

# Enhancing Operational Efficiency in a Multispecialty Hospital

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# Executive Summary

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**Outline the problem, key insights, and recommended actions in 6 bullet points.**

**Problem:**

1. Long wait times and scheduling conflicts

**Key insights:**

1. Peak congestion: 11 AM–1 PM & 3–6 PM
2. Lower satisfaction in Oncology & Gen. Medicine

**Recommended actions:**

1. Automate scheduling & self-check-in
2. Reallocate staff at peak hours
3. Train staff, phased rollout for adoption

# Introduction

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**Summarize the opportunity, describe the approach, and outline the key questions or hypotheses to be analyzed in 6 bullet points.**

**Opportunity:**

1. Reduce patient wait times
2. Improve resource allocation

**Approach:**

1. Analyze appointment, feedback & resource data
2. Map workflows (As-Is vs To-Be)

**Key questions/hypotheses:**

1. Will automation cut wait times by ~20%?
2. Can better resource use improve satisfaction?

# Business Objectives

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## Areas of improvement in 6 bullet points:

1. Cut average wait times by 20%
2. Eliminate double bookings
3. Improve patient satisfaction
4. Optimize resource utilization
5. Strengthen interdepartmental communication
6. Ensure data security & compliance



# Methodology

# Requirements Gathering: Business Requirement Document (BRD)

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## **Problem statement:**

HealthFirst Care struggles with long patient wait times, frequent double bookings, and resource shortages during peak hours. These issues are worsened by manual scheduling processes and poor communication across departments, leading to patient dissatisfaction and operational inefficiencies.

## **Key requirements to improve operational efficiency:**

- Real-time scheduling with conflict prevention
- Automated SMS/Email updates for patients
- HIS integration for resource tracking
- Analytics dashboard for feedback & utilization



# Requirements Gathering: Business Requirement Document (BRD)

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## **Constraints:**

The project faces budget limitations that restrict large-scale system upgrades. Implementation must therefore focus on phased rollouts and prioritization of critical modules first.

## **Acceptance criteria:**

- Average patient wait times reduced by 20% within 12 months
- Automated system prevents double bookings
- Patients receive real-time SMS/Email notifications
- Positive feedback scores increase across departments



# Requirements Gathering: Requirement Traceability Matrix (RTM)

Requirement ID	Requirement Description	Priority (MoSCoW)	Stakeholder(s)	Project Objective	Related Data File	Status
FR1	Real-time appointment scheduling with conflict prevention	Must have	Admin staff, Patients	Reduce wait times & scheduling errors	appointment_data.csv	Approved
FR2	Automated SMS/Email updates for delays, cancellations, reminders	Must have	Patients, Admin staff	Improve communication & satisfaction	feedback_data.csv	Approved
FR3	Integrated HIS for resource tracking (doctors, rooms, equipment)	Must have	Doctors, Nurses, Admin Staff	Optimize resource allocation	resource_data.csv	Approved
FR4	Analytics dashboard for patient feedback & resource usage	Should have	IT Team, Management	Support continuous improvement	feedback_data.csv, resource_data.csv	Pending
NFR1	Secure patient data handling (HIPAA/GDPR compliance)	Must have	IT Team, Patients	Protect sensitive data	-	Approved

# Stakeholder Analysis and Engagement Plan

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## **Stakeholders:**

Patients, Doctors, Nurses, Administrative Staff, IT Teams, Hospital Leadership, Support Staff

## **Stakeholders' influence:**

- High influence & high interest (Key players): Doctors, Nurses, Admin Staff
- High influence & low interest (Keep satisfied): IT Teams, Hospital Leadership
- Low influence & high interest (Keep informed): Patients
- Low influence & low interest (Monitor): Support Staff

# Stakeholder Analysis and Engagement Plan

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## **Stakeholder engagement strategies:**

- Regular meetings with key players (doctors, admin staff)
- Training & support programs for smooth adoption
- Involving leadership in decision checkpoints
- Patient feedback loops via surveys & kiosks

## **Stakeholder communication strategies:**

- Weekly progress reports for leadership
- Bi-weekly team huddles for admin & nurses
- Monthly newsletters and dashboards for all staff
- Real-time notifications for patients (SMS/Email)

# Scope Management Plan

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## **In-scope activities:**

- Automated appointment scheduling
- Real-time patient notifications (SMS/Email)
- HIS dashboards for resource tracking
- Analytics dashboards for feedback/performance
- Stakeholder training sessions

# Scope Management Plan

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## **Out-of-scope activities:**

- Clinical treatment & diagnosis
- Construction or facility expansion
- Hiring permanent staff
- Insurance processing

