Unit Code: CPRO306

Unit Title: Capstone Project - IT

Assessment 2 – Interim SRS Report

Group 5

Project 21 – Electronic Prescription System

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# Project Charter - Nitesh

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| --- | --- |
| **PROJECT CHARTER** | |
| **Project Title** | Westcoast Health – Electronic Prescription System |
| **Project Sponsor** | Westcoast Health |
| **Key Stakeholders** | * Project Sponsor * Project Manager * Project Team |

|  |  |  |
| --- | --- | --- |
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| **STAKEHOLDERS** |
| * Administration Staff: management of users, acess to reports, system activity checks * Physicians: write and oversee electronic prescriptions * Pharmacists: verify QR codes and give prescriptions * Customers * IT team: supports problem repairs, upgrades and development * Regulatory bodies: ensure adherence to legal and healthcare privacy regulations |

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| **PROJECT SCOPE STATEMENT** |
| PROBLEM STATEMENT |
| Currently, Westcoast Health uses digital prescriptions that are either handwritten or poorly maintained. This causes several issues, such as misplaced or changed prescriptions, a higher chance of fraud, and mistakes in human data entry. These problems can affect patient safety and system trust in addition to making staff inefficient.   The healthcare system requires a dependable, contemporary solution as Westcoast Health's patient base continues to expand, particularly in the northern suburbs. These issues will be resolved by a centralised, safe electronic prescription system that guarantees precise, traceable, and impenetrable prescriptions. |
| PROPOSED SOLUTION |
| Electronic prescription system with user and prescription management , as well as QR code generation and storage. Pharmacy validation and audit logging will also be included, as well as extra security features. |
| GOAL |
| The goal is to create a centralised electronic prescription system that allows for safe prescription production, delivery, and validation among all Westcoast Health locations. |
| SCOPE AND DELIVERABLES |
| Centralised system built over 12 weeks by a team of 5 developers with the following deliverables:   * User portal with login and registration functionality * Patient management * Prescription management * QR code generator * Pharmacy validation * Audit log * Notification system * Report module * Security module |
| KEY REQUIREMENTS |
| * User authentication and management * Patient management * Prescription creation * QR code generation and storage * Prescription listing and search * Pharmacy validation and dispensing * Patient portal * Audit logging * Admin dashboard * Notifications * Reporting * Security features |
| CONSTRAINTS |
| Time: short development timeframe which might lead to some functionalities to not be fully developed |

# Project Description - Nitesh

## Problem Statement

Westcoast Health currently relies on digital prescriptions either manually written or poorly managed. This has led to a range of issues, such as lost or altered prescriptions, increased fraud risks, as well as frequent human errors with data entry. These issues have impacted patient safety, staff efficiency, and trust in the healthcare system. This project will focus on creating an electronic prescription system that is reliable, centralised and secure and which will address those issues by ensuring accurate, tamper-proof and traceable prescriptions.

## Purpose and Objectives

* Develop a centralised electronic prescription system allowing for safe prescription production, delivery, and validation among all Westcoast Health locations
* Lessen the possibility of misuse, mistake, and loss, retire paper prescriptions
* Use QR codes and digital tokens for prescription verification
* Offer patients, administrators, chemists, and physicians’ role-based security
* Offer electronic prescription records and status updates instantly
* Reduce administrative labour time and improve the quality of data

## Stakeholders

* Westcoast Health management: oversees project development and ensure meeting of business goals
* Doctors: can digitally create, manage, and issue prescriptions
* Pharmacists: can verify the legitimacy of the prescription before administering the medication
* Patients: can safely access and download prescriptions
* IT team: configure and maintain the system’s infrastructure
* Admins: control user accounts and monitor system operations
* Regulatory bodies: verify the compliance of the system with ethical and legal requirements

## Required Project Team

* Project Manager
* Business Analyst
* Backend Developer
* Frontend Developer
* Database Engineer
* Security Expert
* Quality Assurance Tester
* Documentation Writer
* Technical Support and Implementation Team
* Stakeholders

# Scope and Key Deliverables - Ria

## Scope Statement

An electronic Prescription has been done in many countries all over the world. Electronic prescription is computer-based system to create drug prescription and support the prescribing process. This e-prescription of Westcoast Health has some advantages such as:

* Improve of the health care service
* Increase the efficiency of prescribe and dispense medication
* Error handling
* Saving time of the doctors, pharmacist and patient
* Monitoring how the drug prescribed.

