30 PM						
3:00 PM						
3:30 PM						
4:00 PM						
4:30 PM						

[Back](#) [Next](#)

Dashboard Appointments Medical Records

## Confirm Your Appointment

Hospital Selection Service & Department Doctor Selection Time Slot Details & Confirm

**Reason for Visit**  
Describe your symptoms or reason for the visit  
Persistent cough and shortness of breath for two weeks.

**Additional Notes**  
Any other information the doctor should know  
Allergic to penicillin. No known prior medical conditions.

**Insurance Details**

I have valid medical insurance  
Your coverage will be validated upon arrival. Please bring your insurance card.

Important  
Please note that some services or procedures may not be fully covered by your insurance plan. Contact your provider for detailed coverage information.

**Appointment Summary**

Hospital:	City General Hospital
Department:	Cardiology
Doctor:	Dr. Anya Sharma
Date:	October 26, 2024
Time:	10:30 AM
Service:	Routine Check-up

**Total Estimated Duration:** 30 minutes

**Payment Details**

Estimated Cost: **\$150.00**  
This is an estimate. Final cost may vary based on services rendered.

Payment Method:  
 Credit/Debit Card  
 PayPal  
 Pay On-site

Settings Back Confirm Appointment

Company Resources Legal

Dashboard Appointments Medical Records

## Appointment Confirmed!

Your medical appointment has been successfully booked.

Reference Number  
**UCCH-DRER-20241026-001**

Hospital UrbanCare Central Hospital 123 Healthway St, Metropolis, 10001	Doctor Dr. Evelyn Reed Cardiology
Date & Time Wednesday, October 26, 2024 10:30 AM	Service General Check-up

**Check-in QR Code**



Scan this QR code upon arrival at the hospital for quick check-in.

Full confirmation details have been sent to your registered email and phone number.

View My Appointments Make Another Appointment

Settings Logout

Company Resources Legal

## 06. Appuhami M.N.H - IT22140852- Medical Record Management

- Use case scenario

### Medical Record Management

**Use Case:** Scan Health Card & Retrieve Records

**Use Case Scenario:** Hospital Staff Accessing Patient Medical Records via Digital Health Card

#### Description

This use case describes the process by which hospital staff access and retrieve a patient's medical records by scanning a digital health card (barcode or QR code) when the patient arrives. The process ensures secure, quick, and accurate identification of the patient, minimizes delays in registration, and provides immediate access to complete medical history for informed care delivery.

#### Preconditions

- Patient possesses a valid digital health card (physical or mobile-based QR code).
- Hospital staff are authenticated and logged into the hospital system with record access permissions.
- Card scanning equipment (barcode/QR scanner or kiosk reader) is operational.
- Patient's medical records are stored in the central healthcare database.
- Stable network connectivity exists between the hospital system and the central database.
- System audit trail and logging functions are enabled.

#### Main Flow

1. Patient arrives at the hospital and proceeds to the registration desk or self-service kiosk.
2. Hospital staff requests the patient's digital health card.
3. Patient presents the health card (physical barcode card or QR code on mobile app).
4. Staff (or kiosk) scans the card using the barcode/QR reader.
5. System validates the card's authenticity and confirms patient identity.
6. System provides feedback (audio/visual) to indicate a successful scan.
7. System retrieves the patient's medical records from the healthcare database.
8. Patient details and full medical history are displayed on the hospital staff's terminal.
9. Staff verifies that the displayed records match the patient's identity.
10. System automatically logs the access attempt with timestamp, staff ID, and patient ID.
11. Patient visit record is updated to reflect current hospital check-in.
12. Hospital staff proceed with patient admission, treatment, or consultation workflow.

## Alternate Flows

- **A1 — Mobile App QR Code:**  
Patient presents the digital health card via mobile app. Staff scans QR code from the device screen, and the system proceeds as usual.
- **A2 — Kiosk Self-Service:**  
Patient scans the card directly at a kiosk terminal. The system guides the patient via on-screen prompts and notifies hospital staff once the check-in is complete.
- **A3 — Emergency Access:**  
If the patient is unconscious or unable to provide the card, staff use an emergency override protocol. Supervisor approval is required, and enhanced logging ensures accountability.

