Assignment Cover Sheet USF

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Project Title	GoodMead Hospital (HMS) Team Number 6
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Project Details

Project Description

HMS Project Lifecycle:

The GoodMead Hospital Management System (HMS) project is a key initiative launched under GoodMead Hospital's comprehensive e-business modernization strategy. Located in a major metropolitan area, the hospital serves diverse medical domains. To address inefficiencies in existing systems and processes, the HMS project aims to develop a cloud-based, internet-enabled platform that enhances operational efficiency, regulatory compliance, and patient care delivery.

Approved by the hospital board and executed in partnership with consulting firm MethodScience, the HMS project is managed by a dedicated team using a **Composite** Agile Methodology (CAMS). The project lifecycle began with strategic planning, stakeholder engagement, and a detailed review of current processes including patient admissions, staff scheduling, diagnostics, inventory management, and data privacy requirements. Emphasis was placed on enterprise architecture, legal compliance, and collaboration with external entities such as laboratories and pharmacies.

The design and development phases adopt UML 2.5 standards, focusing on usability, system accessibility, and secure data handling. Iterative development cycles are complemented by continuous testing—both internal (alpha) and external (beta)—to ensure quality, performance, and user satisfaction.

The deployment phase is planned in stages, beginning with the Outpatient Department (OPD) and expanding hospital wide. Post-implementation, the HMS will be continuously monitored, with support for optional extensions such as **telemedicine**, **multimedia integration**, and **NoSQL database** capabilities for unstructured data and analytics.

The HMS project is designed to provide measurable operational benefits, improved user experiences, and a scalable foundation for future technological enhancements at GoodMead Hospital.

Overview:

GoodMead is a prominent, multidisciplinary hospital. It offers a wide range of healthcare services including pediatrics, gynecology and obstetrics, orthopedics, radiology, dentistry, sports medicine, and more. In a bid to modernize its operations, the hospital has undertaken a comprehensive review of its current processes and information systems as part of a strategic e-business transformation initiative.

Purpose of the Project:

Following the review, GoodMead's board has commissioned the development of a cloud-based, fully integrated Hospital Management System (HMS). This software solution will streamline and digitize all current and future clinical, administrative, and support operations within the hospital. The project's goals are to increase operational efficiency, ensure regulatory compliance, enhance patient care, and support collaboration with external healthcare entities and service providers.

Scope of the Project:

The HMS initiative encompasses the following key functional areas:

Patient services include registration, medical records management, diagnostics, outpatient scheduling, and emergency services.

Clinical operations involving surgical scheduling, pre- and post-operative workflows, legal documentation, and integration with external labs.

Administrative systems include staff scheduling, resource allocation, facilities management, and financial oversight.

Interoperability with external laboratories, pharmacies, government services, and research institutions.

Compliance and security, especially regarding patient data privacy under EMR (Electronic Medical Records) regulations.

Multimedia support through the integration of a NoSQL database to manage unstructured data such as videos, emails, audio consultations, and medical journals.

Strategic Objectives:

Optimize hospital operations and reduce reliance on outdated manual and fragmented digital tools.

Create an inclusive, accessible, and user-friendly platform compliant with government accessibility standards.

Support remote consultations through high-speed, multimedia-capable systems.

Provide transparency and measurable success through operational metrics and performance dashboards.

Enhance patient and staff experience with seamless digital services across departments.

Technology and Methodology:

HMS will be developed using an object-oriented software engineering approach and designed with UML 2.5 standards.

Tools such as StarUML and Microsoft Visio will support modeling and design.

The implementation platform (e.g., .NET or J2EE) and cloud infrastructure are to be finalized by the technical architecture team.

A NoSQL database will handle unstructured multimedia data.

The development process will follow Composite Agile Methodology (CAMS), which ensures iterative development, continuous feedback, and stakeholder engagement.

Comprehensive testing (alpha and beta) will be conducted both internally and externally in an incremental manner.

Root Cause Analysis

SWOT Analysis:

Strengths

- Strong backing and approval from the hospital board and leadership.
- Partnership with a reputable consulting firm, Method Science.

- Cloud-based design ensures scalability, flexibility, and remote access.
- Structured project governance with a project director, three managers, and a cross-functional team.
- Adopting standardized modeling tools (UML 2.5, StarUML) and Agile methodologies (CAMS).
- Clear goals of improving patient care, resource use, and regulatory compliance.

Weaknesses

- Absence of existing software architecture within the hospital.
- Over-reliance on manual administrative processes (e.g., whiteboards, diaries, Access DB).
- Many procedures, particularly surgical workflows, remain undocumented.
- Technology stack undecided (.NET vs J2EE) may cause delays.
- Resistance to change from staff unfamiliar with IT systems.

Opportunities

- Establishing GoodMead as a benchmark for hospital digital transformation.
- Integration with external entities (labs, pharmacies, emergency services) to enhance collaboration.
- Remote consultations via video/audio enhance outreach and reduce load on facilities.
- Use of multimedia data and NoSQL analytics to support innovative research.
- Public health and awareness features (e.g., sports medicine) strengthen community engagement.

Threats

- High regulatory and legal risks associated with patient data privacy and EMR compliance.
- Cybersecurity threats such as hacking, data leaks, or ransomware.
- Integration complexities with independently operated laboratories and third-party systems.

- Funding uncertainty due to reduced public and charitable support.
- Risk of scope creep from too many concurrent transformation goals.

PESTLE Analysis:

Political Factors

- Strong government support for digital healthcare and EMR systems.
- Policy pressures on hospitals to meet compliance and modernization goals.
- Partial reduction in public healthcare funding affecting budget flexibility.

Economic Factors

- Long-term cost savings are anticipated by digital transformation and cloud solutions.
- Initial capital investment is offset by operational efficiency gains.
- Need for careful budgeting and financial planning due to reduced donations and subsidies.

Social Factors

- High expectations from patients for quick, accessible, and digital service delivery.
- Increasing demand for telehealth and remote consultation, especially post-pandemic.
- Design requirements to cater to elderly users and people with disabilities.

Technological Factors

- Adoption of cloud computing, NoSQL databases, and IoT-enabled EMR for future-ready operations.
- Integration challenges with independently owned lab systems and medical devices.
- Opportunities for innovation via real-time data analytics and media-rich consultations.
- Need for deciding on implementation frameworks (e.g., .NET vs J2EE).

Legal Factors

- Strict legal requirements for handling and storing personal health data.
- Regulatory mandates for documentation of medical consent and patient rights.
- EMR laws require compliance and auditability of digital records.

Environmental Factors

- Digitization is expected to significantly reduce hospital paper use and physical storage.
- Remote access systems can reduce unnecessary patient travel and emissions.
- Potential for partnerships with eco-friendly vendors (e.g., biowaste management, green hosting services).

