Assignment 3 – Requirements Definition

Systems Development Process

AIT 610

MICA Health Solutions

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1 Introduction

1.1 Overview

MICA Health Solutions aims to significantly improve operational efficiency and strategically enhance healthcare delivery systems. The system is described in the requirements overview, alongside its key features and functionalities. Features such as patient appointment scheduling, HIPAA compliance, clinical management, workflow automation, and access to health records address issues related to clinical processes and patient record management. The application seeks to resolve operational problems by focusing on these four areas.

Several essential elements are included in the functional criteria for MICA Health Solutions. Online scheduling will allow patients to make, change, and cancel appointments. Automatic email or SMS reminders will be issued to patients twenty-four hours before appointments. Comprehensive patient health records will be available to doctors in real-time, and they can safely update them while keeping an audit trail. Along with automating clinical operations, including prescription monitoring, scheduling, and billing, the application will also let users create clinical reports to help with decision-making. To further ensure compliance with HIPAA standards and safeguard sensitive patient data, strong user authentication and security mechanisms, including data encryption and multi-factor authentication, will be put in place.

This requirement definition will serve as a structured medium for managing the design phase, mitigating risks, and making sure that the finished product satisfies user requirements and corporate objectives.

2 Requirements

2.1 Functional Requirements

The functional requirements below define the core features and behaviors that the MICA Health Solutions system must provide to enhance operational efficiency and healthcare delivery at Amic General Hospital. These requirements specify what the system will do to achieve key goals, such as automating clinical management, providing real-time access to patient health records, improving communication between patients and doctors, and maintaining compliance with healthcare regulations. By fulfilling these requirements, the system will enable the hospital to improve patient care, streamline workflows, and optimize resources.

Req #	Functional Requirement Statement
F1	The system will allow patients to register an account with personal and health-related information.
F2	The system will provide patients with the ability to book appointments online.

F3	The system will enable patients to view their medical history and clinical records.
F4	The system will allow patients to communicate with healthcare providers via a messaging portal.
F5	The system will allow doctors to access real-time health records of patients.
F6	The system must provide functionality for doctors to update patient health records after consultations.
F7	The system will integrate with existing hospital systems for patient management, billing, and inventory.
F8	The system will support automated appointment reminders through email and SMS.
F9	The system will generate invoices based on consultations and treatments.
F10	The system must automatically update inventory levels based on medication or equipment usage.
F11	The system will offer clinical management tools for scheduling patient record tracking.
F12	The system will allow doctors to prescribe medications digitally.
F13	The system will support online payments for patients to settle bills.
F14	The system will support real-time patient triage and prioritization during emergencies.
F15	The system will provide data-driven insights for hospital management regarding patient care and operational efficiency.
F16	The system will support role-based access control for different types of users (patients, doctors, administrators).
F17	The system must provide multi-factor authentication for all users.
F18	The system must allow the export of medical records in compliance with legal and regulatory standards.
F19	The system will support HIPAA-compliant data storage and processing.
F20	The system will track and log changes to patient records for audit purposes.
F21	The system must notify doctors when patient data has been updated.
F22	The system will provide decision support to healthcare providers for medication prescriptions based on patient records.
F23	The system will offer a centralized dashboard for hospital administrators to monitor hospital activities.
F24	The system must automatically back up patient records to ensure data safety.
F25	The system will support the scanning and uploading of physical medical documents.
F26	The system will enable the generation of reports for clinical, financial, and operational analysis.
F27	The system will allow administrators to assign specific healthcare providers to patients based on availability and specialty.
F28	The system will provide search functionality to locate patients
F29	The system will provide search functionality to locate appointments
F30	The system will provide search functionality to locate medical records
F31	The system will facilitate patient discharge management, including generating discharge summaries.
F32	The system will integrate with external healthcare systems for patient referrals and records transfer.

F33	The system will provide patients with the ability to reschedule appointments online.
F34	The system will provide patients with the ability to cancel appointments online.

2.2 Non-Functional Requirements

Non-functional requirements describe the essential system characteristics that do not pertain to specific functionalities but are critical to ensuring the overall performance, security, and reliability of MICA Health Solutions. These requirements address key aspects such as system availability, scalability, security, compliance with healthcare regulations (e.g., HIPAA), backup & recovery, disaster recovery, and service level agreements (SLAs). These requirements ensure that the system will operate efficiently under varying conditions, protect sensitive patient data, and perform reliably in case of system failures or external threats.