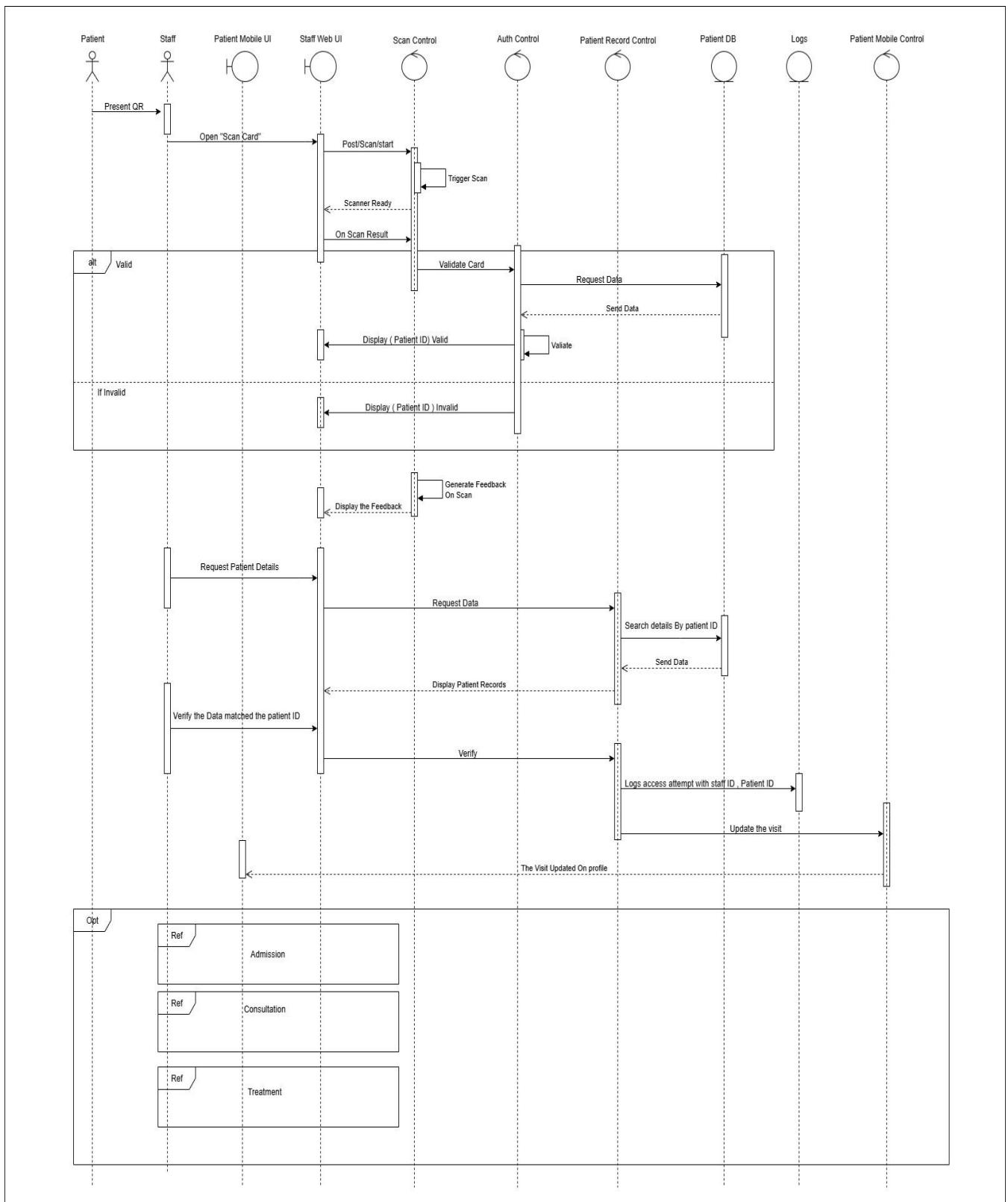
## Exception Flows

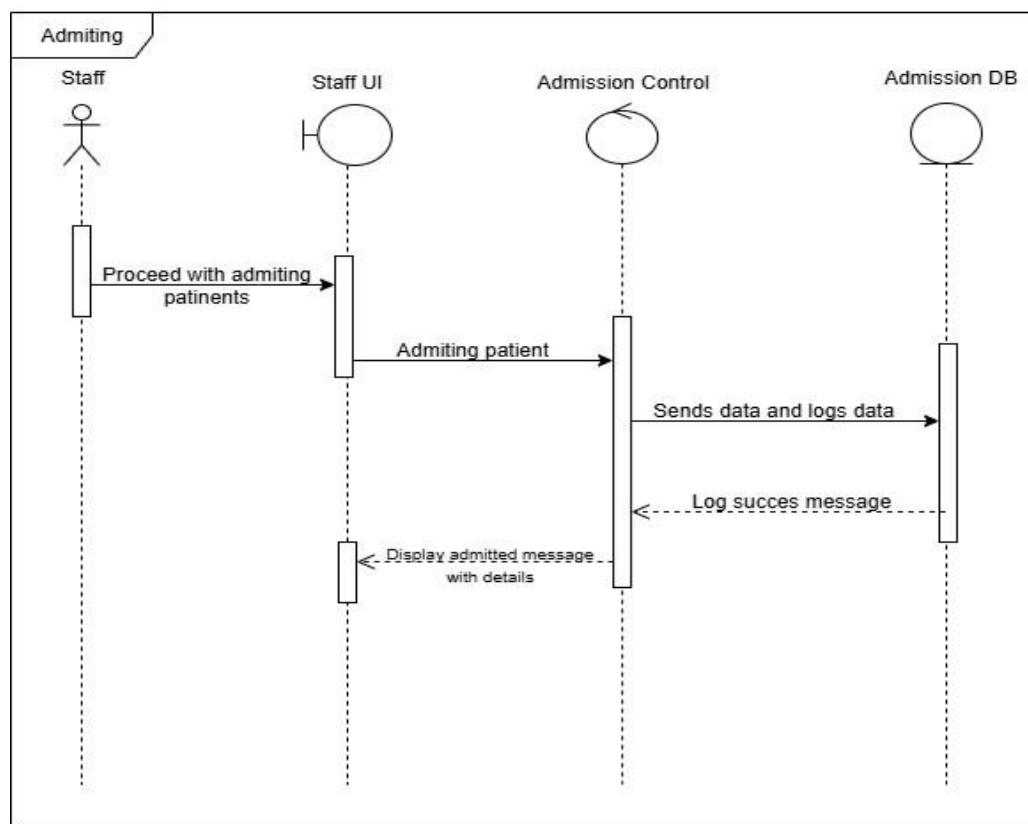
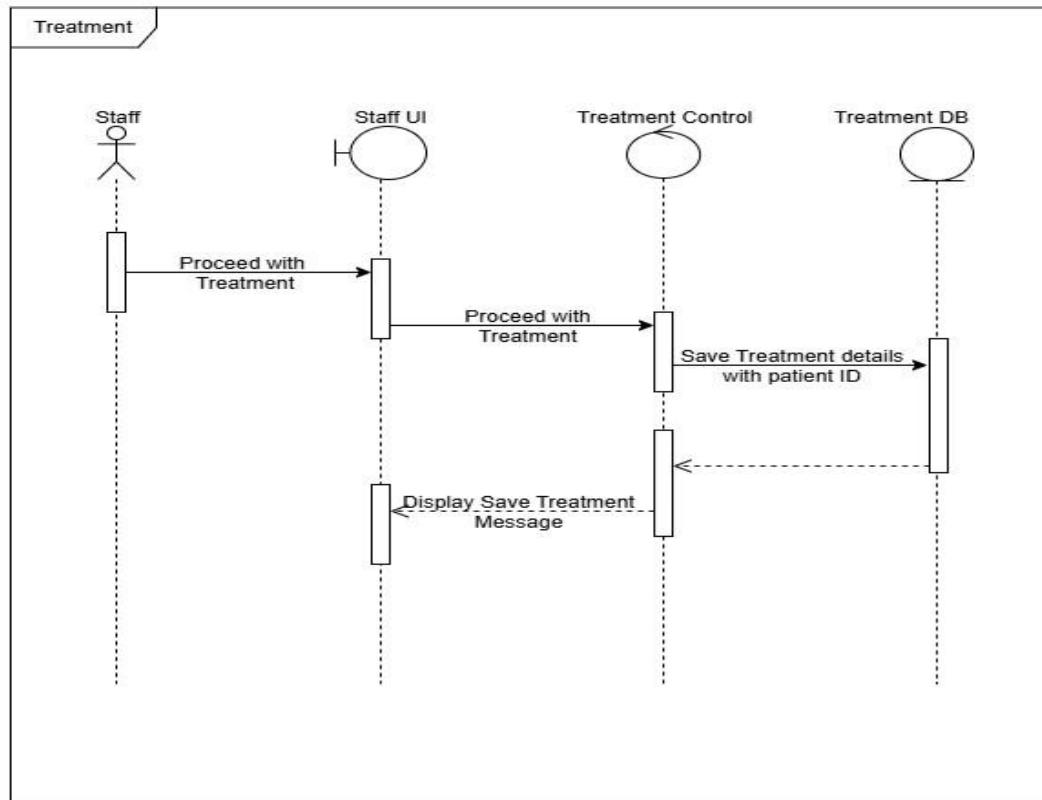
- **E1 — Invalid or Damaged Card:**  
Scanner fails to read the card. System prompts staff to enter patient ID manually.
- **E2 — Patient Not Found:**  
Card scan does not match any patient records. System suggests registering the patient first.
- **E3 — Network Connectivity Issues:**  
If central database is unreachable, the system attempts to fetch cached local records. If unavailable, staff revert to manual registration until connectivity is restored.
- **E4 — Feedback System Malfunction:**  
Audio/visual confirmation fails. Staff must manually verify successful scan, while the system logs the failure for maintenance.

