

# Title: Enhancing Operational Efficiency in a Multi-Specialty Hospital

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Designation: Business Analyst





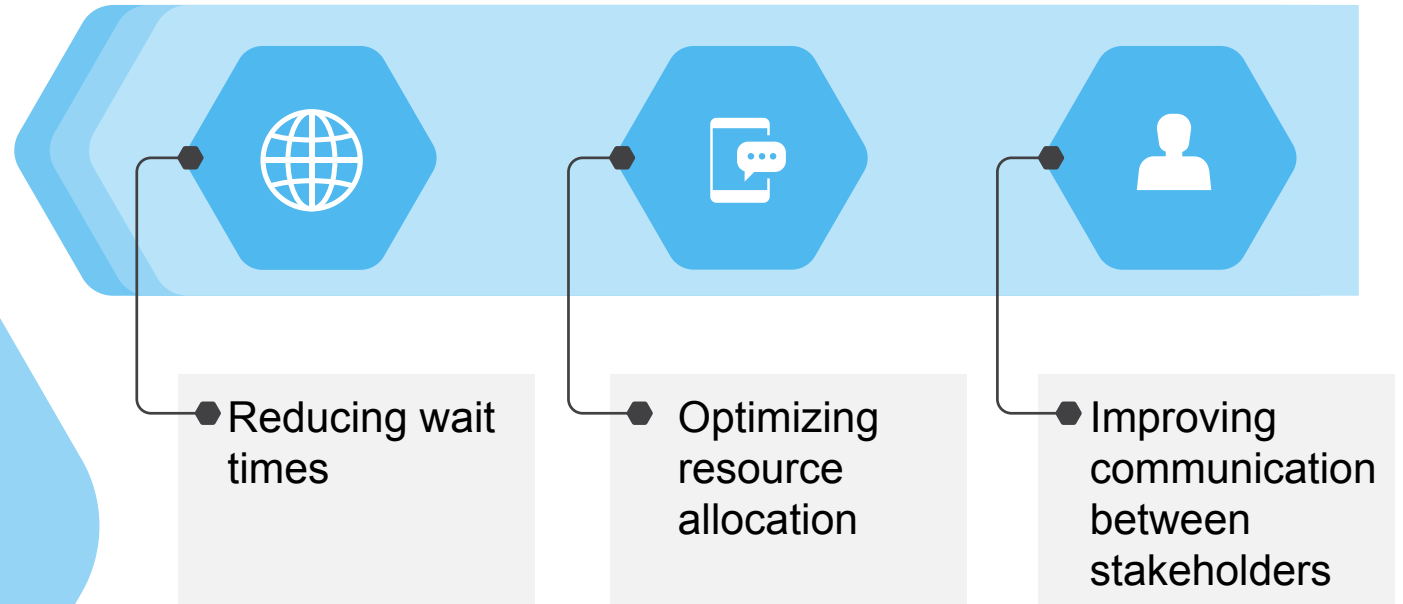
## Case study overview

You have recently been hired as a Business Analyst by HealthFirst Care, a leading multi-specialty hospital renowned for its high-quality patient care and advanced medical facilities.

The hospital has launched an initiative to enhance the overall patient experience in light of increasing patient complaints and operational challenges.

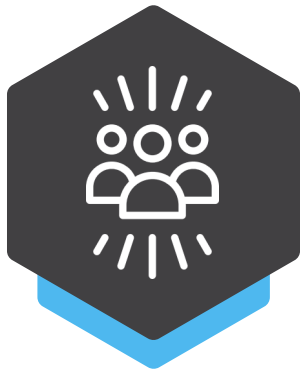
# Case study overview

The management has identified key areas for improvement, including:



# Task overview

As a Business Analyst, you have been tasked with driving this initiative. Your role will involve:



Gathering stakeholder requirements



Analyzing existing processes



Developing data-driven solutions to improve operational efficiency



Developing risk assessment and mitigation plan





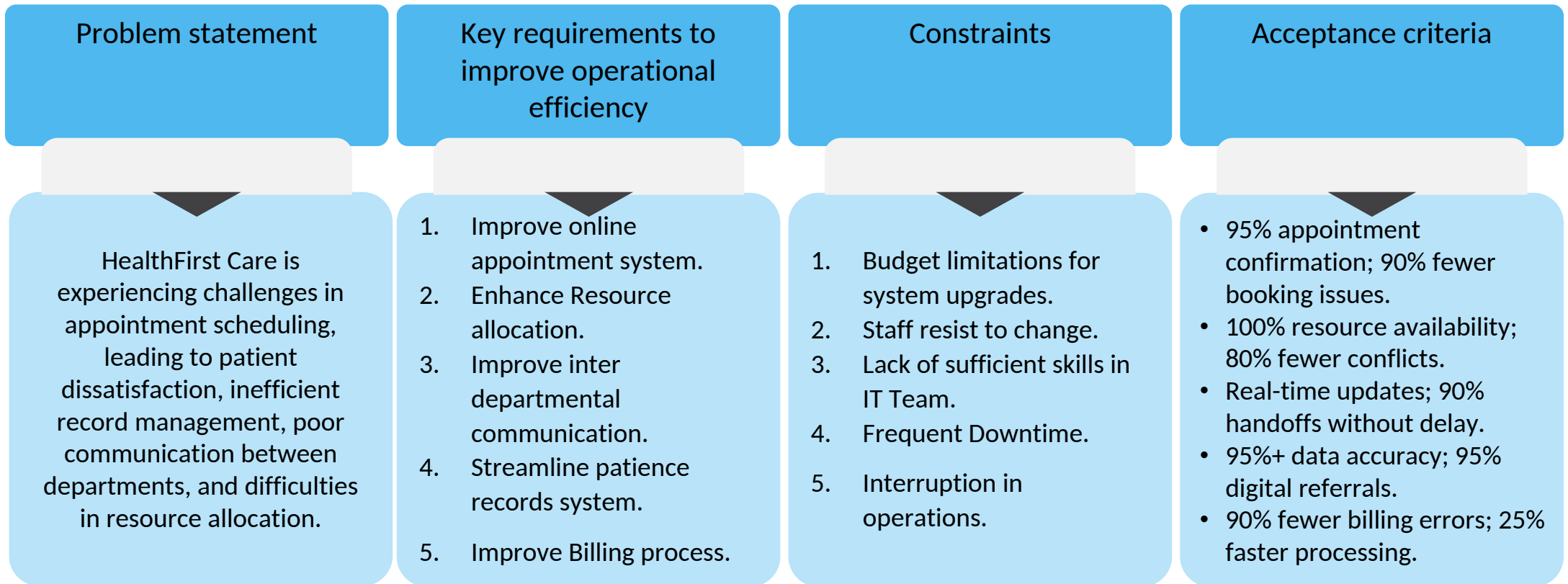
# Task 1



# Business Requirement Document (BRD)

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A BRD defines the business objectives, project scope, key requirements, stakeholder expectations, and deliverables for a project.



# Task 2



# Requirement Traceability Matrix (RTM)

A Requirements Traceability Matrix maps and tracks project requirements throughout the lifecycle, ensuring that each requirement is addressed, tested, and aligned with business objectives, stakeholder needs, and project deliverables.

Categorize requirements into functional and non-functional

Categorize requirements using the MoSCoW method

List requirements based on priority

| Requirement ID | Requirement description   | Priority (MoSCoW) | Stakeholder(s)         | Project objective              | Related data file/ Finding | Status   |
|----------------|---|-------------------|------------------------|--------------------------------|----------------------------|----------|
| FR1            | User-friendly interface for patients.                               | Must Have         | Patients               | Reduces patient experience     | Feedback data              | Approved |
| FR2            | Implement real-time notifications system.                           | Must Have         | Patients, Admin        | Enhance Communication          | Feedback data              | Approved |
| FR3            | Enable real-time visibility of doctors.                             | Must Have         | Admin, Patients        | Reduce wait time               | Appointment data           | Approved |
| FR4            | Upgrade the appointment system.                                     | Must Have         | Patient, IT Team       | Enhance Operational Efficiency | Feedback data              | Approved |
| FR9            | Establish real-time communication channels between key departments. | Must Have         | Doctors, Admin, Nurses | Enhance Communication          | Feedback data              | Approved |
| FR12           | Implement an integrated Hospital Information System (HIS).          | Must Have         | IT, Admin              | Centralize patient data        | Appointment data           | Pending  |
| FR16           | Introduce queue management systems with real-time status updates.   | Must Have         | Patient, Admin         | Reduce wait time               | Appointment data           | Approved |

Sample of high-priority (Must Have) requirements; full RTM includes all priority levels.



# Requirement Traceability Matrix (RTM)

- Categorize requirements into functional and non-functional
- Categorize requirements using the MoSCoW method
- List requirements based on priority

| Requirement ID | Requirement description                                     | Priority (MoSCoW) | Stakeholder(s) | Project objective       | Related data file/ Finding | Status   |
|----------------|---|-------------------|----------------|-------------------------|----------------------------|----------|
| NFR7           | System uptime should be 99.9% or higher                     | Must Have         | Admin, IT      | Ensure reliability      | feedback data              | Approved |
| NFR5           | Data must be secured with encryption and access control     | Must Have         | IT Team        | Ensure data privacy     | feedback data              | Approved |
| NFR4           | Dashboard and reports should load in under 2 seconds        | Must Have         | Admin, Doctors | Enhance performance     | feedback data              | Pending  |
| NFR2           | The system should allow quick updates with minimal downtime | Must Have         | IT Team        | Improve maintainability | feedback data              | Approved |

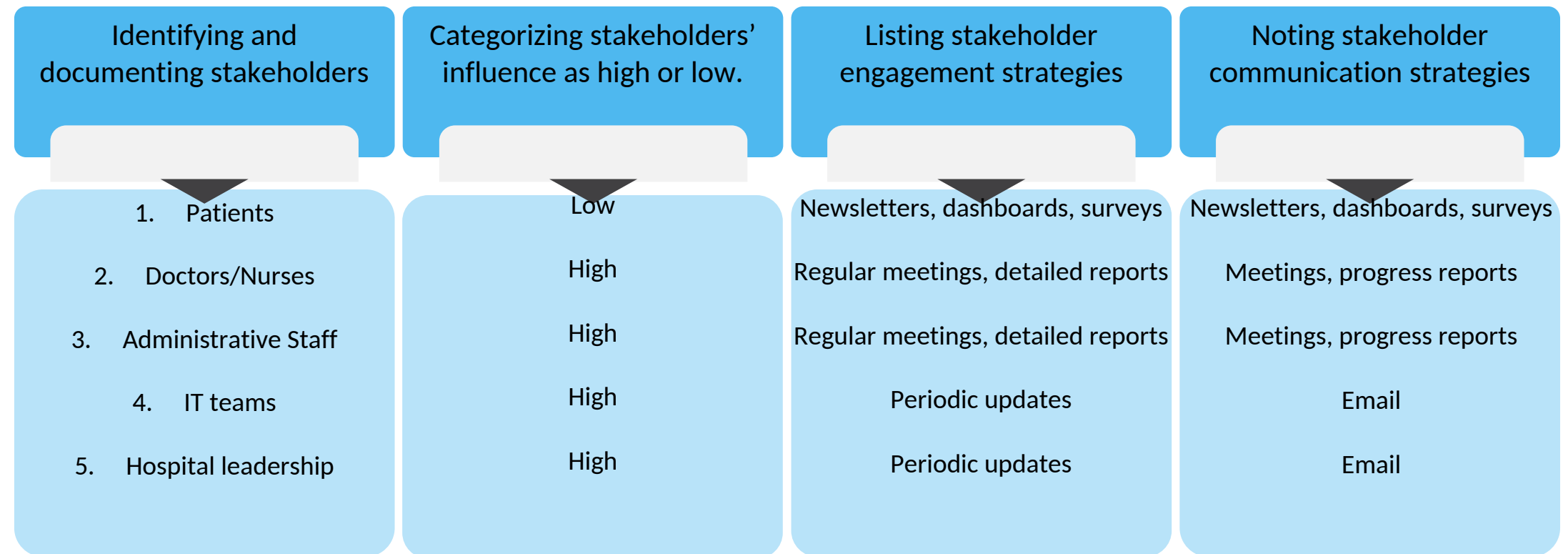
Sample of high-priority (Must Have) requirements; full RTM includes all priority levels.