# Scope Management Plan

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## **Assumptions:**

- Patients have mobile/email access
- Stakeholders join testing & adoption
- Real-time resource data available
- Leadership approves upgrades

# Scope Management Plan

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## **Constraints:**

- Budget limits for IT systems
- Legacy system integration challenges
- HIPAA/GDPR compliance
- Limited staff availability during rollout



# Scope Management Plan

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## Phases in the Work Breakdown Structure (WBS):

WBS ID	Task Name	Task Description	Milestone
1	Project Initiation	Approvals, kickoff, stakeholder alignment	BRD approved
2	Requirements Gathering	Collect requirements, finalize RTM	RTM signed off
2.1	Stakeholder Engagement	Conduct analysis & engagement plan	Stakeholder plan approved
3	Scheduling System	Build scheduling with conflict prevention	Scheduling module ready
3.1	Notification System	Implement SMS/Email alerts	Notifications live
4	Testing & Training	System testing + staff training	UAT complete
5	Go-Live Deployment	Full rollout across hospital	System live

# Scope Management Plan

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## **Scope change management:**

Scope change process -

- Request submitted via change form
- Project Manager logs & reviews feasibility
- Change Control Board evaluates alignment, budget, compliance
- Approve/reject → update RTM/WBS if approved
- Notify all stakeholders of changes