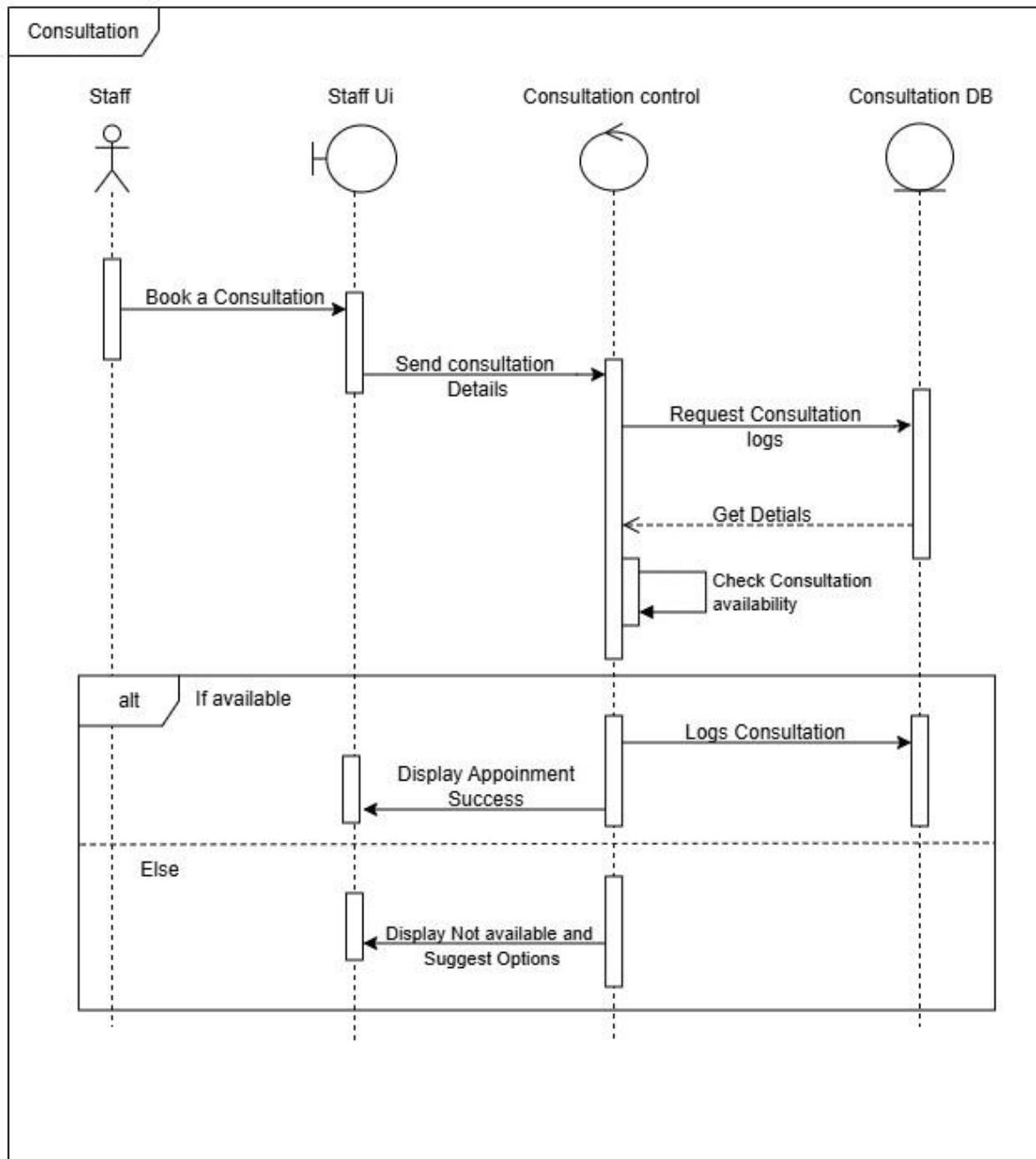
## Postconditions

- Patient's medical records are securely retrieved and displayed.
- System updates audit trail with details of the access attempt.
- Patient is successfully checked into the hospital system.
- Staff gain immediate access to relevant medical history for treatment.
- Patient's visit timeline is updated with the current access.

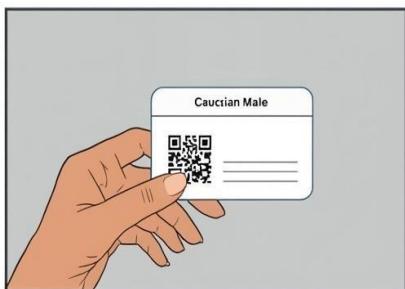
- Sequence diagram







- Storyboard



1. A hospital staff member holds a digital health card.



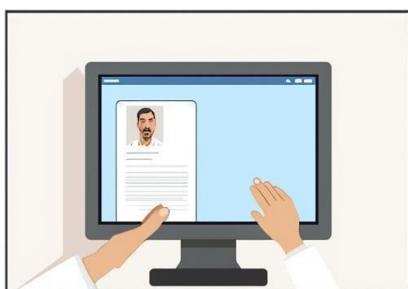
1. Mike got card verified.



6. Descarting sections in or that card.



2. The doctor's computer's patient health card.



3. Medical history application or the history



3. Andrey meteers, collecting data patients



1.3. Giving the patient over the results of the record or giving them a digital health card.



2. The patient average boud you beord and rode an hagacty records to the patient's digital record.



3. Frequently asked questions and frequently asked registration exercise to that registering your owner yet.



4. Nali Patient heb in de service for do acation about medicat records leeverds.



6. The reen stet yhanis ao. colour hem and beor patient records accad by clicca helop rences.

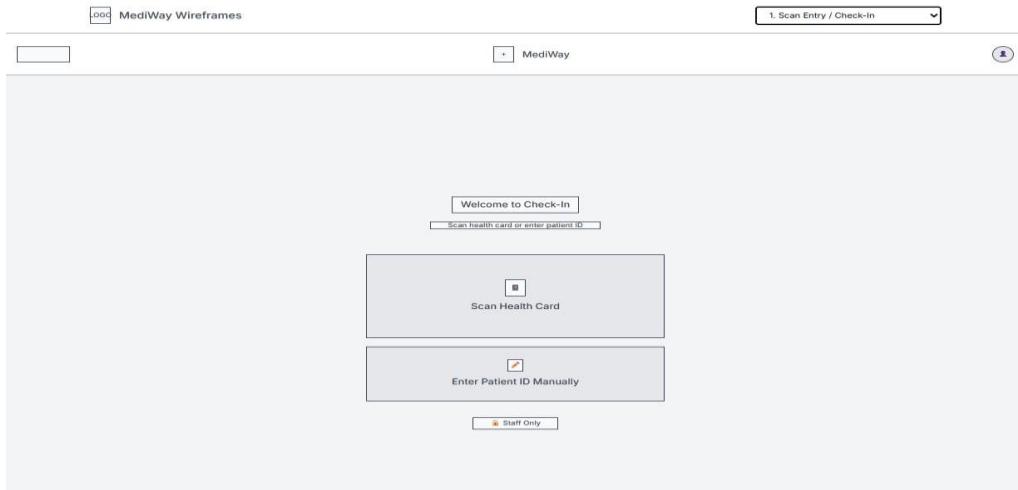


5. 4. Do treatmentally a reterdy the muckebci infer for doram you forlication/ruin this predccr-vetl/pargia the registration.