# Task 3



# Stakeholder Analysis and Engagement Plan

The Stakeholder Analysis and Engagement Plan identifies key stakeholders, understands their interests and influence, and develops strategies to effectively communicate, engage, and manage their expectations throughout the project lifecycle.



# Task 4





# Scope Management Plan

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The Scope Management Plan defines how the project scope will be planned, documented, validated, and controlled to ensure that all project objectives and deliverables are met while preventing scope creep.

## Categorizing scope into in-scope & out-of-scope

### In-scope activities

1. Improve online appointment system.
2. Enhance Resource allocation.
3. Improve inter departmental communication.
4. Streamline patience records system.
5. Improve Billing process.

### Out-of-scope activities

1. Redesign Website.
2. Building new facilities.
3. Recruit more nurses.

## Identifying assumptions and constraints

### Assumptions

1. Patients have device access
2. Budget approvals secured
3. Staff training included
4. No major regulatory changes
5. IT infrastructure is compatible
6. Departmental participation assured

### Constraints

1. Budget limitations for system upgrades.
2. Staff resist to change.
3. Lack of sufficient skills in IT Team.
4. Frequent Downtime.
5. Interruption in operations.

## Defining phases in the Work Breakdown Structure (WBS)

**Work Breakdown Structure (WBS)**

| WBS ID | Task Name                                     | Task Description  | Owner            | Milestone/Deliverable                                 | Estimated Duration |
|--------|---|---|------------------|---|--------------------|
| 1.0    | HealthFirst Care Improvement Initiatives      | Overall project it to improve Patient experience and operational efficiency | Project Manager  | Project Charter                                       | 1 week             |
| 1.1    | Requirements Gathering                        | Collect the project requirements  | Business analyst | Completed requirements phase.                         | 4 weeks            |
| 1.1.1  | Stakeholder Interview                         | Identify stakeholder needs, interest and pain points                        | Business analyst | Stakeholder feedback documented (stakeholder profile) | 1 week             |
| 1.1.2  | Analyse Project Data                          | Analyse the appointments, feedback and resource data to gain insights.      | Data Analyst     | Pivot Tables, Visual Charts                           | 1 Week             |
| 1.1.3  | Develop Business Requirements Documents (BRD) | Gather all stakeholders' requirements in one document                       | Business Analyst | Develop BRD   | 1 Week             |
| 1.1.4  | Develop Requirement Traceability Matrix       | Prioritize the Requirements   | Business Analyst | Develop RTM   | 0.5 Week           |
| 1.1.5  | Develop Stakeholder Engagement plan           | Document stakeholders' engagement details                                   | Business Analyst | Approved Stakeholder Engagement Plan                  | 0.5 Week           |
| 1.2    | System Design                                 | Design the solution to improve the operations                               | IT Team          | Approve design document                               | 2 weeks            |
| 1.3    | Development & Implementation                  | Develop the design and implement it   | Development Team | Functional Prototype                                  | 4 Week             |
| 1.4    | Testing & Validation                          | Test the Solution   | Q/A lead         | User Acceptance & Test Report                         | 2 Week             |
| 1.5    | Training                                      | Conduct training program to train the employees                             | Project Manager  | Go-live confirmation                                  | 1Week              |
| 1.6    | Project Closure                               | Implement the solutions   | Project Manager  | Final Project Sign-Off                                | 1 week             |

## Note Scope Change Management

1. All change requests must be submitted formally (email or document)
2. Reviewed by Project Manager for relevance and feasibility
3. Evaluated for impact on goals, timeline, and budget
4. Final decision made by Hospital Leadership
5. Approval based on patient impact, cost, and timeline fit
6. Change log maintained for tracking approvals and rejections

# Task 5



# Process Map Diagrams

The Process Map Diagrams visually represent the workflow of a system or process, identifying inefficiencies, redundancies, and areas for improvement to enhance operational efficiency and decision-making. You are required to fill the table with processes along with inefficiencies identified using the As-Is model and areas of improvements identified using the To-Be model:

| Process                         | As-Is model  | To-Be model  |
|---------------------------------|--|--|
| Appointment Scheduling          | Manual booking process causes delays<br>- Slot availability not updated in real-time<br>- Confirmation delays due to manual follow-ups | - Automated online booking system<br>- Real-time slot availability<br>- Instant confirmation via SMS/email     |
| Patient Check-In                | - Paper-based check-in at front desk<br>- Long queues due to manual entry<br>- No task visibility for medical staff                    | - Self-service kiosks/digital check-in<br>- Reduced wait time<br>- Task dashboard for doctors and nurses       |
| Interdepartmental Communication | -Delayed communication between departments<br>- Lack of updates during patient transfer<br>- No standard process for handoffs          | - Implement interdepartmental communication system<br>- Real-time updates<br>- Standardized handover protocols |