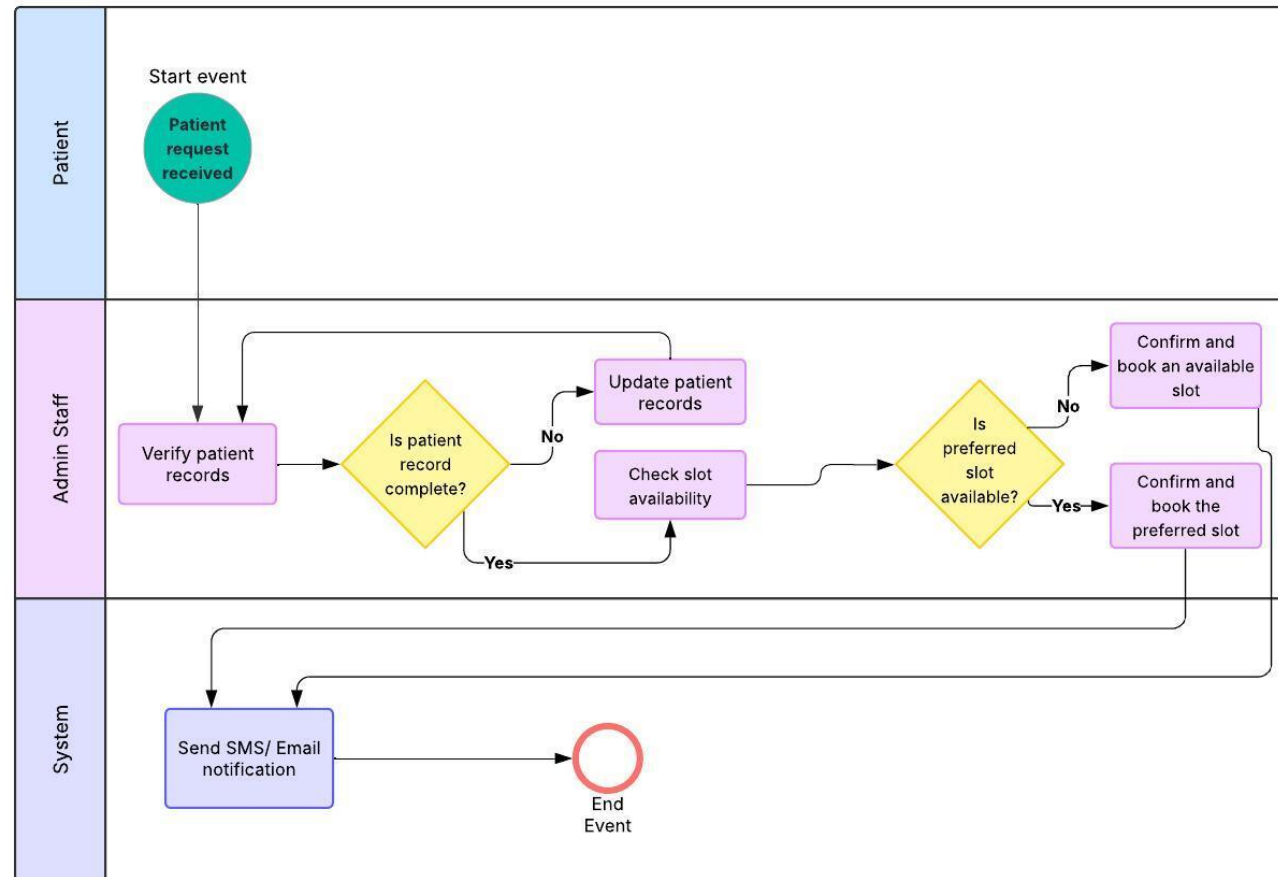
# Process Mapping

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Process	As-Is Model	To-Be Model
Appointment scheduling	Patient request → Manual appointment booking → Admin confirmation → Delays/errors → Patient notified	Patient request → Automated scheduling → Conflict detection → Confirmation via SMS/Email
Patient Check-In	Arrival → Manual paperwork → Waiting for verification → Long wait lines → Check-in complete	Arrival → Self-service kiosk check-in → HIS verification → Immediate notification to departments → Check-in complete
Interdepartmental Communication	Admin identifies resource needs → Manual communication with IT → Delays in resolving issues	Admin identifies resource needs → Input into system → IT auto-alert → Task resolved & verified

# Advanced Process Mapping

## Detailed workflow using the advanced BPMN model:



# Advanced Process Mapping

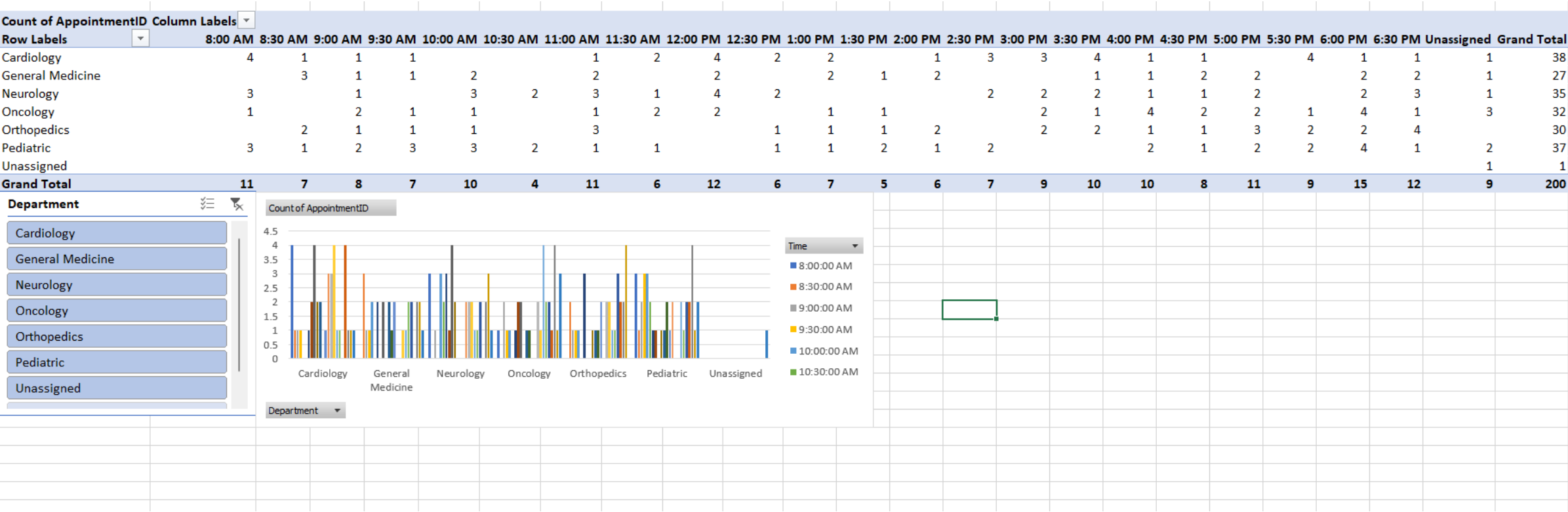
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## Stakeholder responsibility using the Swimlane diagram:

Swimlane (Stakeholders)	Task/Activity	Description
Patient	Request appointment, check-in	Initiates booking/check-in, receives notifications
Admin Staff	Verify records, confirm bookings, manage requests	Handles scheduling, approvals, record updates
Doctors/Nurses	Provide services, respond to alerts	Receive allocations, prepare for consultation
IT/System	Automated scheduling, HIS verification, notifications	Runs backend automation, sends alerts
Hospital Leadership	Oversight	Reviews performance dashboards & approves changes

# Data Analysis

## Trends using a Pivot Table:



# Data Analysis

## Trends analyzed from the Pivot Table:

Count of Feedback Score		Column Labels	
Row Labels	High	Low	Grand Total
Cardiology	41	2	43
General Medicine	22	5	27
Neurology	31	1	32
Oncology	23	8	31
Orthopedics	22	7	29
Pediatric	32	4	36
Grand Total	171	27	198