Req #	Non-Functional Requirement Statement
N1	The system will ensure uptime of 99.9% to maintain continuous access to patient records and clinical services.
N2	The system will handle up to 10,000 concurrent users without performance degradation.
N3	The system must provide a response time of less than 2 seconds for record retrieval requests.
N4	The system will encrypt all patient data, both at rest and in transit, using AES-256 encryption.
N5	The system must comply with HIPAA and other healthcare data protection regulations.
N6	The system will be scalable to accommodate future growth in hospital operations.
N7	The system will have a recovery time objective of 4 hours in case of system failure.
N8	The system will have a user-friendly interface accessible via desktop
N9	The system will have a user-friendly interface accessible via tablet devices.
N10	The system will have a user-friendly interface accessible via mobile devices.
N11	The system will support both English and Spanish language options, allowing patients to access all features of the platform.
N12	The system must ensure that system backups are performed daily.
N13	The system will provide audit trails for all modifications to patient data, stored for at least 7 years.
N14	The system will be accessible 24/7, allowing patients to book appointments and access records at any time.
N15	The system will use a high-availability infrastructure to minimize downtime during maintenance.
N16	The system will ensure that training materials are available online for staff onboarding and continued education.
N17	The system will maintain data integrity with a failure rate of less than 0.01% in medical record updates.

N18	The system will perform automated security audits every month to identify vulnerabilities.
N19	The system will ensure that page load times do not exceed 3 seconds under standard usage conditions.
N20	The system will provide clear and comprehensive error messages to guide users in case of issues.
N21	The system must ensure that all user activity logs are stored securely and accessible only to authorized personnel.
N22	The system will provide a consistent user experience across different platforms and browsers.

3 Data Information Statements

Req #	Database Requirement Statement
DR#1	The system will store and manage information about patients, including: • Patient ID • Name • Date of Birth • Gender • Contact Information • Medical History • Insurance Information
DR#2	The system will store and manage information about Healthcare Providers, including: • Provider ID • Name • Specialty • Contact Information • License Number • Schedule Availability
DR#3	The system will store and manage Appointment made by patients, including: • Appointment ID • Patient ID • Provider ID • Date and Time • Status
DR#4	The system will store and manage Treatment made by Healthcare Providers including: • Treatment ID • Patient ID • Provider ID • Treatment Type • Date • Notes

	• Cost
DR#5	The system will store and manage Medication made by Healthcare Provider, including: • Medication ID • Name • Dosage • Frequency • Prescribing Provider ID • Start Date • End Date
DR#6	The system will store and manage Payments made by the user, including: • Billing ID • Patient ID • Treatment ID • Amount Charged • Payment Date • Payment Type • Payment Status
DR#7	The system will store and manage Lab Test conducted by Healthcare Providers, including: • Test ID • Patient ID • Provider ID • Test Type • Date of Test • Results
DR#8	The system will store and manage Insurance information of the user, including: • Insurance ID • Patient ID • Provider ID • Plan Name • Coverage Details • Expiration Date

4 System Requirements

The system requirements outlined below are non-functional statements that describe how MICA Health Solutions will handle critical operational needs. These requirements cover data retention, backup & recovery, security, system audits, service level agreements, disaster recovery, and contingency plans. By addressing these areas, the system ensures that patient data is safely retained and secured, regular backups are conducted to prevent data loss, security measures are in place to prevent unauthorized access, and contingency plans are available for handling

emergencies or system outages. Each requirement supports the hospital's goal of maintaining operational continuity and patient care quality under all circumstances.

