



# BUSINESS ANALYST PROJECT DOCUMENT

## Hospital Appointment & Patient Flow Optimization

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### 1. Project Overview

#### 1.1 Project Title

Hospital Appointment Scheduling & Patient Flow Management System

#### 1.2 Project Summary

The purpose of this project is to analyze and redesign the appointment and patient flow process in a multi-specialty hospital. The goal is to reduce waiting time, improve doctor scheduling efficiency, reduce patient crowding, and enable faster, more predictable healthcare service delivery.

#### 1.3 Business Context

Hospitals often struggle with:

- Long queues
- Appointment overlap
- Patient congestion in waiting areas
- Delays in doctor availability
- Manual registration errors
- Lack of visibility in patient movement across departments

A structured and automated Appointment & Patient Flow Management System helps improve both operational efficiency and patient satisfaction.

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### 2. Problem Statement

Patients face long waiting times due to inconsistent scheduling, manual registration, and lack of coordination between departments.

Hospital staff struggle with:

- No real-time tracking of patient status
- Appointment clashes
- Walk-in overload
- Queue mismanagement

This leads to poor patient experience and operational inefficiency.

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### **3. Project Objectives**

1. Reduce patient waiting time by 30–40%.
  2. Implement a predictable appointment scheduling mechanism.
  3. Improve coordination between reception, doctors, and diagnostic departments.
  4. Increase patient throughput without additional staffing.
  5. Provide real-time visibility of patient status and queue length.
  6. Reduce manual workload and errors at the reception desk.
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### **4. Scope of Work**

#### **In-Scope**

- Online and offline appointment booking
- Patient registration workflow
- Queue management
- Doctor scheduling
- Movement across departments (consultation → labs → pharmacy)
- Patient notifications
- Basic emergency priority rules

#### **Out-of-Scope**

- Billing and insurance workflows
- Inpatient/ward management
- ICU and emergency room deep workflows
- Ambulance services
- Hospital inventory systems

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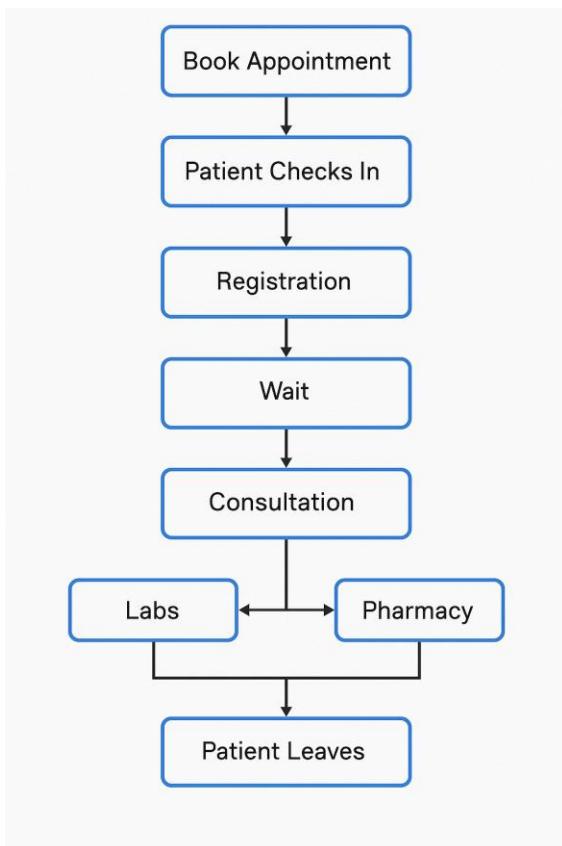
## 5. Stakeholders

Stakeholder	Responsibility
Patients	Book appointments, check-in, consultation
Reception Staff	Registration, queue creation
Doctors	Consultations, schedule management
Lab Technicians	Process diagnostics requests
Pharmacists	Process prescriptions
Hospital Admin	Policies, staffing, escalations
IT Team	System development & integration

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## 6. Workflow Diagrams

### 6.1 AS-IS Workflow Diagram (Current Hospital Flow)



Caption:

Figure 1: AS-IS Hospital Appointment & Patient Flow (Current State)

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## 6.2 TO-BE Workflow Diagram (Improved Hospital Flow)

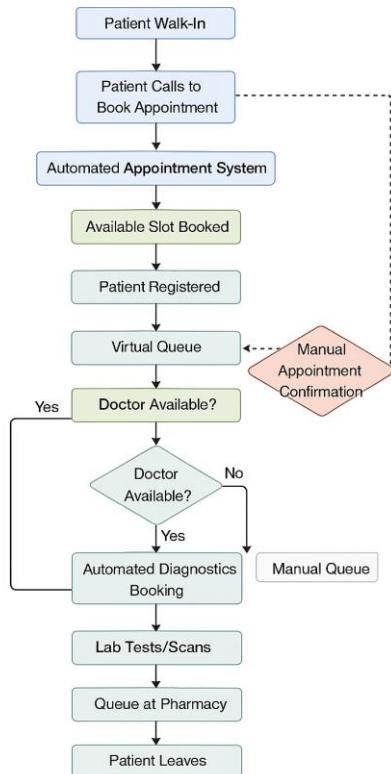


Figure 2: TO-BE Hospital Appointment & Patient Flow (Future State)

