

Schools of Arts and Sciences Computer Science Department

 **Home Care**

**Senior Project**

By Hadi HmoudaAli Chebli

CSCI490

Advisor Dr. Maher Abdulrahman

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# 1. Introduction

## 1.1. Background

In today’s fast-paced world, accessing quality in-home nursing care is a significant challenge, particularly for the elderly, parents with young children, and patients with specific medical needs. Overcrowded hospitals, long waiting times, and the complexity of scheduling personalized home care services often hinder timely healthcare delivery. This gap in accessible, tailored nursing services negatively impacts patients’ well-being, recovery, and quality of life.

## 1.2. Problem Statement

The lack of an efficient, user-friendly platform to connect customers with qualified nurses for in-home care creates barriers to accessing essential healthcare services. Customers struggle to find reliable nurses who meet specific preferences (e.g., gender, expertise), while nurses face challenges in finding flexible, freelance work opportunities.

## 1.3. Significance of the Project

The Home Care platform addresses these challenges by providing a centralized, web-based solution that streamlines the process of requesting and delivering home nursing services. By offering personalized care options, the platform improves healthcare accessibility, enhances patient outcomes, and supports nurses’ professional flexibility. It also reduces the stress of coordinating care and promotes community-driven healthcare initiatives.

**1.4. Why a Web-Based Solution?**

A web-based platform was chosen for its accessibility, scalability, and ease of use. Unlike mobile apps, a website requires no downloads or device-specific updates, making it inclusive for users across various devices (e.g., laptops, tablets, smartphones). The platform’s web-based nature allows seamless integration with multiple features, such as payment gateways, nurse verification systems, providing a comprehensive user experience.

## 1.5. Purpose and Objectives

The primary purpose of the Home Care platform is to simplify access to in-home nursing services by connecting customers with qualified nurses and offering additional healthcare-related functionalities. The platform empowers users to customize their care preferences, supports nurses in managing freelance opportunities.

**Objectives**:

* Enable customers to request tailored nursing services based on preferences (e.g., service type, nurse gender, duration).
* Provide nurses with a flexible platform to view and accept service requests.
* Ensure secure, user-friendly, and efficient management of services, orders, and user accounts for all stakeholders (customers, nurses, admins, charitable organizations, medical companies).

**Name Explanation:**

* Home: Emphasizes the focus on in-home nursing care.
* Care: Reflects the platform’s commitment to personalized, compassionate healthcare services.

# 2. Requirement Analysis

## 2.1. Functional Requirements

### a) Patient Functional Requirements

Registration and Login/Logout:

Customers can sign up, log in, and log out securely.

Profile Management:

Update personal information, medical history, and service preferences (e.g., nurse gender, specific needs).

Browse Services:

View available services (e.g., elderly care, childcare, maternity care, wound cleaning, sample collection) with details such as service description and requirements.

Service Request Building:

1. Select service type and specify details (e.g., nurse gender, number of days, specific medical needs).
2. View available nurses matching the criteria.
3. Choose a nurse or post the request publicly for nurses to apply.
4. Select service dates and preferred time slots.
5. Proceed with secure payment.

Cancel Order:

Cancel a service request with a refund if canceled within a specified timeframe (e.g., 48 hours before the service start).

View Orders:

Access current, upcoming, and past service requests with details (e.g., nurse assigned, service status).

Rate Nurses:

Provide feedback and ratings for completed services to ensure quality and transparency.

1. **Nurse Functional Requirements** Login/Logout:

Secure access to the nurse portal.

Profile Management:

Update professional details, certifications, and availability.

Manage Service Requests:

* 1. View available service requests with customer requirements (e.g., service type, duration, location).
  2. Accept or decline requests based on preference and availability.
  3. View Accepted Services:
  4. Access details of accepted services, including schedules and customer information.

1. **Admin Functional Requirements** Login/Logout:

Secure access to the admin dashboard.

Service Management:

* 1. View, add, update, or set availability of service types (e.g., elderly care, maternity care).
  2. Filter services by category, requirements.

User Management:

* 1. View and manage accounts for customers, nurses.
  2. Suspend or deactivate accounts if necessary.

Order Management:

* 1. View all service requests with customer and nurse details.
  2. Refund status for cancellations.

## 2.2. Non-Functional Requirements

Security:

* Implement password encryption and secure payment gateways to protect user data.
* Ensure compliance with data protection regulations

Accessibility:

Ensure the website is accessible across browsers.

Ease of Use:

Design an intuitive interface with clear navigation and step-by-step guidance for all user tasks.

Performance:

Ensure page load times under 2 seconds and support for at least 10,000 concurrent users.

Scalability:

Design the backend to handle growth in users, services, and orders without performance degradation.

### 2.3. Software Requirements

Frontend:

HTML, CSS, JavaScript for dynamic content.

Backend:

PHP for server-side logic.

Database:

MySQL (via XAMPP for local testing) for storing user data, services, orders, donations, and products.

Development Tools:

* Visual Studio Code for coding.
* XAMPP for local development and testing.

Version Control:

GitHub for collaborative development and code management.

# 3. Analysis

## 3.1. Strengths

Comprehensive User Coverage: The platform supports multiple user types (customers, nurses, admins), addressing diverse healthcare needs.

Flexible Service Model: Customers can customize services, and nurses can work as freelancers, promoting user satisfaction and professional autonomy.

Robust Technology Stack: PHP, MySQL, and JavaScript are wellestablished, scalable technologies suitable for a healthcare platform.

User-Centric Design: Features like profile management, service filtering, and secure payments prioritize usability and trust.

## 3.2. Potential Challenges

Complex User Management: Supporting five user types with distinct functionalities may complicate backend logic and UI design.

Nurse Verification: Verifying nurses’ credentials and ensuring syndicate affiliation requires a robust, secure process to maintain trust and compliance.

Logistics and Scalability: Managing service delivery across cities, handling donations, and processing product sales may pose logistical challenges without clear partnerships or infrastructure.

Data Security: Handling sensitive medical data requires stringent security measures beyond password encryption.

Competitive Landscape: Established platforms like Care.com or local healthcare providers may pose competition, necessitating clear differentiation.

# 4.Use Case Modeling:

• **Use Case Modeling** is the process of identifying how different users will interact with a system and what functions the system should perform.

1. **Use Case Diagram:**
   * A **Use Case Diagram** is a simple visual chart that shows these interactions between users and the system’s main functions.

1.**users**:



sign in



log in



log out



user



depend on

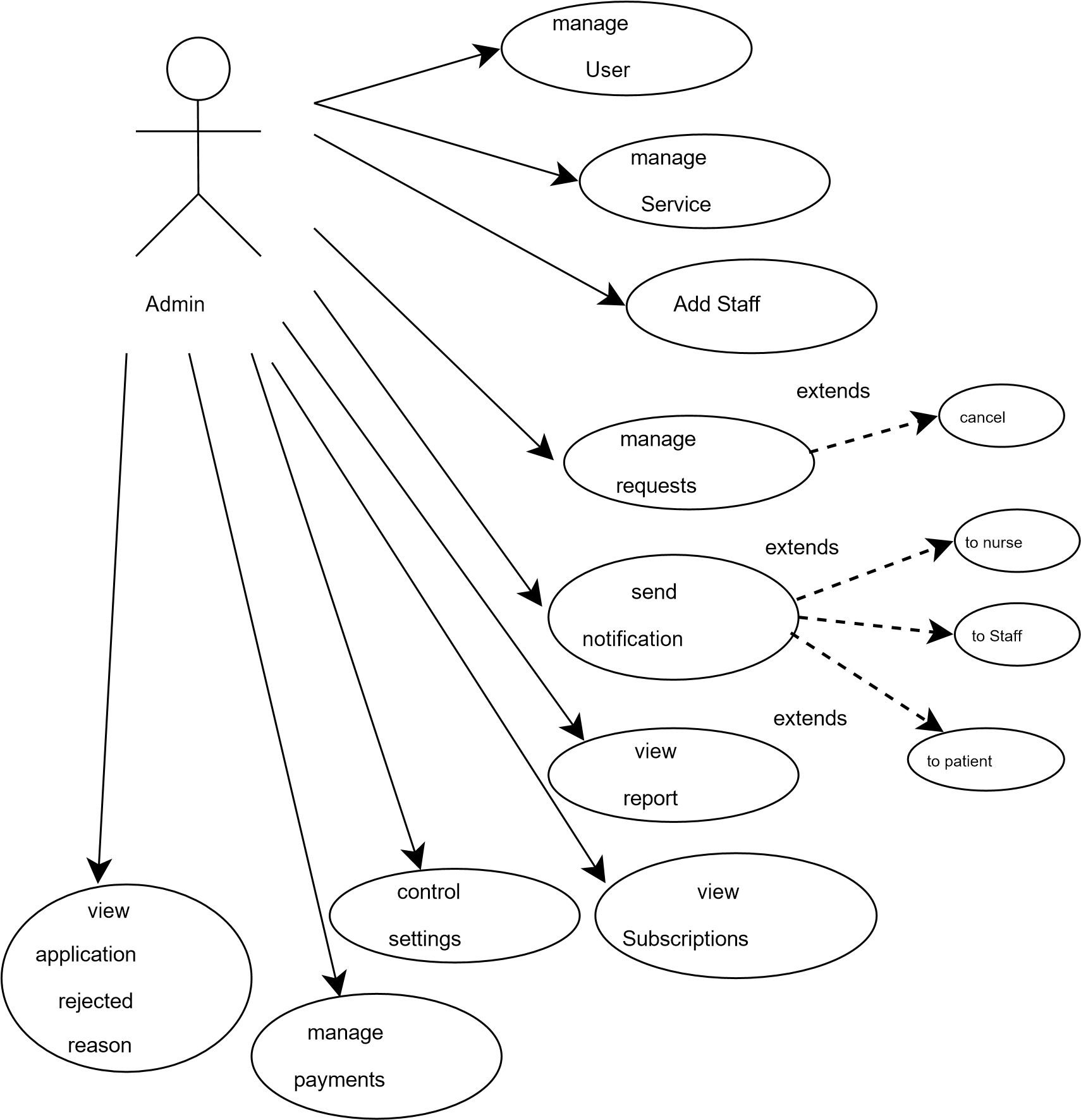


edit profile

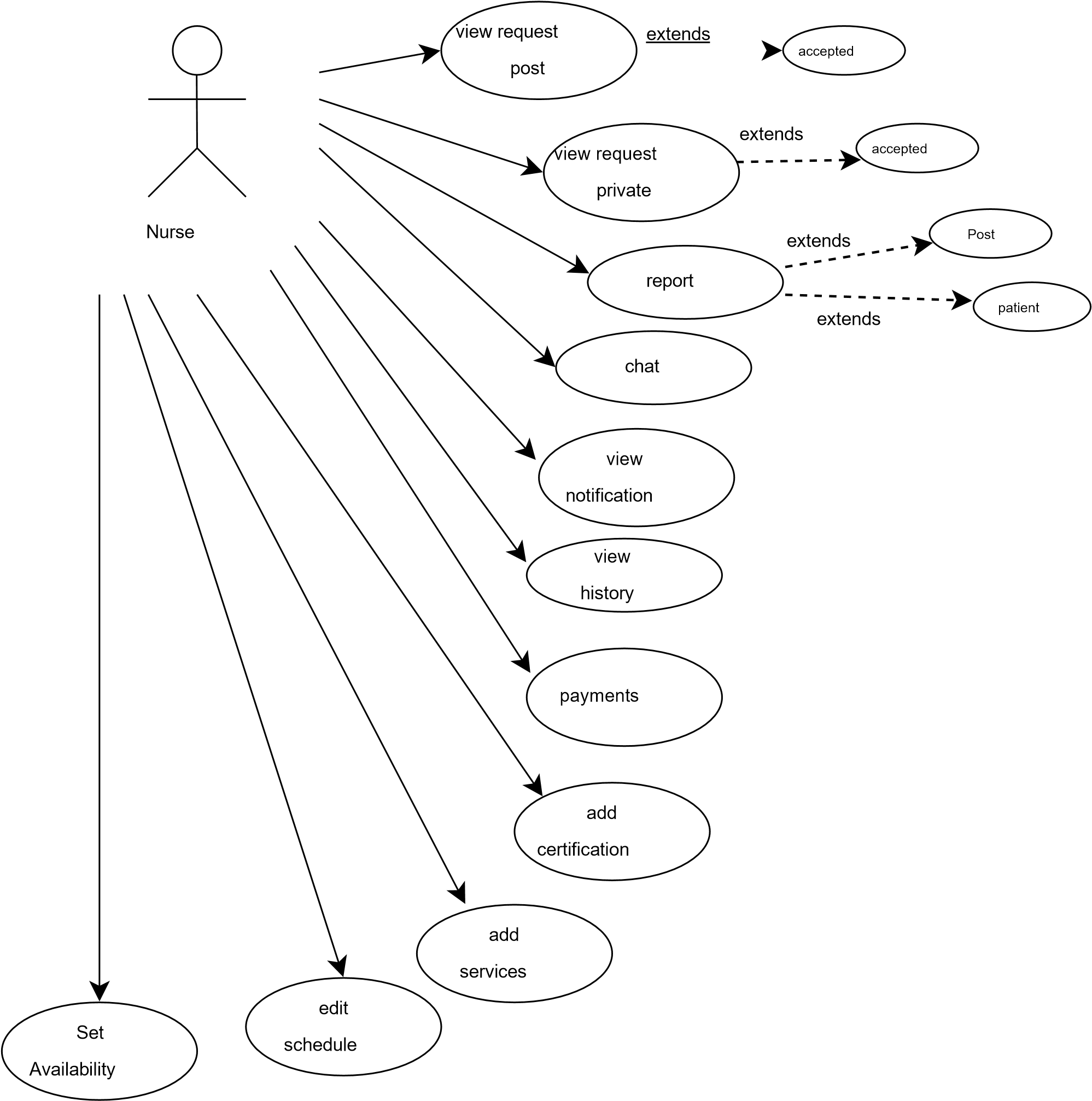
**2**.**Staff**:



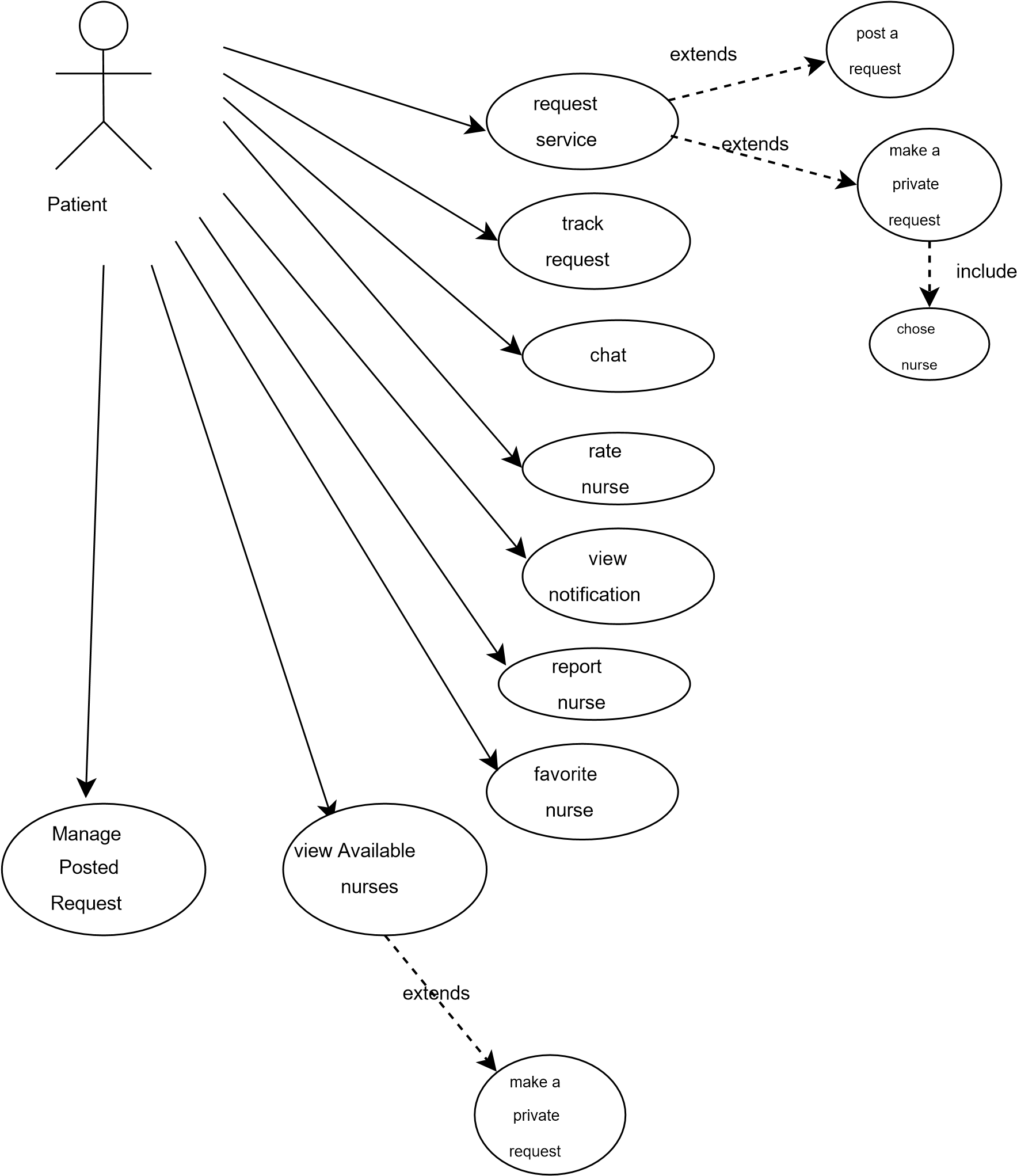
**3.Admin:**



**4.Nurse:**



**5.Patient:**



1. **Use Case Narrative:**

* + A **Use Case Narrative** is a written explanation that describes stepby-step how a specific function works from the user’s point of view.

**Use Case 1: Post Request (Patient)**

|  |  |  |
| --- | --- | --- |
| Name | Post Request | |
| Priority | High | |
| Actor | Patient | |
| Description | The patient posts a service request to find a suitable nurse. | |
| Preconditions | Patient must be logged in.  Patient’s profile must be complete. | |
| Trigger | Patient clicks “Post Request” and submits required details. | |
| Typical Course of Events | Actor Action: | System response: |
| 1.Fills out request form with required information.    3.Submits the form. | 2.Validates input and saves the request.  4.Displays confirmation and notifies relevant nurses. |
| Alternative Scenario | Patient submits incomplete or invalid information, and the system prompts for correction. | |
| Conclusion | The request is posted successfully. | |
| Postcondition | Request is visible to eligible nurses. | |

**Use Case 2: Apply to Request (Nurse)**

|  |  |  |
| --- | --- | --- |
| Name | Accept public Request | |
| Priority | High | |
| Actor | Nurse | |
| Description | Nurse accept an open request posted by a patient. | |
| Preconditions | Nurse must be logged in.  Nurse must have an active profile and valid certification. | |
| Trigger | Nurse views available requests and clicks "Accept". | |
| Typical Course of Events | Actor Action: | System response: |
| 1. Selects a request and clicks accept.    3. Confirms application | 2. Confirms nurse eligibility.  4. updates the request status. |
| Alternative Scenario | Nurse tries to accept for a cancel request and receives an error message. | |
| Conclusion | The nurse successfully accepted to the request. | |
| Postcondition | Application is added to the request record. | |

**Use Case 3: Approve Request (Admin)**

|  |  |  |
| --- | --- | --- |
| Name | Cancel Request | |
| Priority | Medium | |
| Actor | Admin | |
| Description | Admin reviews service requests submitted by patients. | |
| Preconditions | Admin must be logged in.. | |
| Trigger | Admin accesses pending requests dashboard. | |
| Typical Course of Events | Actor Action: | System response: |
| 1. Selects a pending request    3. Clicks Cancel | 2. Displays full request details  4. Updates request status |
| Alternative Scenario | Admin chooses to reject the request and provides a reason. | |
| Conclusion | The request is approved and moves forward in the workflow. | |
| Postcondition | Relevant parties are notified of the approval | |

**Use Case 4: Set Availability (Nurse)**

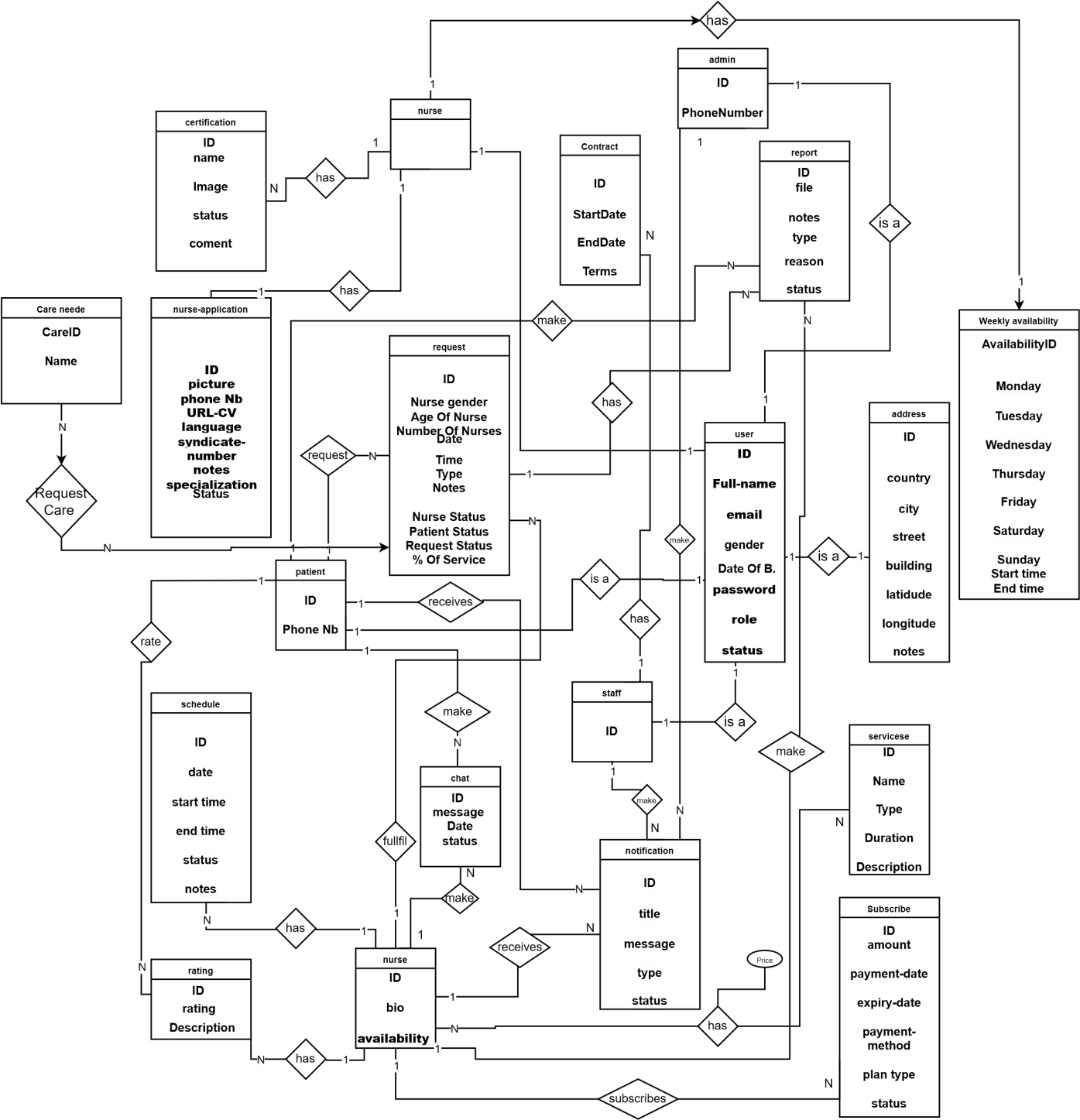
|  |  |  |
| --- | --- | --- |
| Name | Set Availability | |
| Priority | Medium | |
| Actor | Nurse | |
| Description | Nurse updates their calendar to define when they are available for work. | |
| Preconditions | Nurse must be logged in. | |
| Trigger | Nurse navigates to availability settings. | |
| Typical Course of Events | Actor Action: | System response: |
| 1. Opens schedule manager    3. Displays current availability | 2. Displays current availability  4. Saves updates and syncs with request system. |
| Alternative Scenario | Nurse enters overlapping or invalid time slots and is prompted to correct. | |
| Conclusion | Nurse availability is updated. | |
| Postcondition | System reflects new availability for matching with patient requests. | |

**Use Case 5: Send Notification (Admin)**

|  |  |  |
| --- | --- | --- |
| Name | Send Notification | |
| Priority | Low | |
| Actor | Admin | |
| Description | Admin sends system notifications to users (nurses or patients). | |
| Preconditions | Admin must be logged in. | |
| Trigger | Admin selects a user or group and composes a message. | |
| Typical Course of Events | Actor Action: | System response: |
| 1. Opens notification panel.    3. Composes message and selects recipients. | 2. Displays notification template.  4. Sends notification and confirms delivery. |
| Alternative Scenario | Admin sends to an invalid recipient group; system shows an error. | |
| Conclusion | Notification is successfully sent | |
| Postcondition | Users receive notifications in their message center. | |

# 5. ER-Diagram:

• An **ER (Entity-Relationship) Diagram** is a visual map that shows the different parts of a database—like people, things, or events— and how they are connected to each other.



