

Problem Statement:

The Blood Bank Management System aims to streamline the process of blood donation, storage, and distribution to effectively meet the demands of patients in need. The system should provide a centralized platform for donors, patients, and staff to manage blood-related activities, ensuring efficient coordination and transparency throughout the blood donation lifecycle.

User Stories

→ Donor

- **Convenient Blood Donation Process:** Donors can register, manage appointments, and track their donation history, ensuring a hassle-free donation experience while staying informed about their contributions.
- **Timely Notifications:** Donors receive reminders and notifications about upcoming donation opportunities, helping them donate regularly and assist patients in need.

→ Patient

- **Search and Request Blood:** Patients can search for available blood types at nearby centers and send requests to quickly access the blood they need during emergencies.
- **Request Status Updates:** Patients are kept informed with real-time updates on the status of their blood requests, allowing them to plan effectively.

→ System

- **Maintain Accurate User Records:** The system maintains detailed records of donors, patients, staff, and inventory to ensure reliable information is available for all users.
- **Integration with Other Blood Banks:** The system integrates with external blood banks for inventory sharing, expanding blood availability during shortages.

→ Staff

- **Efficient Blood Inventory Management:** Staff can monitor and manage blood inventory levels across donation centers to ensure all blood types are adequately stocked.
- **Process Patient and Donor Requests:** Staff efficiently handle blood requests and donor appointments, fulfilling demands promptly and ensuring system efficiency.
- **Reporting and Analytics:** Staff generate detailed reports on inventory, requests, and donations to identify trends, predict shortages, and support decision-making.

Requirements

Functional Requirements:

1- Donor Management:

- Donors can view their donation history and receive notifications about their next eligible donation.

2- Patient Features:

- Patients can filter searches by location, blood type, and urgency and modify or cancel requests as needed.

3- Inventory Management:

- Tools for setting stock alerts and flagging expiring blood units ensure proactive inventory management.

4- Requests Processing:

- Automated prioritization of blood requests ensures urgency is addressed, with manual overrides for critical cases.

5- Notifications:

- Alerts for staff on pending blood requests and expiring inventory, and updates for patients on their request status.

6- System Maintenance:

- Inactive records are archived after two years, and data is periodically backed up for security.

7- Plasma Testing:

- Plasma testing statuses are tracked, and results are linked to donation records, with notifications for donors.

8- Integration:

- Real-time syncing with partner blood banks and logging of shared inventory transactions.

9- User Roles & Permissions:

- Access to sensitive data is role-restricted, and system admins manage user permissions dynamically.

10- Mobile App Support:

- Mobile apps offer core features for donors and patients, with push notifications for reminders and updates.

Non-Functional Requirements:

1- Performance: The system processes user actions within a second and supports 5,000 concurrent users during peak times.

2- Security: AES-256 encryption secures sensitive data, and user sessions timeout after 15 minutes of inactivity.

3- Availability: Operates 24/7 with 99.95% uptime, with critical maintenance disruptions under five minutes.

4 -Scalability: Supports horizontal scaling for increased demand during emergencies.

5- Usability: Features are responsive across all devices, with key actions accessible in under three clicks.

6- Auditability: Detailed logs of inventory updates, user requests, and staff activities ensure thorough auditing.

• Discussion Points

The system prioritizes user-centric design with dedicated workflows for donors, patients, staff, and the system itself. Functional enhancements improve real-time operations, usability, and scalability. Non-functional requirements emphasize measurable metrics for performance, security, and availability, aligning with the overall goal of an efficient, reliable blood donation management platform