Developing the e-prescription for Westcoast health for decrease the paper prescription that vulnerable such as fake, lost or error. This system has non-functional requirements, such as:

1. Make users available and secure for access the portal by identify the risk and implement mitigation action.

2. Ensure the page can be fast access and validation also can be support for increment users.

3. Has the availability for access from different and multiple clinics for support the scalability.

4. The system will be available 99.5% for user access and has maintenance schedule to notify the user.

5. Reliable for access the integration data without any error

6. The system could be maintain easy by use the name convention.

7. Responsive web interface for all user, mobile friendly for patient and pharmacist access, and could download as PDF with QR code.

8. The web will compatible for common browser.

9. Ability to log all important action that can view and export by admin.

## Key Deliverables

1. User management it can for registration and login for all users (Doctor, Pharmacist, Patient and admin) and provide the access control based on role.
2. Patient management : patient can view and update profiles, link to records.
3. Prescription management : doctor could view, update & delete prescription before dispensing, create the prescription with unique ID, QR code generate with secure token and can provide PDF with QR code.
4. QR code generator : can create QR codes after prescription created by use prescription ID and secure token.
5. Pharmacy validation : pharmacist can scan and enter data, verify by system, display prescription and action log.
6. Patient portal : secure login, view personal prescription and can download / print PDF.
7. Audit log : record system action and admin can view & search for log.
8. Admin : can add, edit, delete user; view system logs, manage system setting, generate reports.
9. Notification : could be send through Email / sms for prescription issued.
10. Report module : Admin can export report as PDF
11. Security module : this system can be secure by validating input, using HTTPS, secure QR validation token.

# Project Milestones - Jeremy

The milestones are to show the important checkpoints of the development towards the Westcoast Health Electronic Prescription System. It also shows the important decisions made in the project. The milestones are important as it will show the progress that is made, risks that can be managed and what the stakeholders will expect from the project so it can be aligned to their view. Budget must be met according to the project and should also be delivered to the stakeholders on time.

* The Project management milestone planning methodology will be used to ensure that the development areas will be known and based off by the stakeholder’s requirements.
* Milestones will allow the important areas to be identified/monitored for each project lifecycle.
* With the milestones that is cleared up, the staff and stakeholders will be on the same page, risk will be reduced and budget is controlled. This is to make sure that the system will require all functional/non-functional requirements without any issues.

## Initiate Milestone

* To explain what the purpose, scope and high-level requirements of the project.
* Stakeholder information will be gained from the doctors, staff, IT areas and the pharmacists.
* What tools to be used such as PHP and MySQL.
* The project plan example to be used such as the timeline of the project, modules and the responsibilities of each role in the project.

## Plan

* Turn the example plan to a real plan that can be executed and finalized.
* The system architecture should be finished, such as the design of the database. Security risks/issues/plans and the layout of the module.
* The roles of each individual job should be given and assigned allowing also the resources to be schedules and to finalize the timeline of the project.
* Risk will then adopt strategies for mitigation and quality will be controlled to ensure harm is minimized to the project.

## Execute the Plan

* To ensure the system modules are developed to the final plan itself.
* The modules such as the management of users, generating the QR code, developing patient portals and to manage prescriptions are where development begins.
* Team meetings needs to be developed to check on the progress of all roles.
* If there are issues in the technical side, or if changes for the better is to be made, it will be changed in real time and not after.

## Monitor and Control

* The project should be monitored to ensure that the scope, time and budget will be aligned with the goals.
* The manager of the project will be tracking the performance of each individual using the KPI and the milestone that are checked by each person.
* Testing of the system by the users in the form of the unit, integration and given feedback by the stakeholder’s view.
* Changes and adjustments to be project and timeline can be made if the stakeholders decide there are changes or any different areas are made from the plan.

## Final Project Closing

* The development, documents of the project to be finalized and signed off.
* The final version of the project will be deployed in the hospital server and the cloud servers in the systems.
* The documentations made such as user guides and the architecture of the systems will be handed to the users for their use for information on it.
* The stakeholders will review, give their opinion and then finalize the project =to ensure it is finished.

Why Project milestones are important in this aspect?

This is to track the progress of all members and ensures communication is stable and clear. Risk will be reduced overall in the projects as it will be broken into different parts such as equipment or the system. Things like the approval time of the stakeholders and project delivery date is split to ensure things are done more efficiently. The milestones allow the members to control the budget and improve teamwork on all departments such as IT and the medical teams. Milestones play a major impact to make the project efficient, fast and safe.