Key Stakeholders

INTERNAL STAKEHOLDERS		
Benjamin Brown	**Project Director**	Oversees the HMS project, ensures alignment with hospital goals, manages overall direction.
Ayana Bojokoeva	**Lead Business Analyst**	Captures business processes, gathers user requirements, and ensures accurate system modeling.
Austin Clark	**Senior Solutions Architect**	Leads the technical design and system architecture; evaluates cloud platforms and technologies.

EXTERNAL STAKEHOLDERS		
Lisa Morante	**Principal Consultant, Method Science**	Advises on methodology, best practices, compliance, and oversees collaboration with IT teams.
Prof. David Sinclair	**Government EMR Compliance Officer, Health NSW**	Ensures patient data privacy and compliance with national EMR regulations
Dr. Meera Kapoor	**Head of Radiology, GoodMead Hospital**	Provides insights for diagnostic systems and ensures integration with third-party labs.
James McAllister	**Director, Swift Labs Diagnostics**	Collaborates for seamless data sharing between hospital and independent diagnostic labs.
Sarah Finnigan	**Senior Advisor, HealthTech Pharma**	Facilitates pharmaceutical data flow, integration of drug information and research.
Constable Rajiv Patel	**Liaison Officer, NSW Emergency Services**	Supports HMS integration with police and ambulance emergency systems.
Mark Reynolds	**Representative, GoodMead Patient Council**	Advocates for patient needs contribute to usability and accessibility requirements
Olivia Chen	**CEO, Cloud Med Hosting Solutions**	Oversees cloud infrastructure, scalability, and uptime commitments.
Karen Beckett	**Public Relations & Donor Liaison, GoodMead**	Monitors and reports community engagement via HMS social responsibility features.

Project Parameters

Cost-Benefit Analysis

Time - The HMS development and implementation timeline is projected to span 18 months, broken down as follows:

Phase	**Duration**
Requirements Gathering	2 months
System Design & Architecture	2 months
Development Phase I	4 months

Development Phase II	4 months
Integration & Interfacing	2 months
Testing	2 months
Deployment & Training	1 month
Contingency	1 month

Budget - The overall budget allocated by the board of GoodMead in collaboration with MethodScience is USD 7.5 million, which includes:

Category	**Cost (USD)**
Consulting (MethodScience)	1.2 million
Software Design & Development	2.5 million
Hardware & Cloud Infrastructure	1.1 million
Testing & QA	500,000
Training & Change Management	400,000
Legal, Compliance, & Security Audit	300,000
Contingency Reserve	850,000
Miscellaneous	650,000

Scope - The HMS project includes:

Patient registration, records, and admissions management
Scheduling system for staff, surgeries, and appointments
Integration with labs, pharmacies, emergency services
Management of operating theatres and pre/post-surgical workflows
Drug inventory and pharmaceutical collaboration
Multimedia support for consultations and research data
Accessibility-compliant user interfaces
Cloud-based, scalable enterprise architecture
NoSQL database for unstructured and multimedia data
Real-time remote consultation and telehealth capabilities

Internal reporting, analytics, and operational dashboard

Quality Expectations

System Availability: ≥ 99.9% uptime (excluding scheduled maintenance)

Response Time: < 2 seconds for key operations on web/app interfaces

Compliance: Full adherence to EMR privacy and security regulations

Accessibility: WCAG 2.1 compliance to support a diverse user base

Security: End-to-end encryption, role-based access, and audit trails

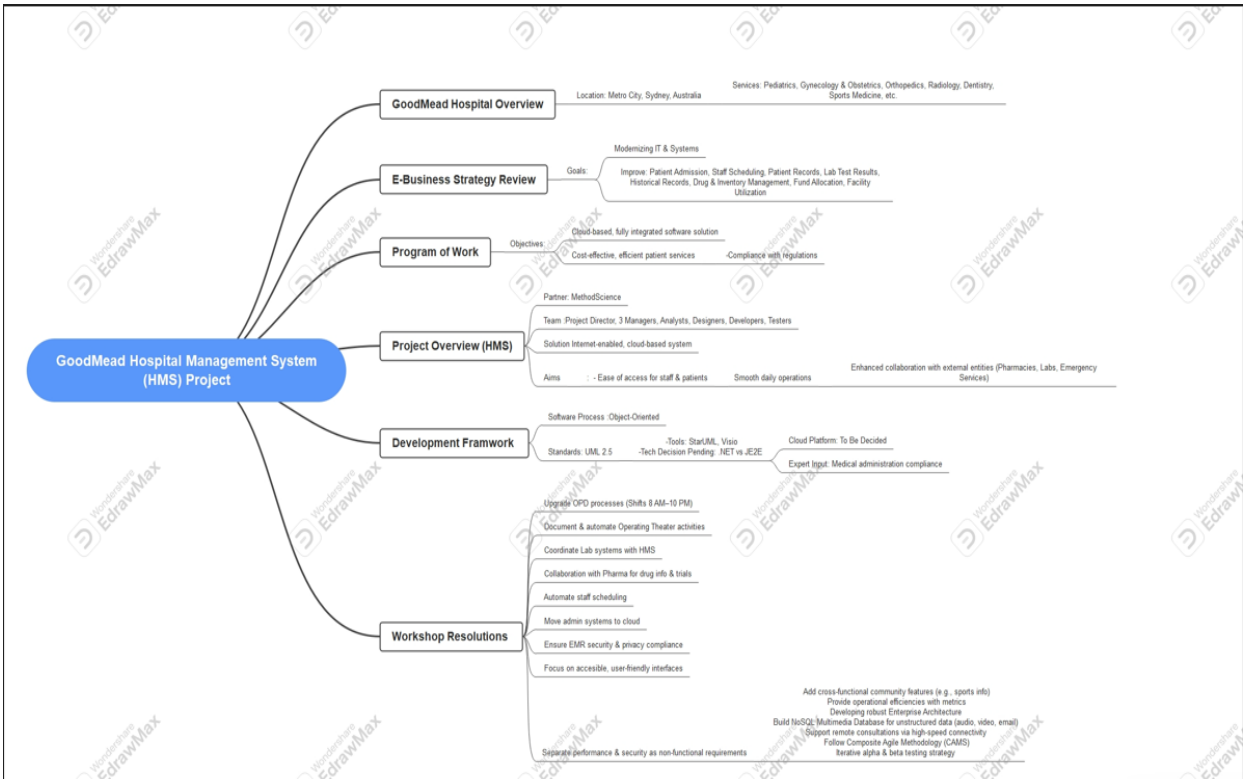
User Satisfaction: ≥ 85% satisfaction rating from staff/patient pilot groups

Test Coverage: ≥ 90% automated test coverage for mission-critical modules

Performance: System must support concurrent access by 500 users with no degradation

Model Of the Problem Space (MOPS)

GoodMead Hospital Mind map



Mind Map for GoodMead Hospital's Hospital Management System (HMS) Project

1. **GoodMead Hospital Overview**
    - **Location:** Metro City, Sydney, Australia
    - **Services:** Pediatrics, Gynecology & Obstetrics, Orthopedics, Radiology, Dentistry, Sports Medicine, etc.