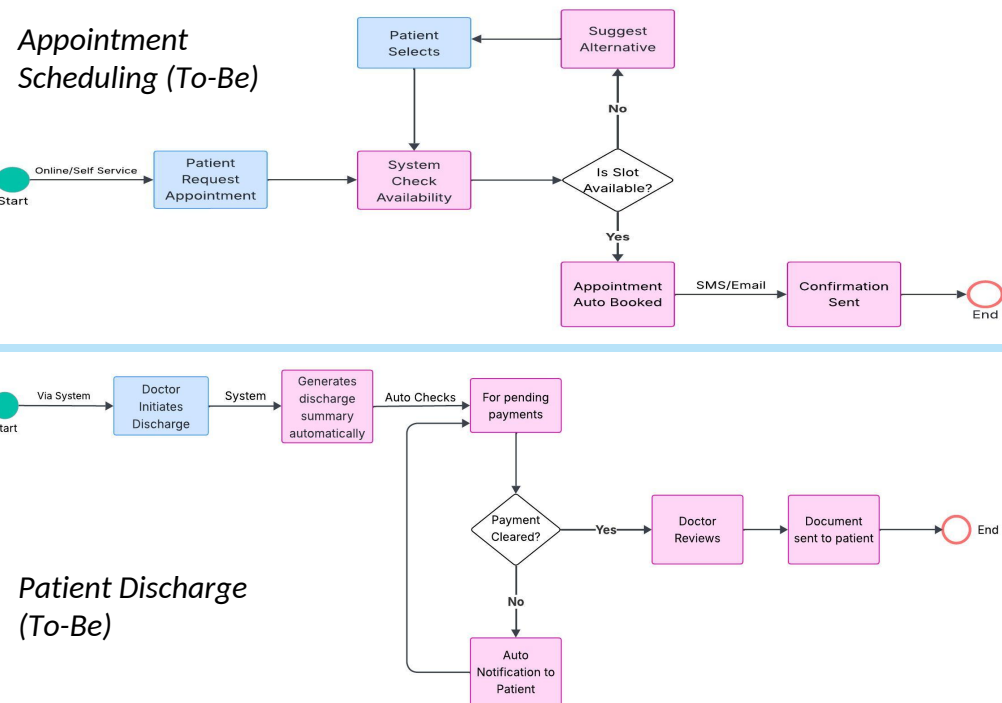
# Task 6



# BPMN and Swimlane Diagrams

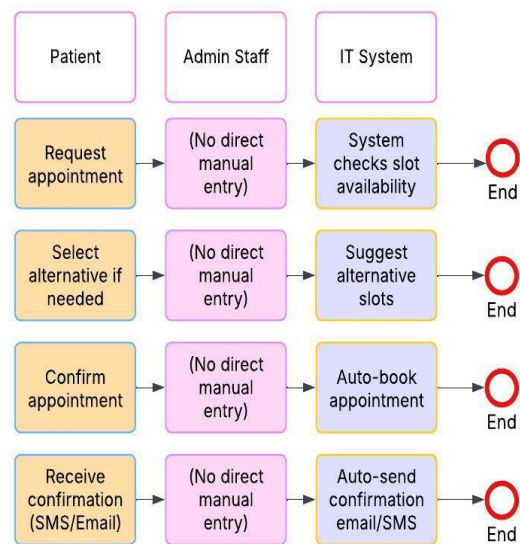
BPMN and Swimlane diagrams provide a structured visual representation of business processes, clarifying roles, responsibilities, and interactions among different stakeholders to enhance workflow efficiency and communication.

## Workflow using Advanced BPMN Model

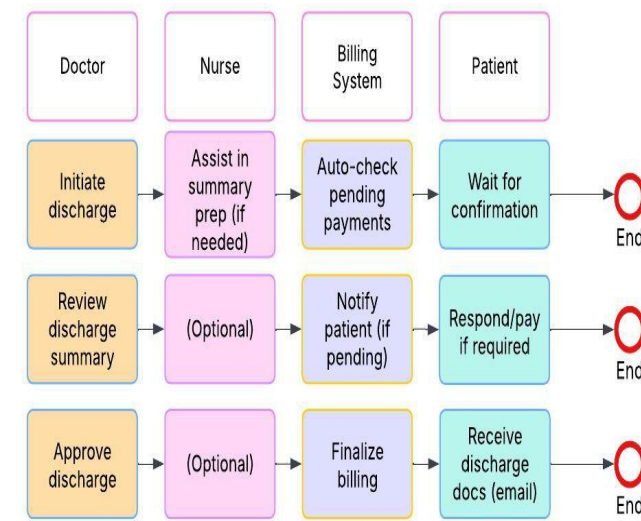


## Stakeholder responsibilities using Swimlane diagram

### Appointment Scheduling (To-Be)



### Patient Discharge (To-Be)



# Task 7



# Data Analysis Document

The Data Analysis Document summarizes the key findings, trends, and insights derived from patient and resource data, providing evidence-based recommendations to enhance hospital operations and patient satisfaction.