SR#	Category	System Requirement
SR#1	Data Retention	The system must retain all patient medical records and transaction logs for a minimum of 7 years to comply with healthcare regulations such as HIPAA.
SR#2	Data Retention	The system must archive data older than 3 years in a secure, cost-effective storage system while ensuring it remains accessible to authorized personnel when required.
SR#3	Data Retention	The system must securely delete data from all databases and backups at the end of the retention period, ensuring no recoverable traces.
SR#4	Data Retention	The system must retain system and access audit logs for at least 5 years to ensure full traceability of user actions and system changes.
SR#5	Backup & Recovery	The system must perform automated daily backups of all critical data, including patient records, clinical data, and billing information.
SR#6	Backup & Recovery	The system must store backups in geographically distributed, secure locations to protect against local disasters.
SR#7	Backup & Recovery	The system must encrypt all backups using AES-256 encryption to ensure data protection in both storage and transit.
SR#8	Backup & Recovery	The system must have a Recovery Time Objective (RTO) of 4 hours, meaning all data can be restored within 4 hours in case of a failure.
SR#9	Backup & Recovery	The system must maintain a Recovery Point Objective (RPO) of 30 minutes to minimize data loss in the event of a disaster.
SR#10	Backup & Recovery	The system must conduct quarterly testing of backup and recovery processes to ensure functionality and performance targets are met.
SR#11	Security	The system must encrypt all sensitive data, including patient records and billing information, in transit using TLS 1.3 and at rest using AES-256 encryption.
SR#12	Security	The system must enforce multi-factor authentication (MFA) for all users accessing sensitive areas of the system.
SR#13	Security	The system must implement Role-Based Access Control (RBAC) to limit user access based on their job functions (e.g., doctors, administrators, patients).

SR#14	Security	The system must anonymize patient data for external reporting or non-care-related purposes to protect patient privacy.
SR#15	Security	The system must have an incident response plan in place to detect, contain, and report security breaches.
SR#16	Security	The system must conduct biannual penetration testing to identify and address security vulnerabilities.
SR#17	System Audit	The system must automatically generate detailed audit logs for all critical activities, including access, updates, deletions, and system configuration changes.
SR#18	System Audit	The system must restrict access to audit logs to authorized administrators and ensure that the logs are securely stored and encrypted.
SR#19	System Audit	The system must have a tamper-proof mechanism for audit logs, including digital signatures to prevent unauthorized modifications.
SR#20	System Audit	The system must generate audit reports that compliance officers can access for regulatory inspections and reviews.
SR#21	Service Level Agreements	The system must guarantee 99.9% uptime to ensure continuous availability of core features, such as patient records, appointment scheduling, and clinical management functions.
SR#22	Service Level Agreements	The system must respond to standard queries (e.g., patient record retrieval) within 2 seconds during peak usage.
SR#23	Service Level Agreements	The system must provide 24/7 technical support with an initial response time of 30 minutes for critical issues.
SR#24	Service Level Agreements	The system must resolve critical issues affecting patient care, such as inability to access records, within 4 hours.
SR#25	Service Level Agreements	The system must provide service credits of 10% of the monthly service fee for every 1% of downtime exceeding the agreed SLA.
SR#26	Disaster Recovery	The system must have a comprehensive Disaster Recovery Plan (DRP) to restore systems, applications, and data in the event of a disaster, such as hardware failure, cyber-attacks, or natural disasters.
SR#27	Disaster Recovery	The system must have geographically redundant data centers to enable automatic failover in case of a catastrophic local failure.
SR#28	Disaster Recovery	The system must have a Disaster Recovery Time Objective (RTO) of 8 hours to restore full system functionality following a disaster.
SR#29	Disaster Recovery	The system must support automatic failover mechanisms to ensure continuity of critical services such as patient record access and billing during system failure.

SR#30	Disaster Recovery	The system must test the Disaster Recovery Plan at least once a year to ensure its effectiveness and update it according to infrastructure changes.
SR#31	Contingency Plans	The system must include a contingency plan to ensure continued operation of core hospital functions (e.g., emergency room services) during system outages.
SR#32	Contingency Plans	The system must provide manual override procedures for critical functions such as patient admission and medication dispensing during system downtimes.
SR#33	Contingency Plans	The system must include a communication protocol to inform staff and patients of system downtimes and provide status updates during disruptions.
SR#34	Contingency Plans	The system must provide alternative access to critical patient data through offline or local storage systems during prolonged outages.
SR#35	Contingency Plans	The system must conduct a post-disaster review following the activation of contingency plans to assess response effectiveness and improve future processes.

5 Use Cases

Use cases (UCs) are detailed descriptions of how users interact with a system to achieve specific goals. They describe the different ways in which the system can be used by the actors and what the expected outcome is supposed to be.