2. **E-Business Strategy Review**
    - **Goals:**
        - Modernizing IT & Systems
        - **Improve:** Patient Admission, Staff Scheduling, Patient Records, Lab Test Results, Historical Records, Drug & Inventory Management, Fund Allocation, Facility Utilization

3. **Program of Work**
    - **Objectives:**
        - Cloud-based, fully integrated software solution
        - Cost-effective, efficient patient services
        - Compliance with regulations

4. **Project Overview (HMS)**
    - **Partner:** MethodScience
    - **Team:** Project Director, 3 Managers, Analysts, Designers, Developers, Testers
    - **Solution:** Internet-enabled, cloud-based system
    - **Aims:**
        - Ease of access for staff & patients
        - Smooth daily operations
        - Enhanced collaboration with external entities (Pharmacies, Labs, Emergency Services)

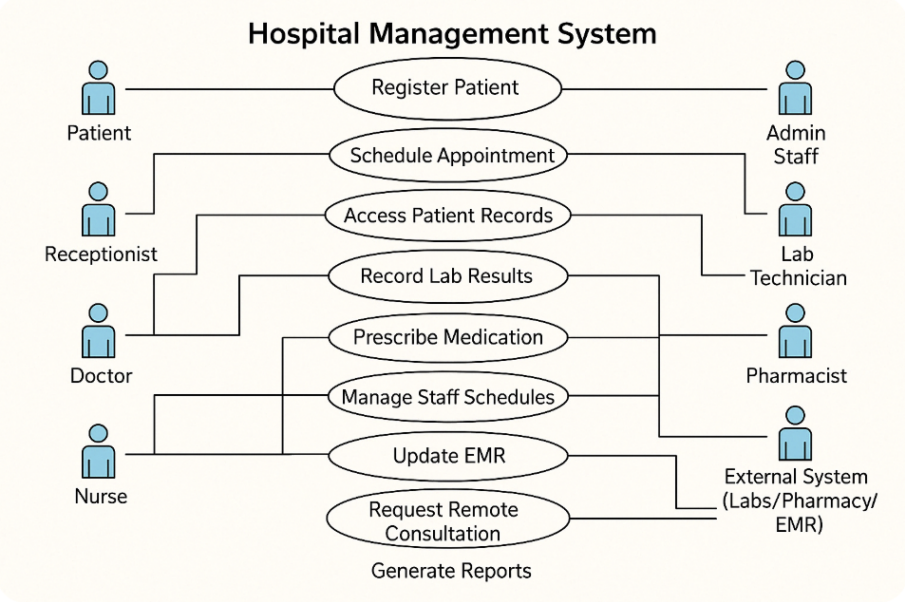
5. **Development Framework**
    - Software Process: Object-Oriented
    - Standards: UML 2.5
    - Tools: StarUML, Visio
    - Tech Decision Pending: .NET vs J2EE
    - Cloud Platform: To Be Decided
    - Expert Input: Medical administration compliance

6. **Workshop Resolutions**
    1. Upgrade OPD processes (Shifts 8 AM–10 PM)
    2. Document & automate Operating Theater activities
    3. Coordinate Lab systems with HMS
    4. Collaboration with Pharma for drug info & trials
    5. Automate staff scheduling

6. Move admin systems to cloud
7. Ensure EMR security & privacy compliance
8. Focus on accessible, user-friendly interfaces
9. Separate performance & security as non-functional requirements
10. Add cross-functional community features (e.g., sports info)
11. Provide operational efficiencies with metrics
12. Developing robust Enterprise Architecture
13. Build NoSQL Multimedia Database for unstructured data (audio, video, email)
14. Support remote consultations via high-speed connectivity
15. Follow Composite Agile Methodology (CAMS)
16. Iterative alpha & beta testing strategy

Functional Model (Use cases & Use case diagrams)

Hospital Management System – Overall Use Case Diagram



This diagram shows all the key interactions between hospital staff, external systems, and the HMS. It shows how different stakeholders like patients, receptionists, doctors, admin staff, etc., interact with the system to perform core hospital tasks. Each oval is a system function, and each stick figure represents an actor that interacts with those functions. This diagram enables stakeholders to see immediately who is doing what in the system.

Actors:

- Patient
- Receptionist
- Doctor
- Nurse
- Admin Staff
- Lab Technician
- Pharmacist
- External System (Labs/Pharmacy/EMR)

Use Cases (Sample - to be refined):

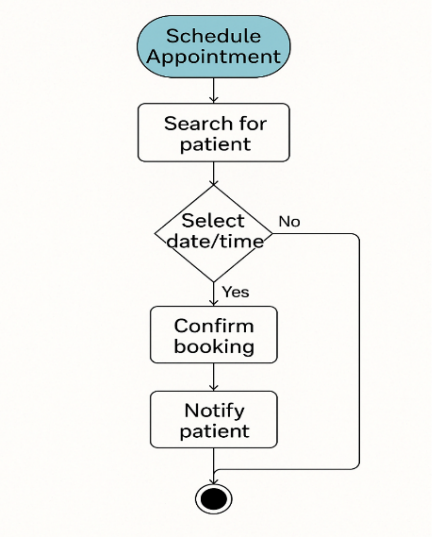
1. Register Patient
2. Schedule Appointment
3. Access Patient Records
4. Record Lab Results
5. Prescribe Medication
6. Manage Staff Schedules
7. Update EMR
8. Request Remote Consultation
9. Generate Reports

Functional Model (Process Modelling with Activity Diagrams)

Use Case 1: Schedule Appointment

1. **Use Case Name**: Schedule Appointment
2. **Actor**: Receptionist
3. **Goal**: To book an appointment for a registered patient with an available doctor.
4. **Preconditions**:
    1. Patients must be registered in the system.
    2. Receptionist must be logged in and have access to scheduling features.

5. **Postconditions**:
    1. Appointment is saved in the system.
    2. Patient receives notification (email/SMS).
6. **Main Flow**:
    1. Receptionist logs into HMS.
    2. Searches for the patient by name or ID.
    3. Views list of available doctors and schedules.
    4. Selects preferred date and time.
    5. Confirms the booking.
    6. HMS sends confirmation notification to the patient.

