DATA MANAGEMENT & DATABSE DESIGN

Github Repository: https://github.com/prarthanashetty29/DMDD/tree/main

Group 1

Topic: Global Healthcare Management System

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Business Problem Statement:

Due to today's fast-paced lifestyle, people move frequently, whether they are travelling or just moving around. This makes it difficult to keep and transport physical medical records, which keeps people from getting the best care possible. Hospitals, doctors, and other healthcare centers can diagnose and treat patients more promptly and efficiently when remote and on-demand access to patient data is made possible through a hassle-free and secure system.

Proposed Solution:

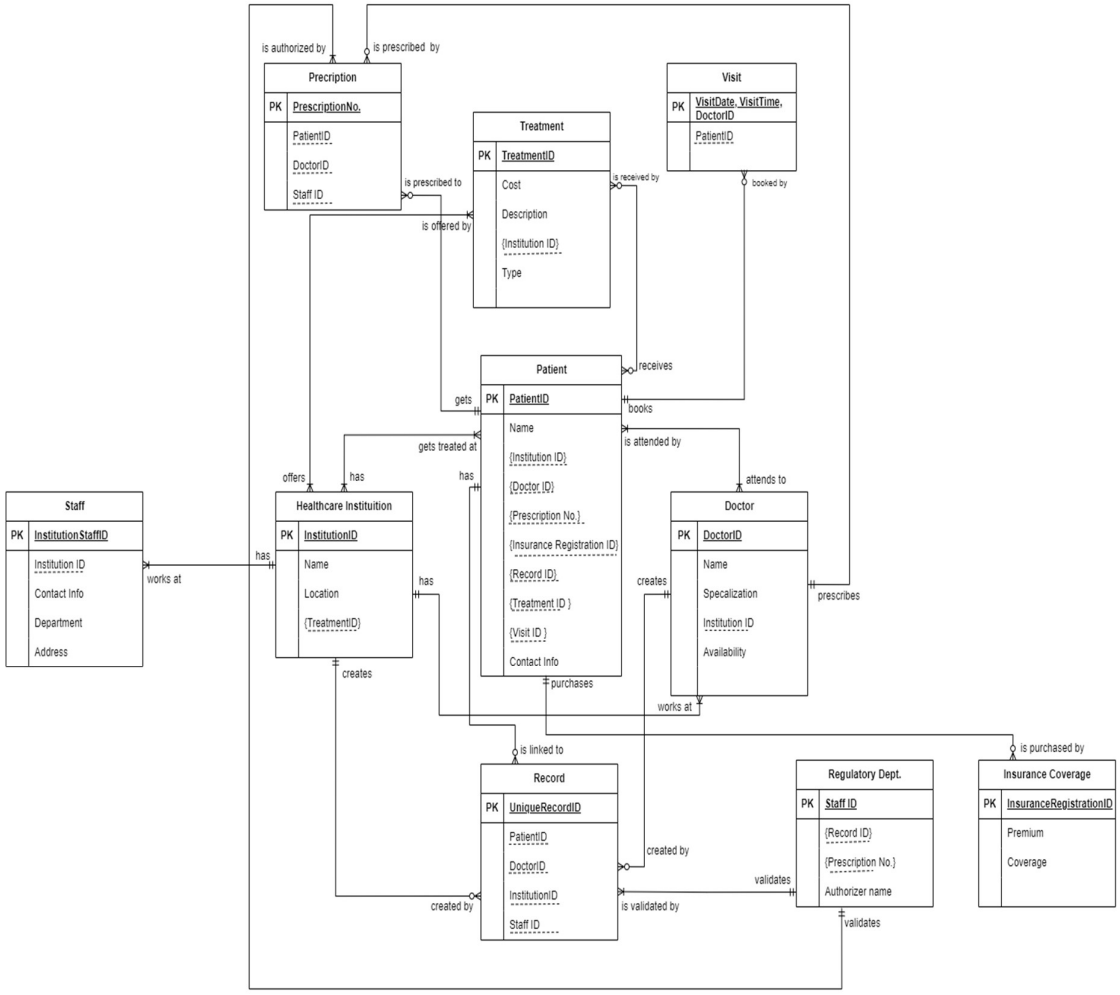
The system will allow healthcare providers to securely access patient data, regardless of their geographical location. We will also focus on the visualization element to gain meaningful insights derived from patient information, healthcare procedures, and financial transactions. Thus, we propose a Global Healthcare Management System, a database system for securely managing large sets of integral patient data and records. It will also include insurance policy data, thereby making the entire patient treatment process easy and hassle-free

Entities included in our System:

- Treatment
- Healthcare Institution
- Patients
- Visits
- Prescription
- Doctors
- Records
- Regulatory Department

- Insurance Coverage
-Staff

Proposed ER Diagram:



Key Database Design Decisions:

1) Entity: **Treatment**
Primary Key: **TreatmentID**
Foreign Key: **InstitutionID**
Entity Relation: This entity is related to healthcare institution entity and Patient entity. Given a particular treatment, it is offered by or carried out by one or many healthcare institutions. Given a particular Treatment procedure, it is received by zero or many patients, depending on the need of the patient.
Description: Treatment entity contains all the information about the treatment/procedure offered by an institution. TreatmentID is an identifier for treatments that we would be allocating in order to keep track of various procedures so it can also help with Insurance and record management. It has InstitutionID as foreign key so that we can maintain which facility provides this treatment. It is a multivalued attribute since one treatment can be offered by various institutions.