- Low-fidelity wireframes

 MediWay Wireframes

1. Scan Entry / Check-In



Welcome to Check-In  
Scan health card or enter patient ID

Scan Health Card

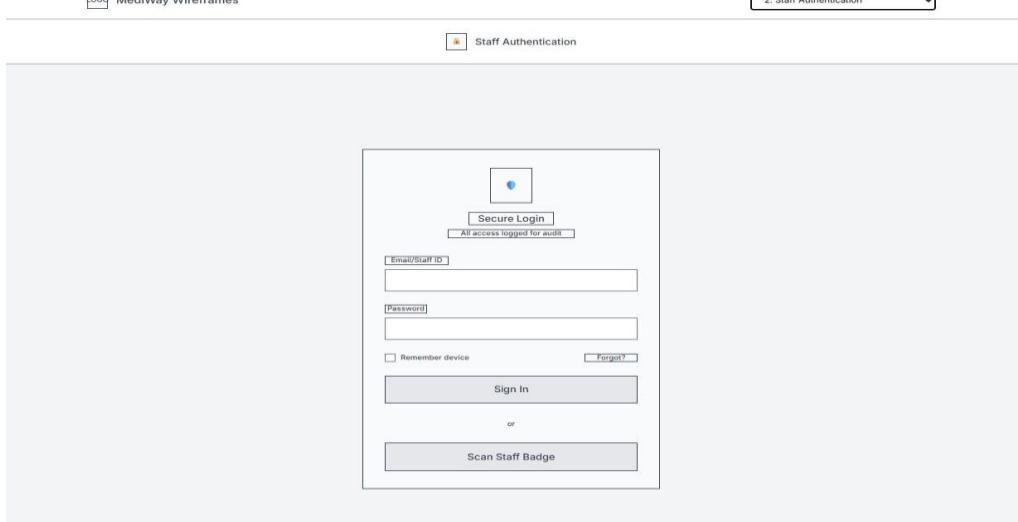
Enter Patient ID Manually

⚠ Staff Only

---

 MediWay Wireframes

2. Staff Authentication



Secure Login  
All access logged for audit

Email/Staff ID

Password

Remember device  Forget?

Sign In

or

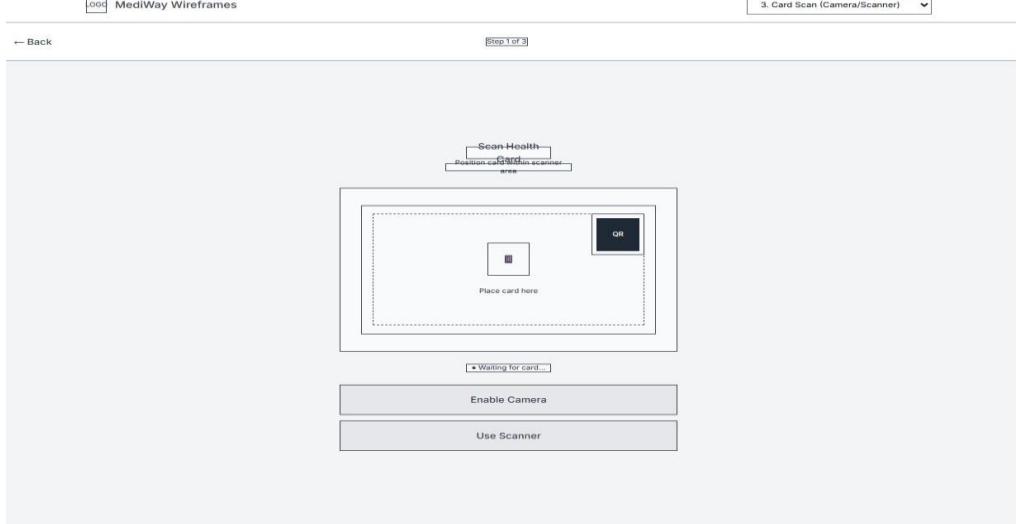
Scan Staff Badge

---

 MediWay Wireframes

3. Card Scan (Camera/Scanner)

← Back Step 1 of 3



Scan Health Card... Position card... scanner area

Place card here

QR

Waiting for card...

Enable Camera

Use Scanner

✓ MediWay Wireframes

✓ Audit log created • Access recorded

4. Scan Success & Identity Match

Card  
Verified  
Patient identity confirmed

 Sarah Johnson  
ID: MW-2024-001234 • Age: 39  
Penicillin Latex

[View Medical Records](#)

[Rescan](#)

✓ MediWay Wireframes

5. Patient Records Overview

← Back [Patient Records]

 Sarah Johnson  
ID: MW-2024-001234 • Age: 39  
Penicillin Latex

[Check-In Now](#)

[History](#) [Medications](#) [Lab Results](#) [Imaging](#) [Visits](#)

Dec 15, 2024 [Chest Pain Evaluation] Dr. Martinez • Cardiology	<a href="#">Emergency</a>
Nov 28, 2024 [Annual Physical] Dr. Martinez • Family Medicine	<a href="#">Routine</a>

✓ MediWay Wireframes

6. Detailed Record (History)

← Back to Overview [Medical History]

All Departments

[Record Sections](#) [All Records](#) [Diagnoses](#) [Procedures](#) [Medications](#) [Lab Results](#) [Imaging](#)

**DEC 15** Emergency Visit - Chest Pain  
Dr. Martinez • Cardiology 2:30 PM

**Diagnoses:** Non-cardiac chest pain, likely musculoskeletal

**Notes:** Patient presented with acute chest pain. EKG normal, troponins negative...

**Attachment:** EKG.pdf Chest\_Xray.jpg

**NOV 28** Annual Physical  
Dr. Martinez • Family Medicine 10:00 AM

MediWay Wireframes

7. Check-In Confirmation

← Back

Check-in Confirmation

Access Granted • 12:04 PM

Confirm Check-In  
Review and confirm check-in details

Patient: Sarah Johnson  
ID: MW-2024-012345

Vital Reason: Follow-up Appointment ▾  
Departments: Cardiology ▾

Triage Level: Level 3 - Urgent ▾  
Staff ID: SJ001 - Dr. Martinez

Timestamp: December 15, 2024 - 12:04 PM

Confirm Check-In

MediWay Wireframes

8. Kiosk Self-Service

Kiosk • Step 1 of 3

English ▾

Welcome to MediWay  
Touch the screen to begin check-in

Scan Health Card

Need Assistance?

MediWay Wireframes

9. Mobile App QR Variant

← Back

Mobile QR Scan

Scan Patient's Mobile QR Code  
Ask patient to scan QR code on mobile

Privacy Protected

Patient's Phone Screen

MediWay Health Card  
Johnson

Scanning...

Reduce Glare + Increase Brightness

Manual ID Entry

MediWay Wireframes

10. Emergency Override

**Emergency Access (Break-Glass)**

**Emergency Override**  
Action: **REINSTATE** and requires supervisor approval

Emergency Reason: \_\_\_\_\_

Supervisor ID: \_\_\_\_\_ Your Staff ID: \_\_\_\_\_

Patient Identifier ID (known): \_\_\_\_\_

**Important Notice: Emergency access will be reported to administration**

Acknowledge this is a genuine emergency

**Cancel** **Grant Emergency Access**

MediWay Wireframes

11. Error: Invalid/Damaged Card

← Back to Scanner

**Card not recognized**  
Unable to read patient card information

**Try Again**

**Enter Patient ID Manually**

**Register New Patient**

**Scanner tips**

MediWay Wireframes

12. Error: Patient Not Found

← Back

**Patient Not Found**

**No patient record found for this card**  
The scanned card is not in our system

**Quick Registration**

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Comments: \_\_\_\_\_

**Create Quick Record**

**Full Registration**

Failed lookups are flagged for audit

[← Back](#)Connection  
Error


Can't reach central  
database

Network connection unavailable

Retry

Use Cached Records (if available)

Proceed with Manual Registration

Connectivity  
diagnostics

Database:

Last Sync:

Local Cache:

Offline

2-15 PM

Today

Available

System Feedback  
ExamplesToast Notification  
PatternsClick buttons below to see different  
feedback typesToasts auto-dismiss after 4  
seconds[← Back to Records](#)

Audit Trail Demo

Open Audit Drawer

Audit Trail Interface  
Click "Open Audit Drawer" to see the  
slide-over panel

Audit Trail Features

- \* Timestamp tracking for all actions
- \* Start ID and location logging
- \* Filter by date and action
- \* CSV export capability

← Back to Scan Entry

Manual Patient Search

Find Patient  
Use only with RIS/CDM details or card unavailable

Search by name, patient ID, or phone...