# Major Risks and Ethical Risks - Morgane

## Project Risks and Mitigation

|  |  |  |
| --- | --- | --- |
| Major Project Risks | | |
| Risk | Description | Mitigation Strategy |
| 1. Unauthorised Access | Critical risk, especially as the system will deal with sensitive data. If user roles aren’t controlled or well-defined, users could access data they shouldn’t. | Strict RBAC principles, session controls, regular permission audits.[[1]](#footnote-1)[[2]](#footnote-2)[[3]](#footnote-3) |
| 1. Weak Authentication Mechanisms | Can lead to unauthorised access to sensitive data and let attackers hijack accounts/crack passwords. | MFA, password\_hash() and password\_verify(), enforcement of strong password policies.[[4]](#footnote-4)[[5]](#footnote-5) |
| 1. Data Leakage/Disclosure | The system deals with PII, which makes it a considerable target for breaches. If the prescription or patient data is not protected, attackers could view or steal it. | Restriction of access using $\_SESSION[‘role’] and $\_SESSION[‘id’]. Limitation of displayed data (ie. patient’s first name or prescription status). Input sanitisation to prevent SQL injection. |
| 1. Prescription Forgery/Duplication | If the QR token can be reused or can be guessed, the same prescription could be used multiple times. | Unique UUID() will be used per prescription and will be marked as “used” in the DB afyer validation to ensure their “one-time-use”.[[6]](#footnote-6) |
| 1. QR Validation Bypass/Tampering | A user might enter a fake QR token or modify it and have access to someone else’s prescription. | Use of server-side validation to match token with patient ID and status. If they have already been used or have expired, they will be rejected. |
| 1. Data Integrity Loss/Fraud | Risk of tampered or deleted prescription records that go undetected if no audit trail. | Logs table will be created and any admin updates will be updated with a timestamp, user ID, and the action performed (CRUD operations). |
| 1. Integration Challenges | Integration with QR-scanning devices might introduce delays or security gaps, especially if tools aren’t fully tested or compatible. | The PHP QR code library (phpqrcode) will be used to ensure compatibility and the QE generator will be tested early on in the sprints. |
| 1. Limited Development Time | The 11-week project timeframe might lead to untested/unrefined features. | Prioritisation of core features and modular sprint development. |
| 1. Team Miscommunication | Misunderstanding of requirements or lack of collaboration can lead to issues in the integration of features. | Weekly meetings and shared documentation (Google Docs and GitHub). |

## Probability/Impact Matrix – Project Risks

A close-up of several colored squares

AI-generated content may be incorrect.

## Ethical Risks in Databases

|  |  |  |
| --- | --- | --- |
| Major Ethical Risks in Databases | | |
| Ethical Risk | Impact | Mitigation Strategy |
| 1. Storing Unencrypted PII | Can expose patients to identity theft if not stored properly and securely. | Storage of the DB on localhost or behind a password. Encryption of the DB will be future work. |
| 1. Overexposed Access | Inadequate access controls will allow access to sensitive data by non-legitimate users. | Session-based access control with $\_SESSION[‘role’] and $\_SESSION[‘id’]. |
| 1. Weak Password Protection | Not setting strong password policies can lead to vulnerable passwords that are easily cracked. | Enforce strong password policies (ie min 8 characters, one number, one special character, etc.) and password\_hash() stored in PHP. Validation client-side with HTML and JS. |
| 1. Data Misuse | Misuse by admins who abuse their access rights to access sensitive data. | Creation of two admin roles (full and limited) and logging of all actions in logs table. |
| 1. Lack of Secure Authentication | Sessions and accounts can be hijacked if not properly secured behind strong and robust authentication measures. | Limitation of session timeouts, regeneration of session IDs after login, PHP’s password\_hash() and password\_verify(). |
| 1. No Audit Trail | Without an audit trail, any potential changes (malicious or accidental) cannot be tracked. | Creation of a log table where all admin updates are stored (user id, action type, and timestamp). |
| 1. Improper Data Collection | Collecting data that is not needed for the system to work will increase privacy risks. | Collection of essential fields only (ie name, email, DoB). |
| 1. Lack of Consent | Lack of knowledge and consent on how data is collected and used. | Creation of a clear privacy policy and implementation of checkbox during signup that confirms consent. |
| 1. Poor Data Retention | Poor storage practices can lead to data being stored indefinitely, increasing the chance of breaches, as well as going against data minimisation laws. | Creation of a strong data retention policy in place and allow users to request the deletion of their account. Addition of created\_at timestamps to users and prescriptions and implementation of a script that flags data for deletion. |

## Probability/Impact Matrix – Ethical Risks

A close-up of several colored squares

AI-generated content may be incorrect.