The UCs highlighted in this report cover the creation, viewing, and updating of patient profiles, medical records, and healthcare provider information. This will ensure that healthcare providers have access to accurate and up-to-date patient data, which is essential for delivering quality care. Also provided in this report are the use cases that describe efficient appointment scheduling and management, reducing missed appointments and optimizing provider availability.

Finally, the report covers the billing and invoicing functionalities that simplify financial transactions, allowing for accurate documentation and easy access for both patients and administrative staff.

Name	Create Patient Profile
Identifier	UC 1.1
Actors	Patient/ Administrative Staff/ Healthcare Providers
Preconditions	The user is authenticated and accessing the system.
Trigger(s)	User wants to create a patient profile.
Business Rule(s)	Only authorized users can create a patient profile.
Scenario	R1.1.1　The user chooses to create a patient profile and clicks "Create a New Patient Profile" button. R1.1.2　The system generates a form with unique patient ID and the following inputs: 　　- Personal Information (Full Name, DOB, Gender, Address, Phone Number, Email Address, Emergency Contact Information) 　　- Medical History (Past Medical Conditions, Family Medical History, Allergies, Current Medications) 　　- Insurance Information (Insurance Provider, Policy Number, Group Number, Coverage Details) 　　- Healthcare Provider Information (Primary Care Physician, Specialist) 　　- Demographic (Ethnicity, Preferred Language, Occupation, Marital Status) 　　- Health Records (Immunization History, Recent Lab and Procedures, Vital Signs) R1.1.3　The user enters the information and submits to the system. R1.1.4　The system validates that all fields are filled, if not **[Alt. Scenario A].** R1.1.5　The system displays a message "Are the following information correct?" R1.1.6　The user verifies that information is correct. R1.1.7　The system creates the patient profile.
Alternative Scenario(s)	Alternate Scenario A: The system displays an "error" message. A1.1.1　The system prompts the user that some fields are blank. A1.1.2　The user fixes missing field(s). A1.1.3　The use case continues at R1.1.3 **(for data entry)**.

Name	View Patient Profile
Identifier	UC 1.2
Actors	Patient/ Administrative Staff/ Healthcare Providers
Preconditions	The patient profile is already created. The user is authenticated and accessing the system.
Trigger(s)	The user wants to view a patient profile.
Business Rule(s)	None
Scenario	R1.2.1　The user navigates the patient profile tab. R1.2.2　The system displays the patient profile home tab and a search

		bar.
	R1.2.3	The user provides relevant patient profile identifier on the search bar.
	R1.2.4	The system displays a list of matching patient profile(s), if not **[Alt. Scenario A].**
	R1.2.5	The user selects the correct patient from the list.
	R1.2.6	The system displays the patient's profile.
	R1.2.7	The user logs out of the system.
	R1.2.8	The system closes the web page.
Alternative Scenario(s)	Alternate Scenario A: The search does not produce a result.	
	A1.2.1	The system returns an empty result window.
	A1.2.2	The user verifies and re-enters the correct patient identifier.
	A1.2.3	The use case continues at **R1.2.3 (for data entry)**.

Name	**Update Patient Profile**	
Identifier	UC 1.3	
Actors	Patient/ Administrative Staff/ Healthcare Providers	
Preconditions	None	
Trigger(s)	The user wants to update a patient profile.	
Business Rule(s)	None	
Scenario	R1.3.1	The user chooses to update a patient profile by choosing a patient profile using the viewer defined in UC1.2.
	R1.3.2	The system displays the patient profile page.
	R1.3.3	The user provides relevant patient profile identifier.
	R1.3.4	The system displays a list of matching patients, if not **[Alt Scenario A].**
	R1.3.5	The user selects the correct patient identifier.
	R1.3.6	The system displays the patient profile.
	R1.3.7	The user clicks the "edit" button to enable editing mode for the patient profile.
	R1.3.8	The system makes the form editable for the user to make changes.
	R1.3.9	The user makes necessary changes to the patient profile.
	R1.3.10	The system validates that all fields are filled, if not **[Alt. Scenario B].**
	R1.3.11	The system displays a message "Are the following information correct?".
	R1.3.12	The user verifies that the information is correct.
	R1.3.13	The system updates the patient profile.
	R1.3.14	The user logs out of the system.
	R1.3.15	The system closes down the web page.