# 6.Mapping:

• **Mapping** is the process of converting elements from an ER diagram—such as entities and relationships—into a format that can be implemented in a database, like tables, columns, and keys.

1. User (**UserID**, FullName, Gender, DateOfBirth, PhoneNumber, Email, Password, Role, Status, AddressID)

1. Admin (**AdminID**, UserID)

1. Patient (**PatientID**, image\_path, UserID)

1. Nurse (**NurseID**, Bio, Availability, NAID, UserID)

1. Staff (**StaffID**, UserID)

1. Nurse-Application (**NAID**, Picture, URL-CV, Language, Gender,

SyndicateNumber, Comments, Specialization, Status, full name, Date of B, Name of Mother, phone number, Email, Rejected reason)

1. Service (**ServiceID**, Name, Type, Duration, Description)

1. Nurse-Services (**NurseID**, **ServiceID,** Price, CreatedAt, UpdatedAt)

1. Certification (**CertificationID**, Name, Image, Comment, Status, CreatedAt, UpdatedAt, NurseID)

1. Schedule (**ScheduleID**, Date, StartTime, EndTime, Notes, Status, NurseID)

1. Subscribe (**SID**, Amount, PaymentDate, PaymentMethod, expiryDate, PlanType, Status, NurseID)

1. Request (**RequestID**, NurseGender, AgeType, Date, Time, Type, NumberOfNurses, Notes, NurseStatus, PatientStatus,

RequestStatus, ServiceFeePercentage, ispublic, reason PatientID,

NurseID, AddressID)

1. [request applications](http://localhost/phpmyadmin/index.php?route=/sql&pos=0&db=homecare&table=request_applications) (**ApplicationID**, ApplicationStatus, ApplicationDate)

1. Rating (**RID**, Rating, Description, PatientID, NurseID, RequestID)

1. Address (**AddressID**, country, city, street, building, latitude, longitude, notes)

1. Report (**ReportID**, ReporterID, ReporterRole, ReportedID,

ReportedRole, File, Type, Notes, Reason, Status, Date, RequestID)

1. Notification (**NotificationID**, SenderID, SenderType, RecipientID, RecipientType, Title, Message, Date, Type, Status)

1. Contract (**ContractID**, StartDate, EndDate, Terms, StaffID)

1. Chat (**ChatID**, SenderID, RecipientID, Message, Date, Status)

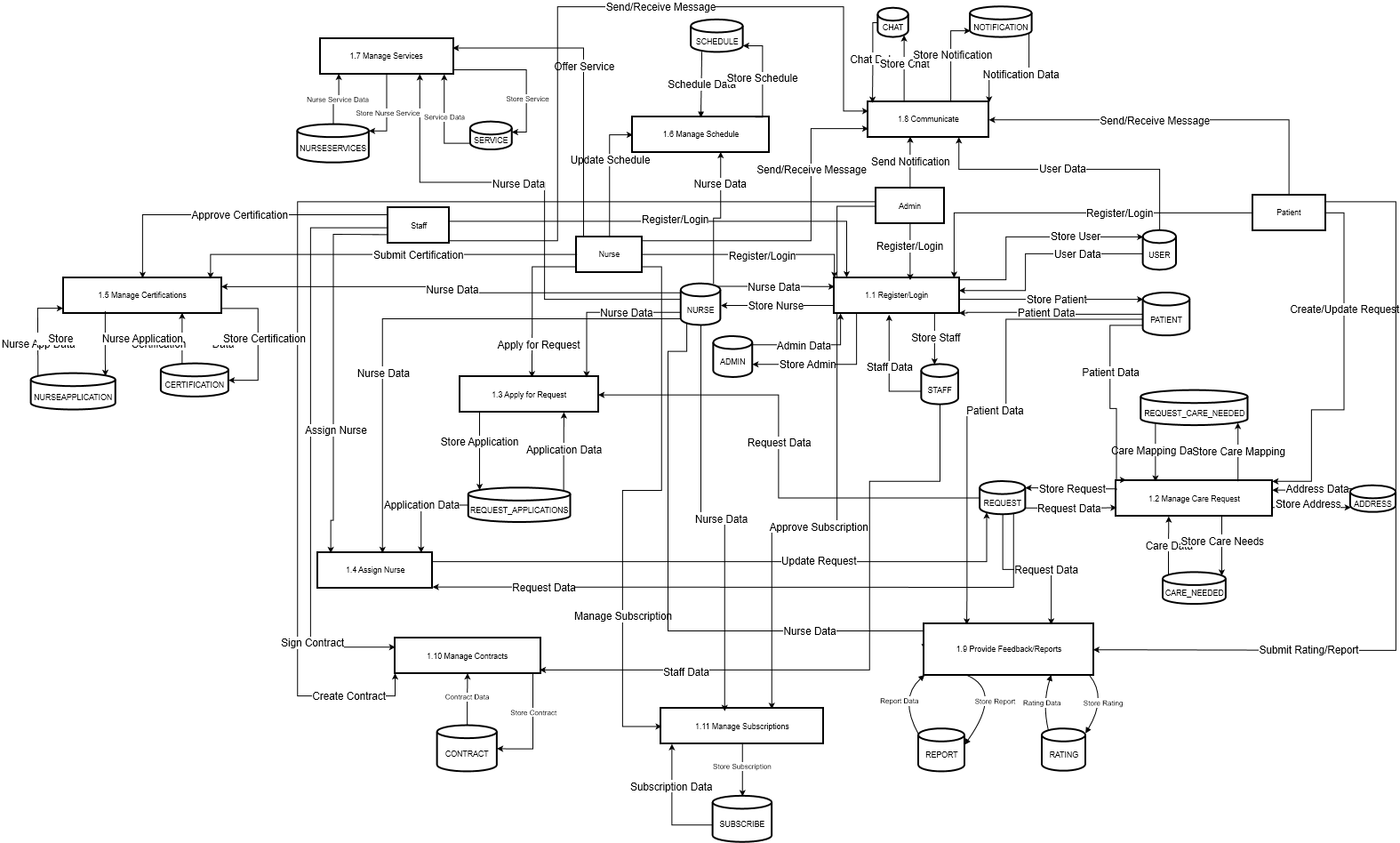
1. [care needed](http://localhost/phpmyadmin/index.php?route=/sql&pos=0&db=homecare&table=care_needed) (**CareID**, Name)

1. Weekly availability (AvailabilityID, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, start time, end time, NurseID)

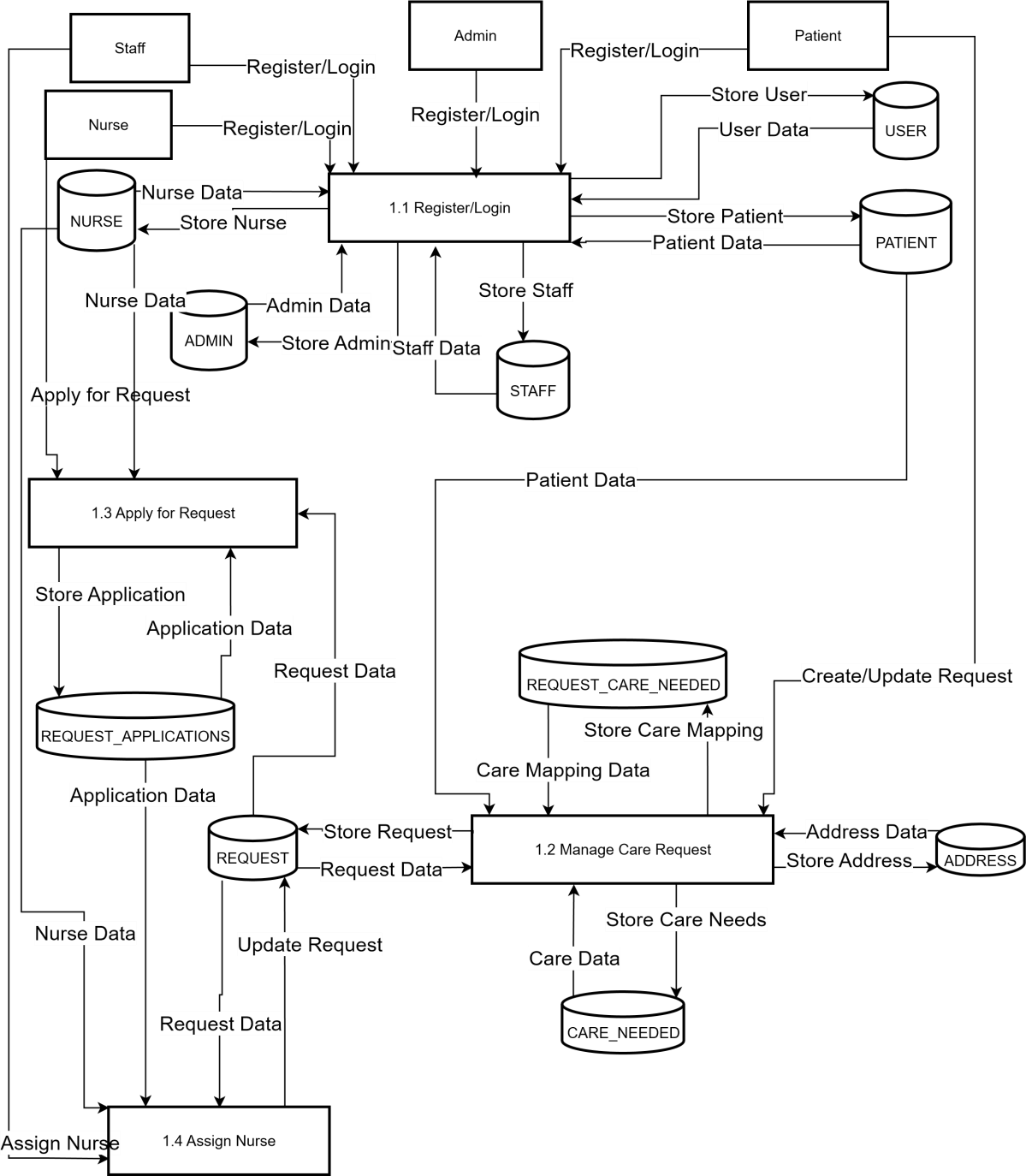
1. [request care needed](http://localhost/phpmyadmin/index.php?route=/sql&pos=0&db=homecare&table=request_care_needed) (**RequestID, CareID)**

**Primary Key** / Foreign Key

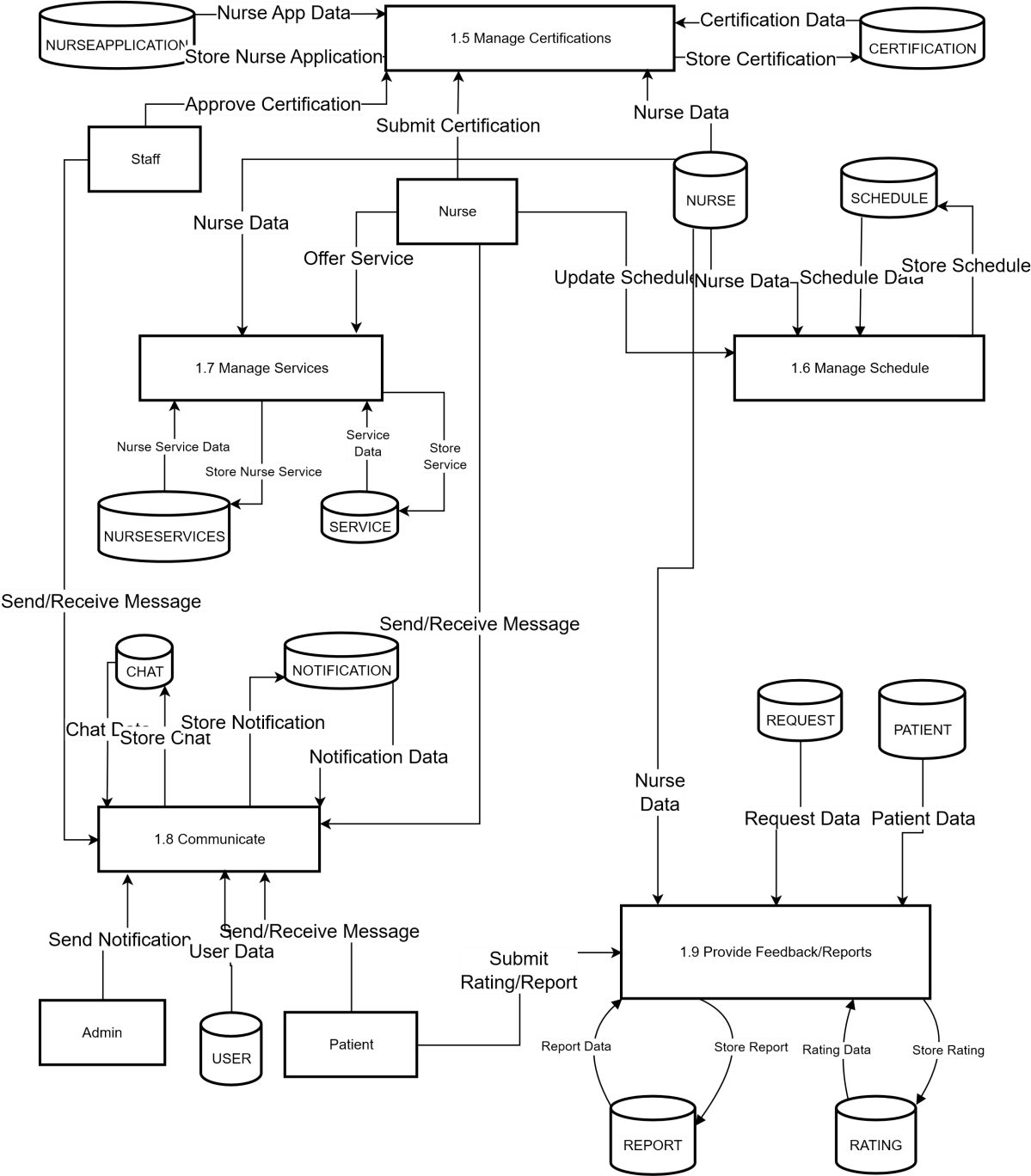
# 7. Data-Flow Diagram (DFD):

• A **Data-Flow Diagram** is a visual tool that shows how information moves through a system—where the data comes from, where it goes, and how it is processed at each step.

8.1: 1.1(Register/login) - 1.2(Manage Care Request) – 1.3(Apply for request) – 1.4(Assign Request).



8.2: 1.5(Manage Certifications) - 1.6(Manage Schedule) – 1.7(Manage Services) – 1.8(Communicate) – 1.9(Provide Reports).



8.3: 1.10(Manage Subscriptions) - 1.11(Manage Contracts).



Contract



CONTRACT



1.10



Manage Contracts



Store



Staf



Approve



Subscriptio



Create



Contrac



Admin



Staff



STAF



SUBSCRIBE



1.1



Manage Subscriptions



Store



Subscription



Dat



Nurse



NURSE



Manage



Nurse

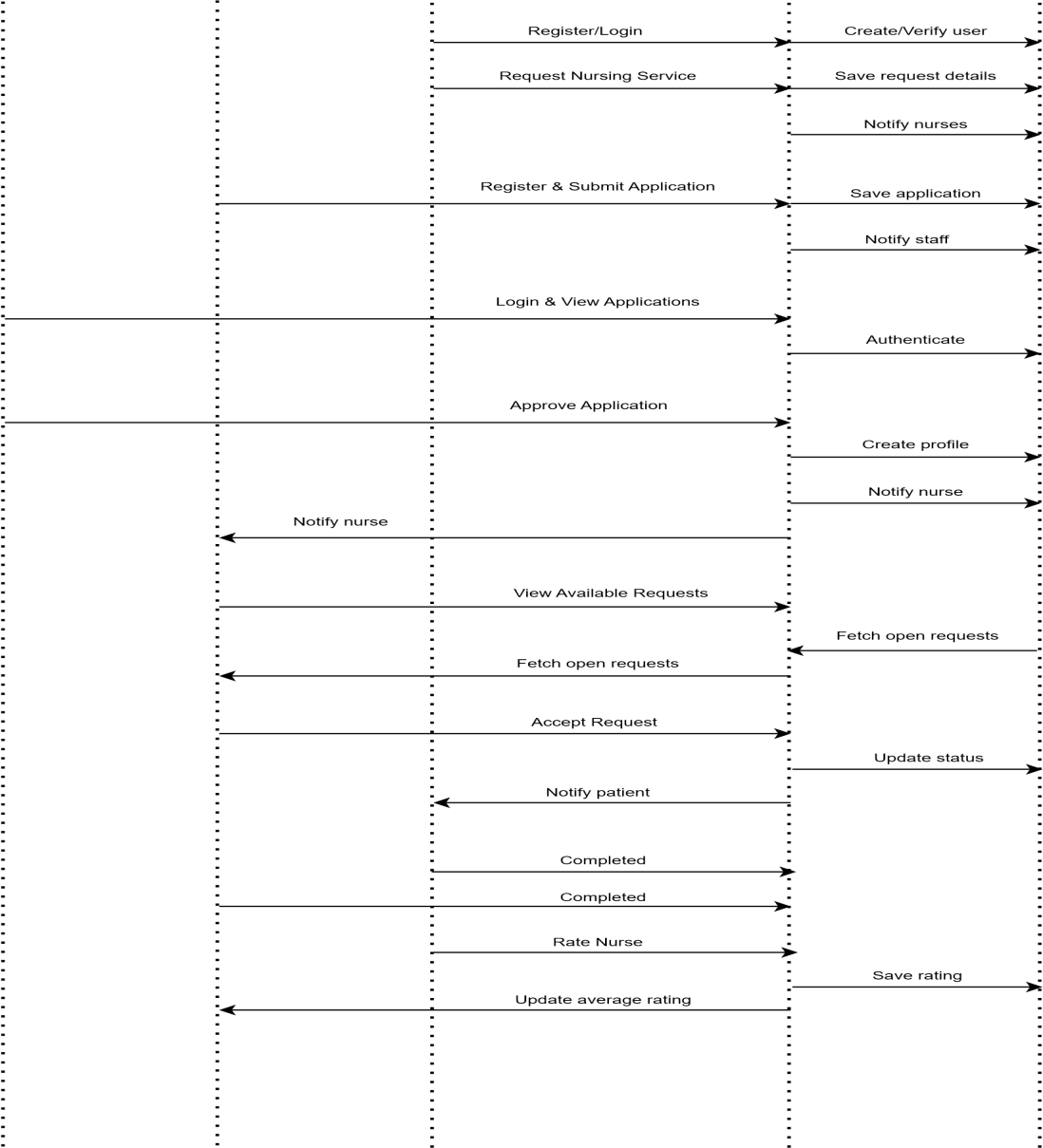


Sign

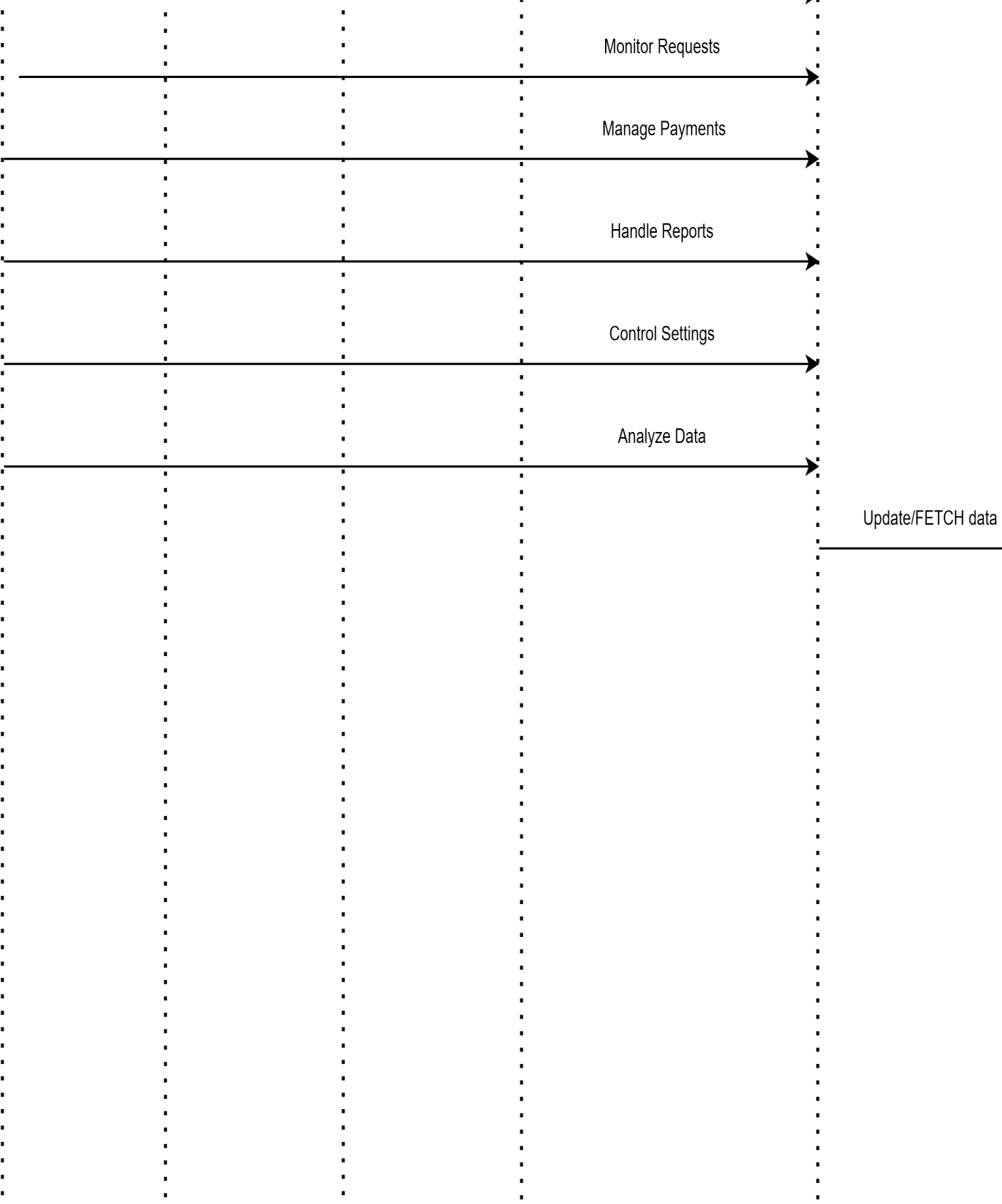
# 8. Sequence Diagram:

• A **Sequence Diagram** is a visual chart that shows how different parts of a system interact with each other over time, step by step, to complete a task.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Admin |  | Staff |  | Nurse |  | Patient |  | System |  | Data Base |



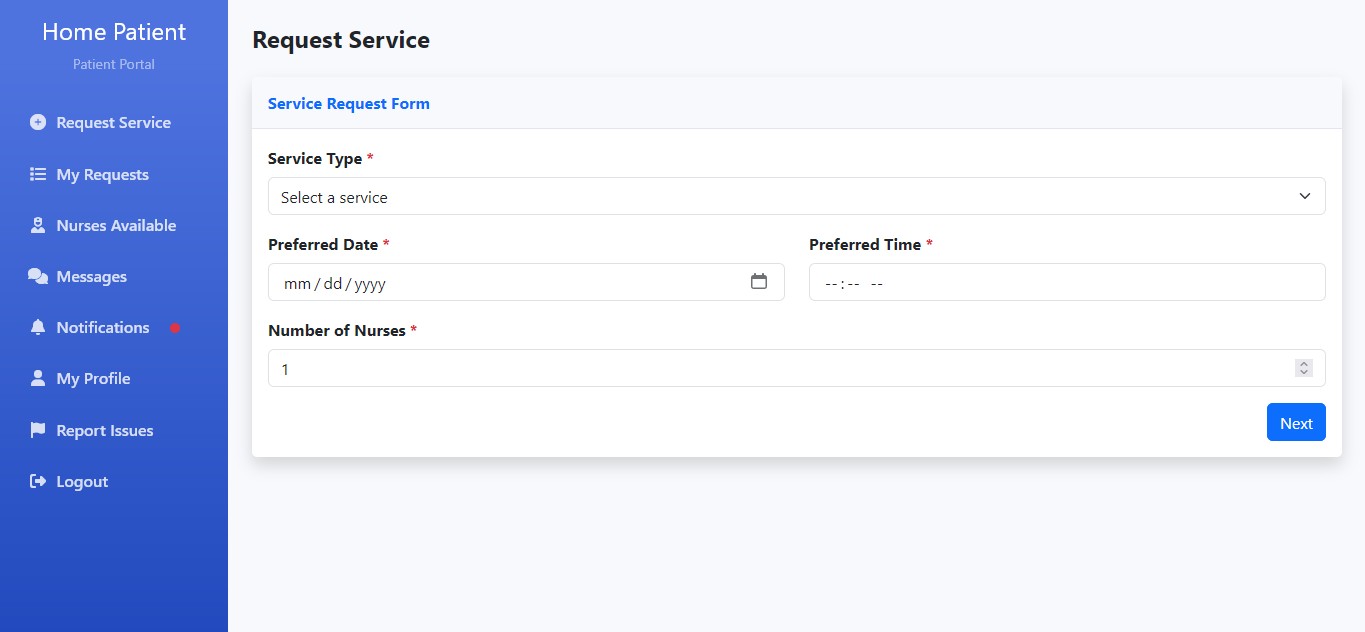
|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Admin |  | Staff |  | Nurse |  | Patient |  | System |  | Data Base |



