CS 475 - Senior Project

Secure Electronic Medical Record System (SEMRS)

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Software Requirements Document

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1. Introduction

1.1. Purpose

1. To develop software which will allow physicians, receptionist, and pharmacists to keep a digital copy of patient records.
2. The application will allow authorized users to view encrypted patient information.

1.2. Scope

1. Application is a secure electronic medical record system.
2. Our product will authorize users to add, edit, and view patient information.
3. Users will get the acknowledgement in real time.
4. Electronic records would reduce the paper work and prevent privacy loss.
5. It would improve the patient therapy.
6. It would assist in eliminating identity theft.

1.3. Definitions, Acronyms, Abbreviations

AES - Advanced Encryption Standard
CD4 - a large glycoprotein that is found on the surface especially of helper T cells, that is the receptor for HIV, and that usually functions to facilitate recognition of antigens by helper T cells
MCHC - Mitchell's Plain Community Health Centre
National ID - a document, in the form of a card, issued by the government with a citizen's information including a National Identification Number.

1.4. References

"CD4." *Merriam-Webster*. <http://www.merriam-webster.com/dictionary/cd4>.

1.5. Overview

The remainder of this document is broken down into five sections. Section 2 provides information on the geographical area for which this application will serve and the problems that are to be resolved with the application in place. Section 3 lists the various interfaces which shall be accessible through the application. Section 4 covers the security features which shall be implemented to deter loss of privacy and identity theft. Lastly, section 5 lists the requirements that the application must feature.

2. Overall Description

2.1. Background Information

Mitchell's Plain Community Health Centre (MCHC), located in Cape Town, South Africa, just one of few public health clinics in the area, suffers from poor service delivery due to the South African government. As a result, even with the implementation of what is regarded as the largest free antiretroviral (ARV) therapy treatment in the world, Africa continues to battle with high prevalence of HIV/AIDS. In the Mitchell's Plain community along 1 in 5 people are HIV positive.

The HIV/AIDS treatment clinic alone caters to over 3,000 patients with almost 40 new enrollments per month. With only two permanent physicians and paper-based records, the task of keeping all of the patients in good health can be very difficult and appear to be impossible.

2.2. Problem Description

Patient folders are constantly being misplaced or permanently lost due to the overwhelming circumstances mentioned above. Lost records can complicate and retard treatment, because the patients must start their treatment process all over. This may translate to a life or death situation for an AIDS patient who has CD4 counts below 100, because they are given a random regiment which could have devastating side-effects. Misplacing patient records can also bring about a privacy issue.

The second major issue that MCHC is facing is that the South African government requires patients to present their National ID to the Pharmacy, due to a recent identity theft in the area. Many patients tend to lose their belongings, including their IDs, due to fires, floods, and robberies. Since ARV treatment requires strict adheres in order to function properly, this is a huge impediment.

2.3. Goals

(a) To develop an application for a secure electronic medical record system that enables authorized users to add, view, and update patient information.
(b) The systems shall be very user friendly and allow the user to enter patient information in real time so the records can be available immediately through the intranet system.
(c) This project does not intend to eliminate files permanently, but rather it focuses on ensuring the safety and security of the files and patient information.
(d) The software shall have a web based front-end and a relational database back-end.

3. Interfaces

3.1. Log-in Screen

At initial launch, the user of the system has to enter their log in credentials in order to gain access to patient records. They are required to have a password that will be encrypted.

3.2. Home

3.2.1. Search

Any user may search for a patient in the records, but depending on their access type, they will only be able to view a limited amount of information about a patient.

3.3. Patient Information Page

3.3.1. Demographics

3.3.1.2. Patient Contact and Insurance Information

This information will be viewable by the physician, the receptionist, and the pharmacist.

3.3.1.2. Patient Photo

Each patient will be required to have a photo taken of them that will be viewable from their patient record page. This will be used to eliminate identity theft, as well as serve as a measure for patient demographics.

3.3.2. User Access History

This section of the patient profile shows a history of which user views the patient information including a timestamp.

3.3.3. Visit History

The history will include a description, visit type, facility, date of service, onset date, issues (injury, medical, allergy). This will serve as a record keeping so that doctors will be up to date on past visits to better serve the patients.

3.3.4. Prescriptions

Physicians will be authorized to write prescriptions for patients to be viewed by the pharmacy. The prescription name, dosage, count, date, and any notes that the pharmacy may need to see will be added to the running list of prescriptions.

3.3.5. Messages

Only physicians can send messages to other physicians concerning the patient.

4. Security

4.1. Access Control

Users will be required to enter a secure password in order to access patients files.

4.2. Audit Log

The audit log will serve as a method to track users accessing the database.

4.3. Authentication

Users secure log-in and password shall be authenticated on the server.

4.4. General Encryption

This application shall use the AES_ENCRYPT() and AES_DECRYPT() functions in MySQL to secure database information.

4.5. Encryption When Exchanging Information

This application shall use the AES encryption functions when exchanging information.

5. Requirements List

REQ 01. The application shall have a MySQL database to store patient information and medical records.

REQ 02. The application shall be web based.

REQ 03. The application shall be accessible through the company's intranet.

REQ 04. Each user shall have a unique user ID.

REQ 05. Each user shall have an encrypted password.

REQ 06. The application shall have a search box that allows the user to search a patient based on either the patient's birth year or the patient's last name.

REQ 07. The application shall have a settings option menu in the header.

REQ 08. The application shall have an easily accessible help menu in the header.

REQ 09. The application shall have a sign-out feature in the header.

REQ 10. The application shall store the following patient information; General information, which includes name, address, phone number, date of birth, gender, photo, summary of past events, as well as insurance information.

REQ 11. The application shall store information regarding patient's appointments, which is to include date of appointment, as well as the main reason for the visit.

REQ 12. The application shall store prescription information, including what type of drug, the dosage and count of the medication, as well as the date that the prescription was written.

REQ 13. The application shall store the access history with regard to messages to be exchanged between physicians, including who, when, and which department.

REQ 14. The application shall store a general summary of the messages sent between physicians, including the past medical history of the patient, the diagnosis history, the prescription history, the immunization records, as well as allergy information including what type of allergy, the date of an allergy, and if the patient has an allergies to a prescription.

REQ 15. This application shall have an administrator user class that allows an administrator to add, inactivate, and edit other user accounts.