Department

Cardiology

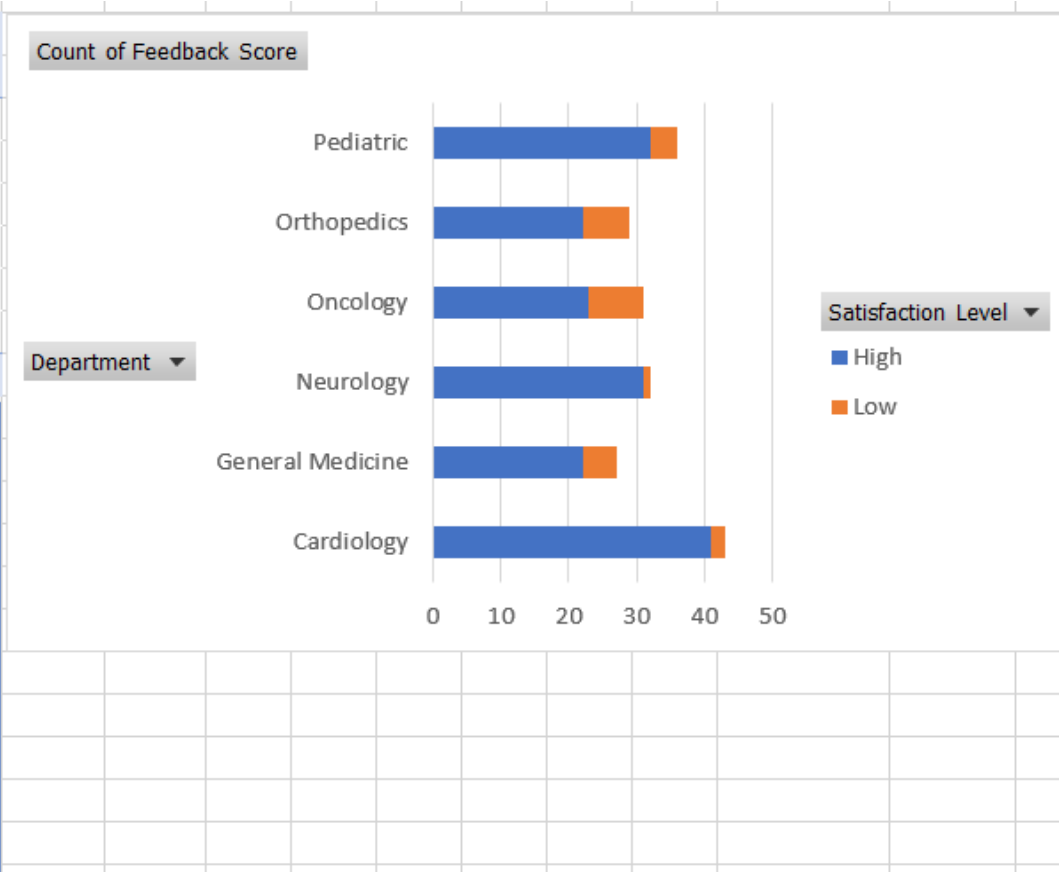
General Medicine

Neurology

Oncology

Orthopedics

Pediatric





# Data Analysis

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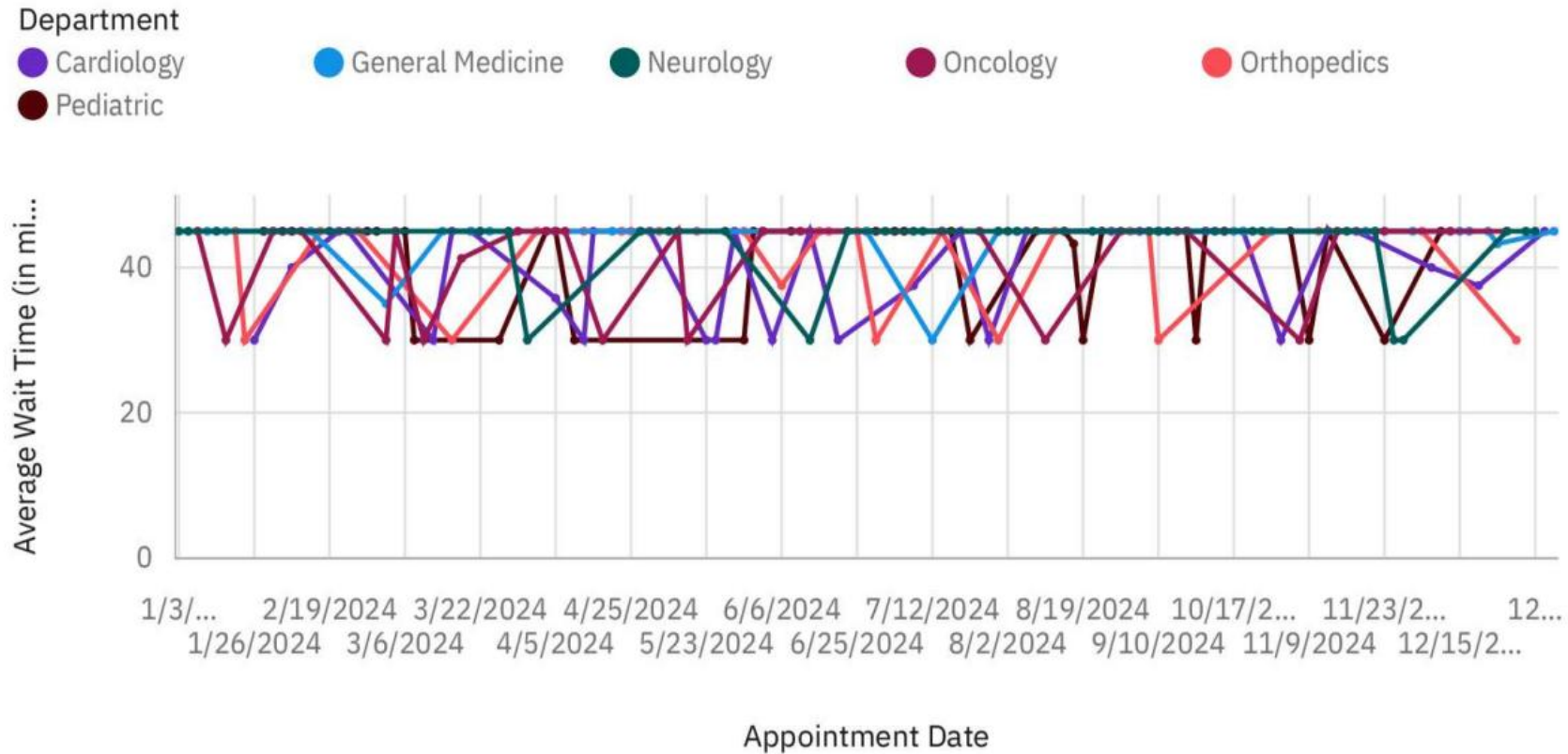
## Key insights:

- Peak demand observed late morning and afternoon, esp. Cardiology & Pediatrics.
- Feedback mostly positive (171 high vs 27 low), but Oncology & General Medicine show dissatisfaction.
- Resource usage averages 3.9 hrs; Pediatrics & Cardiology show highest demand.
- “Unassigned” entries in resources reflect incomplete data collection.
- Misalignment between patient demand and resources causes bottlenecks.