Name \_\_\_\_\_ Patient ID \_\_\_\_\_ Date of Birth \_\_\_\_\_

Search

Search Results

Sarah Johnson  
123-456-7890-1234  
1985

Select

Sarah J. Martinez  
123-456-7890-1234  
1985

Select

Privacy & Accessibility Modal Demo

Privacy Notice Interface  
Click button below to see the privacy modal

Show Privacy Notice

Session Timeout Modal Demo

Session Management Interface  
Click button below to see the timeout modal

Show Session Timeout

- High-fidelity wireframes

**1. Scan Entry / Check-In**

Welcome to Check-In  
Please scan your health card or enter your patient ID to begin

**Scan Health Card**

Enter Patient ID Manually

Authorized staff only

**2. Staff Authentication**

Secure Login  
All access is logged for audit purposes

Email / Staff ID  
Enter your email or staff ID

Password  
Enter your password

Remember this device      [Forgot Password?](#)

**Sign In**

or

Scan Staff Badge

**3. Card Scan (Camera/Scanner)**

Back Step 1 of 3

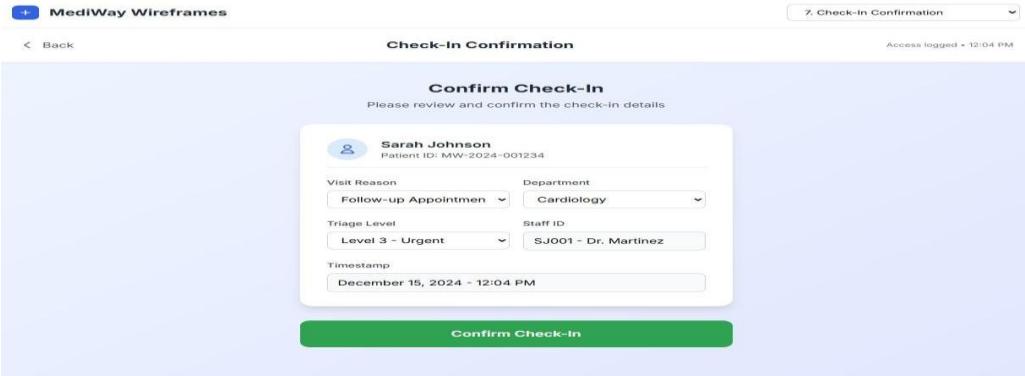
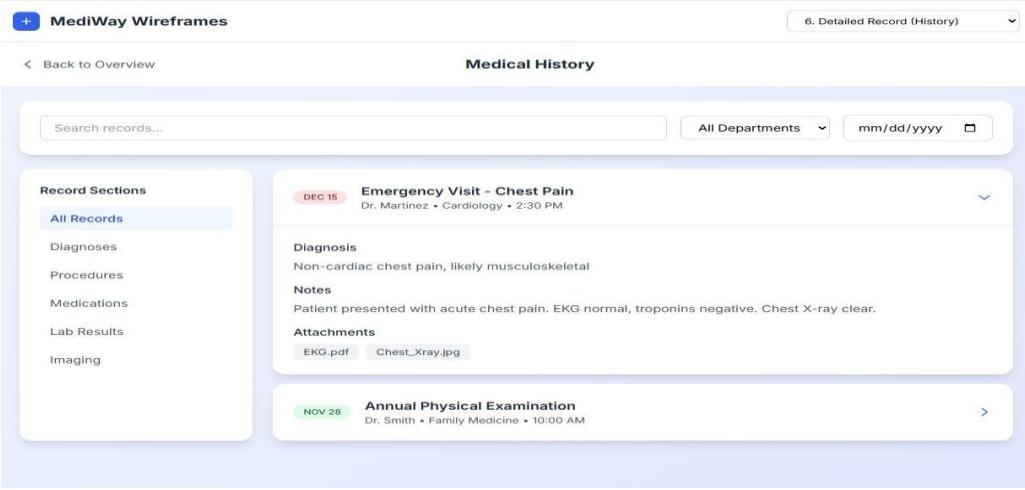
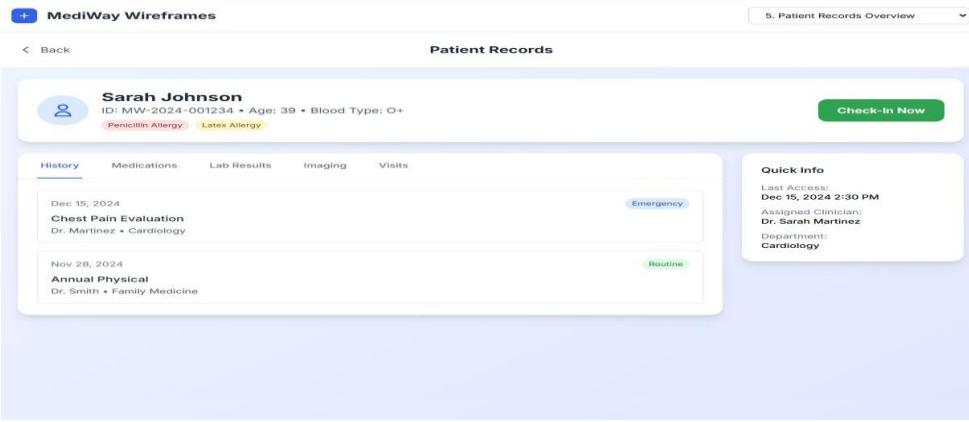
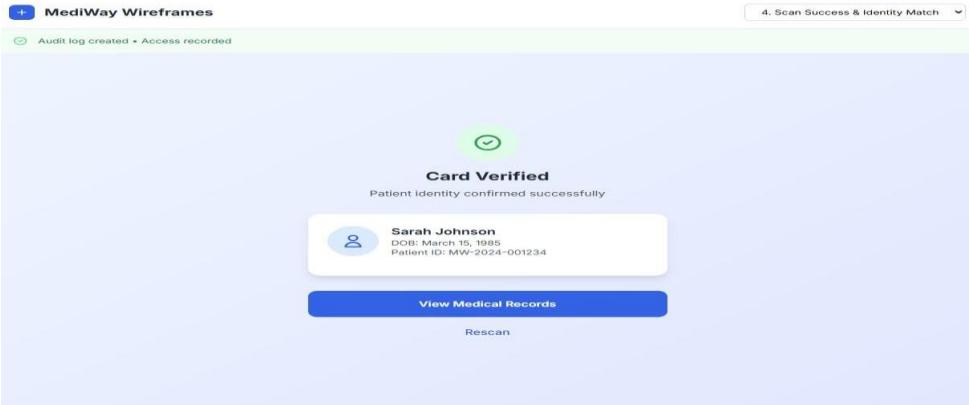
Scan Health Card  
Position your health card within the scanner area