Caption:

Figure 2: TO-BE Hospital Appointment & Patient Flow (Future State)

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## 7. AS-IS Process Description (Current State)

### 7.1 Appointment Booking

- Patients call hospital or walk in to book appointments
- Reception manually checks doctor availability
- Slots often double-booked or unclear
- No limit on walk-ins → overcrowding

### 7.2 Registration & Check-In

- Patients reach reception
- Long queues during peak hours
- Manual entry → slow + error-prone

- Token issuance inconsistent

### **7.3 Waiting Area Overload**

- Patients wait without knowing estimated time
- No queue visibility
- Doctors running late increases congestion

### **7.4 Consultation**

- Patient enters doctor's cabin after long waiting
- Doctor often delayed by previous appointments
- Paper files → slow retrieval

### **7.5 Lab & Diagnostics**

- Patients sent to diagnostics
- No priority mechanism
- Further waiting in unrelated queue

### **7.6 Pharmacy**

- Manual prescription entry
- Long queue at pharmacy as well

### **7.7 Key Issues**

- High patient frustration
- No real-time tracking
- Overlapping schedules
- Walk-ins create unpredictability

## **8. Pain Points in AS-IS Workflow**

### **Operational Issues**

- High waiting time
- No uniform queue management
- Reception overloaded
- Lab/pharmacy delays

### **Technical Issues**

- No integrated system

- Manual appointment records
- Lack of patient tracking system

## Doctor-Side Issues

- Unpredictable appointment lengths
- Overlapping appointments
- No visibility into patient backlog

## Patient-Side Issues

- No idea of when their turn will come
- Standing in multiple queues
- Unclear instructions for diagnostics

## 9. TO-BE Workflow (Future Improved State)

The TO-BE process introduces structured scheduling, digital tokens, automated flow management, and inter-department coordination.

### Optimized Flow

#### 9.1 Appointment Scheduling

- Patients book online or via phone
- System displays doctor availability in real-time
- Smart slot allocation → prevents double booking
- Limited walk-in slots to prevent congestion

#### 9.2 Digital Check-In

- Patients receive QR-based tokens at entry
- Automated registration reduces manual load
- Priority queue for elderly, pregnant women, emergencies

#### 9.3 Real-Time Queue Visibility

- Token display systems show current serving number
- Patients receive SMS updates: “3 patients ahead of you”
- Reduces crowding near doctor chambers

#### 9.4 Coordinated Patient Flow

- System guides patients:

- Consultation → Diagnostics → Pharmacy
- No need to re-register at each department
- Departments notified when patient is approaching

## 9.5 Doctor & Department Workflow

- Doctors view real-time patient queue
- Doctors can mark delay/hold/next
- Lab & pharmacy see upcoming patient load

## 9.6 Integrated Patient Record

- Digital record follows patient across departments
- Reduces time, errors, and duplicate data entry

## 9.7 Proactive Notifications

- Appointment reminders
  - Estimated waiting time
  - Test report ready
  - Medicine prepared for pickup
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## 10. Functional Requirements (FR)

FR1: Allow patients to book, reschedule, and cancel appointments online.

FR2: Real-time doctor availability calendar.

FR3: QR code-based check-in.

FR4: Automated queue management with token assignment.

FR5: Real-time status updates for patient movement.

FR6: Separate priority queue rules.

FR7: System-generated routing (consultation → diagnostics → pharmacy).

FR8: Patient notifications (SMS/app).

FR9: Admin dashboard for monitoring hospital load.

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## 11. Non-Functional Requirements (NFR)

NFR1: 99% system availability.

NFR2: Page load < 2 seconds.

NFR3: Scalable to 5000+ daily patients.

NFR4: Secure storage of medical data (HIPAA equivalent).

NFR5: Fast response APIs (<500 ms)

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## 12. KPIs & Metrics

KPI	Target
Average Patient Waiting Time	Reduce from 60 min → 25 min
Queue Length	Reduce by 40%
Appointment Overlap Rate	<5%
Consultation Throughput per Doctor	+20%
Patient Satisfaction Score	+30% increase

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## 13. Risks & Mitigation

### Risks

- Poor adoption by staff
- Downtime affecting hospital flow
- Wrong queue prioritization
- Network failure in high-load hours

### Mitigation

- Staff training sessions
  - Backup manual token system
  - Failover servers
  - Clear priority rules
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## 14. Future Enhancements

- AI-based appointment time prediction
- Integration with wearable health devices
- Digital prescription auto-sent to pharmacy
- Virtual waiting rooms via mobile app
- Self-service kiosks for registration

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## **15. Conclusion**

The redesigned TO-BE hospital appointment and patient flow system significantly enhances patient experience, reduces operational delays, strengthens doctor productivity, and optimizes hospital-wide coordination. This future-ready workflow supports scalability, automation, and reliable service delivery.

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