# Data Visualization

## Average patient wait time using a horizontal bar chart:

Patient Wait Time Trends

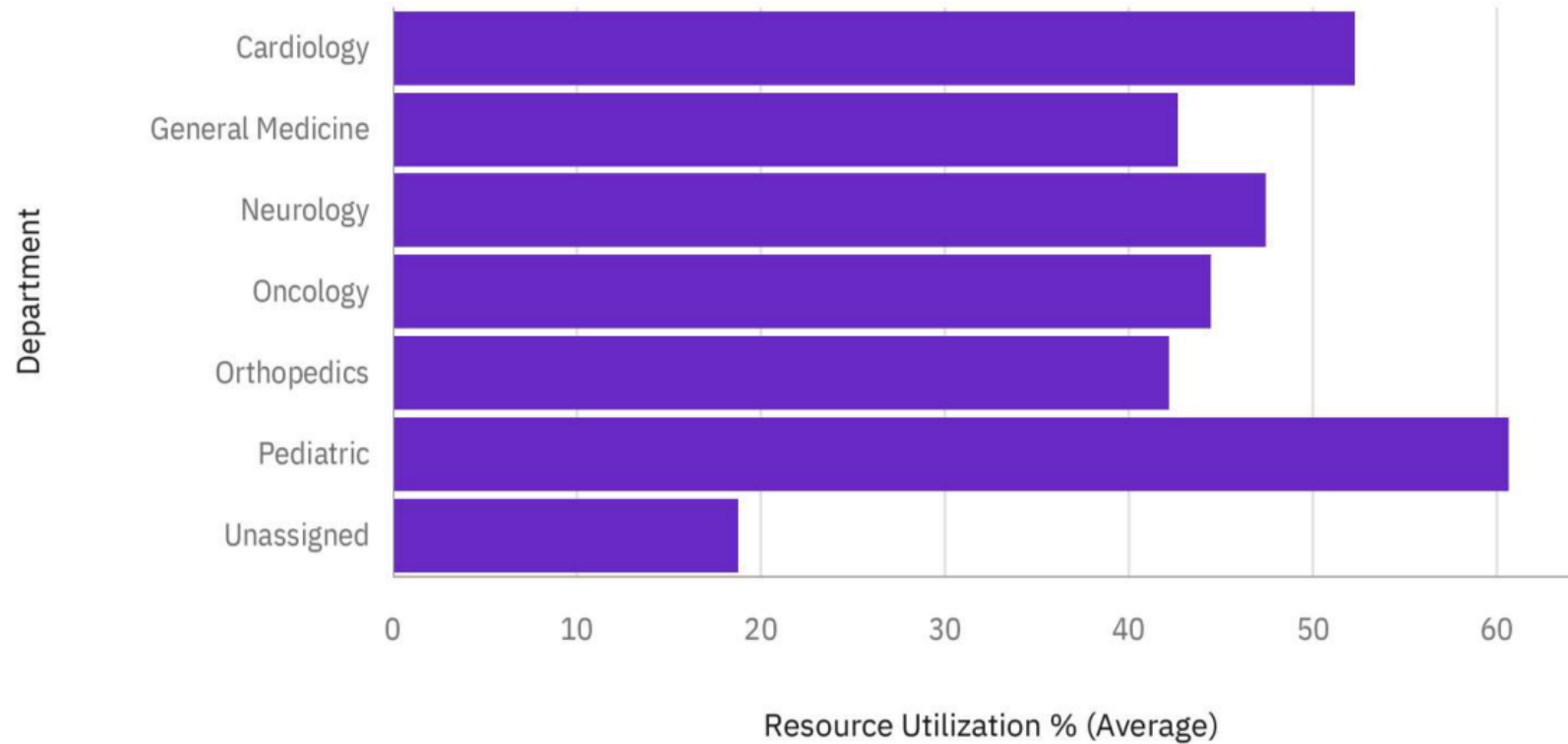


# Data Visualization

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**Bar chart highlighting overused and underutilized resources:**

Resource Utilization % by Department



# Data Visualization

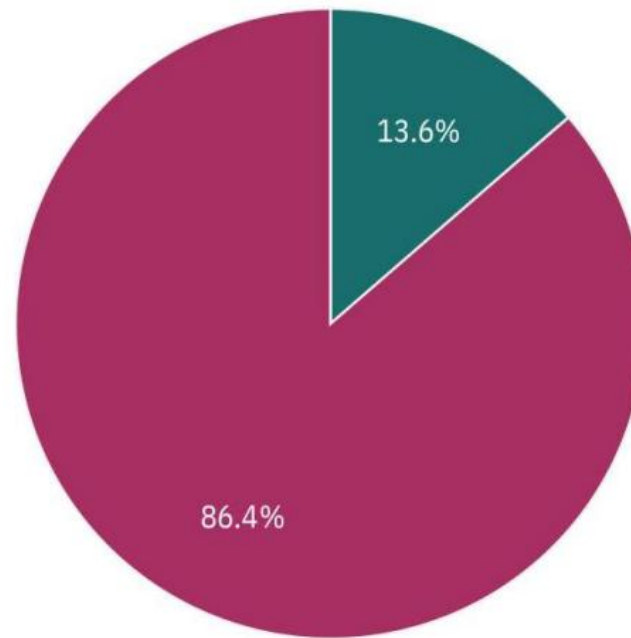
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## Patient feedback visualized using a Pie Chart:

Patient Satisfaction Levels

Satisfaction Level

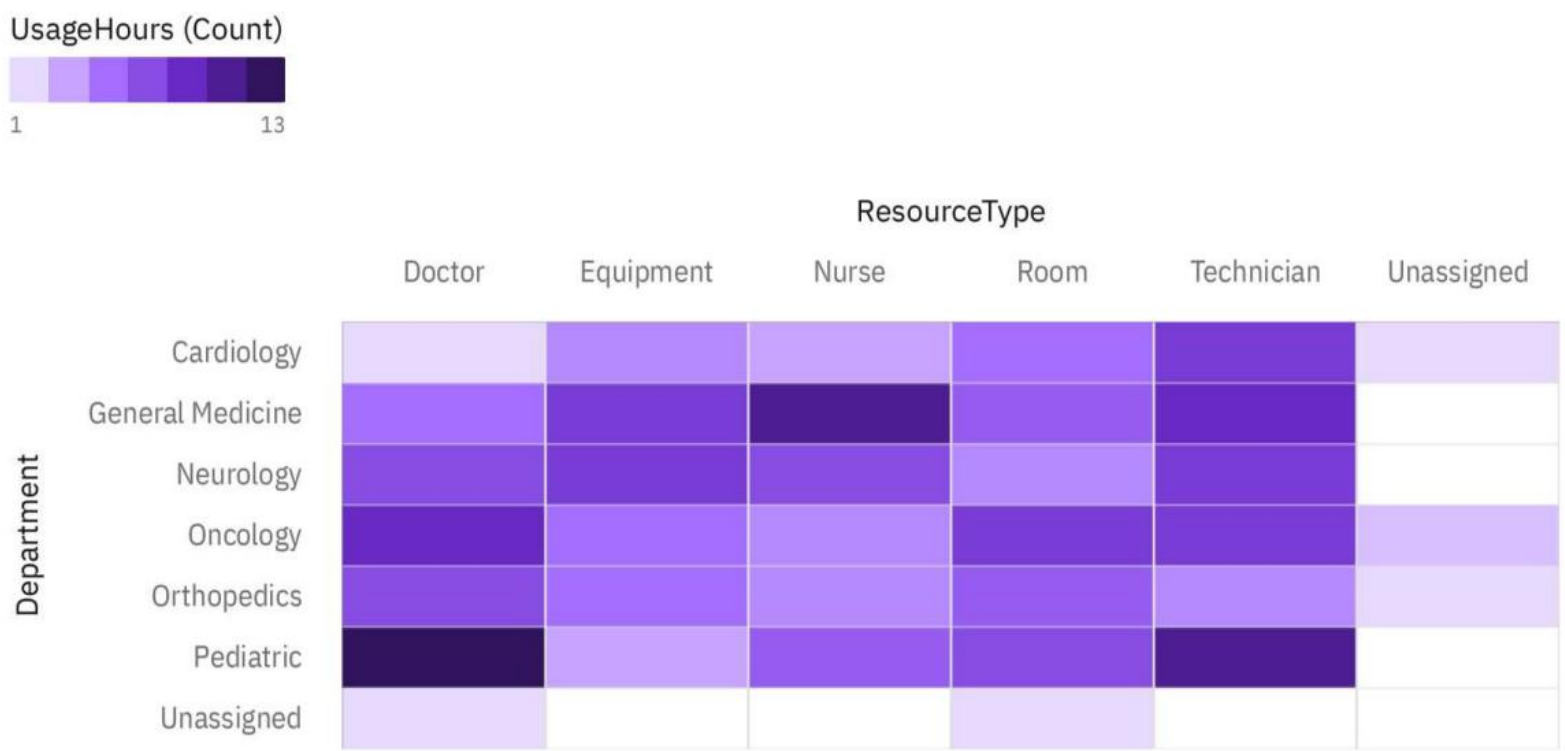
● Low ● High



# Data Visualization

## Heat Map showing the efficiency of departments:

Resource Usage Across Departments



# Risk Management Plan

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## Risks identified in the risk register:

Risk ID	Risk Description	Category	Likelihood	Impact	Severity	Mitigation Strategy
R1	Double bookings and scheduling conflicts in peak hours (Cardiology, Orthopedics)	Operational	High	High	High	Automated scheduling with conflict detection; monitor peak hours closely
R2	Long patient wait times (avg 30–45 mins, esp. Cardiology)	Operational	High	High	High	Self-check-in kiosks, optimize staff scheduling
R3	Manual data entry errors causing “Unassigned” records	Operational	Medium	Medium	Medium	Standardize data entry; mandatory fields
R4	System downtime disrupting scheduling/notifications/HIS	Technical	Medium	High	High	Backup servers, 24/7 IT support, regular maintenance
R5	Data breach of patient information (HIPAA/GDPR risk)	Technical	Low	High	Medium	Encrypt data, audits, strict access controls

# Risk Management Plan

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Risks categorized based on the Risk Assessment Matrix:

Likelihood/Impact	Low Impact	Medium Impact	High Impact
High Likelihood		R6 (Staff resistance)	R1 (Double bookings), R2 (Long wait times), R8 (Budget limitations)
Medium Likelihood		R3 (Data entry errors), R7 (Poor communication)	R4 (System downtime)
Low Likelihood			R5 (Data breach)



# Risk Management Plan

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## Elements identified in the SWOT analysis:

### Strengths

- Strong leadership and engaged stakeholders
- Reliable datasets and documentation (BRD, RTM, dashboards)
- Patient-centered goals (reduce wait times, improve satisfaction)
- Planned HIS integration

### Weaknesses

- Manual scheduling and check-ins still dominate
- Data silos and incomplete entries
- Budget constraints slowing upgrades
- Staff training gaps

### Opportunities

- Automating scheduling and check-in processes
- Expanding dashboards and analytics
- Staff training programs for adoption
- Cloud-based solutions for scalability

### Threats

- Data security and compliance risks
- Staff resistance to change
- High patient volumes straining resources
- Legacy systems complicating integration

# Risk Management Plan

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## Key insights from the Risk Management Plan:

- Scheduling conflicts, long wait times, and downtime are the highest risks.
- Medium risks include manual errors, poor communication, and data security.
- Proactive mitigation like automation, training, and encryption can lower impact.
- Strategic opportunities (cloud adoption, analytics) can offset weaknesses.
- Balanced risk management ensures project continuity and patient satisfaction.