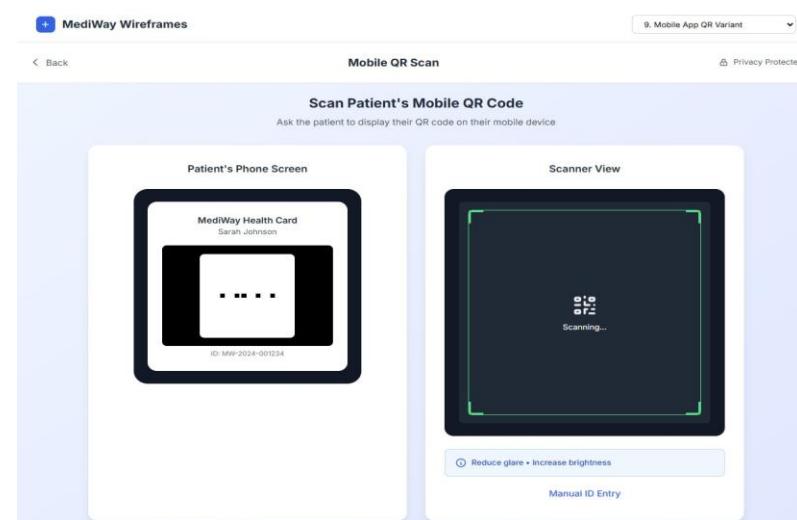
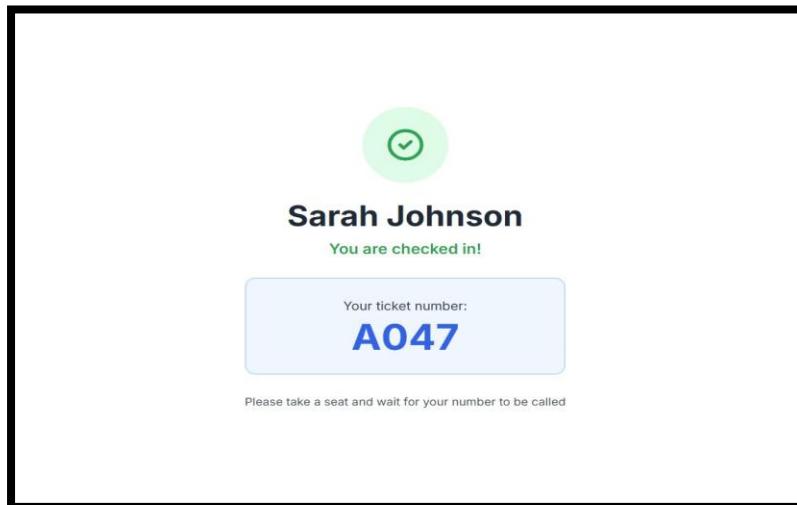
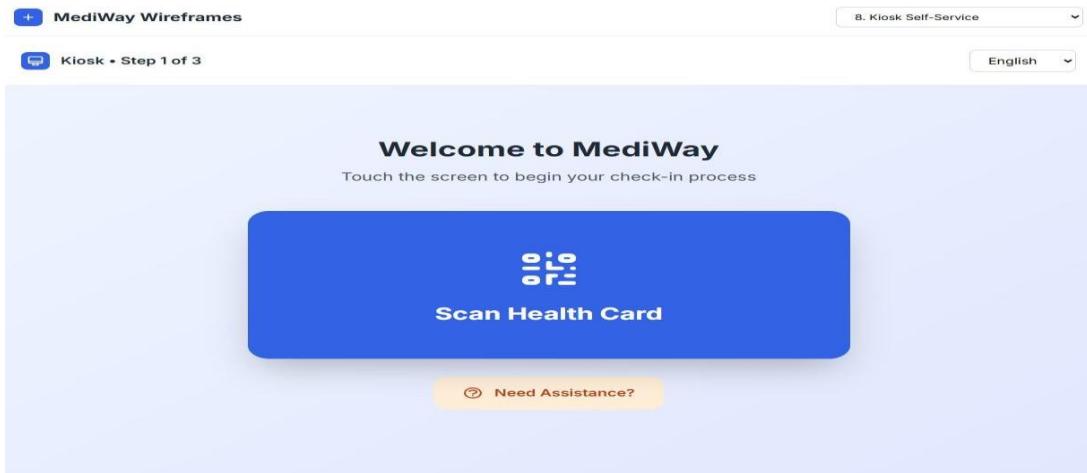
Place card here

Waiting for card...

**Enable Camera**

Use Scanner





**MediWay Wireframes**

10. Emergency Override

### ⚠️ Emergency Access (Break-Glass)


**Emergency Override Required**

This action will be logged and requires supervisor approval

**Emergency Reason \***

Describe the emergency situation requiring immediate access...

**Supervisor ID \*** **Your Staff ID \***

Enter supervisor ID Enter your staff ID

**Patient Identifier (if known)**

Patient name, ID, or other identifier

⚠️ Important Notice

This emergency access will be immediately reported to hospital administration and compliance teams. Use only in genuine emergency situations.

I acknowledge this is a genuine emergency requiring immediate access

**Cancel** **Grant Emergency Access**

◀ Back to Scanner

**Card Error**


**Card Not Recognized**

Unable to read health card information. The card may be damaged or incompatible.

**Try Scanning Again**

Enter Patient ID Manually

Register New Patient

[View Scanner Tips](#)

**Scanning Tips:**

- Ensure card is clean and undamaged
- Hold card steady within the frame
- Avoid glare and shadows
- Try different angles if needed

◀ Back

**Patient Not Found**


**No Patient Record Found**

The scanned card is not in our system. You can create a new patient record below.

**Quick Registration**

First Name	Last Name
<input type="text" value="Enter first name"/>	<input type="text" value="Enter last name"/>
Date of Birth	
<input type="text" value="mm/dd/yyyy"/>	
Phone Number	
<input type="text" value="(555) 123-4567"/>	
Health Card Number	
<input type="text" value="Enter card number"/>	

**Create Quick Record & Check In**

**Full Registration Process**

ⓘ Privacy Notice  
Failed lookups are logged for audit purposes. All patient data is protected under HIPAA.

< Back

**Connection Error**



**Can't Reach Central Database**  
Network connection is unavailable. You can still use cached records or proceed offline.

[Retry Connection](#)

Use Cached Records

[Proceed with Manual Registration](#)

**System Status**

Database Connection:	✖ Offline
Last Sync:	2:15 PM Today
Local Cache:	🕒 Available
Cached Records:	1,247 patients

**System Feedback Examples**

**Toast Notification Patterns**  
Click the buttons below to see different feedback types in action

 Success

Scan successful  
Patient verified and ready for check-in

[Show Success Toast](#)

 Warning

Permission required  
Contact supervisor for elevated access

[Show Warning Toast](#)

 Error

Access denied  
Invalid credentials provided

[Show Error Toast](#)

 Information

[Show Info Toast](#)

 Loading

[Show Loading Toast](#)

 Toast Behavior

Toasts automatically dismiss after 4 seconds and can be manually closed by clicking the × button

< Back to Scan Entry

**Manual Patient Search**

**Find Patient Record**  
Use only when scan fails or card is unavailable

Search

**Advanced Filters**

Full Name	Patient ID	Date of Birth
First Last	MW-2024-XXXXXX	mm/dd/yyyy 

**Search Results** 2 patients found

	<b>Sarah Johnson</b> ID: MW-2024-001234 • DOB: March 15, 1985 • Age: 39 <small>Penicillin Allergy Latex Allergy</small>	<a href="#" style="background-color: #28a745; color: white; padding: 2px 10px; border-radius: 5px;">Select Patient</a>
	<b>Sarah J. Martinez</b> ID: MW-2024-005678 • DOB: June 22, 1990 • Age: 34 <small>No Known Allergies</small>	<a href="#" style="background-color: #28a745; color: white; padding: 2px 10px; border-radius: 5px;">Select Patient</a>

## 07. Nethmina W.P.R - IT22253958- Data Analysis & Reporting

- Use case scenario

**Name:** Generate Statistical Report for HealthCare Managers

**Description:**

A Healthcare Manager requests statistical reports on patient visits and service use. The system collects data, shows peak times and capacity gaps, and offers staffing recommendations and patient flow actions, such as opening triage lanes, reassigning staff, or rescheduling non-urgent appointments. The manager reviews, modifies, and implements staffing plans or schedule changes, either manually or by exporting data to the rostering system.