## Trends identified using Pivot Table

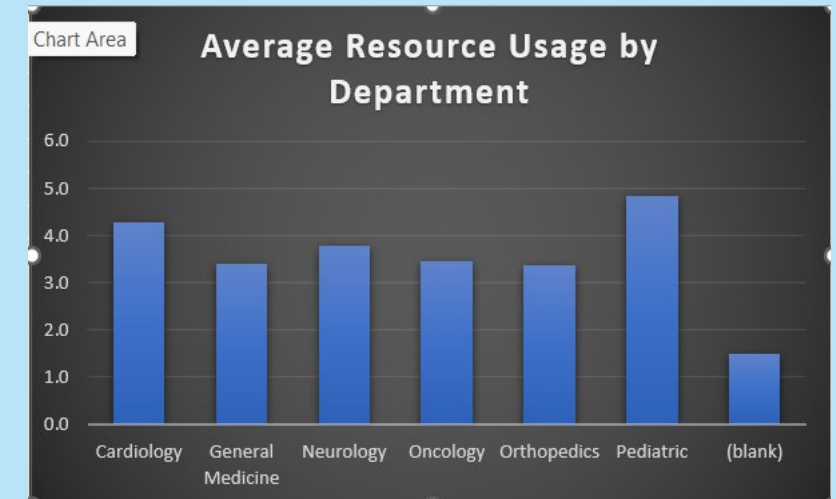
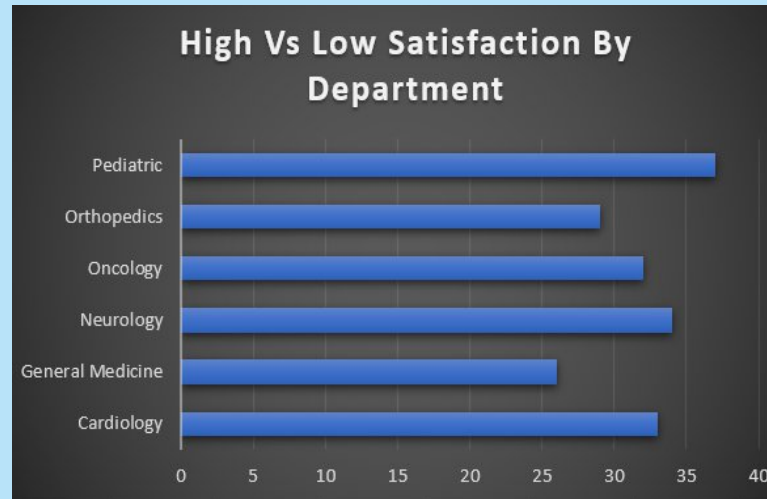
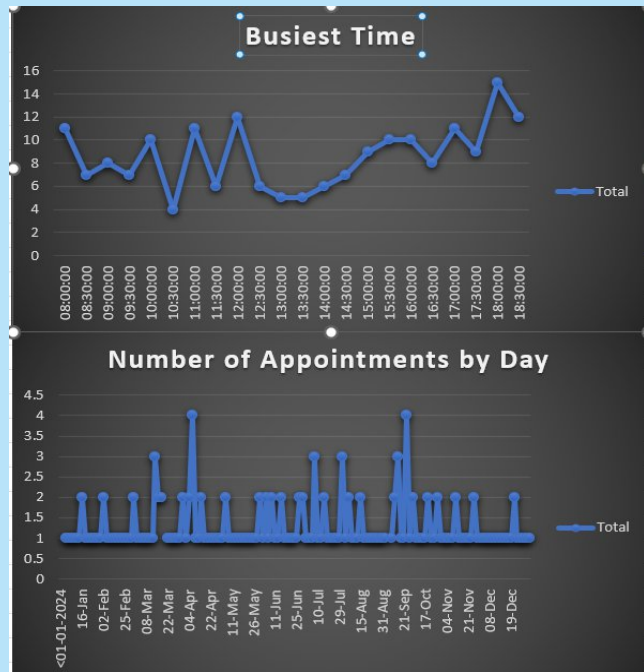
| Departments      | Count of AppointmentID |
|------------------|------------------------|
| Cardiology       | 37                     |
| Pediatric        | 35                     |
| Neurology        | 34                     |
| Orthopedics      | 30                     |
| Oncology         | 29                     |
| General Medicine | 24                     |
| Grand Total      | 189                    |
| Row Labels       | Count of AppointmentID |
| 18:00:00         | 15                     |
| 18:30:00         | 12                     |
| 12:00:00         | 12                     |
| 17:00:00         | 11                     |
| 11:00:00         | 11                     |
| 08:00:00         | 11                     |
| 16:00:00         | 10                     |
| 10:00:00         | 10                     |
| 15:30:00         | 10                     |
| 17:30:00         | 9                      |
| 15:00:00         | 9                      |
| 16:30:00         | 8                      |
| 09:00:00         | 8                      |
| 08:30:00         | 7                      |
| 09:30:00         | 7                      |
| 14:30:00         | 7                      |
| 11:30:00         | 6                      |
| 14:00:00         | 6                      |
| 12:30:00         | 6                      |
| 13:30:00         | 5                      |
| 13:00:00         | 5                      |
| 10:30:00         | 4                      |
| Grand Total      | 189                    |

| Satisfaction Level By Department |      |     |
|----------------------------------|------|-----|
|                                  | High | Low |
| Pediatric                        | 32   | 5   |
| Neurology                        | 33   | 1   |
| Cardiology                       | 31   | 2   |
| Oncology                         | 26   | 6   |
| Orthopedics                      | 21   | 8   |
| General Medicine                 | 21   | 5   |
| Grand Total                      | 164  | 27  |

| Department       | Average of UsageHours |
|------------------|-----------------------|
| Pediatric        | 4.85                  |
| Cardiology       | 4.29                  |
| Neurology        | 3.79                  |
| Orthopedics      | 3.50                  |
| Oncology         | 3.47                  |
| General Medicine | 3.41                  |
| Grand Total      | 3.89                  |



## Analyzed trends



## Key insights

### 1. Appointment Data Insights

- **Top Departments (by Appointments):**
  - Cardiology (37)
  - Pediatric (35)
  - Neurology (30)
- **Least Appointments:**
  - General Medicine (24)
- **Busiest Appointment Time:**
  - 6:00 PM (15 appointments)
  - Also busy at 11:00 AM & 12:00 PM
- **Slow Hours:**
  - 1:00 PM – 2:00 PM
- **Seasonal/Peak Trends:**
  - Spikes observed in April & September (possible health drives or seasonal trends)

### 2. Feedback/Satisfaction Data Insights

- **Highest Satisfaction (High/Low):**
  - Neurology (33/1)
  - Pediatric (32/5)
  - Cardiology (31/2)
- **Lowest Satisfaction Ratio:**
  - Orthopedics (21 High / 8 Low)
- **Overall Feedback:**
  - 164 High vs 27 Low → Generally positive feedback
- **Observation:**
  - Neurology shows **excellent patient satisfaction**

### 3. Resource Usage Data Insights

- **Top Resource Usage (Average Hours):**
  - Pediatric (4.85 hrs)
  - Cardiology (4.29 hrs)
- **Lowest Resource Usage (Average Hours):**
  - General Medicine (3.41 hrs)
  - Oncology (3.47 hrs)
- **Alignment with Demand:**
  - Higher resource usage aligns with departments having higher patient volume.

