PROJECT TITLE: *HIPAA-Compliant Scalable Cloud-Based Electronic Medical Records System (EMRS) with Decentralized Access Control for Collaborative Patient Care.*

TEAM MEMBERS:

1. Matsiko Ian Sezi
2. Lusiba Mark Collins
3. Kalema Allan
4. Ahimbisibwe Hassan
5. Oyoka Daniel

KEYWORDS AND ABBREVIATIONS:

1. **HIPAA** – Health Insurance Portability and Accountability Act of 1996
2. **Decentralize** - To distribute various aspects of computing across a network of interconnected devices or nodes thus ensuring client independence and security.
3. **EMRS** – Electronic Medical Records System
4. **Biometric** - Biological measurements and characteristics that can be used to identify individuals.

PROJECT OVERVIEW:

This project aims to develop and implement an electronic medical records system (EMRS) specifically designed for use by both high- and low-income earning individuals, easy to use by individuals of different education backgrounds, and accessible in all geographical and network settings. The system will address the challenges of paper-based medical records that are currently in use by providing a secure, reliable, accessible, and efficient platform for managing patients' data.

PROBLEM STATEMENT:

Today, despite the various technological milestones that have been achieved worldwide, a sweeping wave that has not left out third-world countries, storage, and accessibility of patient records is still a huge challenge here in Uganda. Patients have to carry small books and at times small pieces of paper to medical centers to get their prescriptions noted. After some time when the same patient has

to return to the medical center, it is usually hard to retrace these small pieces of paper, and the health facilities despite keeping huge files of patient data do not have the time to dig up previous records.

A case in point is Mulago National Referral Hospital, the biggest hospital in Uganda. Outpatients have to carry their own notebooks while in-patients are provided with files after getting admitted. These new files are issued on each visit and are not linked to files from previous visits. Additionally, Outpatients who visit the hospital for minor treatment cases and testing are issued with sheets of paper showing their test results and recorded in Ministry of Health issued books for future reference. After a while, when MoH-issued books are filled up, they are stored away as archives which despite being freely accessible to authorized medical personnel, usually take a very long time considering the time-critical nature of medical cases.

Private hospitals have tried to come up with computerized storage and prescription systems but these are only accessible by these particular facilities and in the long run hinder collaboration and a patient visiting a different facility has to either carry copies of medical documents from previous visits which are very easy to misplace. Once they have been misplaced, tests have to be re-run and procedures re-done.

This is an outline of the dangers of the current hard paper systems;

- Loss and damage: Records can be easily destroyed or misplaced, leading to incomplete medical histories.
- Limited accessibility: Sharing patient information across facilities or with specialists can be cumbersome and time-consuming.
- Data security concerns: Paper records are vulnerable to unauthorized access and breaches of patient privacy.
- Inefficiencies: Manually searching paper records is inefficient and can delay diagnoses and treatment.

THE IDEA (outline):

Our idea is to build a medical system that has both medic and patient interfaces.

Medics can only access patient data after the patient has entered their password and fingerprint.

The password alone allows you access to limited data and the fingerprint gives you complete access.

A patient has to have two next of kin individuals from the list of four who when they provide their passwords, can allow password-level access to medical personnel incase the patient is unable to.

The project shall make use of an embedded system, a fingerprint reader in this case. Fingerprints have been selected because they can be read even when the patient is unconscious but in this case with two next of kin individuals present or after providing their passwords.

Different medical personnel shall have different accessibility levels, all records are stored permanently and backup servers, at least two shall be used after the project has been fully established.

PROJECT OBJECTIVES:

To Develop an EMRS that is:

o Offline-first: The system shall function primarily offline to ensure continued operation in areas with limited or unreliable internet connectivity. Data synchronization shall occur when internet access is available.
o User-friendly: The interface shall be simple and intuitive for healthcare workers and individuals (the general population) with varying levels of technical expertise.
o Low-cost and low-maintenance: Utilize open-source technologies and minimize hardware requirements to be affordable and maintainable in resource-constrained settings.
o Secure: Implement robust data encryption and access controls to ensure patient privacy and data security.

- o Interoperable: Consider future integration with existing health information systems in the country.

TARGET USERS:

- The general population
- Doctors
- Nurses
- Community Health Workers (CHWs)
- Pharmacists
- Other healthcare professionals involved in patient care

PROJECT DELIVERABLES:

- A fully functional EMRS software application
- User manuals and training materials for healthcare workers
- Implementation plan for deployment in pilot clinics

PROJECT SUCCESS METRICS:

- Increased adoption rate of the EMRS by healthcare workers
- Improvement in data accuracy and completeness
- Reduced time spent searching for patient records
- Enhanced communication and collaboration among healthcare providers
- Improved patient care outcomes

SUSTAINABILITY PLAN:

- Develop a strategy for ongoing technical support and maintenance of the EMRS.
- Partner with local stakeholders, including government health agencies and NGOs, to ensure long-term sustainability and potential for national rollout.
- Explore options for local data storage and hosting solutions.

  This project will contribute to strengthening the healthcare infrastructure by improving access to patient data, promoting efficient healthcare delivery, and ultimately enhancing patient outcomes.