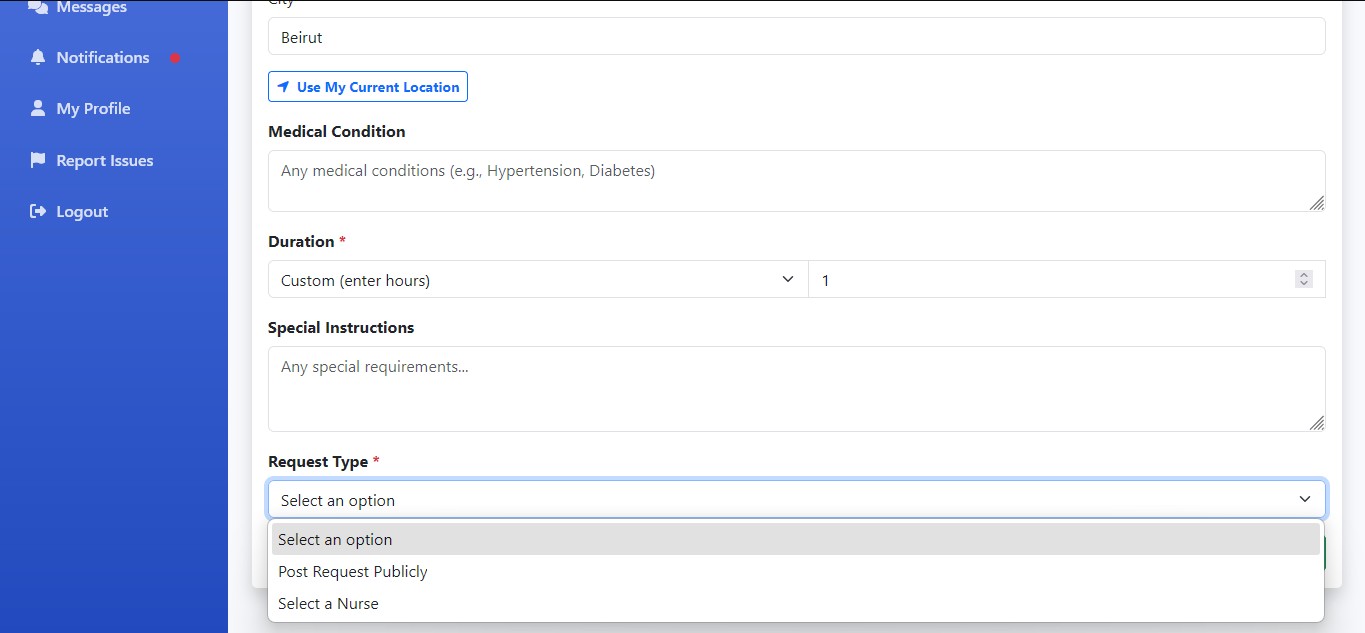
# 9. Website Demo:

**Patient:**

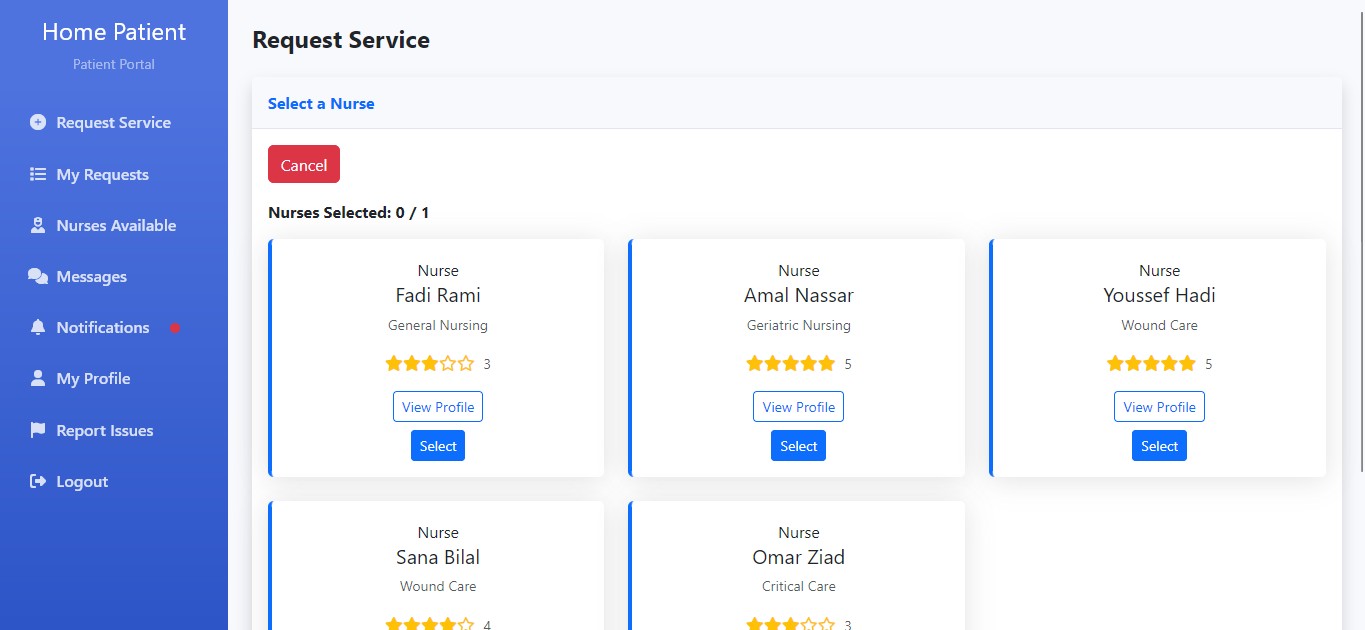
### Request a service

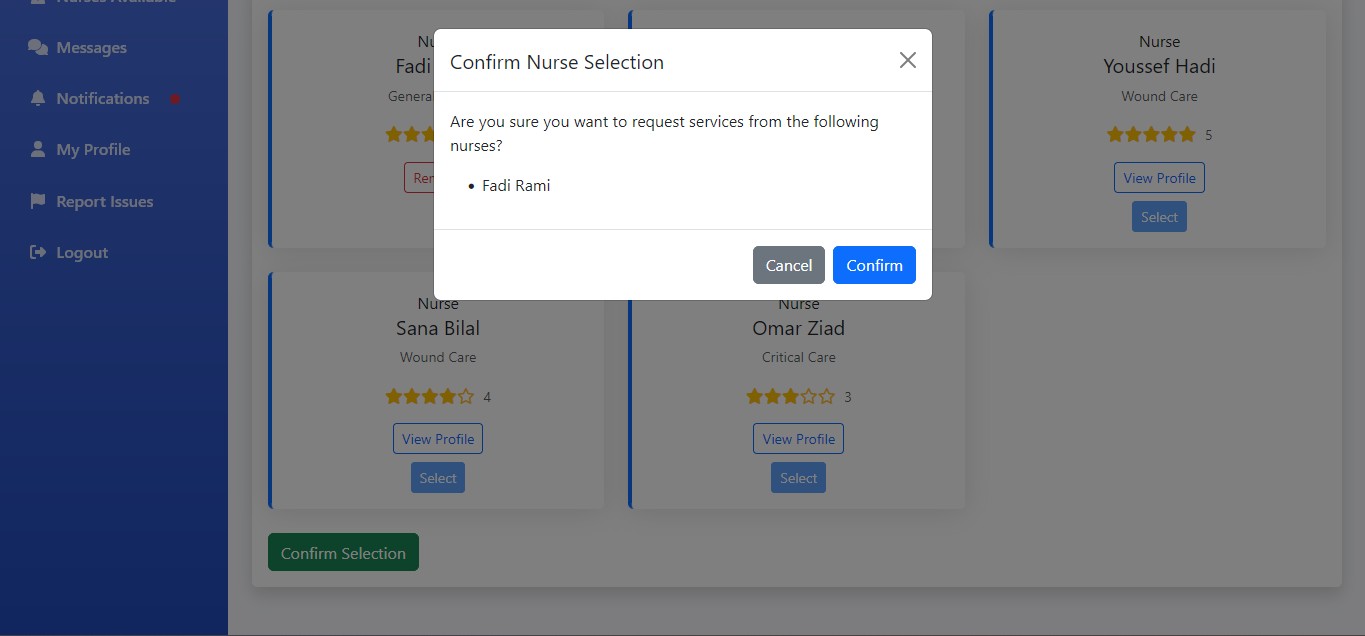


### Choose if he needs to select a nurse or post the request

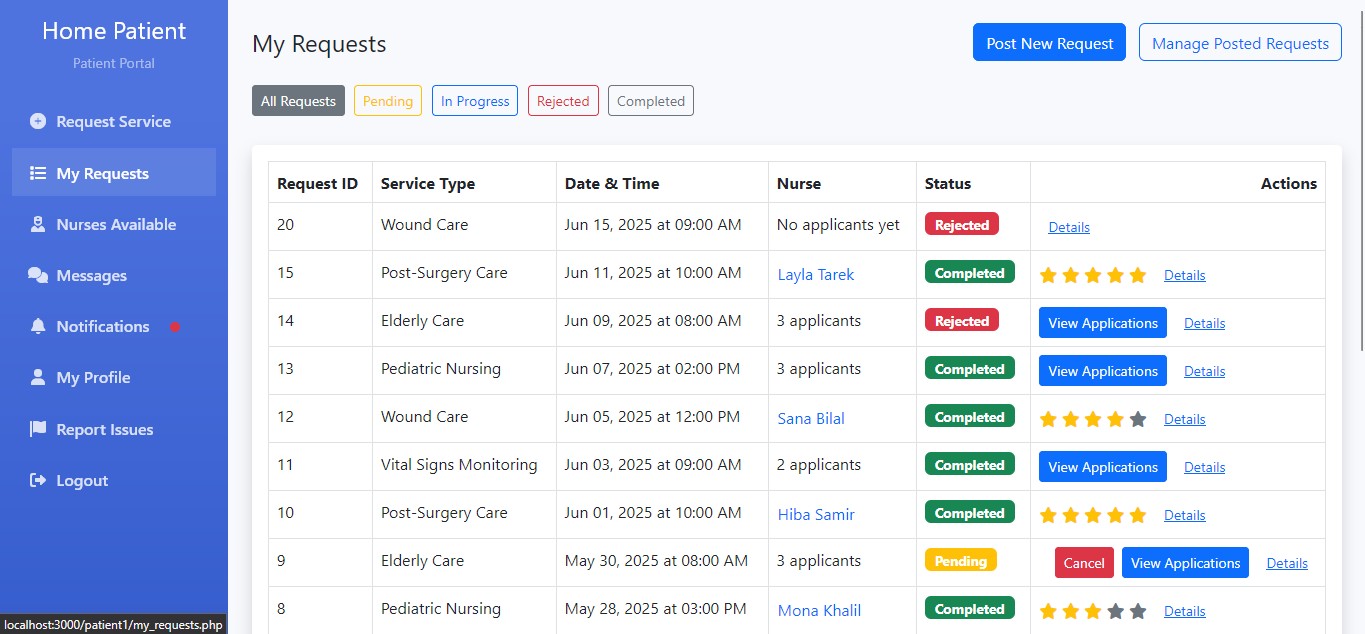


### Select the nurse

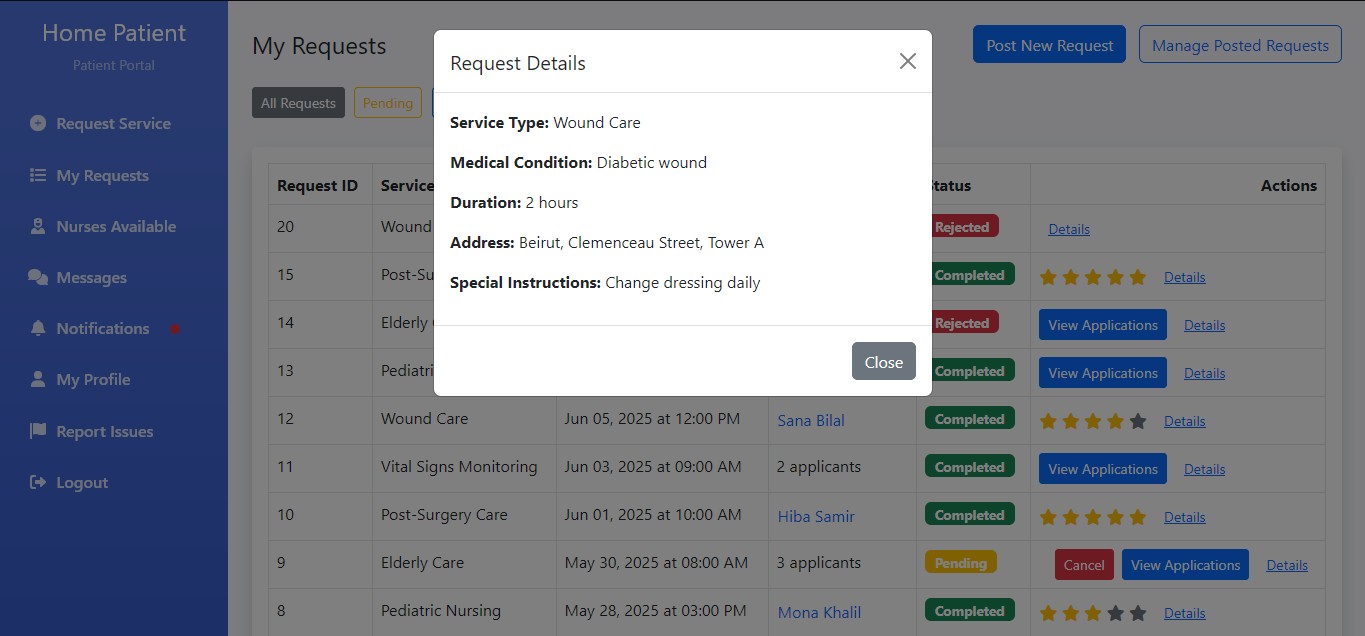




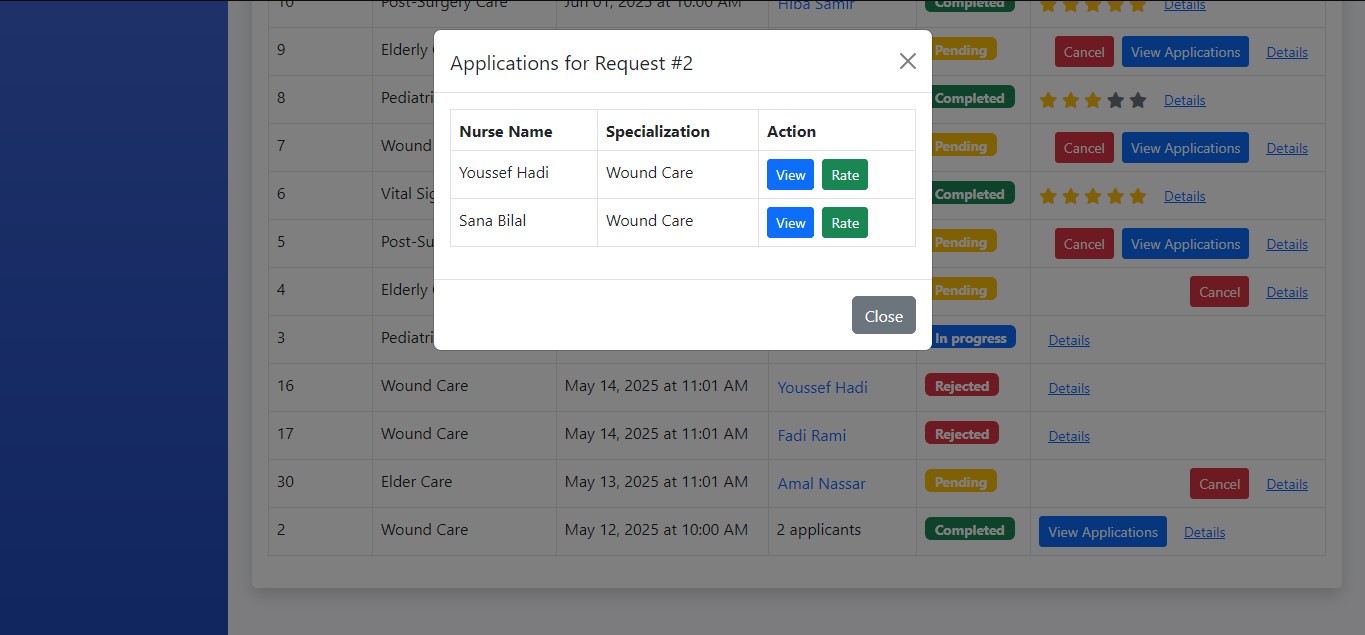
### View All requests



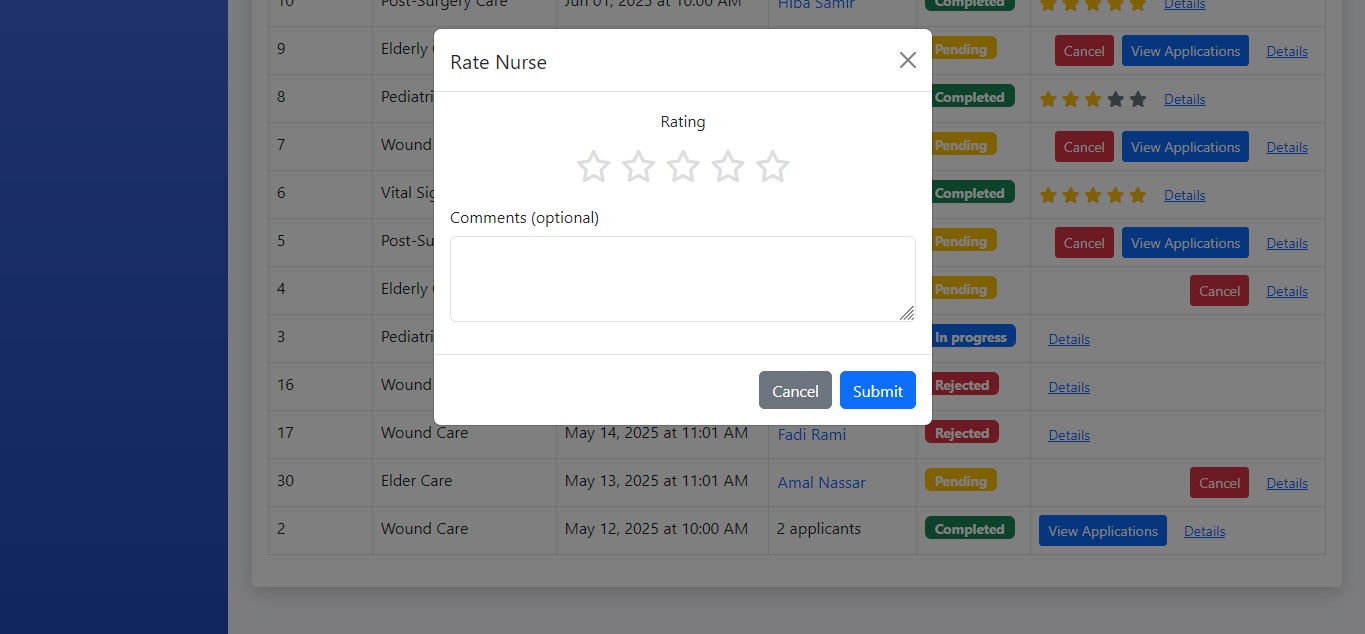
### Details of request



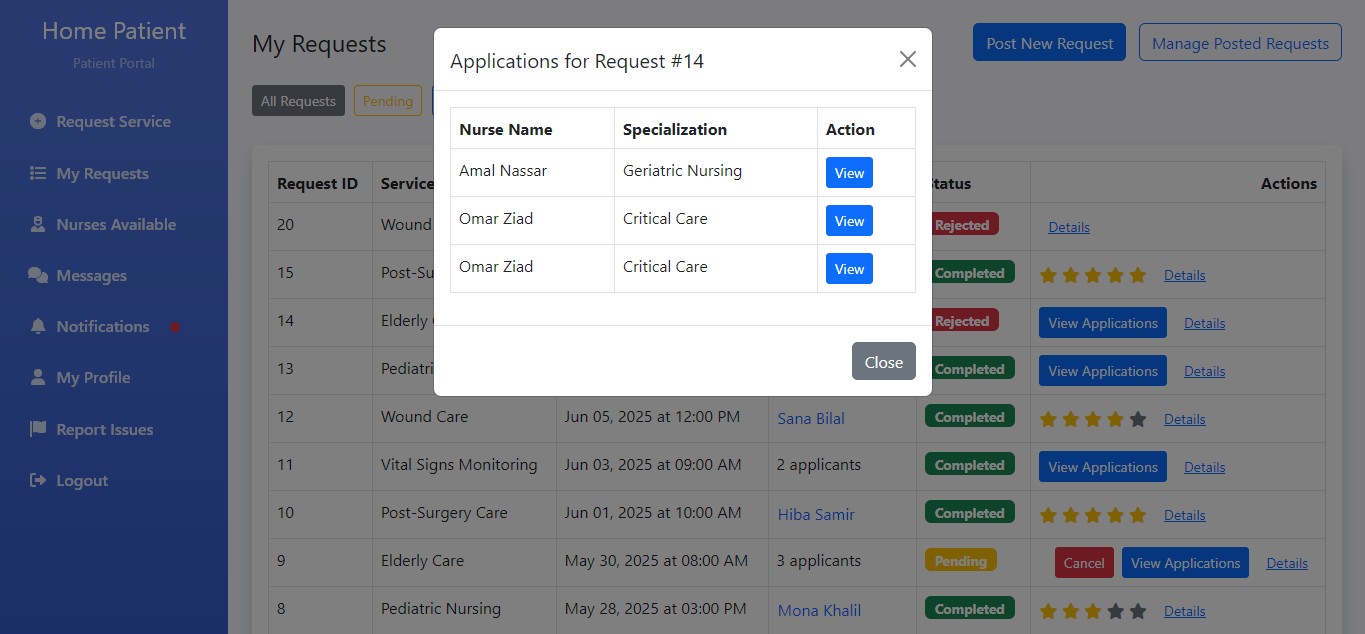
### Request for the post requests



### Rate the nurse

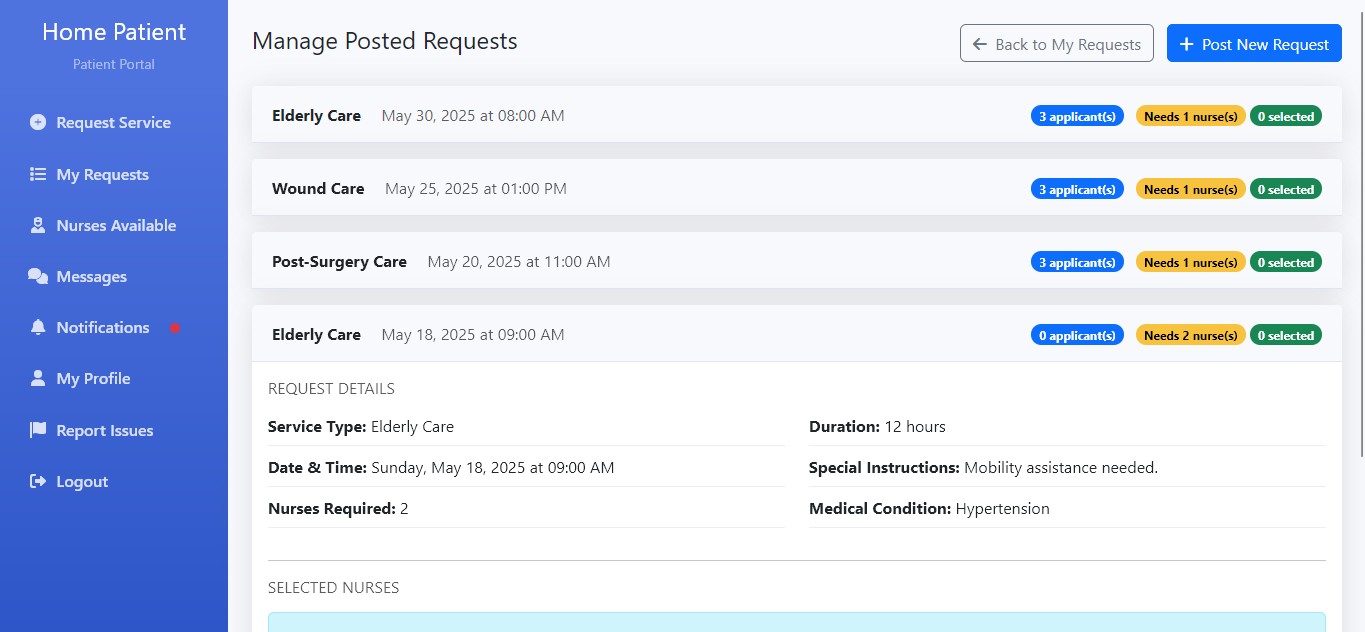


### View nurse profile





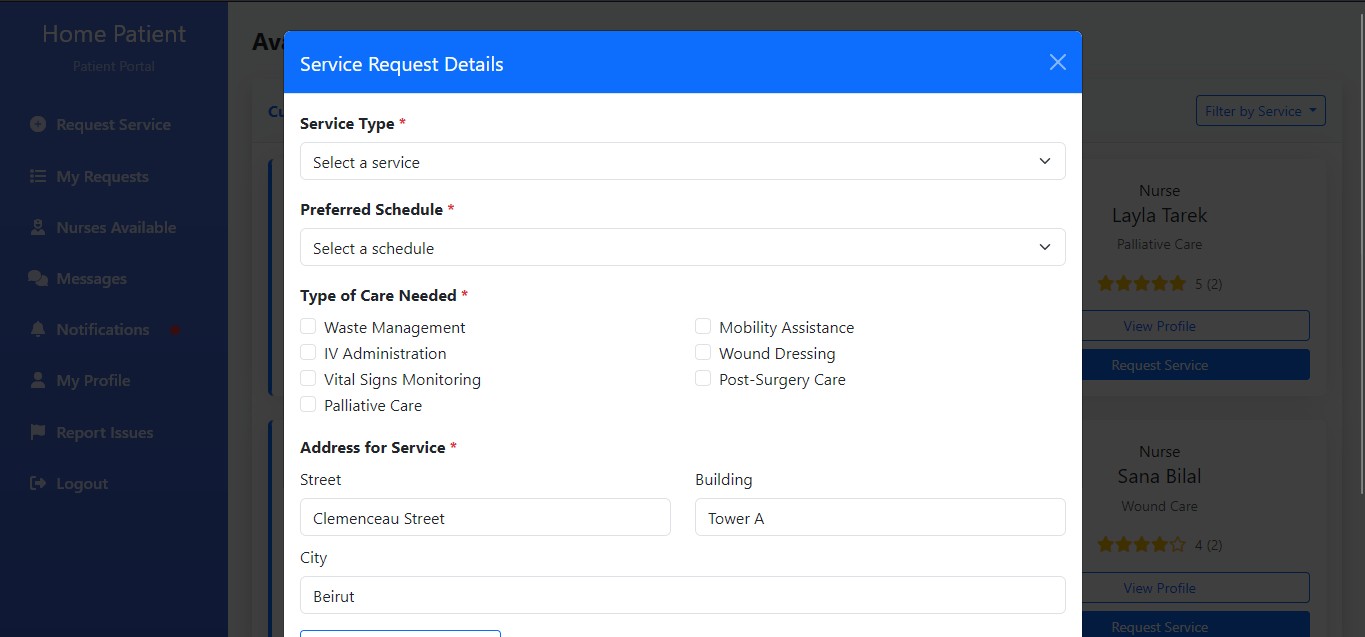
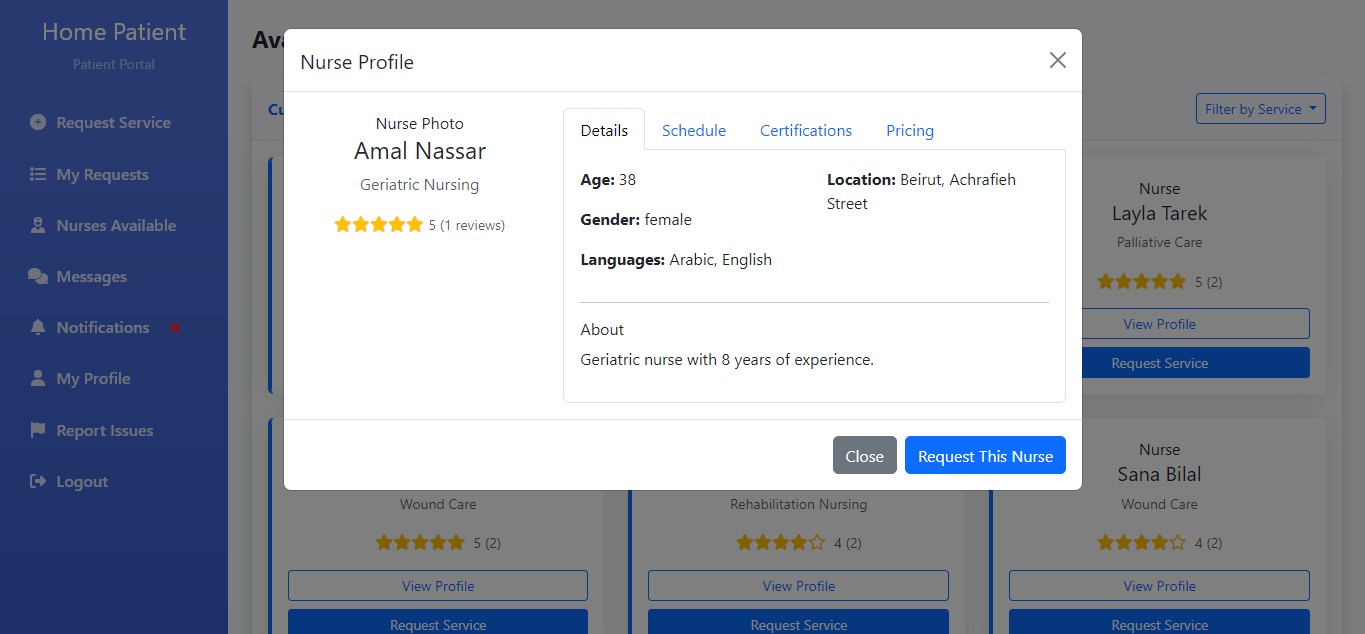
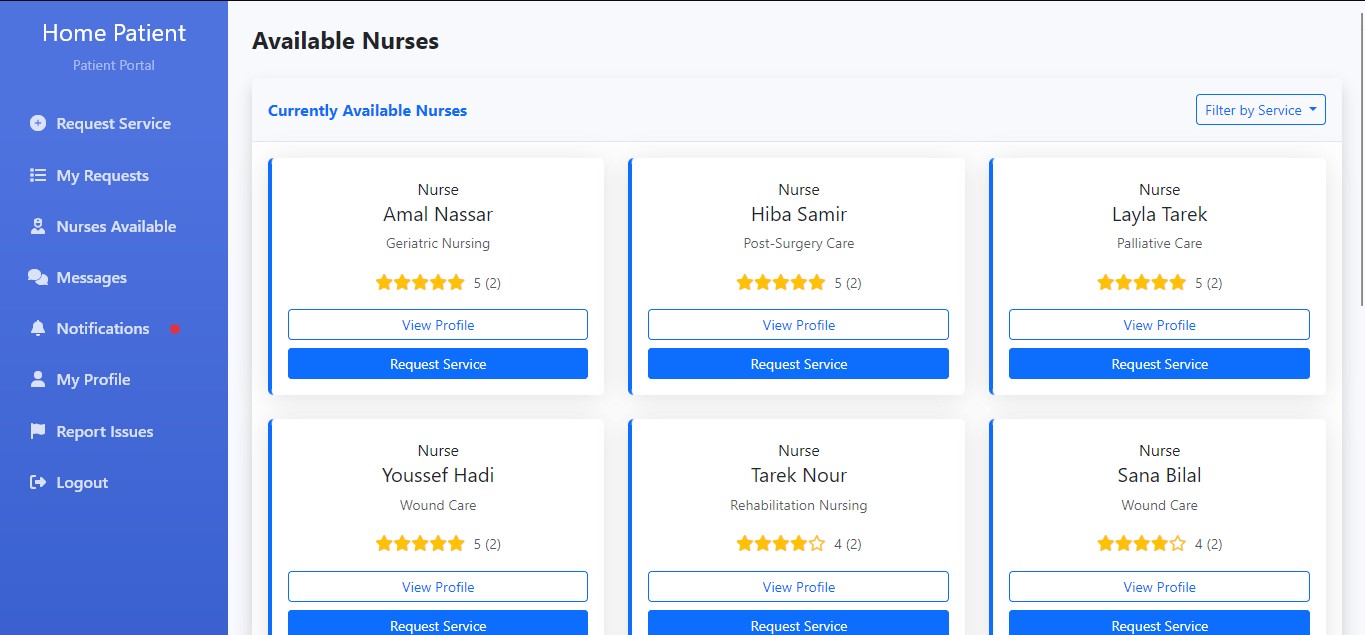
### Follow up on published requests



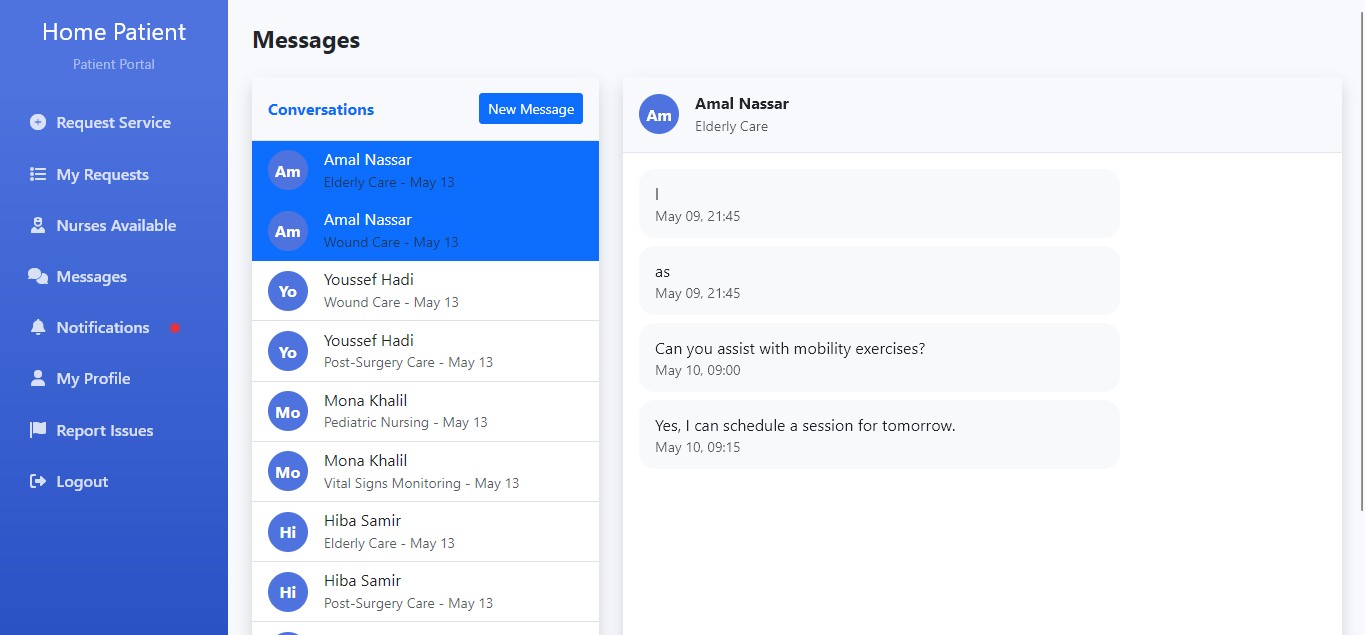
### Select the nurse needed and confirm



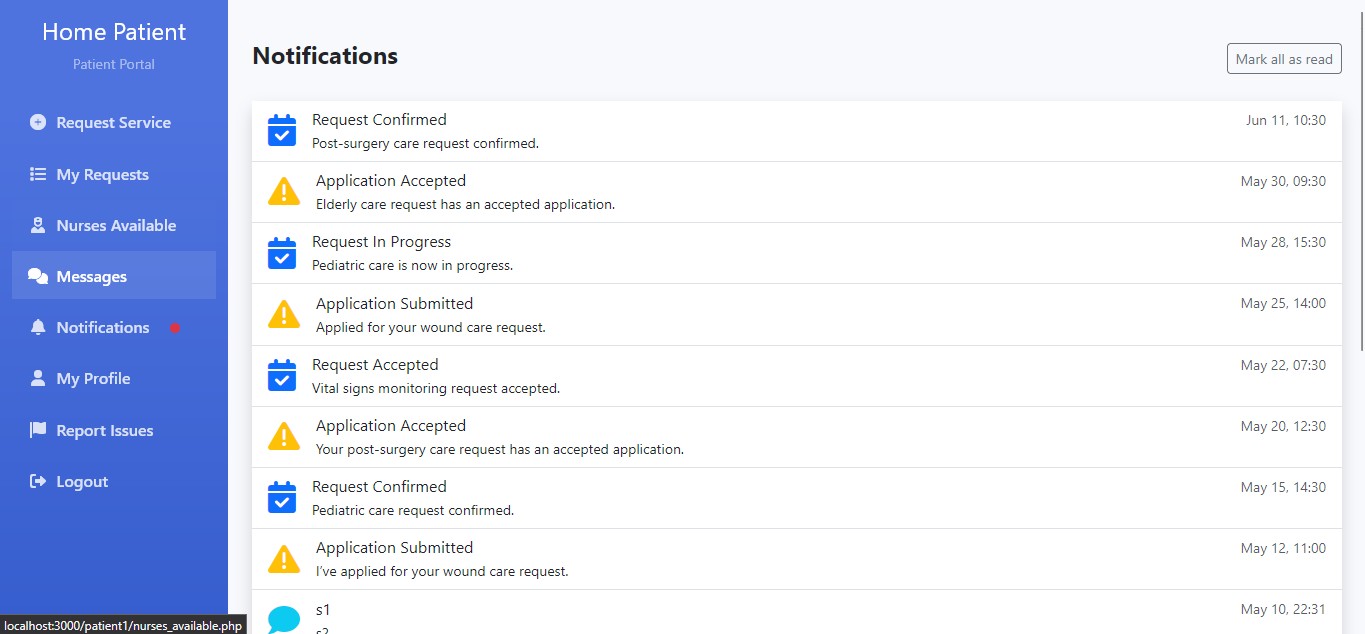
### View and requests the nurses available



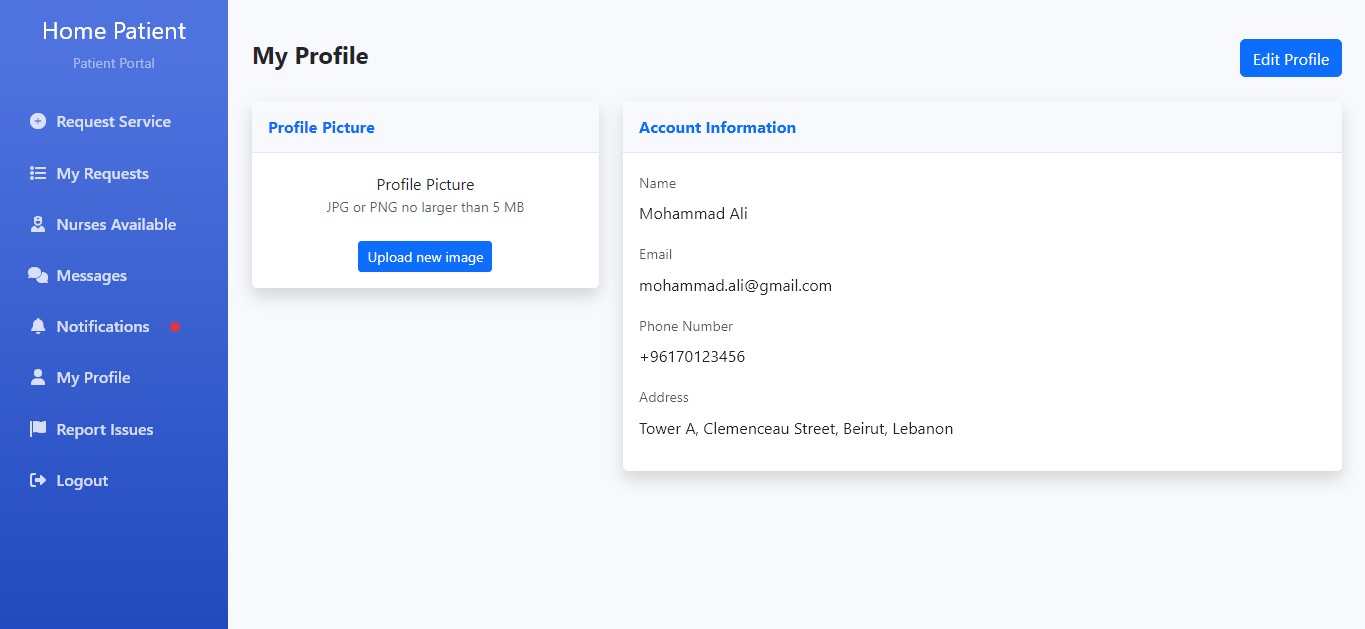
### Communicate with nurses to follow up on the required service

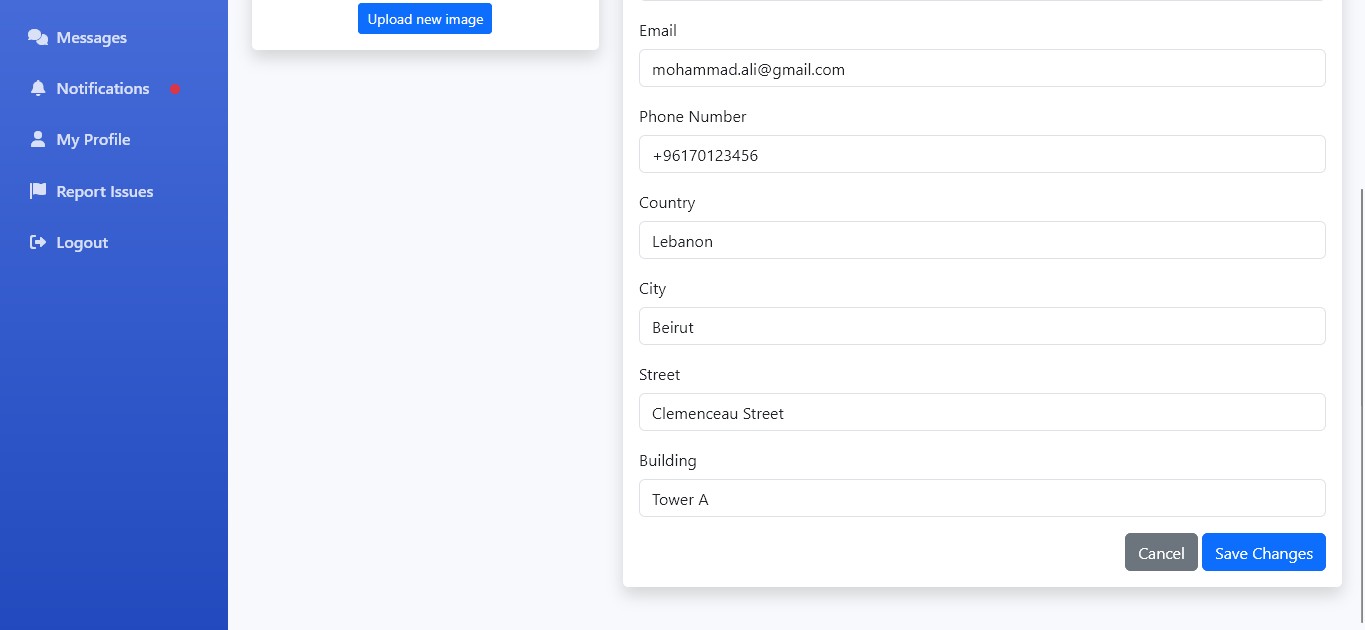


### Readings of the messages from the admin and staff

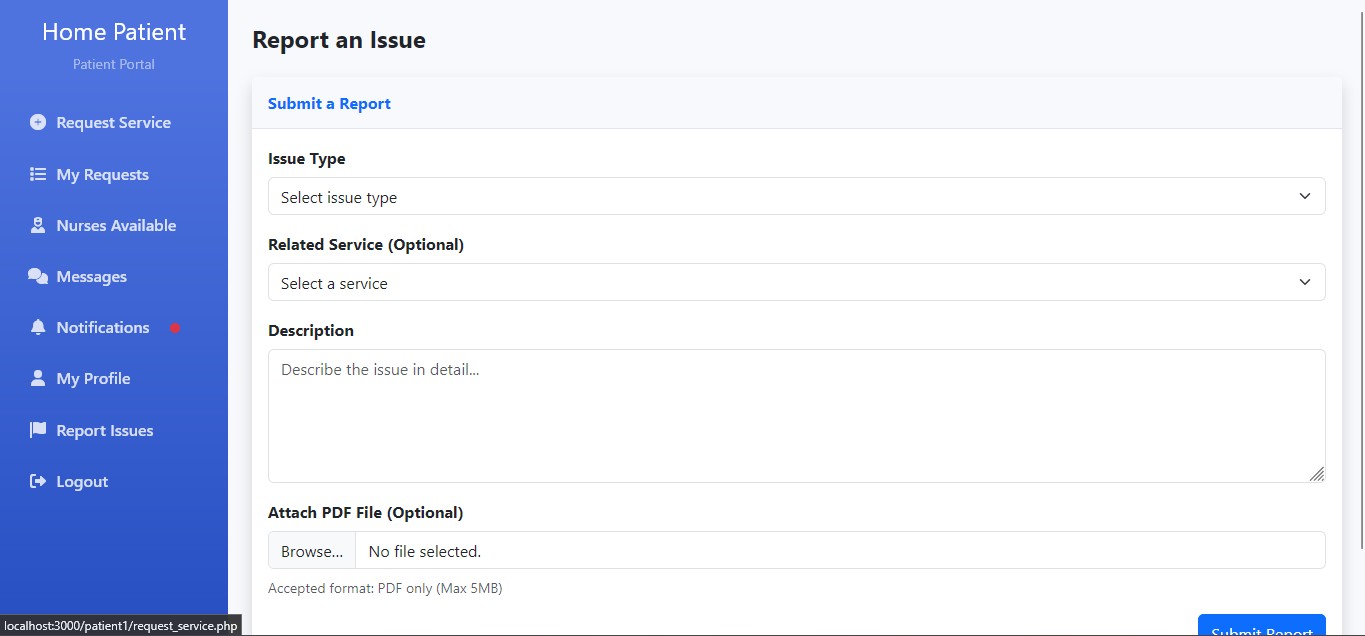


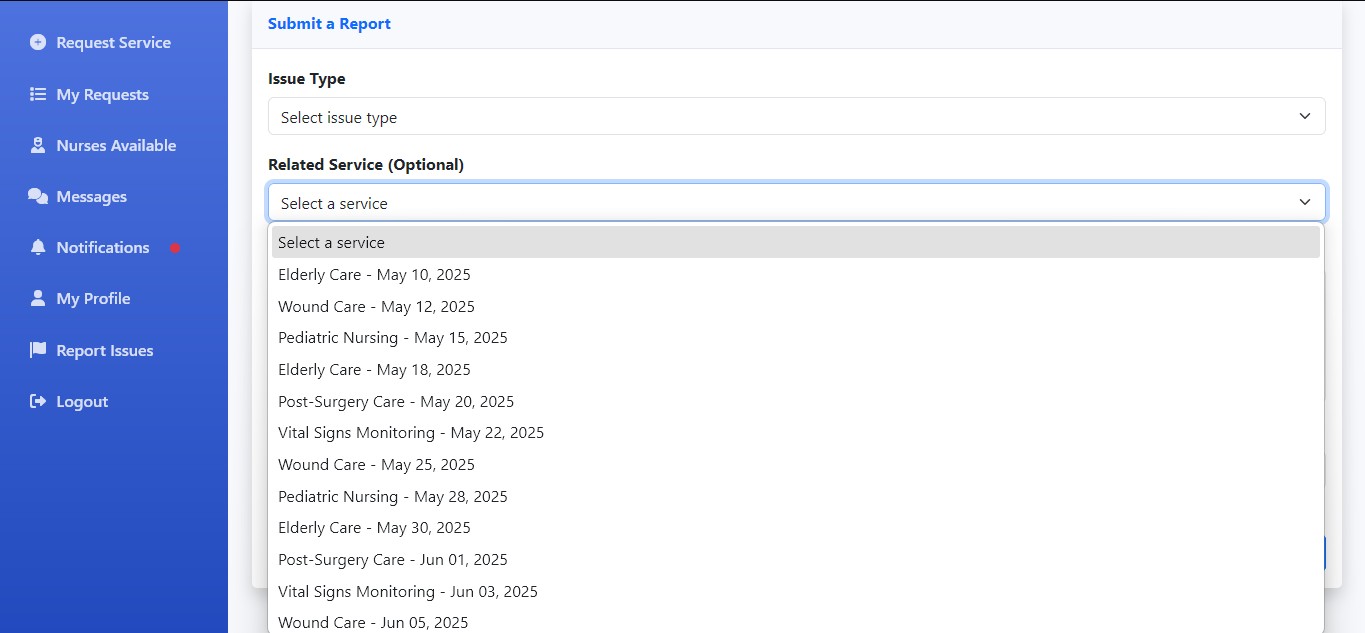
### View and edit the Profile of patient