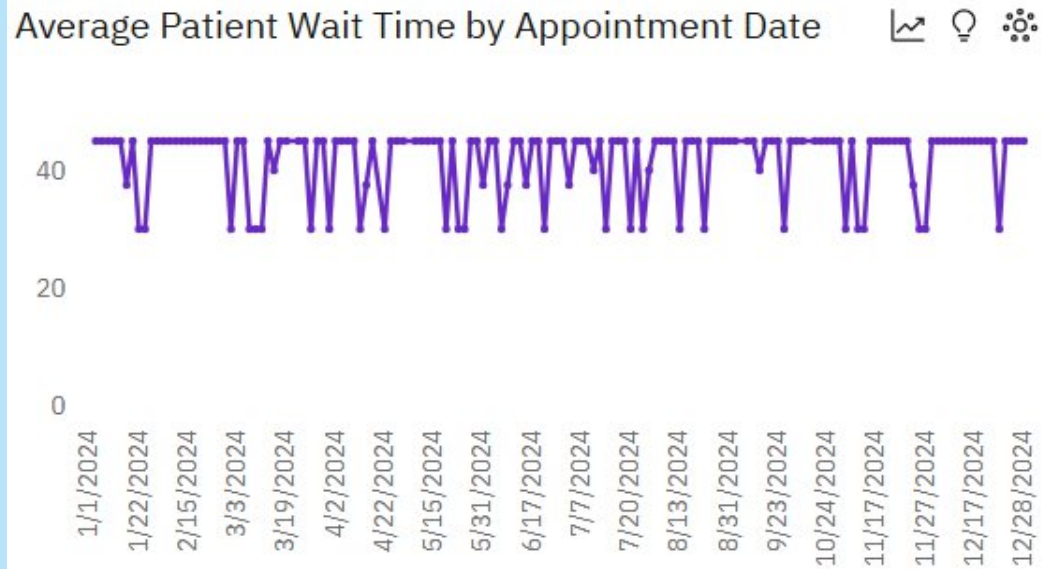
# Task 8



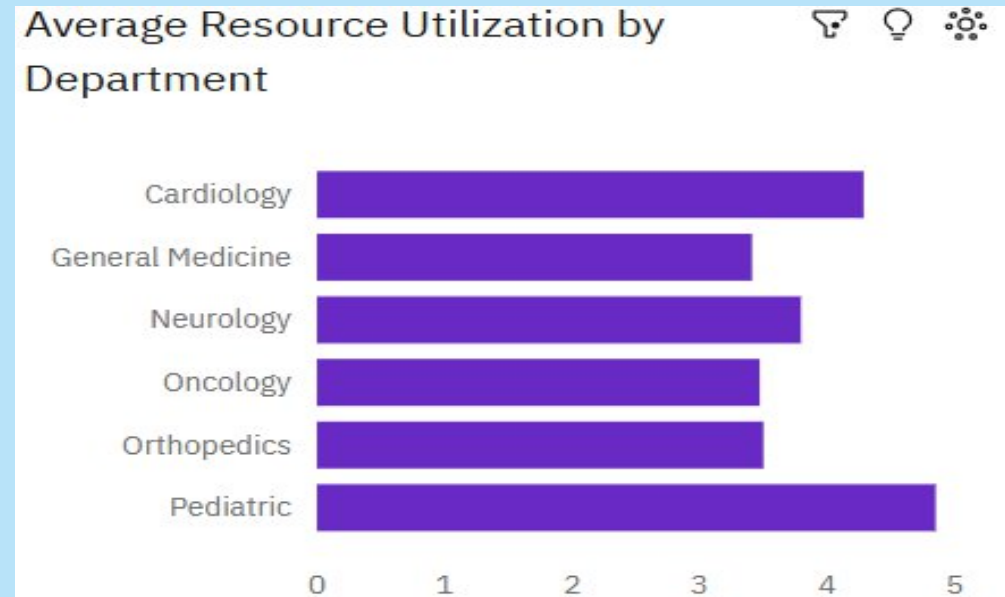
# Dashboard

Dashboards visualize key operational metrics, such as patient wait times, resource utilization, and staff productivity, enabling data-driven decision-making for improved hospital efficiency and patient experience.