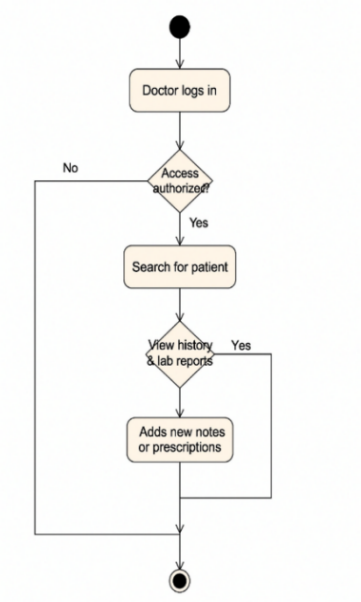


Use Case 1 Diagram

Use Case 2: Access Patient Records

1. **Use Case Name**: Access Patient Records
2. **Actor:** Doctor
3. **Goal**: To view and update the medical records of a patient.
7. **Preconditions**:
    1. Doctor must be authenticated and authorized.
    2. Patient records must exist in the system.
8. **Postconditions**:
    1. Records viewed and possibly updated with new notes or prescriptions.
9. **Main Flow**:

1. Doctor logs into HMS securely.
2. Searches for the patient's record using patient ID or name.
3. Views medical history, lab reports, and previous prescriptions.
4. Adds new consultation notes, prescriptions, or updates.
5. Saves changes to the EMR system.



Use Case 2 Diagram

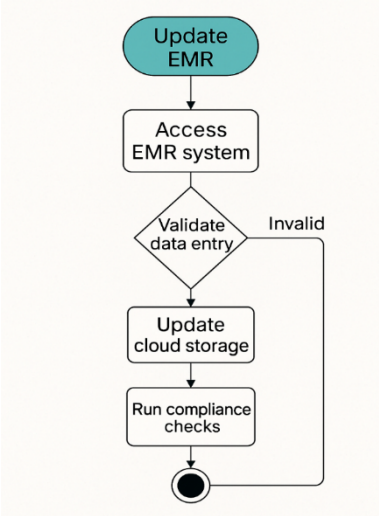
Use Case 3: Update EMR

1. **Use Case Name:** Update Electronic Medical Records (EMR)
2. **Actor:** Admin Staff
3. **Goal:** To ensure that EMRs are updated, accurate, and compliant with regulations.
4. **Preconditions:**
    5. Admin staff must have authorization to access EMR.
    6. EMR entries requiring updates are identified.
10. **Postconditions:**
    1. Data securely stored and synchronized in the cloud.
    2. Compliance checks are completed.
11. **Main Flow:**

1. Admin logs into the HMS system.
2. Accesses the EMR system interface.
3. Validates the data entry for correctness.
4. If invalid, data must be corrected.
5. Updates the EMR and syncs it with cloud storage.
6. Runs compliance checks to ensure data meets legal standards.
7. The session ends after a successful update and validation.

Alternative Flow:

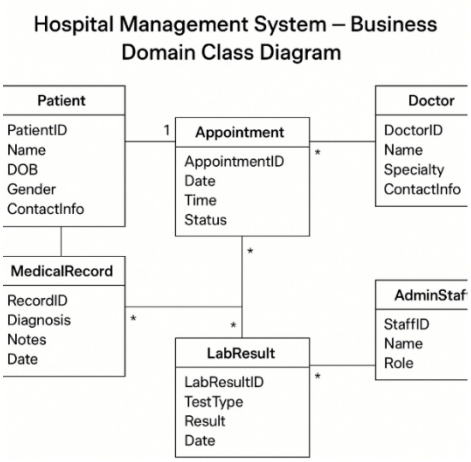
If data entry is invalid, the system prompts correction before proceeding.



Use Case 3 Diagram

Business Domain Model (with Class Diagrams)

Hospital Management System – Business Domain Class Diagram (Core Medical Functions)



Business Domain Class Diagram (Core Medical Functions)

Hospital Management System – Business Domain Class Diagram (Core Medical Functions)

This diagram represents the **core medical workflow** within the Hospital Management System. It shows how patients interact with doctors through appointments, and how their medical records and lab results are managed.

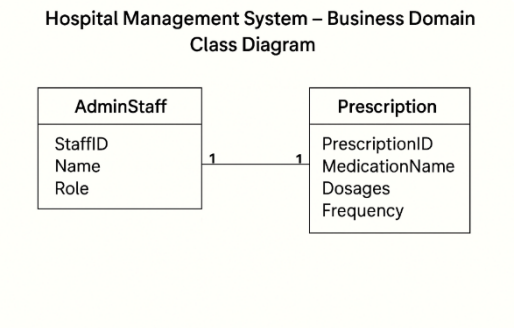
a. Classes & Relationships:

1. **Patient**:
    b. Attributes: PatientID, Name, DOB, Gender, ContactInfo.
    c. **Relationships**:
        i. Has **one-to-many** relationship with **Appointment** (one patient can have many appointments).
        ii. Has **one-to-many** relationship with **MedicalRecord** (one patient can have multiple medical records).
2. **Appointment**:
    a. Attributes: AppointmentID, Date, Time, Status.
    b. **Relationships**:
        i. Linked **many-to-one** to **Patient** and **Doctor**.
        ii. **One-to-many** relationship with **LabResult** (appointments can lead to multiple lab tests).
3. **Doctor**:

a. Attributes: DoctorID, Name, Specialty, ContactInfo.
b. **Relationships**:
    i. Can have **many appointments** with various patients.

4. **MedicalRecord**:
    a. Attributes: RecordID, Diagnosis, Notes, Date.
    b. **Relationships**:
        i. Linked to **one Patient**.
        ii. Has **one-to-many** relationship with **LabResult**.
5. **LabResult**:
    a. Attributes: LabResultID, TestType, Result, Date.
    b. **Relationships**:
        i. Linked to **one MedicalRecord** (test results are part of a patient's medical history).
        ii. Also associated with **Appointments** that required testing.

Hospital Management System – Business Domain Class Diagram (Administrative Functions)



Business Domain Class Diagram (Administrative Functions)

This diagram focuses on the **administrative and prescription management** part of the system, involving **AdminStaff** and the process of managing **Prescriptions** issued after appointments.

Classes & Relationships:

1. **AdminStaff**:
    a. Attributes: StaffID, Name, Role.
    b. **Relationships**:
        i. Can manage multiple **Prescriptions** in the system.
        ii. Supports administrative operations related to appointment tracking, EMR updates.
2. **Prescription**:
    a. Attributes: PrescriptionID, MedicationName, Dosages, Frequency.
    b. **Relationships**:
        i. Each prescription is linked to **AdminStaff** who may manage or process it.
        ii. Can be part of the follow-up from **Appointments**.

Non-Functional Requirements (NFRs)

The Non-Functional Requirements for the Hospital Management System (HMS) define the critical qualities of system operation beyond its core functionalities. These requirements ensure the system is **efficient**, **user-friendly**, and **secure**, supporting the healthcare environment's demands for performance, accessibility, and data protection. The following categories represent the essential non-functional aspects of the HMS:

Performance

- The system must support at least **200 concurrent users** (doctors, nurses, admin staff, patients) with no noticeable degradation in performance.