**Preconditions**

- Manager account with report and rostering permissions.
- Reporting database and data warehouse are up to date.
- Current staffing rosters and staff availability data are accessible.
- Business rules and thresholds, such as maximum wait time and minimum nurse-to-patient ratio, are defined and available.
- A notifications channel exists, whether through email, SMS, or in-app, to alert staff or the front desk.

**Main Flow**

1. The manager logs in and opens Reports, then selects Operational or Visits.
2. Next, the manager chooses a report template or sets specific parameters, including date range, hospital, departments, and aggregation.
3. The manager clicks Generate. The user interface sends a ReportRequest to ReportController.
4. ReportController authenticates and verifies the request.
5. DataAggregator retrieves metrics that include total visits, visits by hour, visits by department, average wait times, no-show rates, and throughput.
6. CapacityEngine uses the aggregated metrics, current roster, and business rules to determine:
  - Peak time windows
  - Forecasted demand for each window
  - Current scheduled staff capacity per role, including nurses, doctors, and admin staff
  - Staffing gaps or surpluses
  - Suggested patient-flow actions
7. ReportFormatter creates an interactive report with:
  - Charts and tables showing visits over time and busiest departments

- Highlighted peak times and severity
  - A staffing recommendation panel
  - Suggested patient-flow measures and their estimated impact
8. ReportController records the action in the AuditLog and sends the report back to the user interface.
  9. The manager reviews the report and recommended staffing plan. The options include:
    - Apply Now: Push the recommended changes to the roster system (requires manager confirmation).
    - Adjust & Apply: The manager edits the proposed roster changes and applies them.
    - Simulate: Run a quick simulation to show projected wait-time changes after adjustments.
    - Schedule: Save the recommendation as a recurring action
  10. If the manager selects Apply Now or Adjust & Apply, ReportController calls the RosterSystem API to create or modify shifts and NotificationService to alert affected staff. The AuditLog records these changes.
  11. The manager can also schedule a follow-up, such as sending report results to stakeholders or enabling ongoing monitoring alerts for set thresholds.

### **Alternate Flows**

- A1 — If auto-recommendation is disabled, the system only provides suggestions, and the manager must manually update the roster.
- A2 — If RosterSystem reports staff unavailability for recommended slots, the system suggests alternatives, such as temporary hires or overtime, or marks the recommendation as pending approval.
- A3 — When the manager requests a simulation, CapacityEngine returns projected metrics after applying the recommendations and displays the expected average wait time change.
- A4 — If the manager activates a patient-flow action, the system notifies the front desk and updates signage boards.
- A5 — For long-term forecasting, the job runs in the background, and an email or notification is sent upon completion.

### **Postconditions**

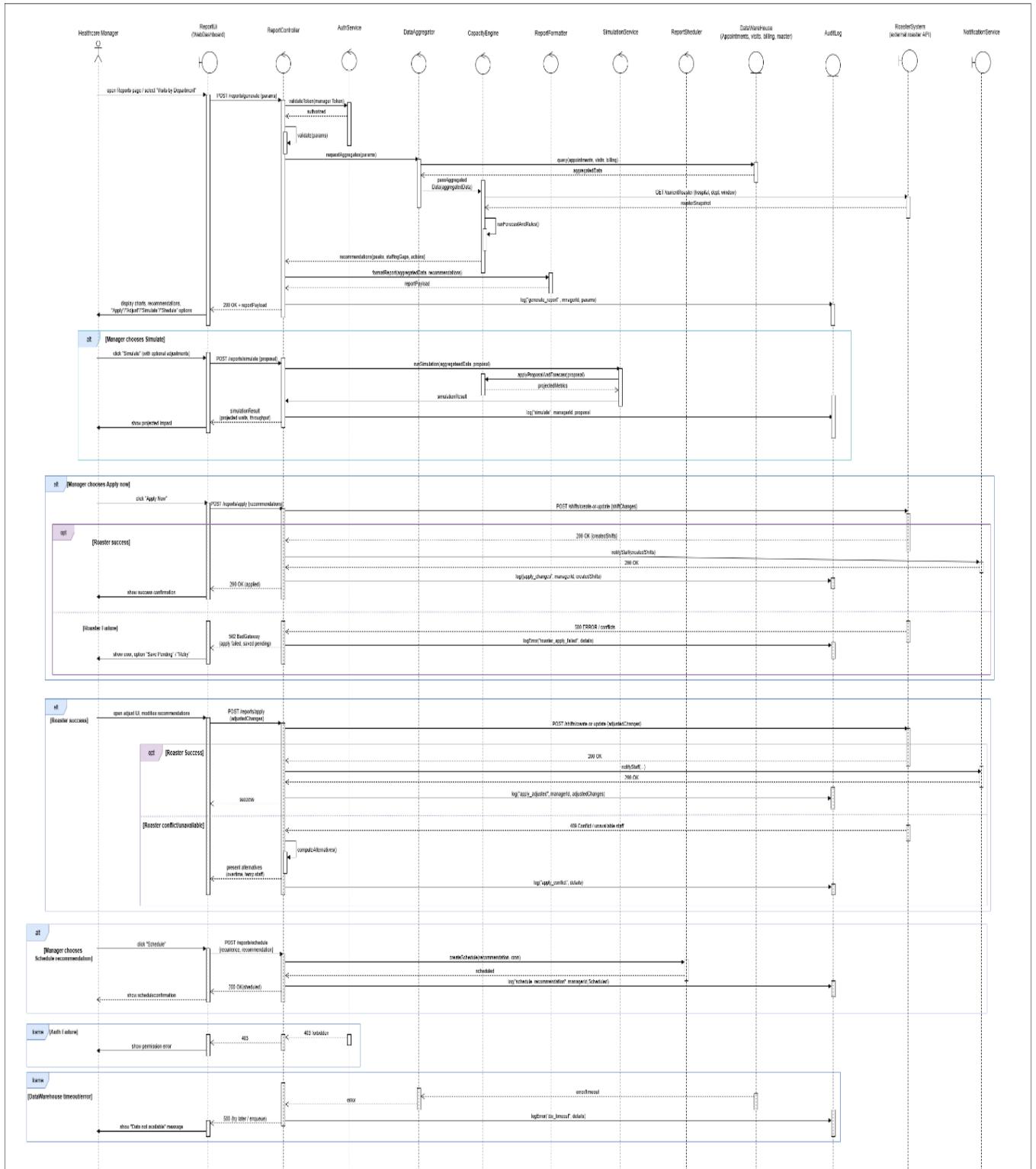
- The manager sees the report and staffing and flow recommendations.
- If applied, the roster updates in RosterSystem, staff receive notifications, and an audit entry is created.