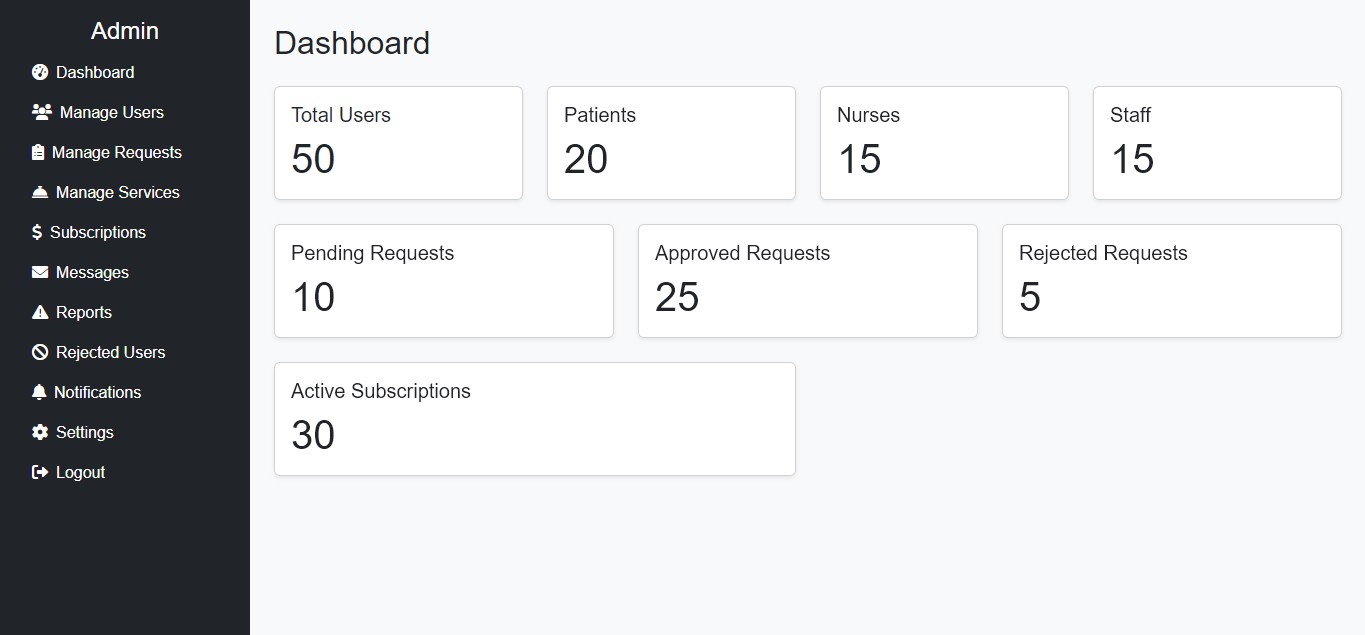
### Make a report



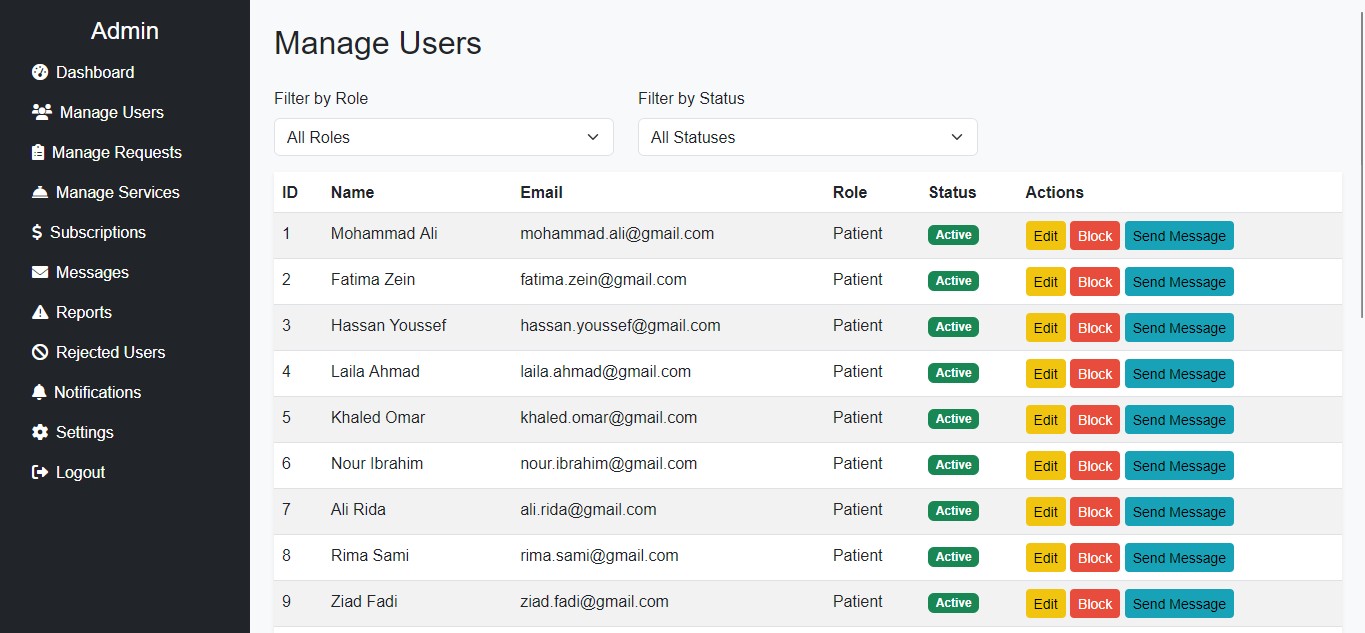


**Admin:**

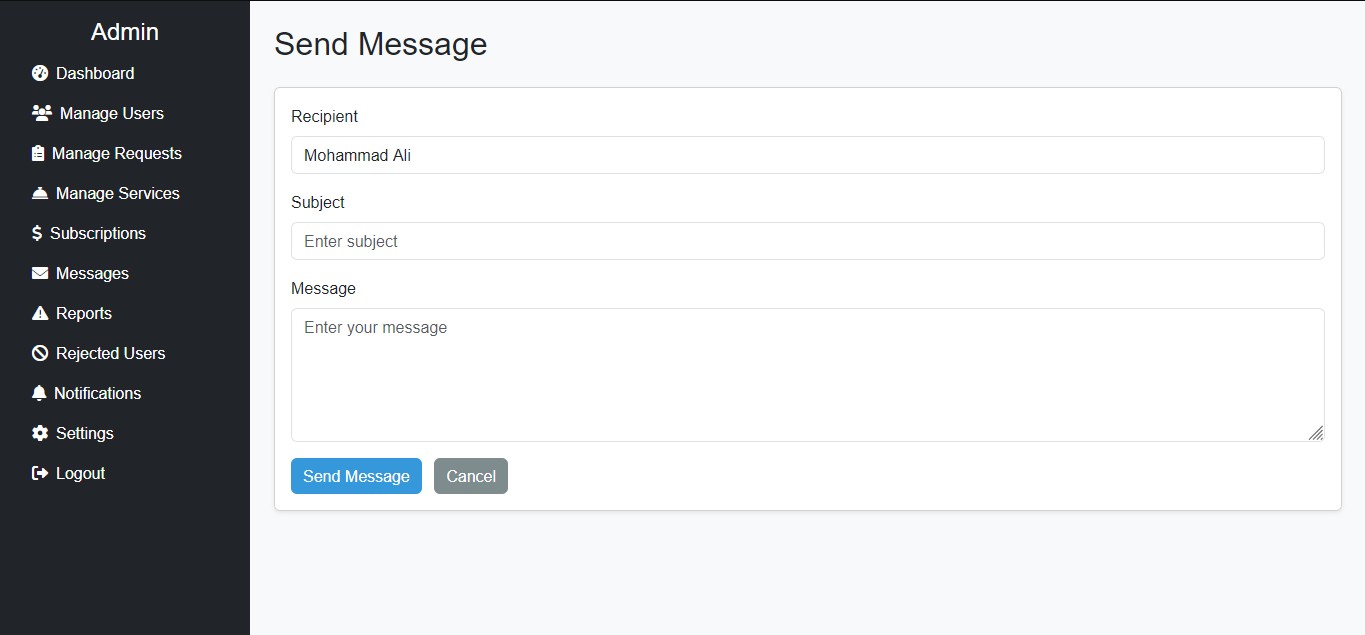
### View Dashboard



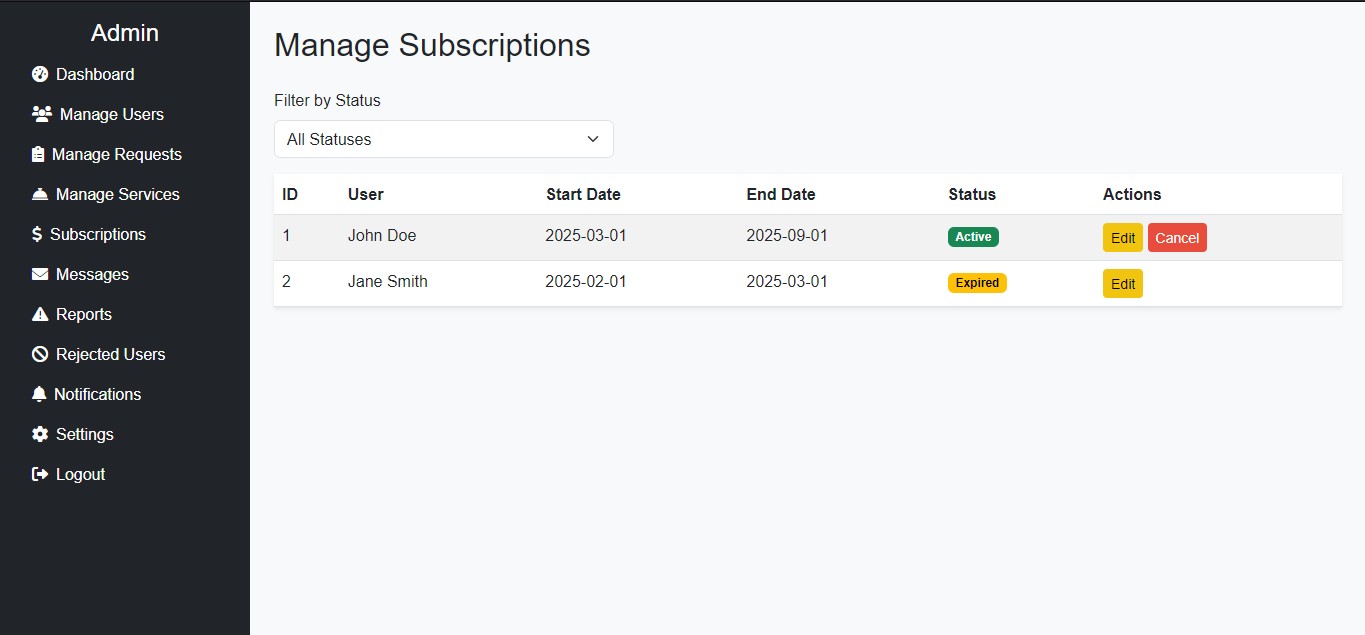
### Manage users (block - send message)