Alternative Scenario(s)	Alternate Scenario A: The search does not provide a result.
	A1.3.1 The system returns an empty result window.
	A1.3.2 The user verifies and re-enters the correct patient identifier.
	A1.3.3 The use case continues at **R1.3.3 (for data entry).**
	Alternate Scenario B: The system displays an "error" message.
	B1.3.1 The system prompts the user that some fields are blank.
	B1.3.2 The user fixes the missing field(s)
	B1.3.3 The use case continues at **R1.3.9 (for data entry).**

Name	Create Medical Record
Identifier	UC 1.4
Actors	Doctor
Preconditions	The doctor is authenticated and accessing the system.
Trigger(s)	The doctor wants to create a patient's medical record after a consultation, diagnosis, or treatment.
Business Rule(s)	Only authorized users can create a medical record.
Scenario	R1.4.1 The doctor chooses to create a patient's medical record and clicks "Create a New Patient Medical Record" button.
	R1.4.2 The system generates a form with following inputs.
	- Personal Information (Patient ID, Full Name, DOB, Gender, Address, Phone Number, Email Address, Emergency Contact Information)
	- Medical History (Past Medical Conditions, Family Medical History, Allergies, Current Medications)
	- Insurance Information (Insurance Provider, Policy Number, Group Number, Coverage Details)
	- Healthcare Provider Information (Primary Care Physician, Specialist)
	- Demographic (Ethnicity, Preferred Language, Occupation, Marital Status)
	- Health Records (Immunization History, Recent Lab and Procedures, Vital Signs)
	R1.4.3 The doctor enters the information and submits to the system.
	R1.4.4 The system validates that all fields are filled, if not **[Alt. Scenario A].**
	R1.4.5 The system displays a message "Are the following information correct?"
	R1.4.6 The doctor verifies that information is correct.
	R1.4.7 The system creates the patient's medical record.
Alternative Scenario(s)	Alternate Scenario A: The system displays an "error" message.
	A1.4.1 The system prompts the user that some fields are blank.

	A1.4.2 The doctor fixes missing field(s).
	A1.4.3 The use case continues at **R1.4.3 (for data entry)**.

Name	**View Medical Record**
Identifier	UC 1.5
Actors	Doctor
Preconditions	The doctor is authenticated and authorized to access and view the patient's medical record.
Trigger(s)	The doctor wants to view a patient's medical record after a consultation, diagnosis, or treatment.
Business Rule(s)	Only authorized personnel can update the medical record.
Scenario	R1.5.1 The doctor navigates the patient profile tab.
	R1.5.2 The systems display a list of patients registered in the hospital with a search bar.
	R1.5.3 The doctor provides relevant patient identifier on the search bar.
	R1.5.4 The system displays the medical record that matches with the patient identifier, if not **[Alt. Scenario A].**
	R1.5.5 The doctor selects the patient's record.
	R1.5.6 The system displays the patient's current medical record, including medical history, diagnoses, treatments, and prescriptions.
	R1.5.7 The doctor logs out of the system.
	R1.5.8 The system closes the web page.
Alternative Scenario(s)	Alternate Scenario A: The search does not produce a result.
	A1.5.1 The system returns an empty result window.
	A1.5.2 The doctor verifies and re-enters the correct the patient identifier.
	A1.5.3 The use case continues at **R1.5.3 (for data entry).**

Name	**Update Medical Record**
Identifier	UC 1.6
Actors	Doctor
Preconditions	The doctor is authenticated and authorized to access and update the patient's medical record.
Trigger(s)	The doctor wants to update the patient's medical record after a consultation, diagnosis, or treatment.
Business Rule(s)	Only authorized personnel can update the medical record.
Scenario	R1.6.1 The doctor chooses to update a patient's medical record by choosing a medical record using the viewer define in UC 1.5.
	R1.6.2 The system displays the patients' medical record page with a search bar.
	R1.6.3 The doctor provides relevant patient identifier on the search bar.