- **95% of user interactions** (such as appointment booking or record retrieval) must complete within **2 seconds**.
- System must handle **up to 10,000 transactions per day** without failure or slowdown.
- The HMS must ensure that **lab results** and **prescriptions** are available to authorized users within **5 seconds** after submission.

Usability

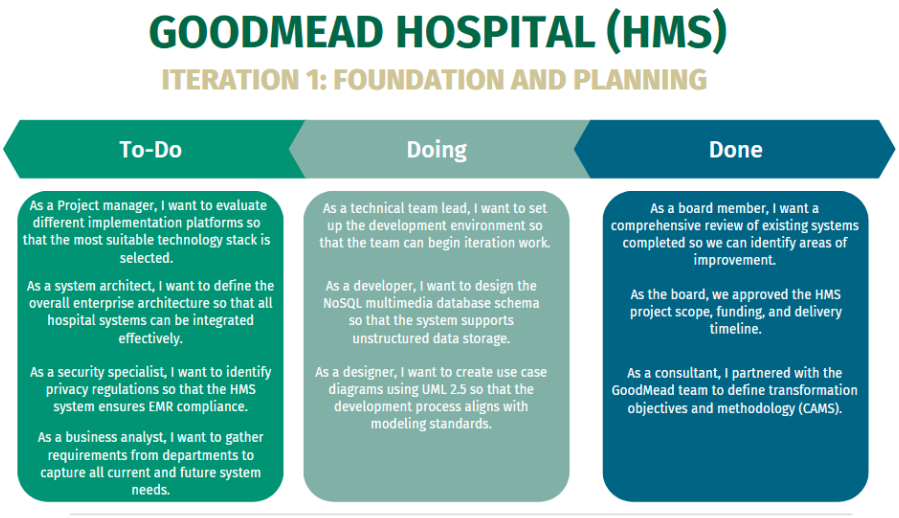
- The system must provide a **simple and intuitive interface** accessible to both technical and non-technical hospital staff.
- The HMS must comply with **WCAG 2.1 Level AA** standards for accessibility, supporting users with disabilities.
- **New users** (e.g., newly hired staff) should be able to learn and navigate the system effectively with **no more than 2 hours of training**.
- The system interface must be **responsive**, allowing use on desktop, tablet, and mobile devices.
- Provide **multi-language support** initially in **English**, with the ability to add more languages as needed.

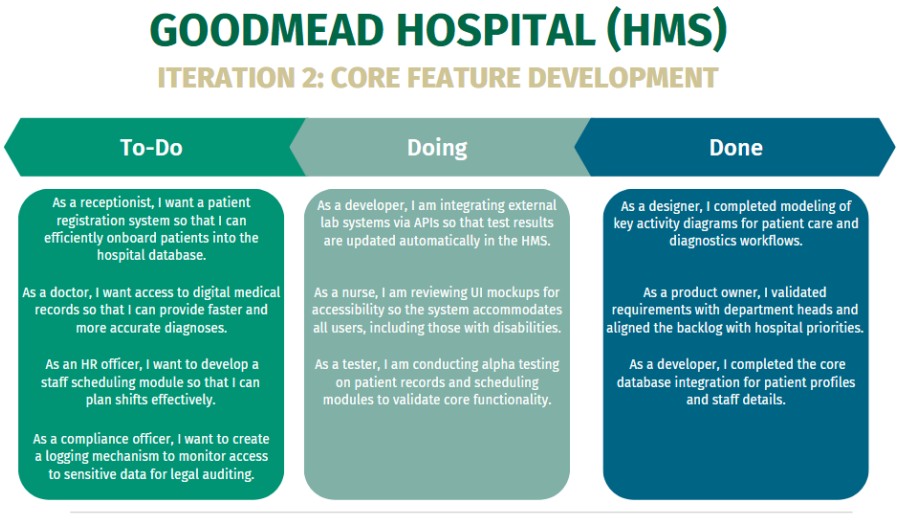
Cybersecurity

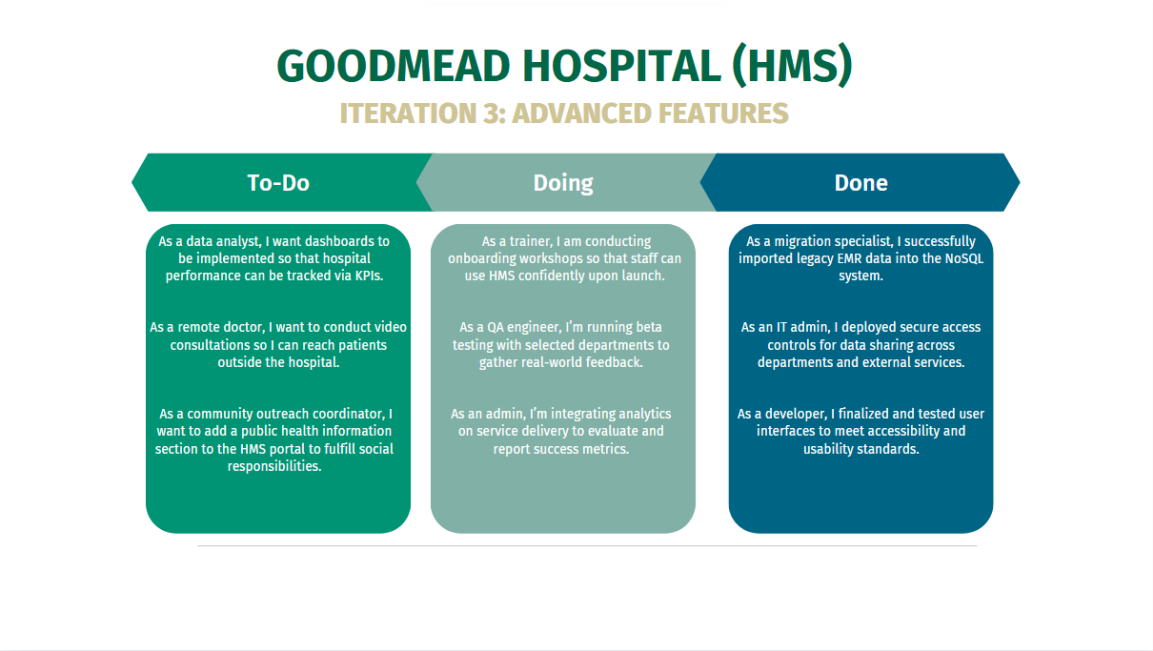
- All **data at rest and in transit** must be encrypted using **AES-256 encryption**.
- The system must enforce **role-based access control (RBAC)**, ensuring only authorized users can access sensitive data like patient records.
- **Two-Factor Authentication (2FA)** must be implemented for administrative and medical staff accessing patient data.
- System must be compliant with **healthcare data protection laws** (such as **HIPAA** in the US).
- **Audit logs** must be maintained for **all user actions** on sensitive data and retained for at least **6 months**.
- The system must detect and block **unauthorized access attempts** and generate alerts for the security team within **1 minute**.