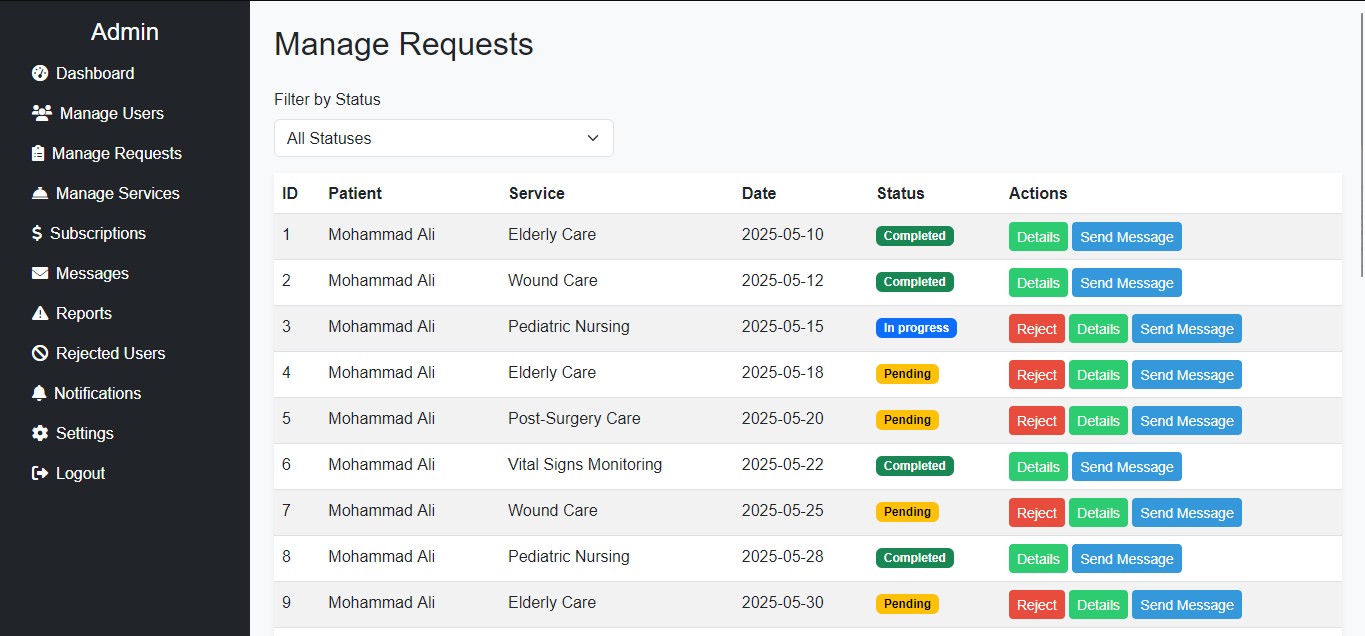
### Send message



### Manage Subscriptions

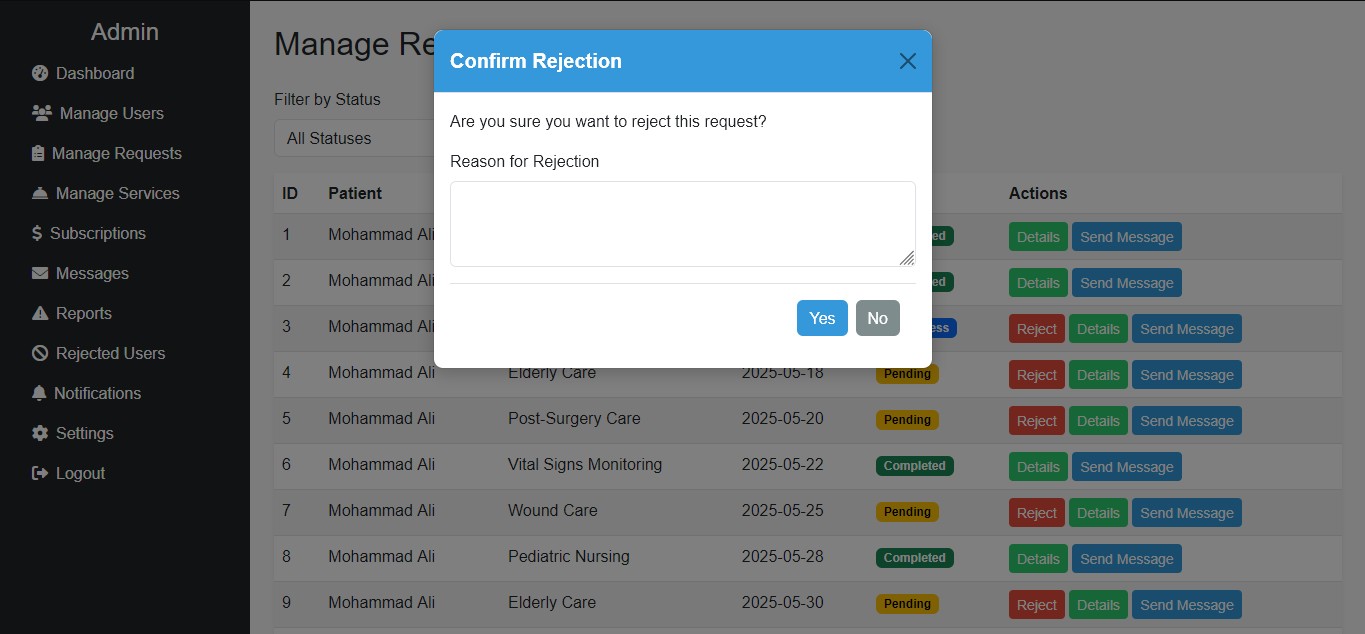


### Manage Requests

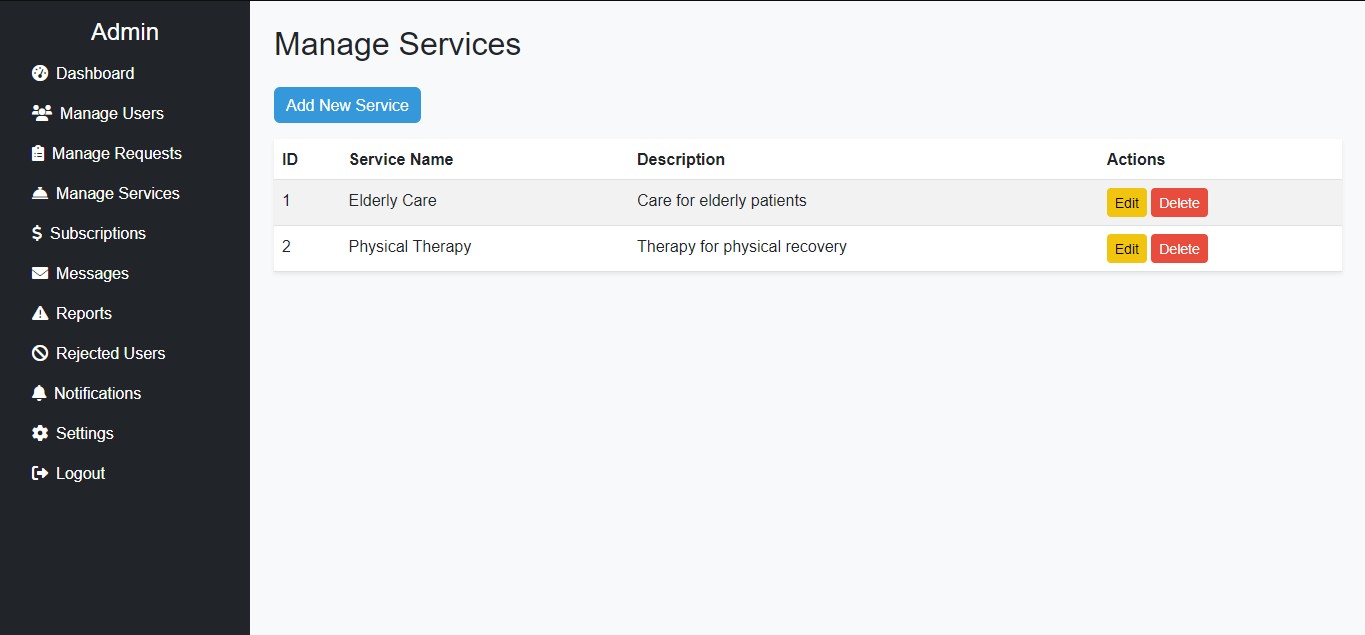




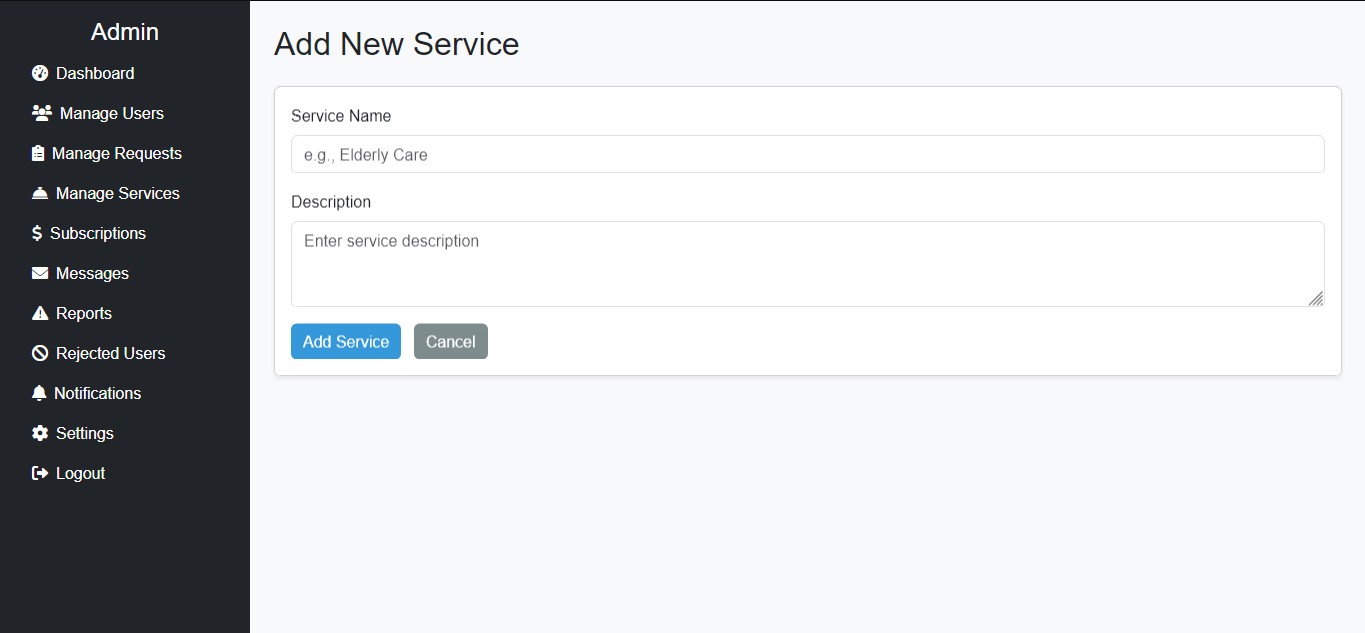
### Rejected the request

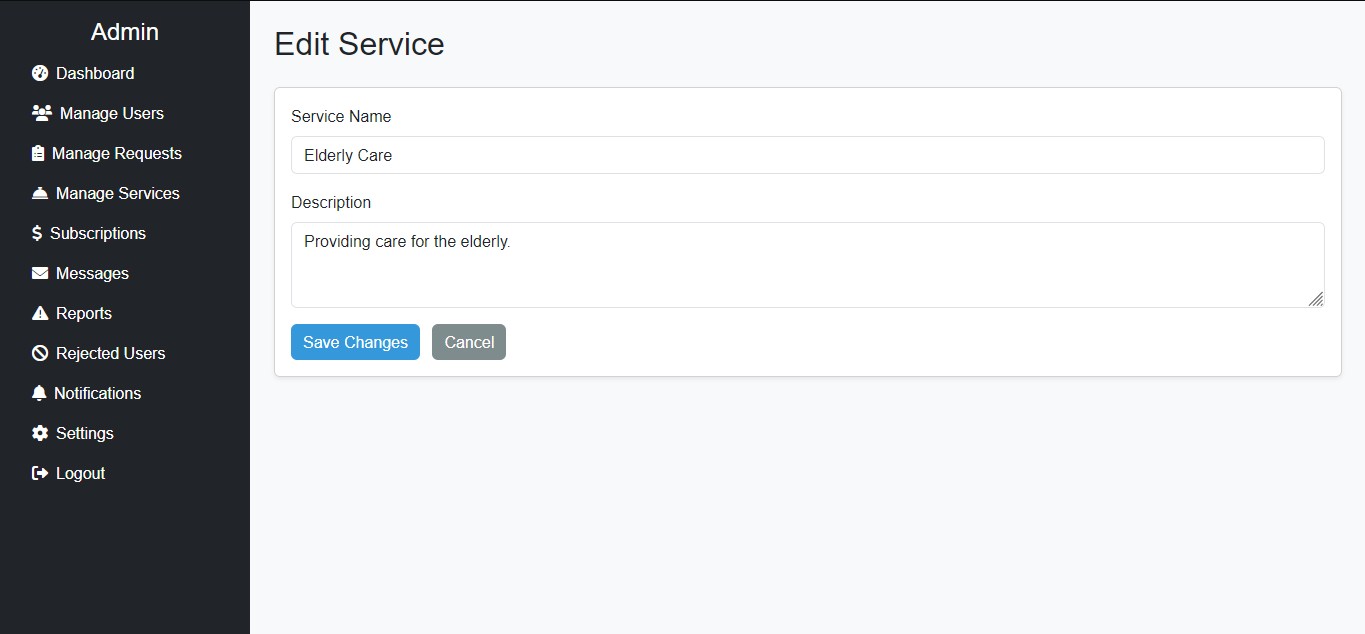


### Manage Services

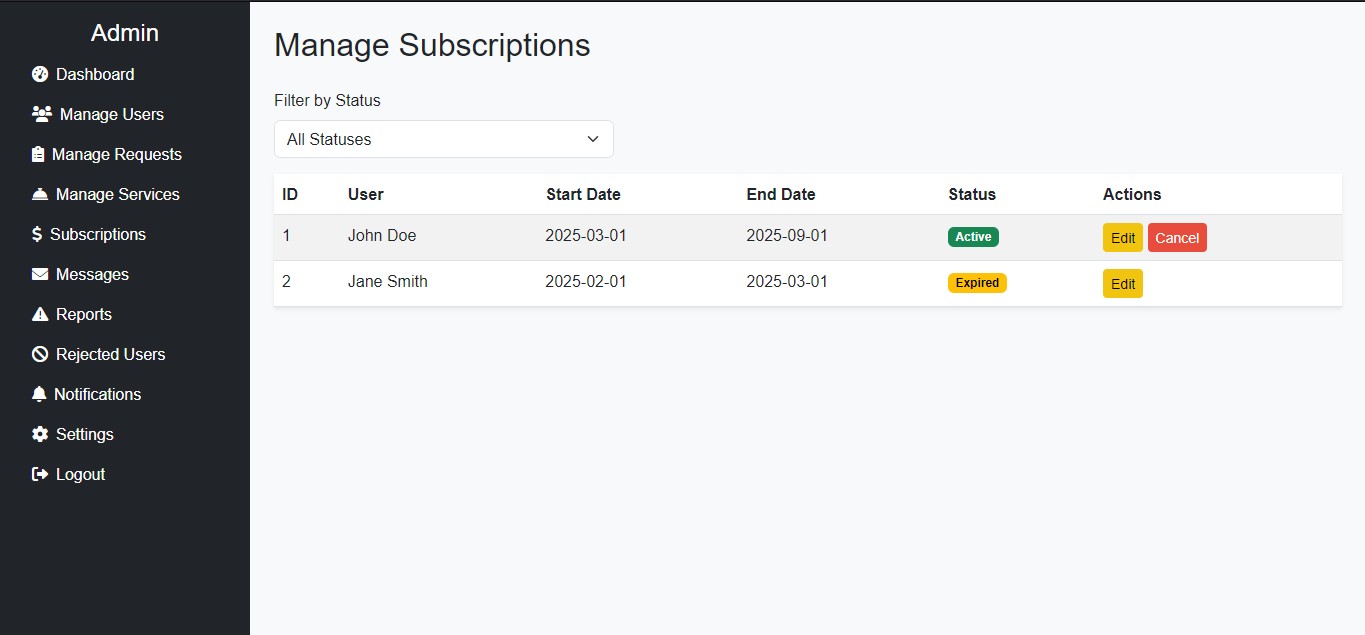


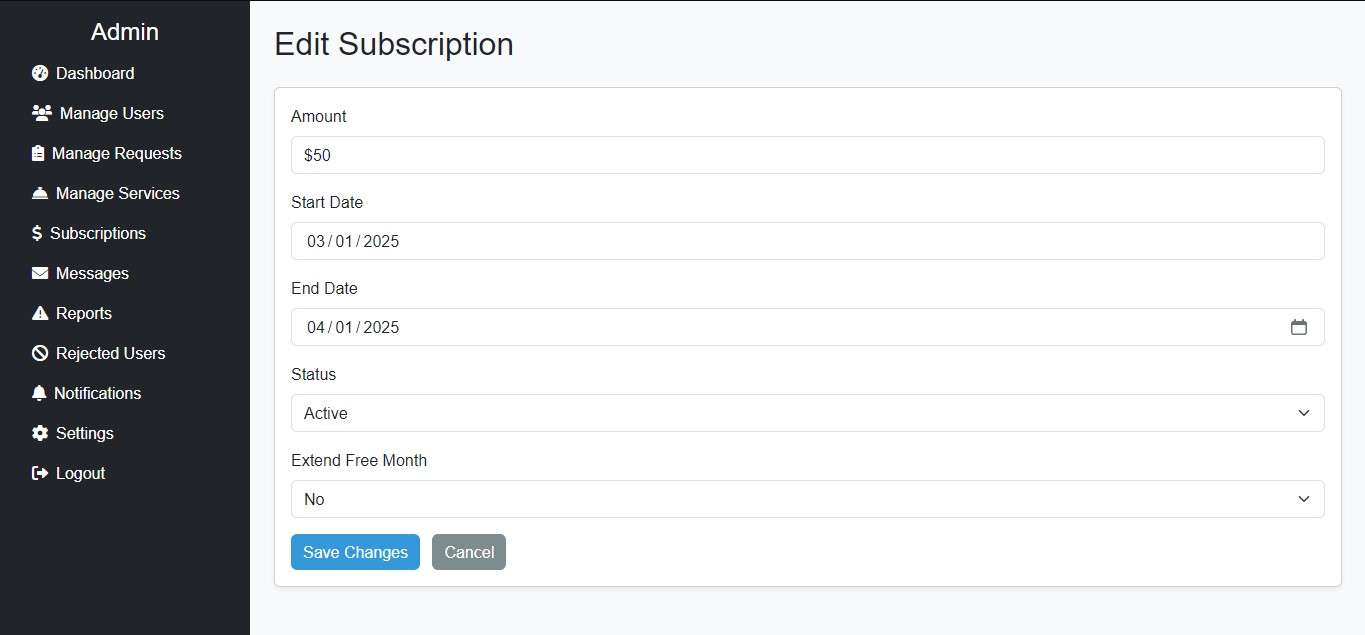
### Add/edit new service



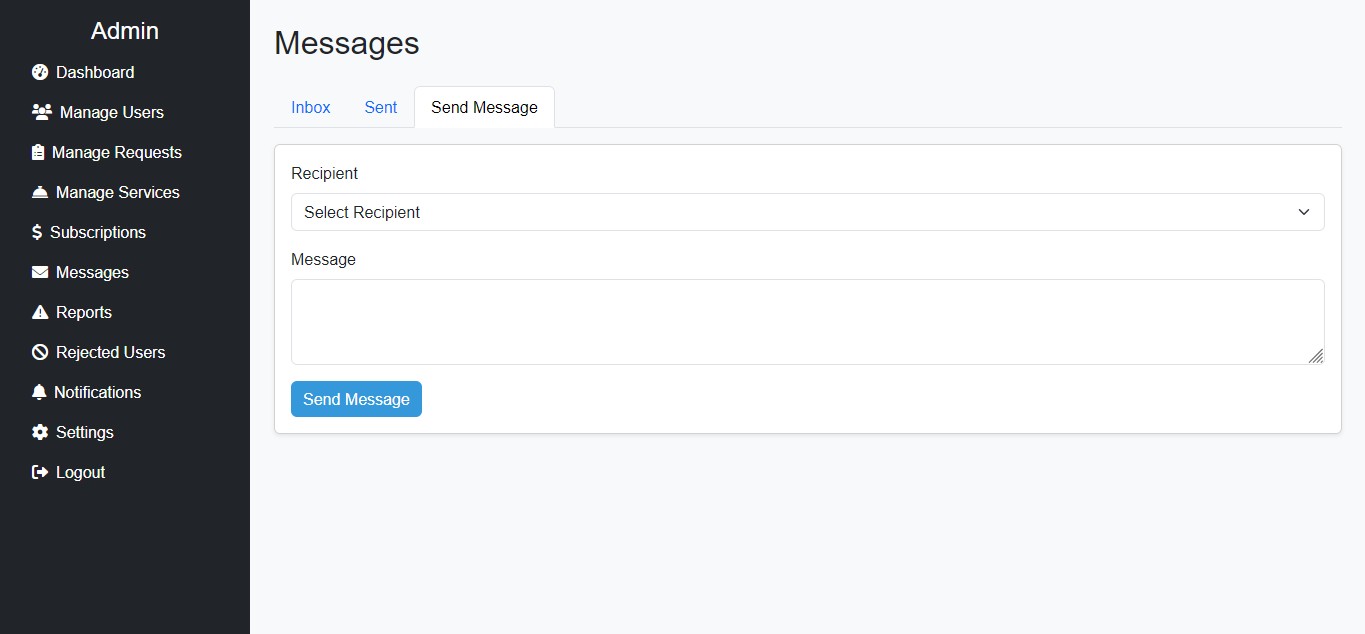


### Manage Subscriptions

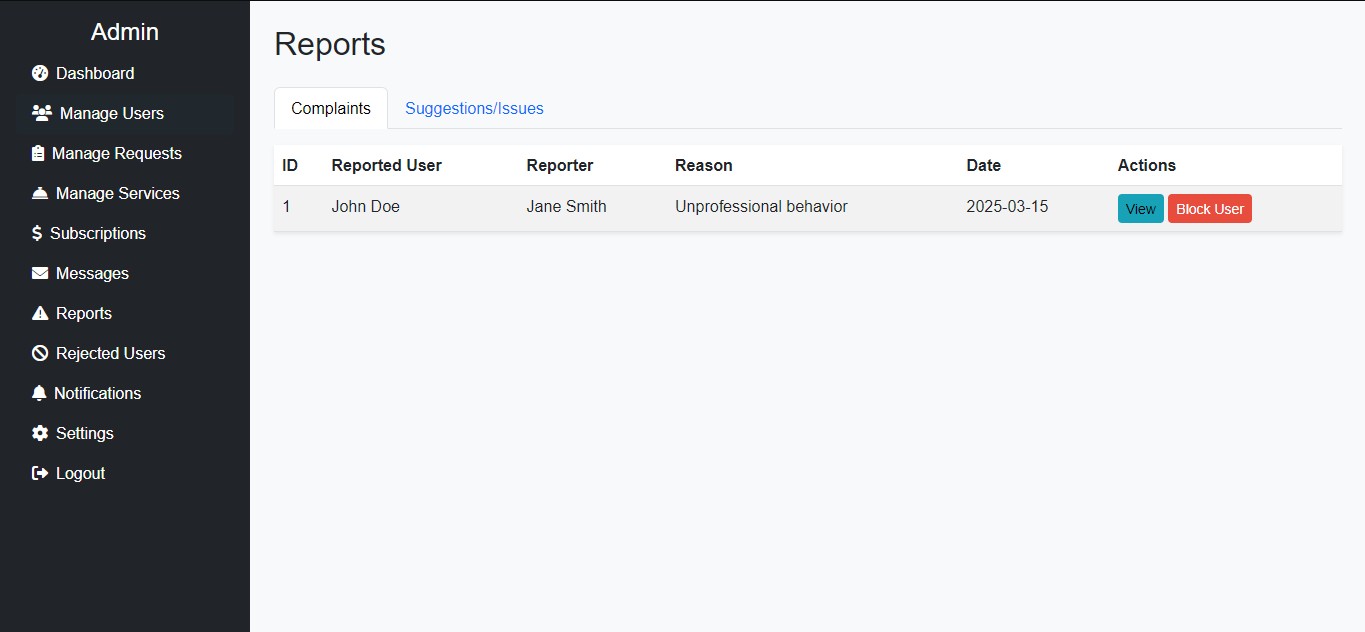




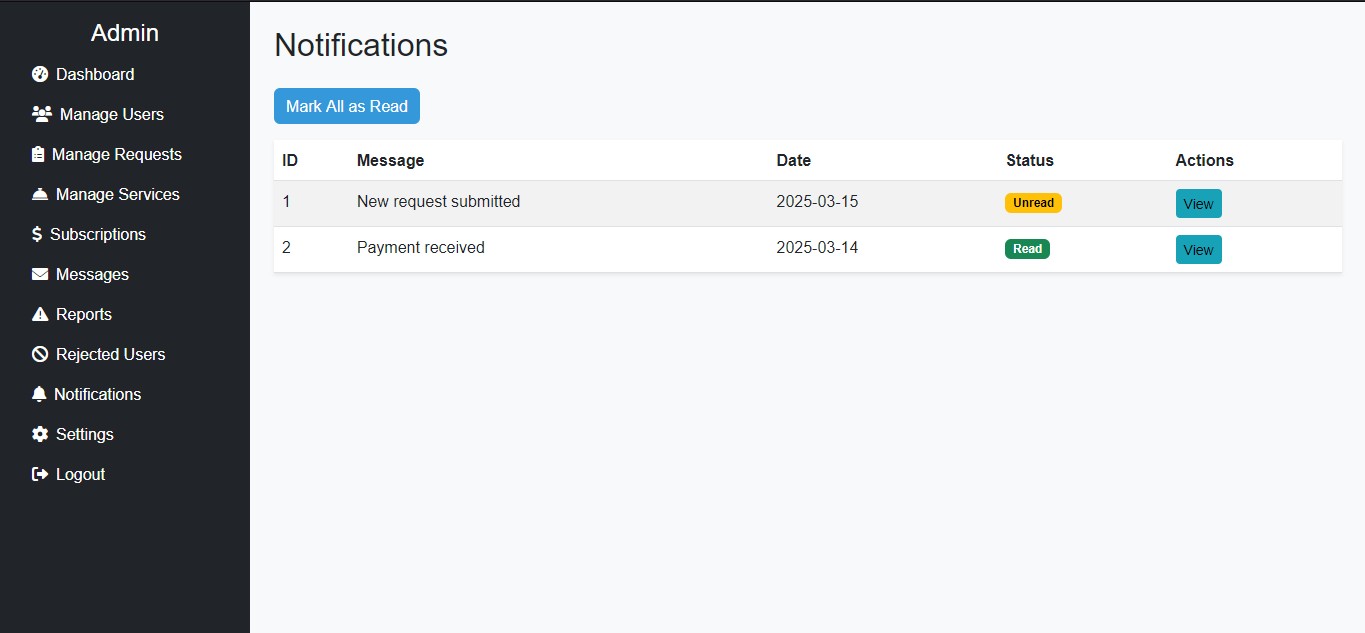
### Send Messages



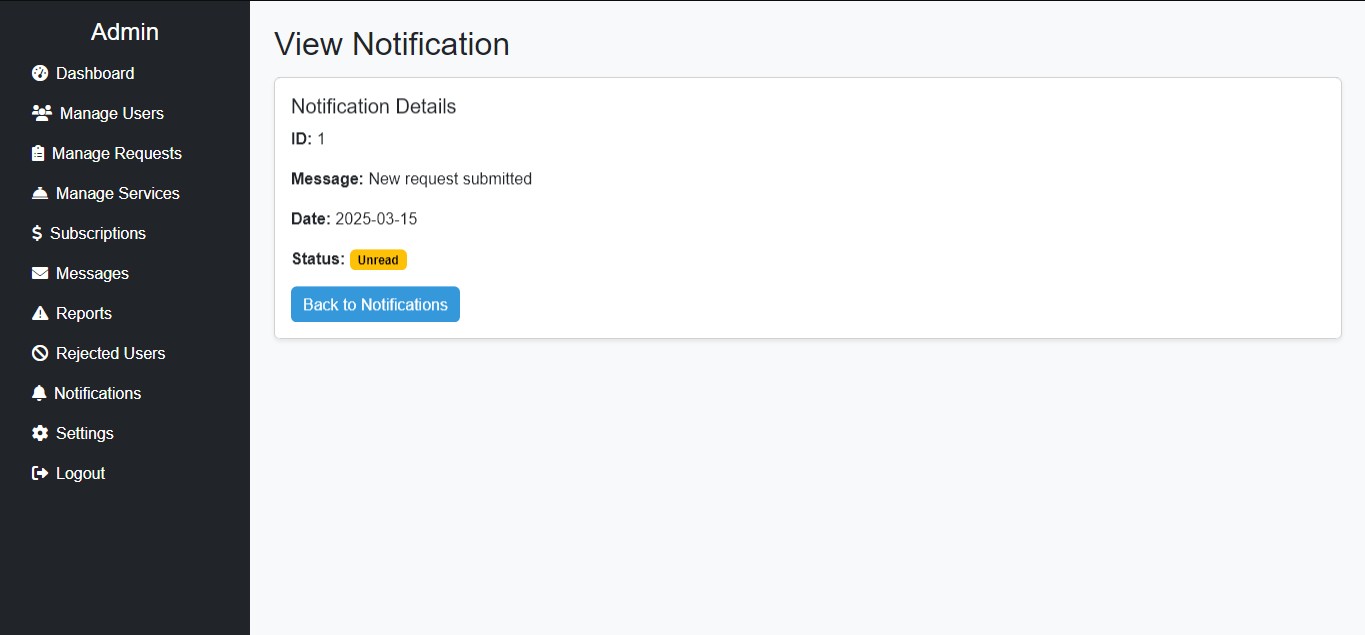
### View Reports



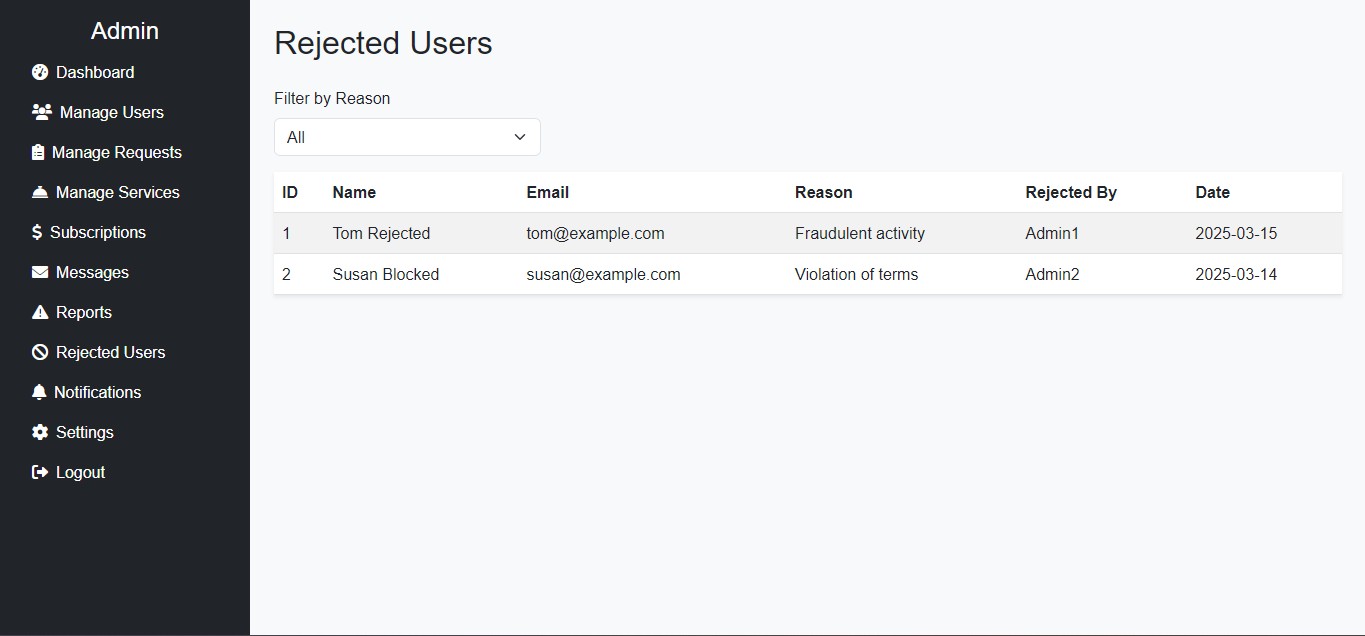
### Notifications



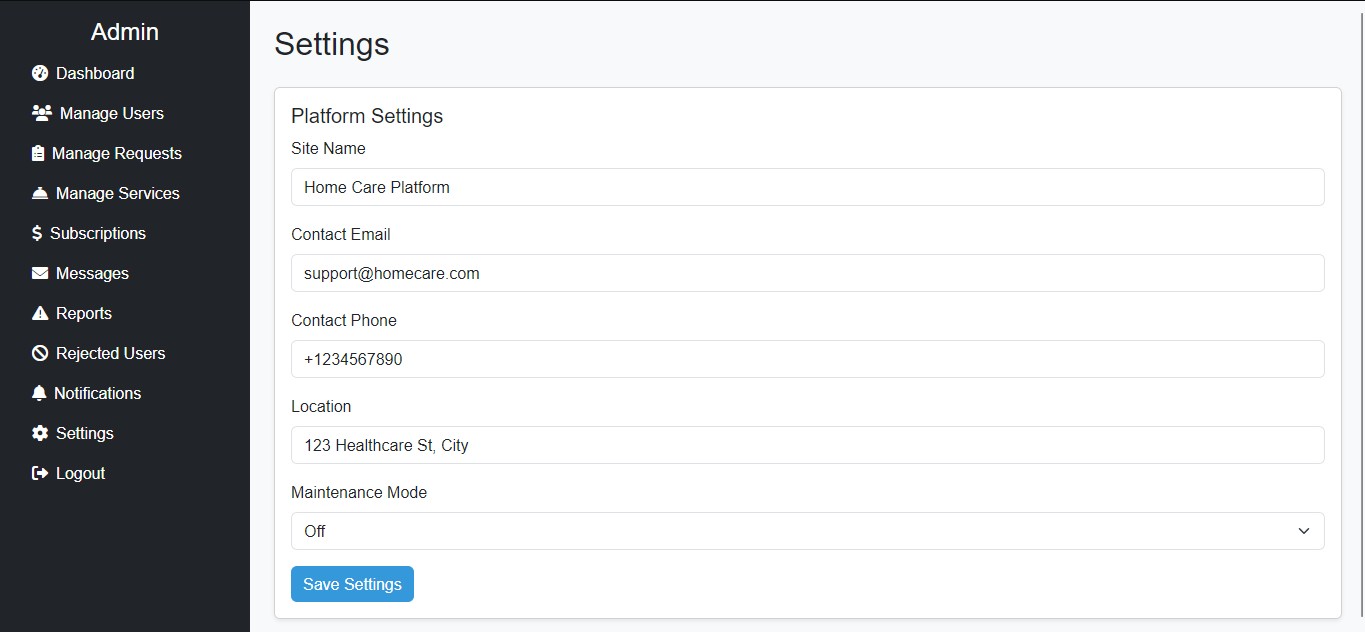
### View Notification



### View Rejected Users from nurses

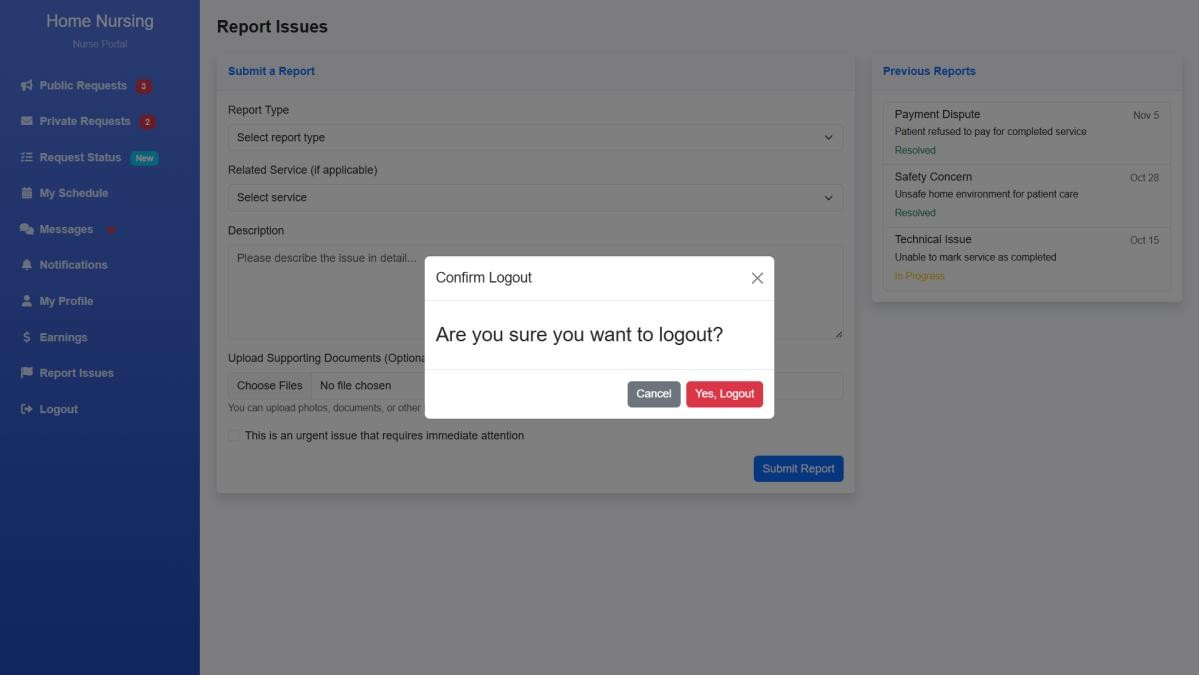


### Edit Settings

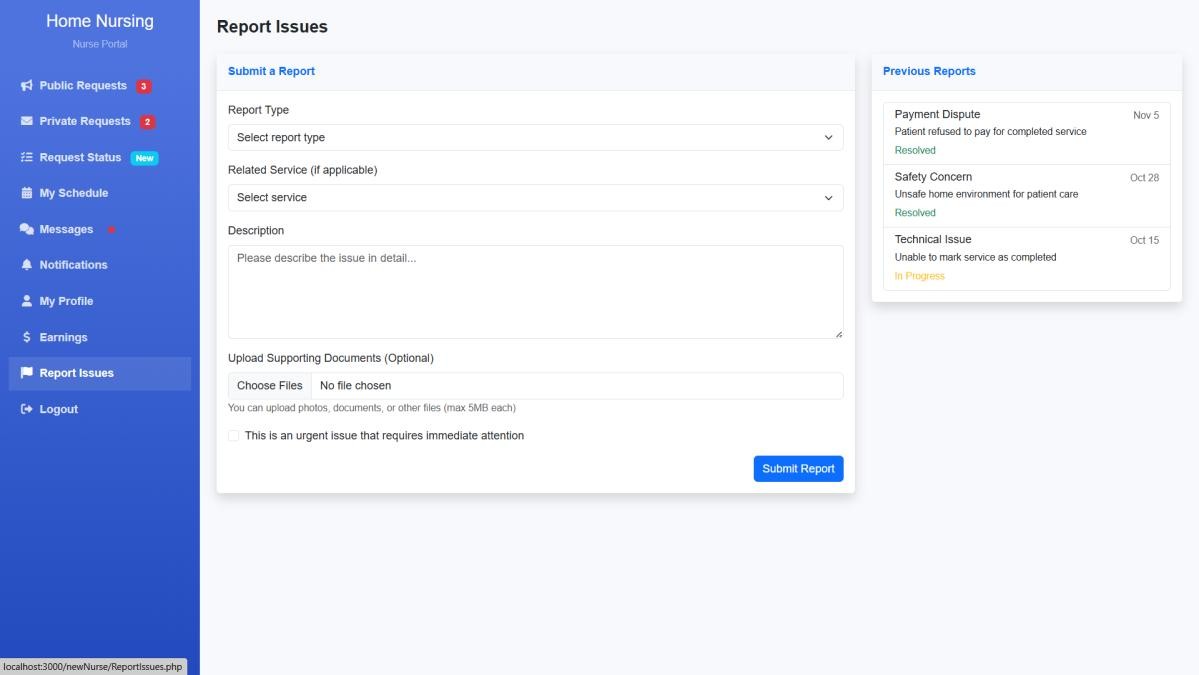


**Nurse:**

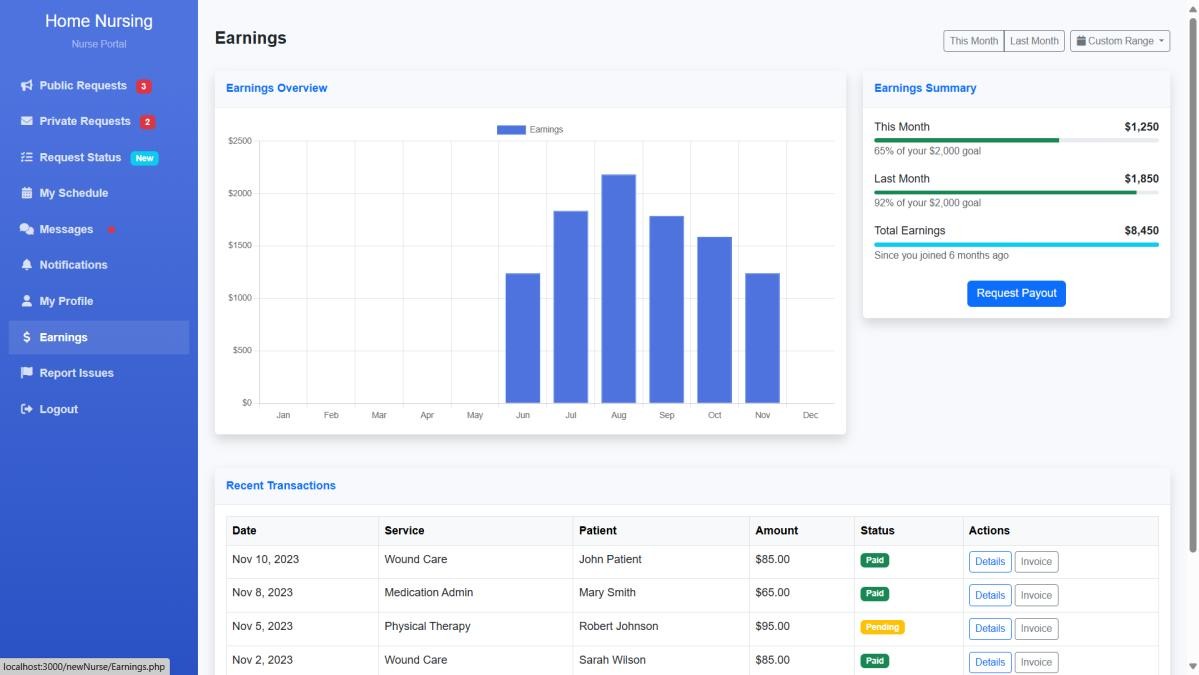
## Log out



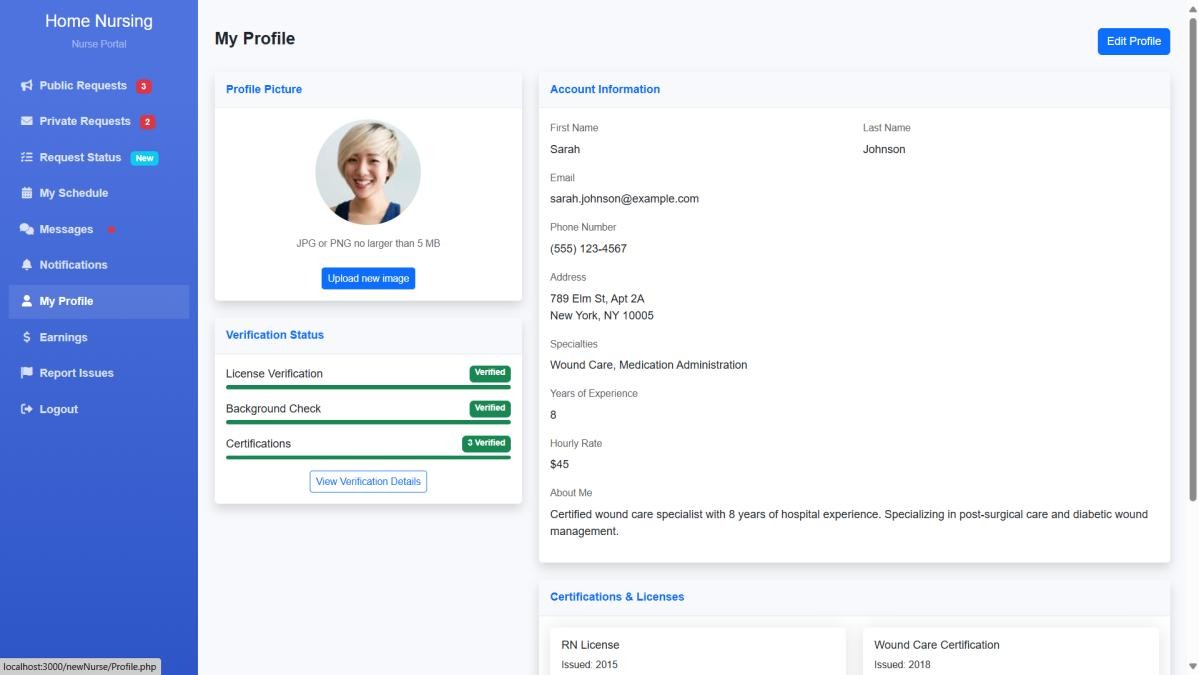
## Make report



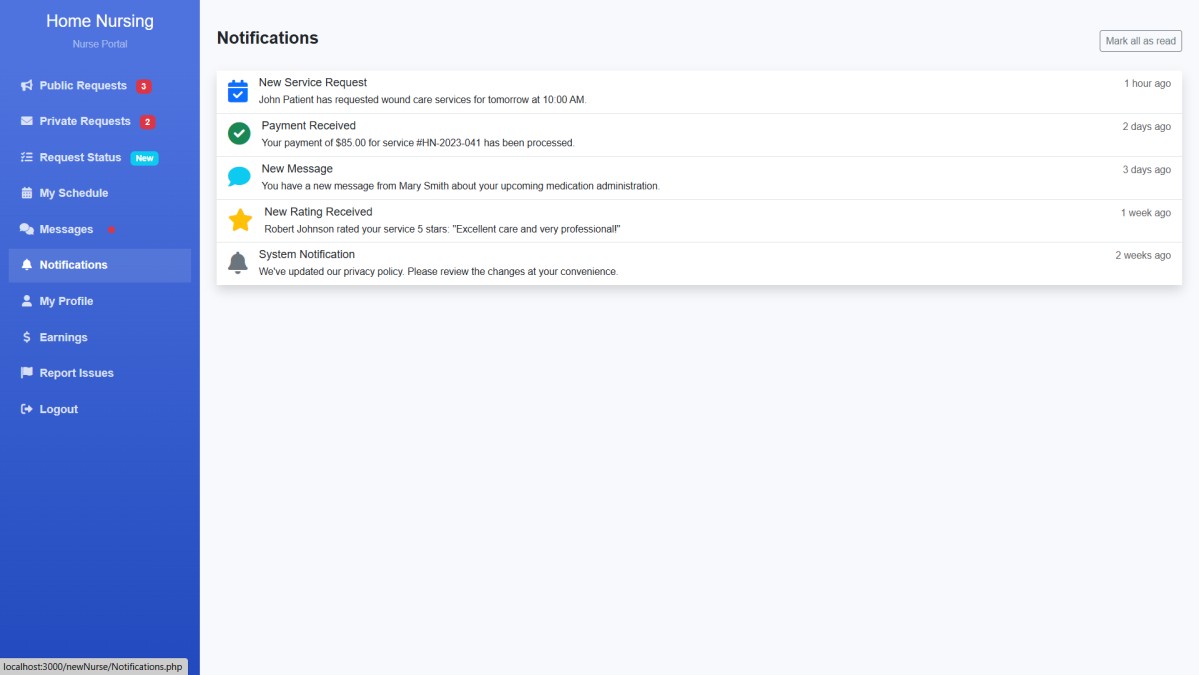
## Payment and earnings page



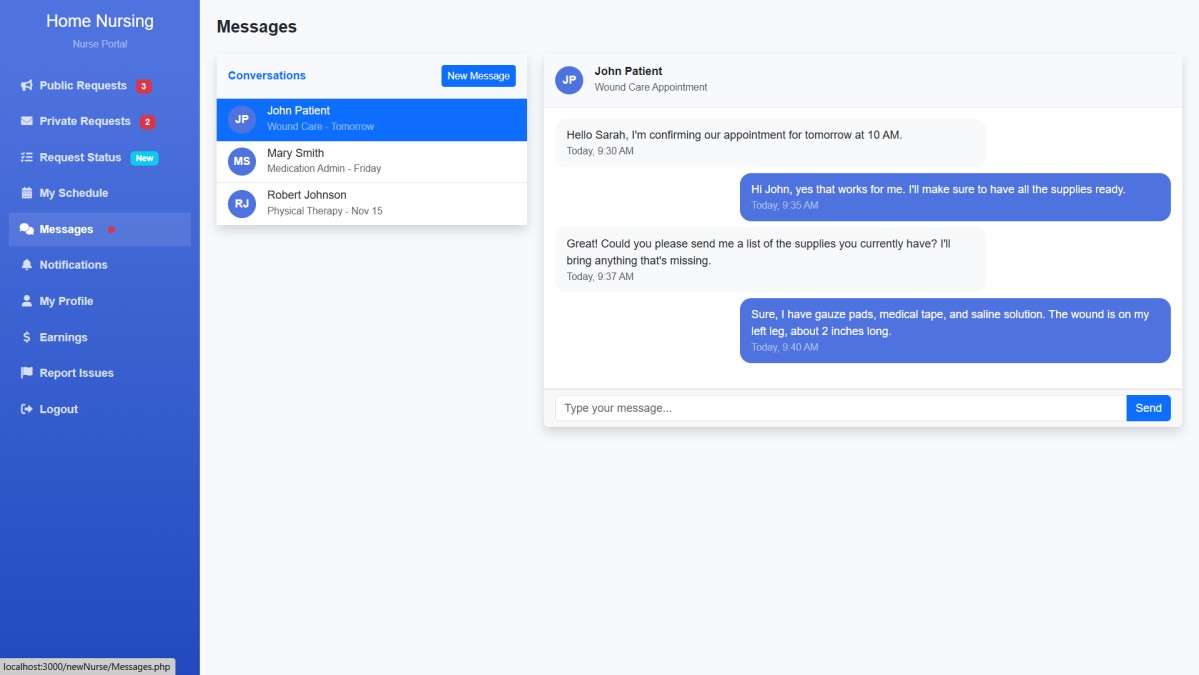
## Profile : view / edit



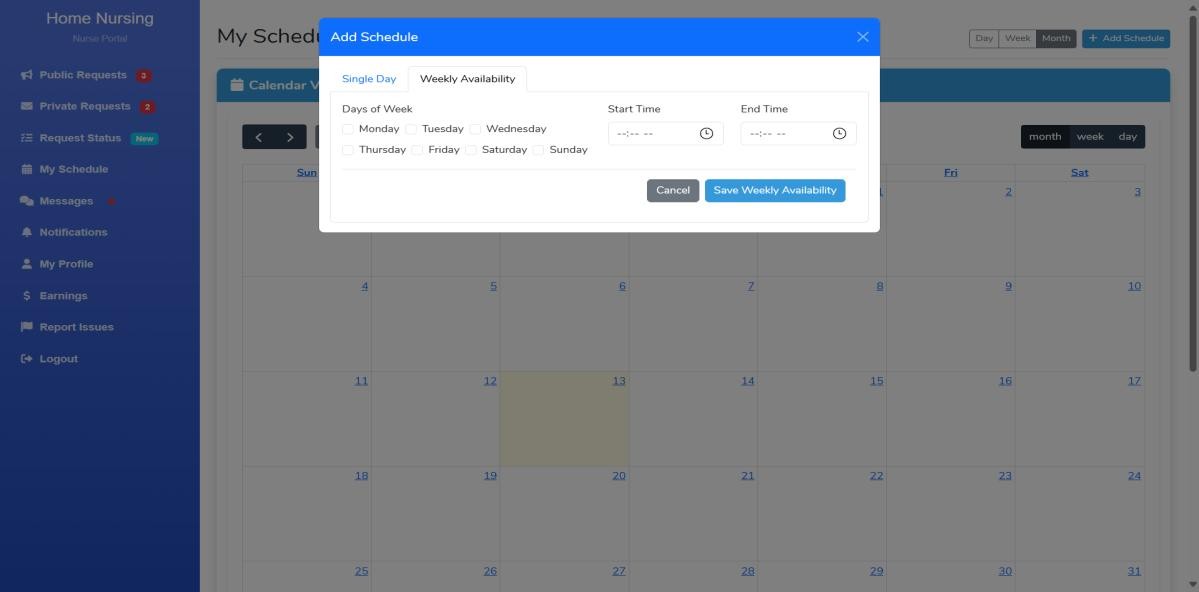
## View notifications

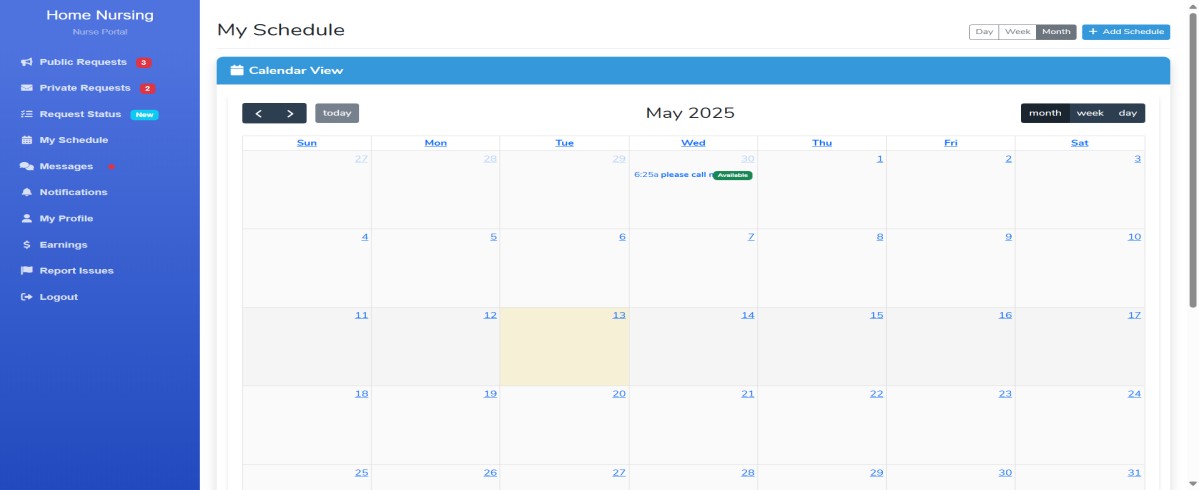
c

### Messages between nurse and patient

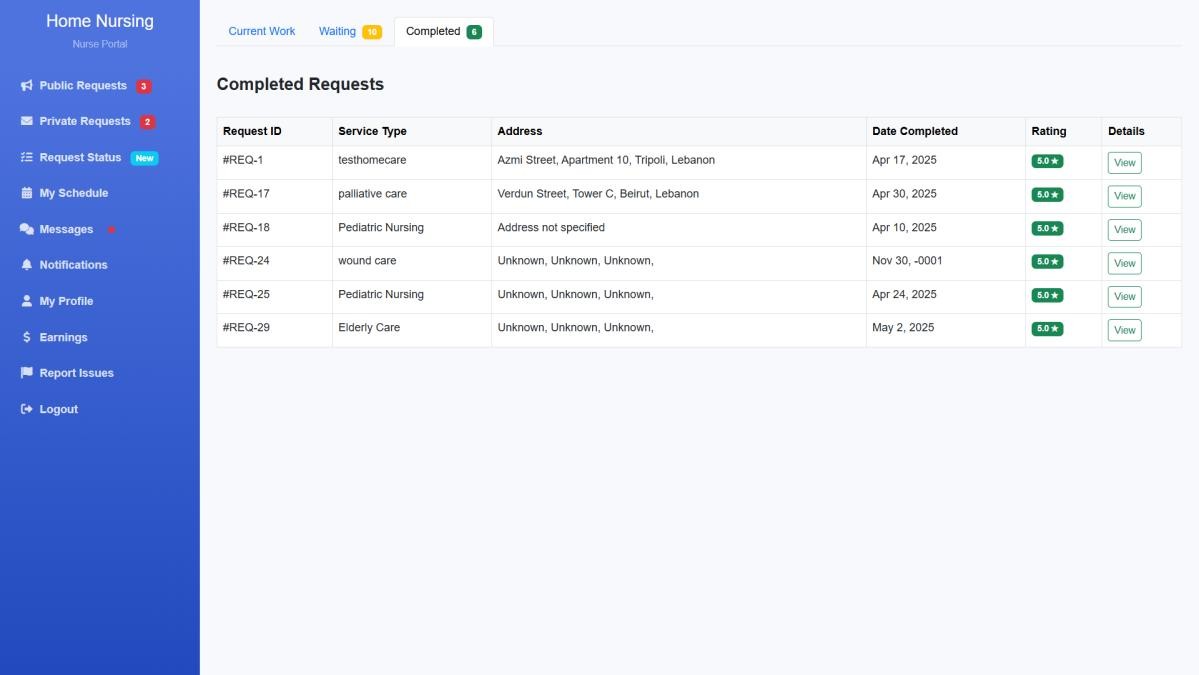


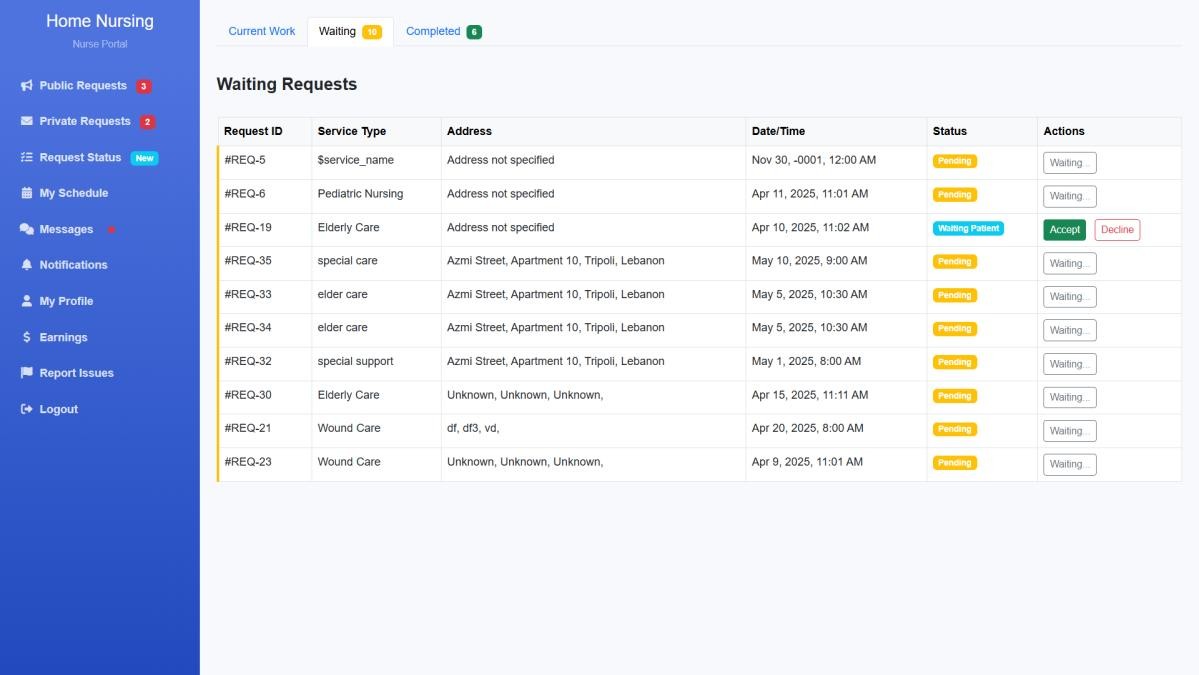
### Make schedule



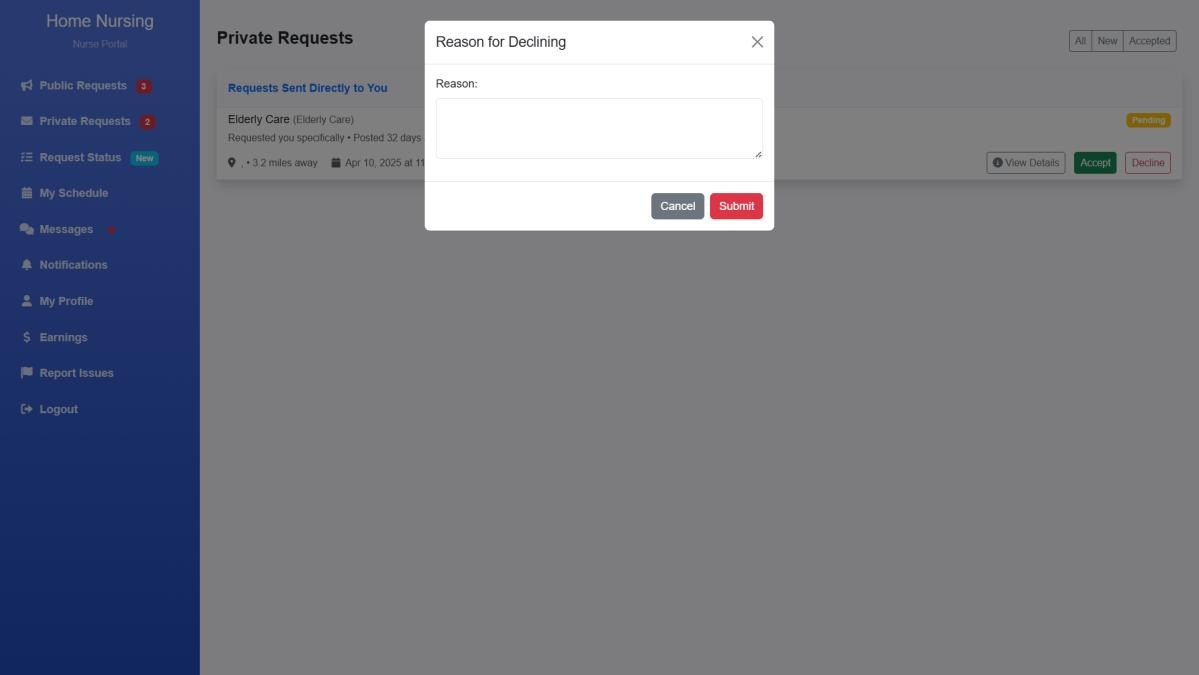


## Manage requests

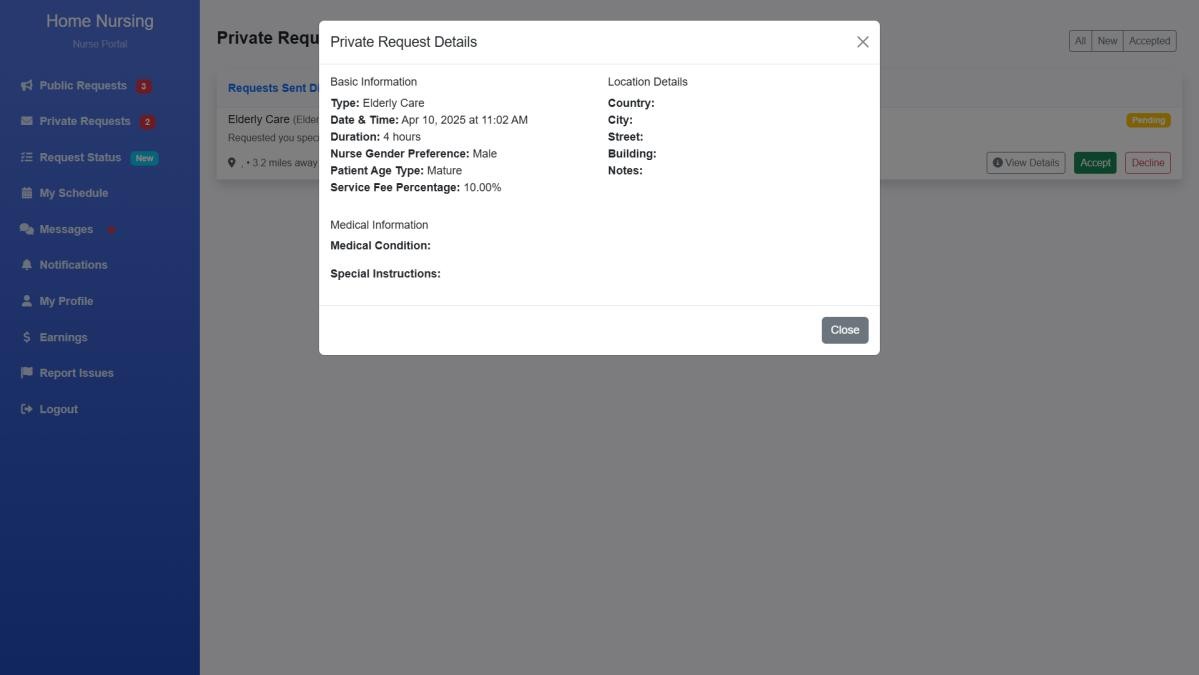




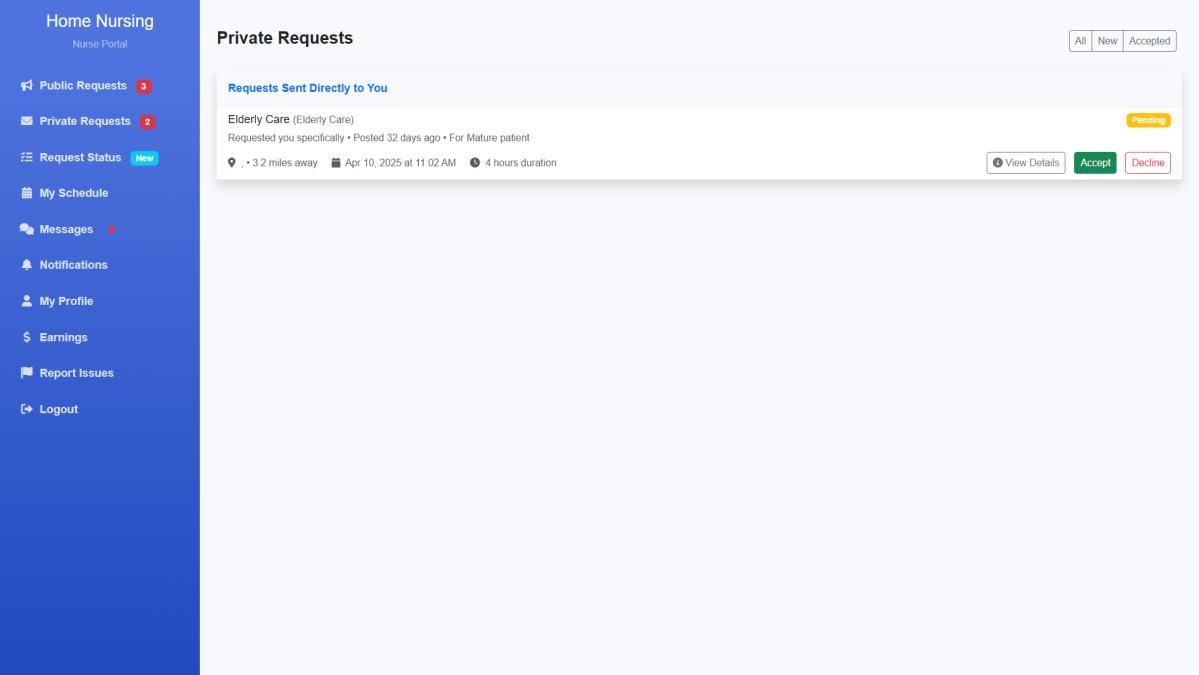