	R1.6.4	The system displays a list of matching patient medical records, if not **[Alt. Scenario A].**
	R1.6.5	The doctor selects the correct patient medical record.
	R1.6.6	The system displays the patient's current medical record, including medical history, diagnoses, treatments, and prescriptions.
	R1.6.7	The doctor clicks the "Edit" button to edit or add new information.
	R1.6.8	The system displays a form where the doctor can input new details, such as diagnosis, treatment, or lab results.
	R1.6.9	The doctor enters the updated information in the medical record form.
	R1.6.10	The system validates that all fields are filled, if not **[Alt. Scenario B].**
	R1.6.11	The system displays a message "Are the following information correct?"
	R1.6.12	The doctor verifies that the information is correct.
	R1.6.13	The system saves the updated information in the patient's medical record.
	R1.6.14	The system generates a confirmation message that the record has been successfully updated and the patient is notified.
Alternative Scenario(s)	Alternate Scenario A: The search does not provide a result. A1.6.1 The system returns an empty result window. A1.6.2 The user verifies and re-enters the correct patient identifier. A1.6.3 The use case continues at **R1.6.3 (for data entry).** Alternate Scenario B: The system displays an "error" message. B1.6.1 The system prompts the user that some fields are blank. B1.6.2 The user fixes the missing field(s) B1.6.3 The use case continues at **R1.6.9 (for data entry).**	

Name	Create Appointment	
Identifier	UC 1.7	
Actors	Patient	
Preconditions	Patient is authenticated and accessing the system	
Trigger(s)	Patient wants to create an appointment	
Business Rule(s)	Only authorized personnel can make an appointment.	
Scenario	R1.7.1	The patient chooses to create an appointment
	R1.7.2	The systems display a form with two sections: Select available date and select available time slot.
	R1.7.3	The patient selects the most convenient date from the available date displayed on the form.

	R1.7.4	The system updates the form to display available time slots for the selected date, if none **[Alt. Scenario A].**
	R1.7.5	The patient selects a time slot from the available options.
	R1.7.6	The system updates the form to assign the patient to a doctor available
	R1.7.7	The system verifies the selections and displays the appointment summary for the patient to confirm.
	R1.7.8	The patient confirms the appointment.
	R1.7.9	The system successfully creates the appointment and sends a confirmation message to the patient.
Alternative Scenario(s)	Alternate Scenario A: If the patient selects an unavailable date, time, or cancels the process.	
	A1.7.1	The system prompts the patient that the date is unavailable.
	A1.7.2	The patient selects a different date.
	A1.7.3	The use case continues at R1.7.3 **(for selection)**.

Name	View Appointment
Identifier	UC 1.8
Actors	Patient
Preconditions	Patient is authenticated and accessing the system The patient has at least one scheduled appointment.
Trigger(s)	Patient wants to view all appointments made
Business Rule(s)	None
Scenario	R1.8.1 The patient clicks on "My Appointments" on the system. R1.8.2 The system displays a list of the patient's upcoming and past appointments. R1.8.3 The patient selects an appointment to view, if none **[Alt. Scenario A].** R1.8.4 The system displays the details of the selected appointment, including the date, time and doctor. R1.8.5 The patient views the appointment details. R1.8.6 The system provides options to modify or cancel the appointment if it is an upcoming one.
Alternative Scenario(s)	Alternate Scenario A: If the patient has no scheduled or valid appointments. A1.8.1 The system displays "No appointments scheduled." A1.8.2 The patient closes the browser. A1.8.3 The use case ends.

Name	Update Appointment
Identifier	UC 1.9
Actors	Patient
Preconditions	Patient is authenticated and accessing the system

	Patient has an upcoming scheduled appointment
Trigger(s)	Patient wants to make changes to an appointment already created
Business Rule(s)	None
Scenario	R1.9.1 The patient clicks on "My Appointments" on the system. R1.9.2 The system displays a list of the patient's upcoming and past appointments. R1.9.3 The patient selects the upcoming appointment they want to Modify, if none **[Alt. Scenario A].** R1.9.4 The system displays the current details of the selected appointment (date, time). R1.9.5 The patient clicks the "Edit" button. R1.9.6 The system displays a form where the patient can modify the appointment details (date, time). R1.9.7 The patient selects the most convenient date from the available date displayed on the form. R1.9.8 The system updates the form to display available time slots for the selected date, if none **[Alt. Scenario B].** R1.9.9 The patient selects a time slot from the available options. R1.9.10 The system updates the form to assign the patient to a doctor available. R1.9.11 The system verifies the updated selections and displays the appointment summary for the patient to confirm. R1.9.12 The patient confirms the updated appointment. R1.9.13 The system successfully updates the appointment and sends a confirmation message to the patient with the new details.
Alternative Scenario(s)	Alternate Scenario A: If the patient has no scheduled or valid appointments. A1.9.1 The system displays "No appointments scheduled." A1.9.2 The patient closes the browser. A1.9.3 The use case ends. Alternate Scenario B: If the new date or time is not available or if the patient cancels the update process. B1.9.1 The system prompts the patient that the date is unavailable. B1.9.2 The patient selects a different date. B1.9.3 The use case continues at R1.9.7 (**for selection**).