Agile Project Approach

Project Kanban Board – Hospital Management System (HMS)







User Stories

Iteration 1

To-Do:

User Story: As a project manager, I want to evaluate different implementation platforms (.NET, J2EE) so that the most suitable technology stack is selected.

User Story: As a system architect, I want to define the overall enterprise architecture so that all hospital systems can be integrated effectively.

User Story: As a security specialist, I want to identify privacy regulations so that the HMS system ensures EMR compliance.

User Story: As a business analyst, I want to gather requirements from departments to capture all current and future system needs.

Doing:

User Story: As a technical team leader, I want to set up the development environment so that the team can begin iteration work.

User Story: As a developer, I want to design the NoSQL multimedia database schema so that the system supports unstructured data storage.

User Story: As a designer, I want to create use case diagrams using UML 2.5 so that the development process aligns with modeling standards.

Done:

User Story: As a board member, I want a comprehensive review of existing systems completed so we can identify areas of improvement.

User Story: As the board, we approved the HMS project scope, funding, and delivery timeline.

User Story: As a consultant, I partnered with the GoodMead team to define transformation objectives and methodology (CAMS).

Iteration 2

To-Do:

User Story: As a receptionist, I want a patient registration system so that I can efficiently onboard patients into the hospital database.

User Story: As a doctor, I want access to digital medical records so that I can provide faster and more accurate diagnoses.

User Story: As an HR officer, I want to develop a staff scheduling module so that I can plan shifts effectively.

User Story: As a compliance officer, I want to create a logging mechanism to monitor access to sensitive data for legal auditing.

Doing:

User Story: As a developer, I am integrating external lab systems via APIs so that test results are updated automatically in the HMS.

User Story: As a nurse, I am reviewing UI mockups for accessibility, so the system accommodates all users, including those with disabilities.

User Story: As a tester, I am conducting alpha testing on patient records and scheduling modules to validate core functionality.

Done:

User **Story**: As a designer, I completed modeling of key activity diagrams for patient care and diagnostics workflows.

User Story: As a product owner, I validated requirements with department heads and aligned the backlog with hospital priorities.

User Story: As a developer, I completed the core database integration for patient profiles and staff details.

Iteration 3

To-Do:

User Story: As a data analyst, I want dashboards to be implemented so that hospital performance can be tracked via KPIs.

User Story: As a remote doctor, I want to conduct video consultations so I can reach patients outside the hospital.

User Story: As a community outreach coordinator, I want to add a public health information section to the HMS portal to fulfill social responsibilities.

Doing:

User Story: As a trainer, I conduct onboarding workshops so that staff can use HMS confidently upon launch.

User Story: As a QA engineer, I'm running beta testing with selected departments to gather real-world feedback.

User Story: As an admin, I'm integrating analytics on service delivery to evaluate and report success metrics.

Done:

User Story: As a migration specialist, I successfully imported legacy EMR data into the NoSQL system.

User Story: As an IT admin, I deployed secure access controls for data sharing across departments and external services.

User Story: As a developer, I finalized and tested user interfaces to meet accessibility and usability standards.

The Agile Approach:

The Agile methodology is highly appropriate for the GoodMead Hospital Management System (HMS) project due to the complexity, evolving requirements, and stakeholder diversity involved. Hospitals operate with interconnected functions such as patient care, administrative tasks, legal compliance, and cross-organizational collaboration—making flexibility and responsiveness critical. Agile supports this by enabling iterative development, early feedback, and continuous improvement.

Our team has adopted the Composite Agile Methodology Stack (CAMS), combining structured sprint planning with flexible adaptation. Each sprint will deliver specific, prioritized features such as outpatient scheduling, electronic medical records, and laboratory integration. Regular Agile ceremonies—daily stand-ups, sprint reviews, and retrospectives—will ensure strong communication, fast issue resolution, and stakeholder involvement. Agile's emphasis on collaboration and transparency will help meet key non-functional goals like compliance, usability, and security.

Given the need for scalability, accessibility, and future enhancements (e.g., multimedia consultations, NoSQL data support), Agile provides an ideal foundation. It allows us to deliver an MVP early and evolve the system to meet emerging needs while ensuring high quality and regulatory alignment throughout.

Business Analysis Activities – HMS Project

Stakeholder Workshops

Used to gather high-level requirements, resolve conflicts, and validate priorities.

Workshops helped uncover undocumented practices in surgical processes and clarified key compliance needs.

Daily Stand-Ups

These short, focused meetings allow BA team members to track progress, surface blockers, and synchronize analysis tasks with the rest of the team.

User Story Mapping

A visual technique to organize user needs and system interactions. It supports scoping and helps align features with user journeys, especially in complex modules like patient scheduling and staff rostering.

Use Case Modelling

Formal modelling of system behaviour from a user's perspective, applied to functions like patient admission, lab result tracking, and emergency coordination.

Process Mapping

Used to identify inefficiencies in current workflows (e.g., manual scheduling) and design improved future-state processes in alignment with digital transformation goals.

Backlogging (Refinement Sessions)

Regular sessions to prioritize, detail, and update user stories. This ensures that development focuses on features that deliver immediate business value.

Prototyping and Wireframing

Early UI/UX designs help stakeholders visualize system behaviour and provide feedback before development begins—vital for accessibility compliance and usability testing.

Gap Analysis

Applied to compare existing functionalities with HMS goals and identify missing capabilities

Requirements Review

Formal sessions conducted with stakeholders to validate and approve requirements, ensuring traceability and reducing rework.

Reviews and Demos

Held at the end of each sprint to showcase completed work to stakeholders, validate deliverables, and adjust priorities based on feedback.

Retrospectives

Conducted to reflect on what worked well, what didn’t, and how the team can improve. This continuous improvement of mindset helps refine analysis techniques over time.

Regulatory and Compliance Review

Specialized sessions to ensure requirements adhere to EMR data-sharing regulations, privacy laws, and medical documentation standards.

Risk Management Approach

GoodMead Hospital HMS

Security & Privacy Risks

Risk: Patient data breach or unauthorized access to EMR records, violating strict government privacy regulations.

Mitigation:

Implement end-to-end encryption and role-based access controls.

Use multi-factor authentication (MFA) for staff and service providers.

Regular security audits and penetration testing.

Clinical Operations & Process Risks

Risk: Failure to properly model undocumented clinical workflows (e.g., pre/post-op, legal documentation).