# Feasibility Study – Felix

## Technical Feasibility

This system is technically feasible as the developers have the required skills to achieve it and all tools and software needed are freely available. The project will use programming tools such as PHP and MySQL database for the backend, as these tools are low in cost, have been around for a long time and thus have a strong community support, and allow for easy integration with QR code libraries and role-based access control logic. The system will be developed and tested in a local XAMPP environment to ensure security and easy debugging during development, and will then be further designed for mogration to a cloud-hosted environment for live deployment to all Westcoast Health locations.

The frontend will be done through the standard HTML, CSS, and JavaScript tools to build an accessible interface that is user-friendly and tailored to patients, pharmacists, and other admin staff that would need to use it. The QR code functionality will be implemented using open-source PHP libraries such as phpqrcode.

The main goal behind this project is to deliver a system that is designed for modularity, security, and easy maintenance.

## Operational feasibility

The system is operationally feasable and will operate as a fully working prescription platform. It will handle key workflows for doctors, patients, and pharmacists, each of them with role-based access. Prescriptions will be securely generated, stored, and validated using QR codes. Core functionalities (login, session management and role-based access) will ensure only authorised users can view/modify prescription data.

The system will be deployed to a central web server to allow for secure access through any of the Westcoast Health locations. A centralised database will however be used to ensure operational consistency across clinics to improve efficiency and prescription accuracy.

## Economic feasibility

The project is economically feasible as it uses free open-source technologies (PHP, MySQL, JavaScript, and GitHub). Labour costs will also be free as the project is developed as part of a Capstone Project.

If the project goes live, extra costs will need to be taken into consideration, such as the monthly fee for a cloud-based virtual server, domain name, SSL certification, API integration, etc.

## Legal and etchical feasibility

The project will comply with regulatory laws such as HIPAAn APPs and GDPR by incorporating user consent, role-based access, and data minimisation. Audit logs will also be kept to ensure liability and traceability and mitigate any ethical risks such as improper access or data misuses.

## Schedule Feasibility

The project can be finished in 12 weeks, however, non-core features might be skipped or deferred if any drawbacks happen, such as email/SMS notification, complex UX/UI and mobile responsiveness beyond basic compatibility.

Suggested timeline:

* Weeks 1-2: planning and database schema design
* Weeks 3-4: role-based dashboards, prescription form and QR code generation
* Weeks 5-6: QR validation, prescription view, and secure authentication, sessions, logins
* Weeks 7-8: audit trail and access controls are tested, data validation, input sanitation, backups
* Weeks 9-10: finalisation of UI and features, testing and debugging
* Weeks 11-12: last fixes and testing, documentation, report writing

# Feedback

“Overall Strengths:

* Well-structured, logically organised.
* Thorough risk analysis and feasibility coverage.
* Strong technical alignment with real-world constraints and healthcare relevance.

Areas to improve:

* Include evidence of teamwork (logs etc).
* Proofreading for grammar and repetition.
* Add more visual elements. For example, in section 6.5 you may add a table or graph to improve readability.
* You have mentioned names in the table of contents. I would recommend that you mention the contribution in the "individual contribution form" rather than in the table of contents.”

Fixes t ken

# References

Individual Contribution Statement Form

1. <https://www.usenix.org/publications/loginonline/bcrypt-25-retrospective-password-security> [↑](#footnote-ref-1)
2. <https://www.sciencedirect.com/science/article/abs/pii/S0164121215001041> [↑](#footnote-ref-2)
3. <https://journaljerr.com/index.php/JERR/article/view/1141> [↑](#footnote-ref-3)
4. <https://www.jsr.org/hs/index.php/path/article/view/1764/817> [↑](#footnote-ref-4)
5. <https://arxiv.org/pdf/2306.08169> [↑](#footnote-ref-5)
6. <https://www.sciencedirect.com/science/article/abs/pii/S1084804516000102> [↑](#footnote-ref-6)