## Rejected reason



## Details of private requests



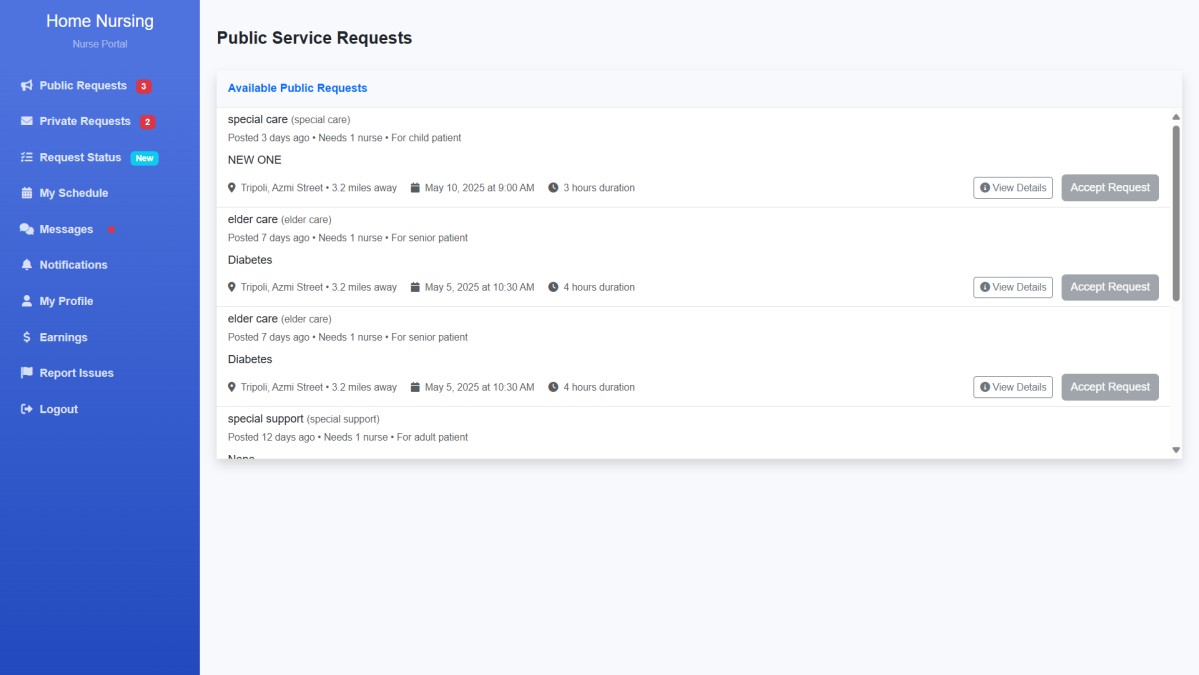
### Private requests



## Details of public requests

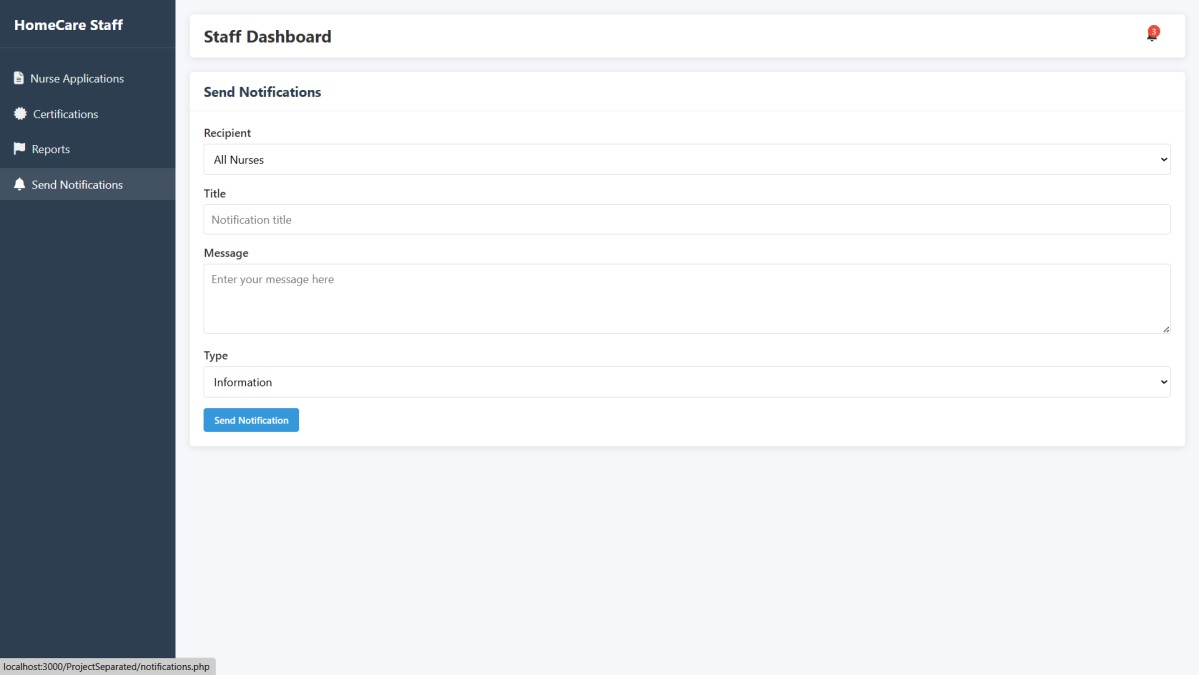


## Public requests

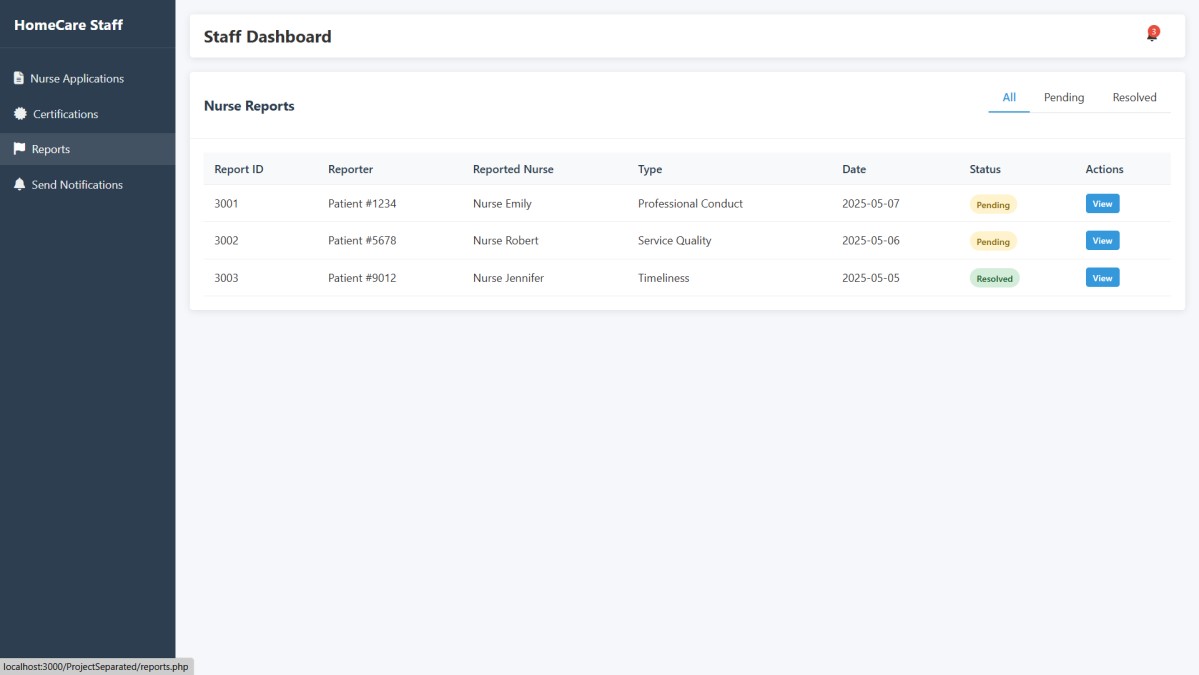


**Staff:**

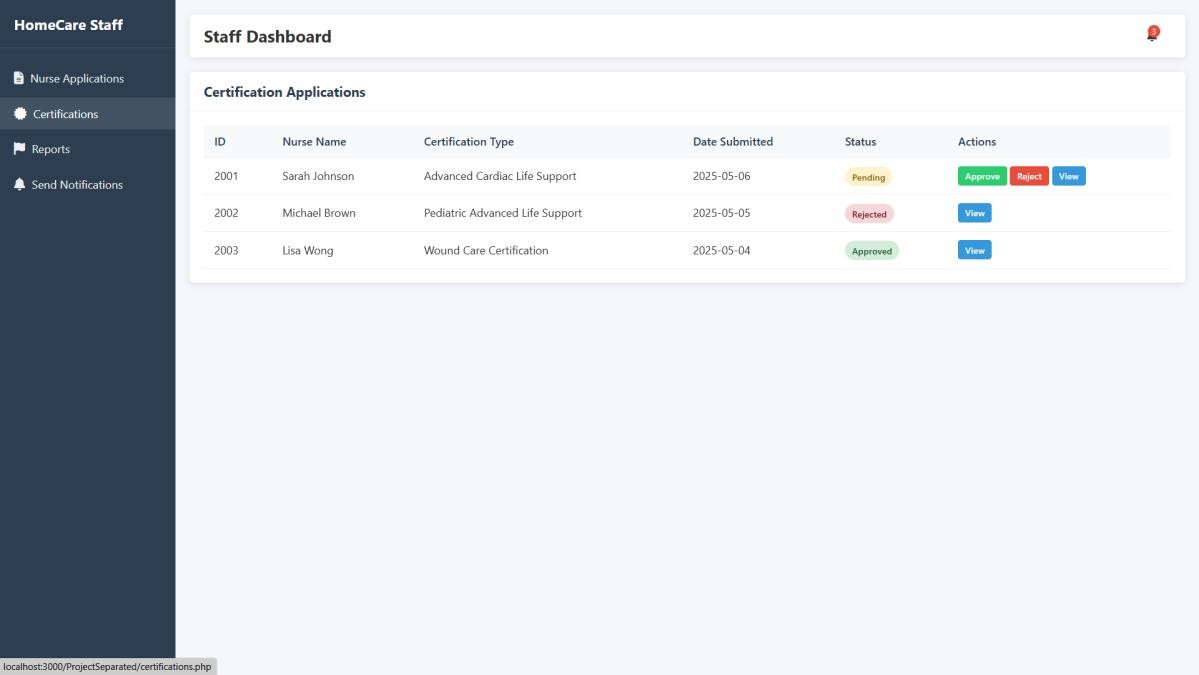
### Send notifications



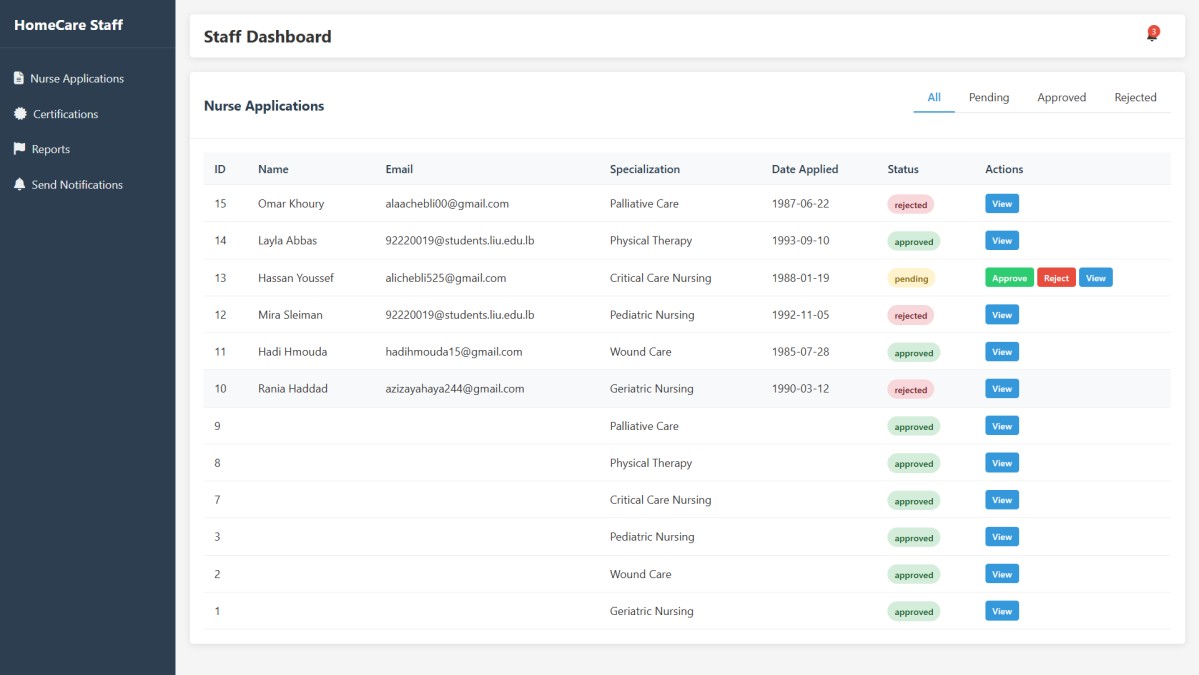
## View reports

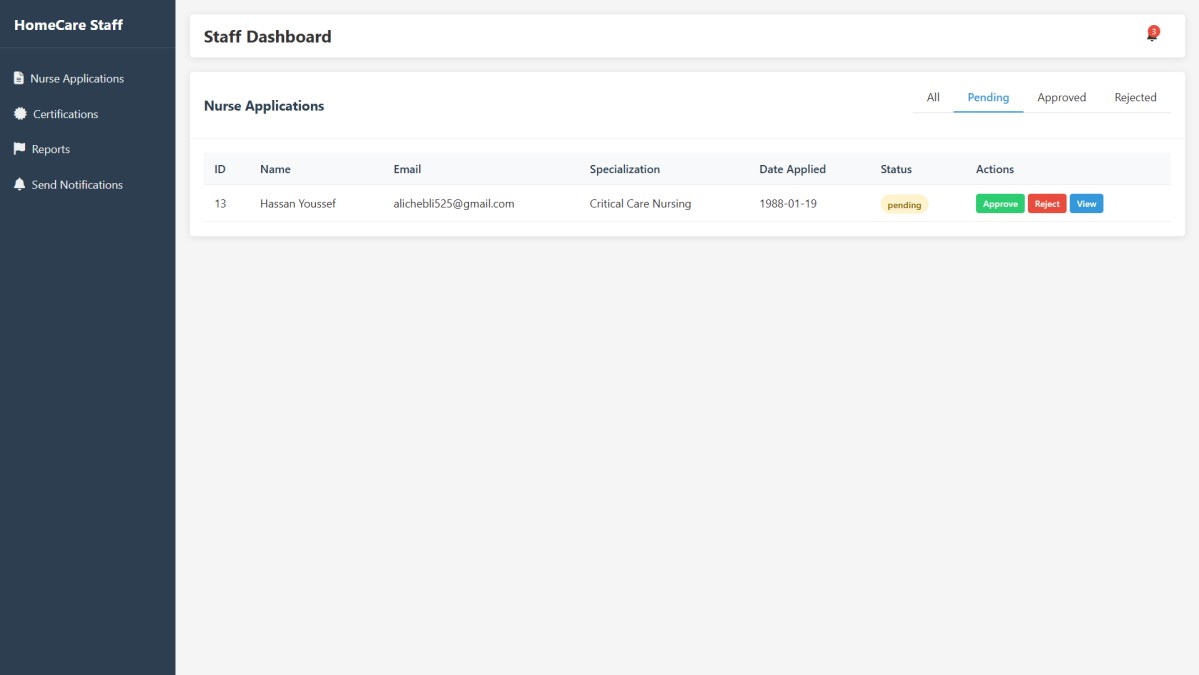


## Manage certifications

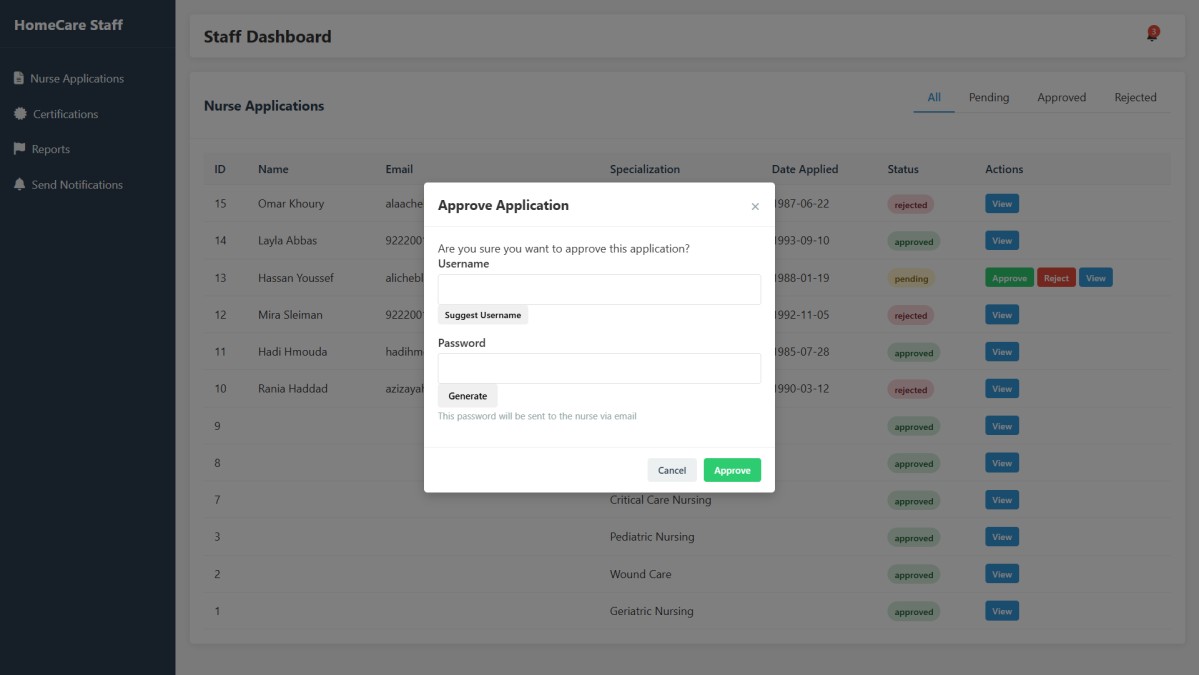


## Manage nurse applications

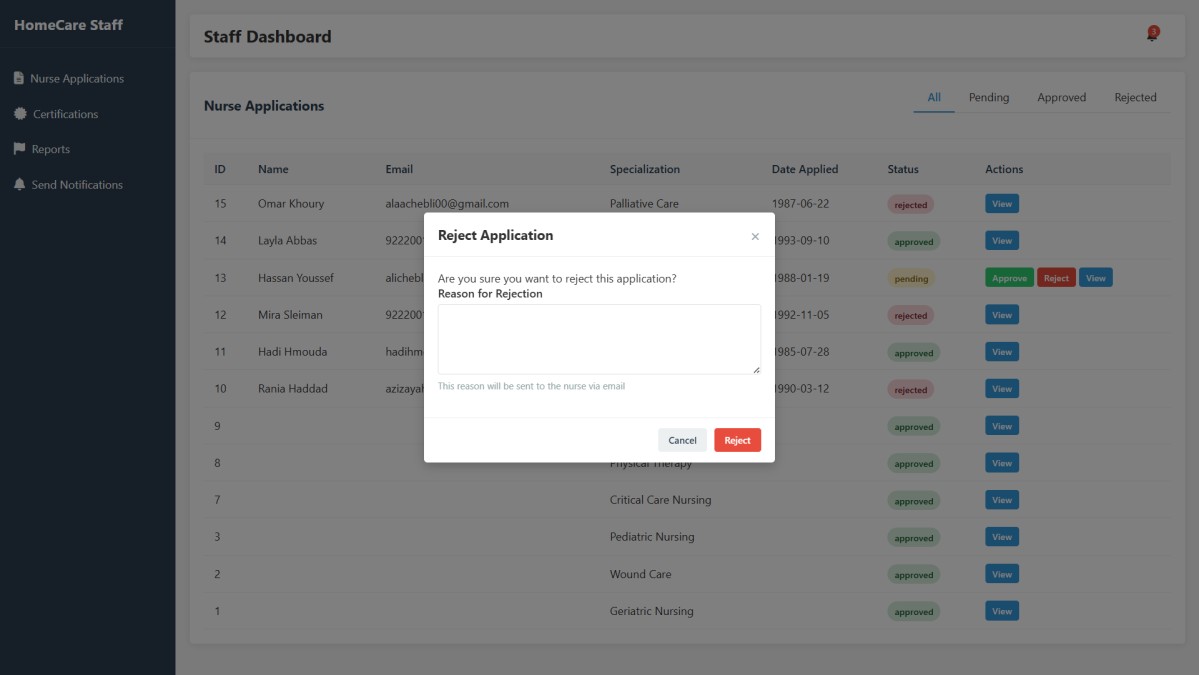




### Send new profile via email



## Send rejected reason via email



# 10. Conclusion:

The Home Care: Home Nursing Services platform is a promising solution to bridge the gap in accessible, personalized in-home healthcare. By offering tailored nursing services, it addresses critical healthcare needs while empowering nurses. Addressing challenges in user management, nurse verification, logistics, and security will be essential for success. With the recommended enhancements, the platform can establish itself as a leading healthcare solution, delivering convenience, trust, and impact to its users.

# 11. Future Considerations

To enhance and scale the platform's effectiveness for patients, nurses, and administrators, the following future improvements and considerations are proposed:

### *1. Real-Time Request Matching System*

* Implement a smart algorithm that automatically matches patient requests with the most suitable available nurses based on availability, skills, and location.
* Allow patients to see recommended nurses instantly.