Mitigation:

Collaborate with medical domain experts to document implicit workflows.

Conduct on-site observations and interviews with clinical staff.

Use iterative feedback loops to update workflows

Integration Risks

Risk: Incompatibility or communication failures with external labs, pharmacies, and ambulance systems.

Mitigation:

Adopt HL7/FHIR standards for health information exchange.

Build APIs to support secure and asynchronous communication.

Test all integrations in sandbox environments with external partners.

User Adoption & Training Risks

Risk: Resistance from staff used to manual or legacy systems.

Mitigation:

Conduct hands-on training sessions before rollout.

Appoint department "change" to assist adoption.

Provide easy-to-access documentation and helpdesk support.

Technology & Platform Risks

Risk: Delay in selecting or switching between implementation platforms (.NET vs J2EE), affecting architecture decisions.

Mitigation:

Conduct a technical feasibility study early in the project

Involve cloud architects in parallel during platform selection.

Choose a modular design to minimize platform lock-in.

Performance & Scalability Risks

Risk: HMS may not handle peak usage or multimedia data traffic (e.g., video consultations, and NoSQL workloads).

Mitigation**:**

Perform load and stress testing using real hospital scenarios.

Use cloud autoscaling and caching mechanisms.

Optimize multimedia storage with CDN and data lifecycle policies.

Budget & Resource Risks

Risk: Project cost overruns due to scope creep or unforeseen technical complexities.

Mitigation:

Define and enforce a change management protocol.

Use Agile sprints to monitor budget burn-down rate.

Maintain a contingency reserve for unexpected costs.

Schedule Risks

Risk: Delays in rollout due to dependencies across departments or delayed feedback from clinicians.

Mitigation:

Use CAMS methodology to break down work into smaller deliverables.

Maintain strict sprint retrospectives and planning reviews.

Identify and resolve blockers daily via stand-up meetings.

Stakeholder & Communication Risks

Risk: Misalignment of priorities among hospital board, project team, and consultants.

Mitigation:

Schedule bi-weekly steering committee reviews.

Use project dashboards for transparent progress tracking.

Maintain stakeholder engagement through regular updates and demo sessions.

Compliance & Legal Risks

Risk: HMS fails to meet compliance standards for digital health services and EMR frameworks.

Mitigation:

Engage regulatory experts in the design and review phases.

Align documentation with government e-health frameworks.

Conduct legal compliance verification before each major release.

Innovation & Multimedia Data Risks

Risk: No SQL-based unstructured data storage (emails, videos) fails to deliver performance or analytics benefits.

Mitigation:

Use proven NoSQL platforms.

Employ metadata tagging for searchability and analytics integration.

Pilot multimedia services with limited departments first.

Risk Register:

RISK REGISTER					
Risk Name	**Risk Description**	**Quadrant**	**Likelihood**	**Consequences**	**Mitigation**
Security & Privacy	Patient data breach or unauthorized access to EMR records, violating strict government privacy regulations.	Operational	2	11	• Implement end-to-end encryption and role-based access controls. • Use multi-factor authentication (MFA) for staff and service providers. • Regular security audits and penetration testing.
Clinical Operations & Process	Failure to properly model undocumented clinical workflows (e.g., pre/post-op, legal documentation).	Operational	3	9	• Collaborate with medical domain experts to document implicit workflows. • Conduct on-site observations and interviews with clinical staff. • Use iterative feedback loops to update workflows
Budget & Resource	Project cost overruns due to scope creep or unforeseen technical complexities.	Operational	6	3	• Define and enforce a change management protocol. • Use Agile sprints to monitor budget burn-down rate. • Maintain a contingency reserve for unexpected costs.
Schedule	Delays in rollout due to dependencies across departments or delayed feedback from clinicians.	Operational	8	1	• Use CAMS methodology to break down work into smaller deliverables. • Maintain strict sprint retrospectives and planning reviews. • Identify and resolve blockers daily via stand-up meetings.
Stakeholder & Communication	Misalignment of priorities among hospital board, project team, and consultants.	Strategic	4	5	• Schedule bi-weekly steering committee reviews. • Use project dashboards for transparent progress tracking. • Maintain stakeholder engagement through regular updates and demo sessions.
Compliance & Legal	HMS fails to meet compliance standards for digital health services and EMR frameworks.	Operational	1	10	• Engage regulatory experts in the design and review phases. • Align documentation with government e-health frameworks. • Conduct legal compliance verification before each major release.
Innovation & Multimedia Data	No SQL-based unstructured data storage (emails, videos) fails to deliver performance or analytics benefits.	Operational	5	4	• Use proven NoSQL platforms. • Employ metadata tagging for searchability and analytics integration. • Pilot multimedia services with limited departments first.
Integration	Incompatibility or communication failures with external labs, pharmacies, and ambulance systems.	Strategic	7	8	• Adopt HL7/FHIR standards for health information exchange. • Build APIs to support secure and asynchronous communication. • Test all integrations in sandbox environments with external partners.
User Adoption & Training	Resistance from staff used to manual or legacy systems.	Operational	11	2	• Conduct hands-on training sessions before rollout. • Appoint department "change" to assist adoption. • Provide easy-to-access documentation and helpdesk support.
Technology & Platform	Delay in selecting or switching between implementation platforms (.NET vs J2EE), affecting architecture decisions.	Operational	9	7	• Conduct technical feasibility study early in the project • Involve cloud architects in parallel during platform selection. • Choose modular design to minimize platform lock-in.
Performance & Scalability	HMS may not handle peak usage or multimedia data traffic (e.g., video consultations, NoSQL workloads).	Operational	10	6	• Perform load and stress testing using real hospital scenarios. • Use cloud autoscaling and caching mechanisms. • Optimize multimedia storage with CDN and data lifecycle policies.

Change Management Approach

The implementation of the GoodMead Hospital Management System (HMS) will bring significant organizational changes, affecting both technology and day-to-day operations. The most notable change is the transition from largely manual, paper-based processes to a modern, cloud-based, internet-enabled system. This will impact departments such as

outpatient services, operating theatres, administrative scheduling, laboratory coordination, inventory control, and patient record management. Staff will need to adapt to new digital workflows, software interfaces, and compliance protocols, which may initially cause resistance or uncertainty.

To manage these changes effectively, a structured change management plan will be applied. This includes early and continuous engagement with stakeholders, clear communication of the project's vision and benefits, and hands-on involvement of users in the design and testing phases. Comprehensive training programs will be provided to all staff groups—medical, administrative, and technical tailored to their specific system interactions.

Change agents and super-users will be appointed within departments to support their peers during the transition. Regular feedback loops through surveys, workshops, and retrospectives will help identify areas of concern and address them proactively. Risks such as productivity dips, system misuse, or compliance breaches will be mitigated by phased rollouts, robust user support, and close monitoring during the early adoption stages.

