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**MSIS 661- Information Architecture**

**Team DB Health Squad [Group 3]**

**Final Problem Statement**

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# **INTRODUCTION**

Electronic health records (EHRs), referred to as diagnosis records in our project, are widely used in the healthcare industry at hospitals. But these diagnosis records can be isolated from one hospital to another, which is inconvenient for patients who receive care in different settings. Other problems exist with diagnosis records such as missing data or showing the wrong diagnosis. It can also be difficult for patients to make appointments online with a hospital and view the details of their diagnosis record like tests ordered and diagnoses.

# **PROBLEM STATEMENT**

## **IDEAL :**

## Patient information is integrated across platforms, patient history is centralized and easily transferred from one hospital to another, and integrated between patients and physicians in order to deliver a great patient experience. Making online appointments is easy and the website interface is friendly to help patients view their diagnosis record.

## **REALITY :**

Diagnosis records are not always maintained and updated, which results in bad patient experiences. According to ReferralMD, “3 out of every ten tests are reordered because the results cannot be found” and “Patient charts cannot be found on 30% of visits” (ReferralMD, n.d.).

Limitations of the current system:

* Mismatching patient records
* Missing appointment records
* Inefficient appointment making system which results in patients missing appointments
* Important health data from appointments, visit summary, and test records is not centralized
* Mismanagement and miscommunication between patients and doctors

## **CONSEQUENCES :**

When it comes to healthcare, there is much data generated from different sources such as from the patient-front, internally from physicians, and externally from lab work if referred out for specific medical tests. Having a poorly integrated database system for these kinds of critical data will have a broad impact on the healthcare organization and can result in a life-threatening situation for patients.

In the USA alone, medication errors are estimated to cause harm to at least 1.5 million patients per year, with about 400,000 preventable adverse events (Agrawal, 2009).

According to the National Coordinating Council for Medication Error Reporting and Prevention, 9 out of 14 categories of errors were caused when using conventional medical records, resulting in patient harm (Vaidotas et al., 2019).

Many of the errors are more direct and related to inaccurate data about patient's medication, allergies, previous visit health summary, and treatments. Decisions were being made based on inconsistent or missing data not stored in a centralized database.

For instance, it results in poor treatment or misdiagnosis due to insufficient data, low customer satisfaction, and unnecessarily causes an increase in the operating costs, loss of time and money to both the parties, and even results in facing lawsuits.

Moreover, not using IT systems, including well-designed databases for securely sharing patient data can also result in a potential loss of up to $88 billion over 10 years in costs (Agrawal, 2009).

## **PROPOSAL**

We propose a secure, HIPAA compliant database, like Amazon Relational Database Service (RDS), that stores electronic diagnosis records and makes it easy for patients to book online appointments so that they can get a test ordered for a specific diagnosis faster, without the loss of data from their first visit with a physician. Physicians also have a portal to log into to have the latest patient information during appointments and easily update diagnosis records. This results in a better patient experience and money savings for the hospital.

Expectations for the new system:

* Friendly user interface for easy appointment scheduling and centralized access for physicians to view/update diagnosis records and order tests for patients.
* Protect patients’ safety by increasing the accuracy of matching data of diagnosis records.
* Easy to match healthcare facility to patient booking appointment with the hospital by zip code.
* Construct more efficient communication and management between patients, hospitals, and physicians.
* Improve the efficiency of data capturing and storing to reduce missed diagnoses.

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# **BUSINESS RULES**

Below are the set of business rules which defines the constraints and rules which will be later used to design our centralized healthcare database management system. These business rules are defined under certain business assumptions and are database-oriented.

1. Each HEALTHCARE\_FACILITY can have one or many PATIENTs
2. Each PATIENT can go to one HEALTHCARE\_FACILITY (for the sake of simplicity)
3. Each HEALTCHARE\_FACILITY can have one or many PHYSICIANs
4. Each PHYSICIAN can belong to one and only one HEALTHCARE\_FACILITY
5. An APPOINTMENT can have one and only one PATIENT
6. Each PATIENT can have one or many APPOINTMENTs
7. An APPOINTMENT can have one and only one PHYSICIAN
8. Each PHYSICIAN can have one or many APPOINTMENTs
9. Each PHYSICIAN can order one or many TEST\_ORDERs
10. Each TEST\_ORDER can be ordered by one and only one PHYSICIAN
11. A SCREENING\_TEST belongs to one and only one TEST\_ORDER
12. A TEST\_ORDER can have one or many SCREENING\_TESTs
13. Each DIAGNOSIS can have one or many SCREENING\_TESTs
14. A SCREENING\_TEST belongs to one and only one DIAGNOSIS
15. An APPOINTMENT can have one or many SCREENING\_TESTs
16. Each SCREENING\_TEST can belong to one and only one APPOINTMENT
17. Each PATIENT has one or many DIAGNOSIS\_RECORDs
18. A DIAGNOSIS\_RECORD belongs to one and only one PATIENT
19. Each DIAGNOSIS has one or many DIAGNOSIS\_RECORDs
20. A DIAGNOSIS\_RECORD belongs to one and only DIAGNOSIS
21. A PHYSICIAN updates one or many DIAGNOSIS\_RECORDs
22. Each DIAGNOSIS\_RECORD is updated by one and only one PHYSICIAN

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# **REFERENCES :**

Agrawal, A. (2009, June). Medication errors: Prevention using information technology systems. Retrieved February 03, 2021, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2723209/

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Vaidotas, M., Yokota, P., Negrini, N., Leiderman, D., Souza, V., Santos, O., & Wolosker, N. (2019, July 10). Medication errors in emergency departments: Is electronic medical record an effective barrier? Retrieved February 03, 2021, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6611086/