### *2. Secure Payment Gateway Integration*

* Integrate a fully secure and compliant payment system (e.g., Stripe, PayPal) for processing transactions.
* Allow recurring payments for long-term care plans.

### *3. Enhanced Analytics & Reporting*

* Admins can access dashboards that track user activity, nurse performance, response times, and patient satisfaction.
* Generate dynamic charts for operational insights (e.g., peak hours, request volumes, and completion rates).

### *4. Credential Verification System*

* Automate certification and license validation for nurses during registration or updates.
* Partner with third-party verification services for compliance.

### *5. User Behavior Tracking & Segmentation*

* Enable behavioral analytics to segment patients and nurses (e.g., frequent users, high performers).
* Use insights to offer personalized recommendations or incentives.

### *6. Advanced Notification & Reminder System*

* Introduce automated reminders for pending requests, or expiring certifications.
* Allow push/email/SMS notification options for real-time engagement.

### *7. Availability Calendar Sync*

* Allow nurses to sync their availability calendar with external services like Google Calendar or Outlook.
* Avoid scheduling conflicts across platforms.

### *8. In-App Video or Voice Consultation*

•Integrate secure video or voice call features for virtual consultations between patients and nurses before confirmation.

***9. Multi-Language and Accessibility Support*** •Provide multi-language options for diverse user bases.

•Ensure accessibility compliance (e.g., WCAG 2.1) for users with disabilities.