Additionally, strong leadership sponsorship and ongoing stakeholder alignment will help reinforce the importance of the changes, while a well-defined escalation process will ensure issues are addressed quickly. Overall, the change management approach is designed to be proactive, inclusive, and adaptive, ensuring the hospital is well-positioned to realize the full benefits of the HMS transformation.

Business & Enterprise Architecture (MOAS) Perspective

GoodMead Hospital – Hospital Management System (HMS)

Mission: To modernize and integrate GoodMead Hospital's healthcare services through a secure, cloud-based, internet-enabled Hospital Management System (HMS), improving

patient care, operational efficiency, compliance, and collaboration with external healthcare stakeholders.

Objectives:

Enhance Patient Experience: Enable faster registration, digital medical records, and seamless communication across departments.

Optimize Resource Management: Improve staff scheduling, facility usage, and inventory control.

Ensure Legal and Regulatory Compliance: Align with electronic medical record (EMR) initiatives and privacy laws.

Promote Interoperability: Facilitate data exchange with external laboratories, pharmacies, and emergency services.

Support Multimedia & NoSQL Data: Enable storage and analysis of audio/video consultations, unstructured records, and research material.

Enable Agile Transformation: Adopt Agile (CAMS) practices to ensure iterative delivery and adaptability to user feedback.

Drive Organizational Efficiency: Replace outdated systems, eliminate duplication, and improve workflow automation.

Empower Decision-Making: Provide real-time analytics and reporting to aid in governance, planning, and funding decisions.

Architecture:

Business Architecture:

Defines key healthcare services (e.g., outpatient, surgical, diagnostics) and supporting functions (e.g., HR, inventory, finance). Includes role-based workflows and operational policy alignment.

Application Architecture:

Comprises cloud-based modules for Patient Management, Staff Scheduling, Lab Integration, Inventory Control, Billing, and Regulatory Compliance. Unified via a secure portal.

Data Architecture:

Incorporates a hybrid data store to support structured hospital records and multimedia/unstructured content. Includes EMR, test results, images, audio, and video data.

Technology Architecture:

Cloud-first, Internet-enabled platform leveraging microservices and integration middleware. Includes high-speed connectivity for telehealth and IoT-based data access.

Security & Compliance Architecture:

End-to-end encryption, role-based access controls, secure data sharing, and government-mandated EMR standards compliance.

Scope:

Primary Operations: Patient intake, medical records, diagnostics, operating theater scheduling, and outpatient services.

Support Functions: HR, finance, drug management, facilities booking, and stakeholder communication.

External Integration: Connection with third-party laboratories, pharmaceutical companies, emergency services, and government systems.

User Groups: Doctors, nurses, administrators, patients, external partners, and government regulators.

Business Intelligence / Data Science Perspective

The integration of Business Intelligence and Data Science into the Hospital Management System (HMS) at GoodMead Hospital is a strategic initiative aimed at enhancing decision-making, optimizing operations, and improving patient outcomes. As part of the broader digital transformation strategy, data-driven insights will play a pivotal role in achieving clinical efficiency, operational excellence, and strategic alignment.

Clinical Insights & Predictive Health Analytics

Using patient historical records, lab results, and treatment outcomes, predictive models can identify at-risk patients, recommend personalized care plans, and support clinical decisions.

- Predicting emergency room admissions.
- Early detection of complications.
- AI-based triage support and diagnostics.

Operational Efficiency & Resource Optimization

Data science models will analyze patterns in hospital operations to optimize scheduling, reduce bottlenecks, and manage inventory

- Forecasting patient volumes to improve staff scheduling.
- Optimizing operating room and bed utilization.
- Tracking and predicting inventory use (e.g., drugs, equipment).

Strategic & Regulatory Intelligence

BI tools will be leveraged to monitor KPIs, track compliance, and support executive reporting

- Real-time dashboards for performance monitoring.
- Analytics to support funding decisions and ROI tracking.
- Automated compliance reporting with visual summaries.

Summary

By embedding BI and Data Science within HMS, GoodMead Hospital will gain deep operational, clinical, and strategic insights. These capabilities will drive data-informed decision-making, ensure compliance, improve patient outcomes, and provide a foundation for continuous innovation in healthcare delivery.

Organizational Adoption of BA: Leadership Perspective

The implementation of the GoodMead Hospital Management System (HMS) relies not only on technical excellence but also on strategic leadership in adopting Business Analysis

(BA) practices across the organization. From a leadership perspective, BA is not just a role or function, it is a critical capability that ensures the alignment of business goals with technical execution throughout the project lifecycle.

Strategic Commitment to BA

By embedding BA into early-stage strategic planning and decision making, the executive team ensures that business needs, regulatory requirements, and patient centric outcomes are clearly defined and continuously validated.

Leadership as Enablers of BA Practice

Senior leaders play an enabling role for BA methodologies, allocating resources to skilled analysts, and fostering a culture of collaboration between clinical staff, administrative teams, and IT. Leadership support ensures that analysts have access to stakeholders, clear mandates, and the authority to drive change.

Promoting BA as a Shared Responsibility

GoodMead's leadership promotes the understanding that Business Analysis is not just the job of a few specialists but a shared organizational responsibility. Department heads, project managers, and process owners are encouraged to participate in workshops, process modelling sessions, and continuous feedback loops, all of which are driven by BA techniques.

Driving Agility and Continuous Improvement

With the HMS project adopting a Composite Agile Methodology (CAMS), the leadership ensures that BA activities are integrated into every sprint and release cycle. This agile mindset allows business analysts to deliver incremental value, validate assumptions rapidly, and support adaptive planning.

Investing in BA Maturity

Leadership is committed to enhancing the maturity of BA capabilities across GoodMead Hospital. This includes providing training, adopting industry-standard tools, and

standardizing documentation practices. This maturity is key to sustaining the HMS and future technology projects.

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Project Meeting Minutes

MEETING MINUTES – APPROXIMATELY 720 MINUTES (12 HOURS)

The collaboration for the GoodMead Hospital Management System (HMS) project report and presentation was carried out entirely online through structured and scheduled virtual meetings, document sharing, and real-time co-editing tools. The team held regular weekly meetings using platforms such as Microsoft Teams and GroupMe to discuss project progress, clarify requirements, assign responsibilities, and resolve issues collaboratively. Google Drive was used as a central repository for storing and editing shared documents, including drafts of the report, use case diagrams and slide decks. Each team member was assigned specific report sections based on their strengths and interests. Collaborative editing and peer reviews ensured consistency in style and content across different sections. Diagrams and modelling work were created using StarUML/Canva and discussed collectively before finalization. The final presentation was developed with live feedback and collaborative revisions during virtual meetings. This approach allowed the team to work efficiently, stay organized, and produce a cohesive and well-integrated report and presentation.