# Risk Mitigation Plan

## Strategies to mitigate risks:

Risk ID	Risk Description	Category	Likelihood	Impact	Severity	Mitigation Strategy
R1	Double bookings and scheduling conflicts in peak hours (Cardiology, Orthopedics)	Operational	High	High	High	Introduce AI-driven scheduling system with real-time conflict alerts; implement a cap on overbooking
R2	Long patient wait times (avg 30–45 mins, esp. Cardiology)	Operational	High	High	High	Redesign appointment slots; add buffer times; deploy virtual queue management for updates
R3	Manual data entry errors causing “Unassigned” records	Operational	Medium	Medium	Medium	Automate data capture (OCR, drop-downs); enforce validation rules; staff refresher training
R4	System downtime disrupting scheduling/notifications/HIS	Technical	Medium	High	High	Set up cloud-based redundancy; automated failover systems; conduct monthly disaster recovery drills
R5	Data breach of patient information (HIPAA/GDPR risk)	Technical	Low	High	Medium	Apply multi-factor authentication; regular penetration testing; staff cybersecurity awareness training

# Risk Mitigation Plan

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## Factors included in the Contingency Plan:

Risk ID	Contingency Plan
R1	If double bookings occur, temporarily increase admin support, manually resolve conflicts, and alert patients with revised times.
R2	If wait times exceed thresholds, trigger overflow protocol by reassigning patients to available doctors/nurses.
R3	In case of major data entry errors, isolate incorrect records, initiate emergency data reconciliation, and notify impacted staff.
R4	During downtime, activate backup servers and manual scheduling sheets until system recovery is confirmed.
R5	If a data breach occurs, isolate affected systems, notify compliance officers, launch forensic investigation, and implement immediate security patches.

# Risk Mitigation Plan

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## Risks prioritized based on the Visual Risk Matrix:

Priority Level	Risk ID & Description	Rationale	Action Urgency
High	R1: Double bookings, R2: Long wait times, R4: System downtime	Directly impact patient flow and satisfaction	Immediate
Medium	R3: Data entry errors	Causes inefficiencies and “Unassigned” cases but recoverable	Moderate
Medium	R5: Data breach	Regulatory/compliance risk, less frequent but severe	High

# Risk Mitigation Plan

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## Key insights from the Risk Mitigation Plan:

- Automated scheduling, redesigned slots, and AI monitoring reduce patient-facing risks.
- Contingency plans ensure quick recovery from breaches, downtime, and booking errors.
- Risk prioritization highlights scheduling, wait times, and system reliability as urgent focus areas.
- Balanced approach combines proactive strategies (automation, training, encryption) with reactive measures (backups, overflow protocols).
- Patient safety, compliance, and satisfaction remain central to mitigation efforts.

A photograph of a laptop on a wooden table in a dimly lit cafe. The background is filled with warm, out-of-focus lights, creating a bokeh effect. The laptop screen displays a network diagram with blue nodes and connecting lines. A white mug is visible to the right of the laptop.

# Findings and Recommendations

# Key Findings

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1. Appointment scheduling inefficiencies created double bookings and longer patient wait times.
2. Data analysis revealed peak load pressures in Cardiology and Pediatrics, and staff bottlenecks during check-ins.
3. Risk assessment showed high-severity risks in scheduling conflicts, downtime, and compliance vulnerabilities.



# Key Recommendations

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1. Deploy AI-driven scheduling and self-check-in kiosks to reduce conflicts and waiting.
2. Automate data entry and validation to eliminate manual errors.
3. Strengthen IT infrastructure with redundancy, failover systems, and disaster recovery drills.
4. Enhance cybersecurity with multi-factor authentication and regular training.

# Conclusion

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## **Provide a summary of observations in 3–5 bullet points.**

1. HealthFirst Care's challenges are rooted in manual workflows, siloed data, and peak-hour inefficiencies.
2. Advanced BPMN models and swimlane mapping clarified stakeholder responsibilities and streamlined processes.
3. Data insights highlighted critical pain points in wait times, satisfaction, and resource utilization.
4. Risk management and mitigation strategies addressed both operational and technical threats proactively.
5. Collectively, these improvements ensure reduced patient delays, higher satisfaction, and stronger organizational resilience.

**A P P E N D I X**

# Appendix

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Cognos  
dashboard