- If scheduled, recurring adjustments are stored in ReportScheduler with dates for the next runs.
- Monitoring alerts are created for specific thresholds, if enabled.
- Any patient-level personal information remains masked unless consent is given and permissions allow more detailed access.

### **Exception Flows**

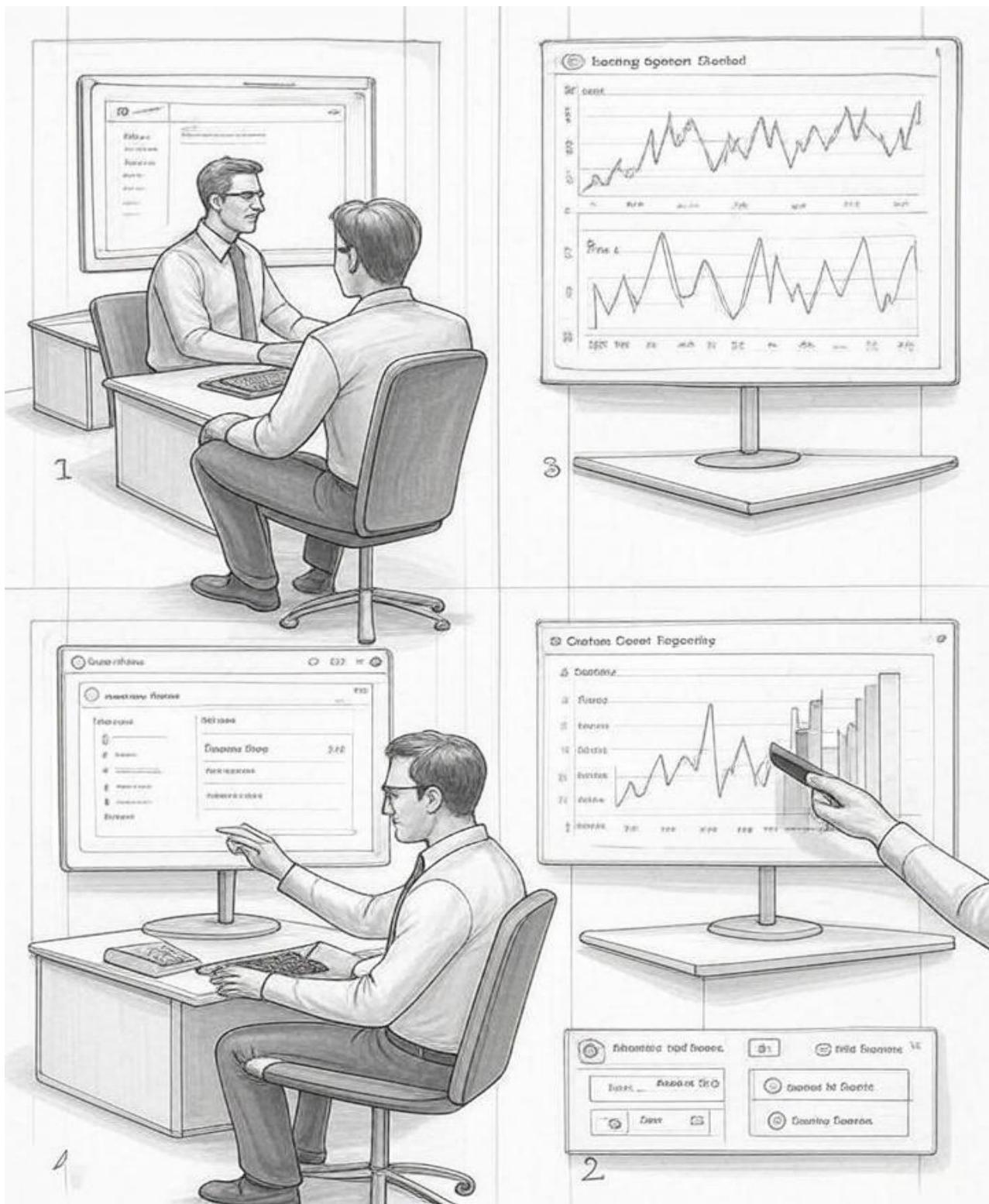
- E1 — If the RosterSystem API fails, the schedule change doesn't apply. The user interface shows an error and stores the change as pending with retry options. The audit logs record the failure.
- E2 — If extra staffing requires a budget or approval beyond the manager's rights, the system indicates that HR or Finance approval is needed and routes a request accordingly.
- E3 — If thresholds or business rules are missing or corrupt, CapacityEngine displays an error and prompts the admin to configure settings.
- E4 — If staff cannot be notified due to SMS or email errors, the system logs the incident and identifies which staff were not notified, offering a chance to retry the notifications.

- Sequence diagram



Sequence Diagram Drive Link: [Assignment 1](#)

- Storyboard



- Low-fidelity wireframes

**SH Smart Healthcare — Reports**  
Visits by Department (low-fi wireframe)

**Filters**

From: [ 2025-07-01 ] To: [ 2025-07-31 ] Hospital: [ Colombo General ] Department: [ All ]

Choose parameters to generate report  
Aggregate: [ Daily ]

Generate Schedule Reset

**Visits Over Time** Line chart placeholder

**Top Departments** Bar chart placeholder

**Results (sample)**

Date	Department	Visits	Avg Wait	Peak Hour
2025-07-01	Outpatient	120	00:35	09:00
2025-07-01	Emergency	210	00:42	14:00
2025-07-02	OPD	150	00:30	10:00
Total		480		

Export CSV Export PDF Save Snapshot

Low-fi wireframe — grayscale, interaction not implemented

- High-fidelity wireframes

**Smart Healthcare System**

Signed in as Manager Alice [Help](#)

**Filters**  
Select parameters for report generation

From: 07/01/2025 To: 07/31/2025 Hospital: Colombo General Department: All

Aggregate: Daily [Generate Report](#) [Schedule](#) [Reset](#)

**Visits Over Time**

Total: 971

Date	Visits
2025-07-01	780
2025-07-02	650
2025-07-03	720
2025-07-04	680
2025-07-05	800
2025-07-06	850
2025-07-07	900
2025-07-08	850
2025-07-09	950
2025-07-10	800
2025-07-11	750
2025-07-12	900
2025-07-13	1000
2025-07-14	800
2025-07-15	550
2025-07-16	750
2025-07-17	800
2025-07-18	700
2025-07-19	580
2025-07-20	600
2025-07-21	750
2025-07-22	800
2025-07-23	700
2025-07-24	650
2025-07-25	580
2025-07-26	550
2025-07-27	420
2025-07-28	700
2025-07-29	650
2025-07-30	680
2025-07-31	620

**Top Departments**

Peak hour & averages

Department	Visits
Pediatrics	4600
Outpatient	4400
Emergency	4300
Radiology	4200
OPD	4100

Date	Department	Visits	Avg Wait	Peak Hour
2025-07-01	Outpatient	104	00:47	14:00
2025-07-01	Emergency	111	00:22	8:00
2025-07-01	Pediatrics	134	00:37	17:00
2025-07-01	OPD	220	00:37	14:00
2025-07-01	Radiology	198	00:20	12:00
2025-07-02	Outpatient	204	00:30	10:00
<b>Total</b>		<b>971</b>		

[Export CSV](#) [Export PDF](#) [Save Snapshot](#) Preview data is sample only