Name	Delete Appointment
Identifier	UC 1.10
Actors	Patient
Preconditions	Patient is authenticated and accessing the system Patient has an upcoming scheduled appointment
Trigger(s)	Patient wants to delete an appointment

Business Rule(s)	None
Scenario	R1.10.1 The patient clicks on "My Appointments" on the system. R1.10.2 The system displays a list of the patient's upcoming and past appointments. R1.10.3 The patient selects the current appointment to delete, if not **[Alt. Scenario A].** R1.10.4 The system displays the details of the selected appointment, including the date, time and doctor. R1.10.5 The patient views the appointment details. R1.10.6 The patient clicks the "Cancel Appointment" button. R1.10.7 The system displays a pop-up screen, prompting the patient to confirm the cancellation of the appointment. R1.10.8 The system cancels the appointment and sends a cancellation confirmation to the patient.
Alternative Scenario(s)	Alternate Scenario A: The user cancels the deletion process. A1.10.1 The system retains the original appointment details. A1.10.2 The patient closes the browser. A1.10.3 The use case ends.

Name	Create Billing Invoice
Identifier	UC 1.11
Actors	Billing Staff / Administrative Staff
Preconditions	User is authenticated and accessing the system Medical records are updated on patient's profile
Trigger(s)	User wants to create an invoice for a patient
Business Rule(s)	Only authorized personnel can create a billing invoice.
Scenario	R1.11.1 The user chooses to create a billing invoice and clicks on the profile inbox icon. R1.11.2 The system displays a list of pending financial requests. R1.11.3 The user opens the record to validate the details of services or treatment on the patient's medical record. R1.11.4 The system displays the patient's services and treatment as selected by the health provider. **[Alt Scenario A]** R1.11.5 The user confirms and submits the invoice creation. R1.11.6 The user can print or send the invoice electronically to the patient or insurance provider.
Alternative Scenario(s)	Alternate Scenario A: The details of service or treatments does not match the patient's medical record A1.11.1 The user returns the request to the healthcare provider with a note of discrepancy. A1.11.2 The system sends a notification to the health provider with a note of discrepancy. A1.11.3 The use case ends.

Name	View Billing Invoice
Identifier	UC 1.12
Actors	Billing Staff / Administrative Staff
Preconditions	User is authenticated and accessing the system An invoice must exist for the selected patient
Triggers	User wants to view a billing invoice
Business Rule(s)	Only authorized personnel can view a billing invoice.
Scenario	R1.12.1 The user chooses to view an existing invoice and navigates to the patient profile tab. R1.12.2 The system displays a list of patients registered in the hospital with a search bar. R1.12.3 The user provides relevant patient identifier on the search bar. R1.12.4 The system displays the patient's profile and medical history. R1.12.5 The user clicks on the tab "Billing & Payments". R1.12.6 The system displays all the invoices and payments on the patient's profile. R1.12.7 The user clicks on the "View" button on the specific invoice they wish to view. **[Alt Scenario A]** R1.12.8 The system displays all the details on the invoice including Invoice Number, Date of issue, Services or treatments rendered, insurance details R1.12.9 The user can print or send the invoice electronically to the patient or insurance provider.
Alternative Scenario(s)	Alternate Scenario A: There are no invoices for the selected patient A1.12.1 The system displays a message that there are no invoices available. A1.12.2 The user closes the browser. A1.12.3 The use case ends.