Average patient wait time using a Line Chart



Bar Chart highlighting overused and underutilized resources

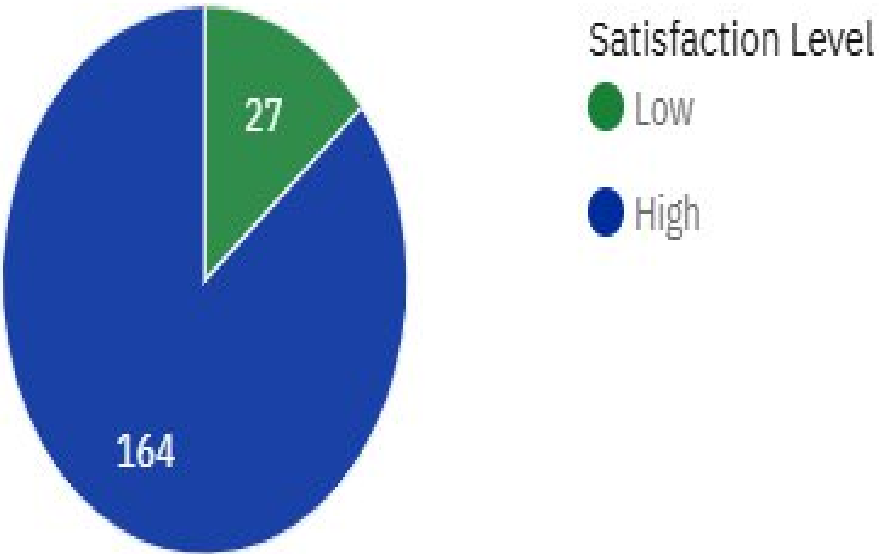




Dashboard

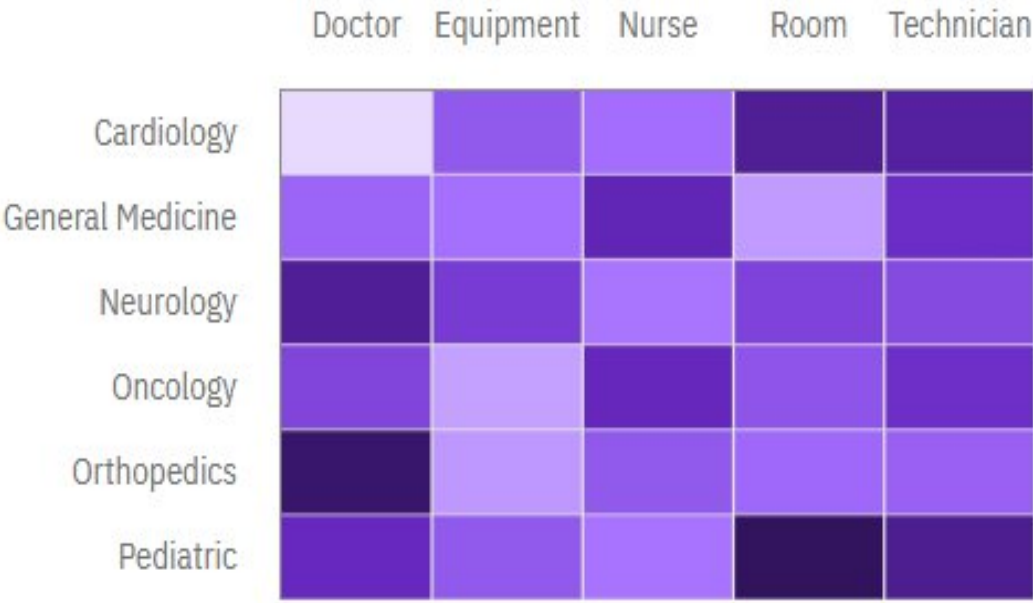
Patient feedback visualized using a Pie Chart

Overall Patient Satisfaction  
Distribution (High vs Low)



Heat Map showing the efficiencies of the departments

Resource Usage Intensity Across  
Departments



# Task 9



# Risk Management Plan

The Risk Management Plan identifies, assesses, and mitigates potential risks—such as data privacy concerns, system integration challenges, and operational inefficiencies—to ensure smooth project execution and improved patient care.

## Risks identified in the risk register

| Risk ID   | Risk Description                         | Risk Category      | Likelihood | Impact | Severity | Mitigation Strategy   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
|---|--|--------------------|------------|--------|----------|---|---------------|------------|--------------------|-------------------|--------|--------|-----------------|-----------|-----------|-------------------|---------|---------|
| R1  | Data Breach                              | Technical Risks    | 2          | 3      | 6        | Implement Strong encryption.                                  |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R2  | System Downtime                          | Technical Risks    | 2          | 3      | 6        | Regular Maintenance of  |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R3  | Stakeholder resist to change             | Stakeholder Risks  | 2          | 2      | 4        | Conduct awareness session and provide benefits early on       |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R4  | Limited Stakeholder Involvement          | Stakeholder Risks  | 1          | 2      | 2        | Conduct Regular Meetings. Prepare stakeholder engagement plan |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R5  | Staff Resistance to change               | Operational Risks  | 2          | 3      | 6        | Conduct Training Sessions. Offer Incentives                   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R6  | Software Implementation Delay            | Operational Risks  | 2          | 3      | 6        | Use Agile Methodologies                                       |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R7  | Budget Overrun                           | Operational Risks  | 1          | 3      | 3        | Conduct Time to time budget review                            |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R8  | Integration Failure with existing System | Technical Risks    | 2          | 3      | 6        | Conduct Phased integration with backup plans                  |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R9  | Unrealistic Stakeholder Expectations     | Stakeholder Risks  | 2          | 2      | 4        | Set Clear Acceptance Criteria                                 |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| R10   | Lack of Skillset required by IT Team     | Technical Risks    | 2          | 3      | 6        | Arrange Necessary Training and external support               |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
|   |  |                    |            |        | 49       |   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| Total Risk Score  |  |                    |            |        |          |   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| <table><tr><th>Risk Category</th><th>Likelihood</th><th>Impact Risk Rating</th></tr><tr><td>Operational risks</td><td>1. Low</td><td>1. Low</td></tr><tr><td>Technical risks</td><td>2. Medium</td><td>2. Medium</td></tr><tr><td>Stakeholder risks</td><td>3. High</td><td>3. High</td></tr></table> |  |                    |            |        |          |   | Risk Category | Likelihood | Impact Risk Rating | Operational risks | 1. Low | 1. Low | Technical risks | 2. Medium | 2. Medium | Stakeholder risks | 3. High | 3. High |
| Risk Category   | Likelihood                               | Impact Risk Rating |            |        |          |   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| Operational risks   | 1. Low                                   | 1. Low             |            |        |          |   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| Technical risks   | 2. Medium                                | 2. Medium          |            |        |          |   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |
| Stakeholder risks   | 3. High                                  | 3. High            |            |        |          |   |               |            |                    |                   |        |        |                 |           |           |                   |         |         |

## Categorized risks based on the Risk Assessment Matrix

| Risk ID             | Risk Description                         | Likelihood | Impact | Severity | Risk Level |
|---------------------|--|------------|--------|----------|------------|
| R1                  | Data Breach                              | 2          | 3      | 6        |            |
| R2                  | System Downtime                          | 2          | 3      | 6        |            |
| R3                  | Stakeholder resist to change             | 2          | 2      | 4        |            |
| R4                  | Limited Stakeholder Involvement          | 1          | 2      | 2        |            |
| R5                  | Staff Resistance to change               | 2          | 3      | 6        |            |
| R6                  | Software Implementation Delay            | 2          | 3      | 6        |            |
| R7                  | Budget Overrun                           | 1          | 3      | 3        |            |
| R8                  | Integration Failure with existing System | 2          | 3      | 6        |            |
| R9                  | Unrealistic Stakeholder Expectations     | 2          | 2      | 4        |            |
| R10                 | Lack of Skillset required by IT Team     | 2          | 3      | 6        |            |
| Scoring             |  |            |        |          |            |
| Watch List Low      |  |            | 1-2    |          |            |
| Watch List Moderate |  |            | 3-4    |          |            |
| Urgent List High    |  |            | 6-9    |          |            |

## Elements identified in the SWOT Analysis

### Strength (Internal)

1. Strong leadership support.
2. Qualified and Experienced Medical Staff.
3. Highly skilled IT Team.
4. Existing experience with healthcare operations

### Weakness (Internal)

1. Manual workflows in appointment and check-in processes.
2. Lack of effective inter-department communication.
3. Inefficient resource allocation.
4. Limited digital skills and dependence on manual processes.