Name	Update Billing Invoice
Identifier	UC 1.13
Actors	Billing Staff / Administrative Staff
Preconditions	User is authenticated and accessing the system An invoice must exist for the selected patient
Trigger(s)	User wants to update billing invoices
Business Rule(s)	Only authorized personnel can update the billing invoice.
Scenario	R1.13.1 The user chooses to view an existing invoice and navigates to the patient profile tab. R1.13.2 The system displays a list of patients registered in the hospital with a search bar. R1.13.3 The user provides relevant patient identifier on the search bar. R1.13.4 The system displays the patient's profile and medical history. R1.13.5 The user clicks on the tab "Billing & Payments".

	R1.13.6	The system displays all the invoices and payments on the patient's profile.
	R1.13.7	The user clicks on the "Edit" button on the specific invoice they wish to update.
	R1.13.8	The system displays all the details for update on the invoice including charges to services and treatments or payment information or billing address
	R1.13.9	The user makes the appropriate update
	R1.13.10	The system prompts the user to review the changes made to the invoice. **[Alt Scenario A]**
	R1.13.11	The user confirms the changes made on the invoice
	R1.13.12	The system displays a confirmation message that the invoice has been successfully updated.
	R1.13.13	The user can print or send the invoice electronically to the patient or insurance provider.
Alternative Scenario(s)	Alternate Scenario A: The fields for update return with validation errors such as missing fields or invalid/incomplete data	
	A1.13.1	The system displays an error message and prompts the user to correct the error before updating.
	A1.13.2	The user proceeds with the update from step R1.13.8.

Name	Create Healthcare Provider Profile	
Identifier	UC 1.14	
Actors	Admin Staff / HR Personnel / System Administrator	
Preconditions	User is authenticated and accessing the system	
Trigger(s)	User wants to create a profile for a healthcare provider	
Business Rule(s)	Only authorized personnel can create a healthcare provider.	
Scenario	R1.14.1	The user navigates to "Staff Management" on the homepage section from the main menu.
	R1.14.2	The user clicks on "Add New Provider" button.
	R1.14.3	The system displays the fields for the user to provide personal details of the provider.
	R1.14.4	The user supplies the **Personal Details** of the provider such as Name, Date of Birth, Contact Information and Address and clicks "Next". **[Alt Scenario A]**
	R1.14.5	The system displays the fields for the user to provide professional details of the provider.
	R1.14.6	The user supplies the **Professional Details** of the provider such as Qualifications, Educational Background, Certifications and License Information and clicks "Next". **[Alt Scenario A]**
	R1.14.7	The system displays the fields for the user to provide employment details of the provider.

	R1.14.8	The user supplies the **Employment Details** of the provider such as Department, Status, Position, Start Date, Reporting To and Office Number and clicks "Submit". **[Alt Scenario A]**
	R1.14.9	The system displays all the supplied information for review.
	R1.14.10	The user confirms the information supplied and the creation of the profile.
	R1.14.11	The system creates the profile of the provider and notifies the provider via email with login credentials.
Alternative Scenario(s)	Alternate Scenario A: The fields for creation return with validation errors such as missing fields or invalid/incomplete data	
	A1.14.1	The system displays an error message and prompts the user to correct the error before proceeding.
	A1.14.2	The user proceeds with the update from step R1.14.6.

Name	Update Healthcare Provider Profile	
Identifier	UC 1.15	
Actors	Admin Staff / HR Personnel / System Administrator	
Preconditions	User is authenticated and access the system The provider's profile must exist on the platform	
Trigger(s)	User wants to update the profile of a healthcare provider	
Business Rule(s)	Only authorized personnel can update the profile of the healthcare provider.	
Scenario	R1.15.1	The user navigates to "Staff Management" on the homepage section from the main menu.
	R1.15.2	The user searches for a provider using an ID or Last Name in addition with the Date of Birth.
	R1.15.3	The system displays the current profile of the provider.
	R1.15.4	The user can make changes in either the **Personal** (contact information and address) or **Professional** (qualifications, certificates, licenses) or **Employment** (department, position, status). **[Alt Scenario A]**
	R1.15.5	The system displays all the supplied information for review.
	R1.15.6	The user confirms the information supplied and the update of the profile.
	R1.15.7	The system updates the profile of the provider and notifies the provider via email.
Alternative Scenario(s)	Alternate Scenario A: The fields for update return with validation errors such as missing fields or invalid/incomplete data	
	A1.15.1	The system displays an error message and prompts the user to correct the error before proceeding.
	A1.15.2	The user proceeds with the update from step R1.15.5.