### Opportunity (External)

1. Process automation.
2. Enhance patient satisfaction.
3. Staff upskilling and digital literacy programs.
4. Use of data for decision-making and future improvements

### Threats

1. Data security risks (data breaches).
2. Stakeholder resistance to change.
3. Budget overruns during implementation.
4. Potential integration challenges with existing hospital IT systems.

## Key insights

1. **Data security** is a top risk — use encryption and audits.
2. **Staff resistance** may slow progress — training and incentives are needed.
3. **IT skill gaps** can cause delays — provide early upskilling.
4. **System integration** has high risk — use phased rollout and backups.
5. **Budget overruns** are possible — monitor spending regularly.
6. **Low stakeholder involvement** can harm progress — conduct regular meetings.
7. **Not all risks are high**, but even low risks should be tracked.

# Task 10





# Risk Mitigation Plan

The Risk Mitigation Plan identifies potential risks, assesses their impact, and implements strategies to minimize disruptions, ensuring smooth hospital operations and improved patient care.

## Strategies to mitigate risks

| Risk ID | Risk Description                         | Risk Category     | Likelihood | Impact | Severity | Mitigation Strategy   |
|---------|--|-------------------|------------|--------|----------|---|
| R1      | Data Breach                              | Technical Risks   | 2          | 3      | 6        | Implement Strong encryption.                                  |
| R2      | System Downtime                          | Technical Risks   | 2          | 3      | 6        | Regular Maintenance of system                                 |
| R3      | Stakeholder resist to change             | Stakeholder Risks | 2          | 2      | 4        | Conduct awareness session and provide benefits early on       |
| R4      | Limited Stakeholder Involvement          | Stakeholder Risks | 1          | 2      | 2        | Conduct Regular Meetings. Prepare stakeholder engagement plan |
| R5      | Staff Resistance to change               | Operational Risks | 2          | 3      | 6        | Conduct Training Sessions. Offer Incentives                   |
| R6      | Software Implementation Delay            | Operational Risks | 2          | 3      | 6        | Use Agile Methodologies                                       |
| R7      | Budget Overrun                           | Operational Risks | 1          | 3      | 3        | Conduct Time to time budget review                            |
| R8      | Integration Failure with existing System | Technical Risks   | 2          | 3      | 6        | Conduct Phased integration with backup plans                  |
| R9      | Unrealistic Stakeholder Expectations     | Stakeholder Risks | 2          | 2      | 4        | Set Clear Acceptance Criteria                                 |
| R10     | Lack of Skillset required by IT Team     | Technical Risks   | 2          | 3      | 6        | Arrange Necessary Training and external support               |

## Factors included in your Contingency Plan

### Contingency plans-

| Risk ID | Contingency Plan  |
|---------|---|
| R1      | In case of a breach, isolate affected systems, inform IT, conduct root cause analysis, apply fixes.   |
| R2      | If downtime happens, switch to manual processes, activate backups, and inform IT to restore quickly.  |
| R5      | If staff still resist, assign peer mentors/champions, conduct open Q&A, adjust training style.        |
| R6      | If delayed, activate buffer time, focus on priority tasks, notify management, and escalate blockers.  |
| R8      | If failure happens, roll back to stable version, isolate issue, and reattempt with improved checks.   |
| R10     | If skills gap is critical, hire external experts temporarily, provide fast-track training internally. |

## Prioritized risks based on Visual Risk Matrix

| Risk ID             | Risk Description                         | Likelihood | Impact | Severity | Risk Level |
|---------------------|--|------------|--------|----------|------------|
| R1                  | Data Breach                              | 2          | 3      | 6        |            |
| R2                  | System Downtime                          | 2          | 3      | 6        |            |
| R3                  | Stakeholder resist to change             | 2          | 2      | 4        |            |
| R4                  | Limited Stakeholder Involvement          | 1          | 2      | 2        |            |
| R5                  | Staff Resistance to change               | 2          | 3      | 6        |            |
| R6                  | Software Implementation Delay            | 2          | 3      | 6        |            |
| R7                  | Budget Overrun                           | 1          | 3      | 3        |            |
| R8                  | Integration Failure with existing System | 2          | 3      | 6        |            |
| R9                  | Unrealistic Stakeholder Expectations     | 2          | 2      | 4        |            |
| R10                 | Lack of Skillset required by IT Team     | 2          | 3      | 6        |            |
| Scoring             |  |            |        |          |            |
| Watch List Low      |  | 1-2        |        |          |            |
| Watch List Moderate |  | 3-4        |        |          |            |
| Urgent List High    |  | 6-9        |        |          |            |

## Key insights from Risk Mitigation Plan

### Key Insights from Risk Mitigation Plan

- **High-severity risks** such as data breaches and integration failures require immediate attention.
- **Training and awareness sessions** are crucial to reduce staff and stakeholder resistance.
- **System downtime and delays** can be minimized with regular maintenance and agile implementation.
- **Contingency plans** ensure hospital operations continue even if risks occur.
- **Technical risks** were most common, highlighting the need for strong IT support.
- A **visual risk matrix** helped prioritize risks clearly for better decision-making.

## Conclusion

The proposed solutions for HealthFirst Care aim to enhance operational efficiency, improve patient satisfaction, and streamline internal processes. Through detailed requirement gathering, process analysis, and data-driven insights, the project identifies key areas of improvement such as appointment scheduling, resource allocation, and interdepartmental communication. By implementing modern systems, ensuring stakeholder alignment, and applying risk mitigation strategies, the hospital is well-positioned to deliver faster, more reliable, and patient-centered care. These improvements will lead to reduced wait times, better resource utilization, and an overall improvement in the quality of healthcare services.