2) Entity: **Healthcare Institution**
Primary Key: **InsitutionID**
Foreign Key: **TreatmentID**
Entity Relation: This entity has relationships with Patient, Record, Treatment, Doctor, and Staff entities. A healthcare institution offers one or many treatments, has one or many patients, has one or many doctors working (depending on if it's a clinic or hospital or a diagnostic centre), creates zero to many records for patients has one or many staff members working.

Description: A Healthcare institution could be a clinic, a hospital or a diagnostic centre. It contains the name and location so we can keep track of the details of the institution. It also has TreatmentID as a multivalued foreign key attribute. An institution could have multiple offer multiple treatments and this will help us keep track of all the treatments offered at a particular institution.

3) Entity: Prescription
Primary Key: **PrescriptionNo**
Foreign Key: **PatientID, DoctorID, StaffID,**
Entity Relation: This entity is related to Doctor, Patient and Regulatory Department. Given a prescription, it is prescribed by mandatorily one doctor, it is prescribed to mandatorily one patient, and is validated by mandatorily one authorizer.
Description: Prescriptions are prescribed by doctors and provided to patients; thus, in order to validate the data, the regulatory department functions as the official that validates the authenticity of the document by ensuring global adherence. PatientID, StaffID and DoctorID

all three act as foreign keys so we can keep a track of the required information. StaffID would be the ID of the staff person authorizing/validating the prescription.

4) Entity: Visit
Primary Key: **VisitDate, VisitTime, DoctorID (Composite Primary Key)**
Foreign Key: **PatientID**
Entity Relation: This entity is related only to patient to store the details of the patients visits, which will aid the insurance process. A particular visit slot at a particular institution is booked by mandatorily one patient.
Description: The visits are booked by patient and the visit includes of patientID which act as foreign key so as to maintain referential integrity. This information can be viewed indirectly via patient.

5) Entity: Doctor
Primary Key: **DoctorID**
Foreign Key: **InstitutionID**
Entity Relation: This entity is related to prescription, Records, healthcare Institution and patient. A doctor attends to one or many patients, a doctor prescribes zero to many prescriptions, a doctor creates zero to many records, a doctor works at mandatorily one institution only.
Description: Doctor can access or view a patient's previous record and give the further medications accordingly. We have recorded the doctor's name, specialization and availability as attributes to maintain his details. InstitutionID acts as a foreign key so we can keep track of where they are working.

6) Entity: Record
Primary Key: **UniqueRecordID**
Foreign Key: **PatientID, DoctorID, InstitutionID, StaffID**
Entity Relation: This entity is related to Healthcare Institution, Patient, Regulatory Department & Doctor. Given a Record, it is created by only one institution/dotor mandatorily, is validated by only one staff person from the Regulatory Department, is linked to mandatorily only one patient.
Description: The records of Patients are created by Healthcare institutions and doctors which are in turn validated by Regulatory department. This contains, mri scans, ct scans, other health record files, etc

7) Entity: Patient
Primary Key: **PatientID**
Foreign Key: **InstitutionID, DoctorID, TreatmentID, VisitID, Insurance Registration ID, Record ID, Precription No**
Entity Relation: This entity is related to all the other entities except staff and Regulatory

Department because everything depends upon the patient and the records will only exist when there is actually a patient. A patient gets zero to many prescriptions, receives zero to many treatments, books zero to many visits, is attended by one or many doctors, purchases zero to many insurance coverage plans, has zero to many records linked to themselves, gets treated at one to many healthcare institutions.
Description: The patient entity keeps track of name, contact info as attributes to maintain their profile. It has InstitutionID, DoctorID, PrecriptionNo, Insurance RegistrationID, Record ID, TreatmentID and VisitID as foreign key attributes so everything can be linked and kept records of. Suppose a patient undergoes a heart surgery, we will be able to track which facility provided it, which doctor facilitated the treatment, the prescriptions he was prescribed for the treatment, whether he has insurance for it/if he used insurance, his record file, treatment details and surgery visit appointment date.

8) Entity: Regulatory Department
Primary Key: **StaffID**
Foreign Key: **RecordID, PrescriptionNo**
Entity Relation: This entity is related to records and prescriptions. Given a Regulatory Department it validates one or many records/prescriptions.
Description: This entity validates the details which are shown in the records entered by the user. They check whether the documents uploaded are in line with the global standards and the overall authenticity of the records and prescriptions in the system.

9) Entity: Insurance Company

Primary key: **Insurance Registration ID**
Foreign Key: **PatientID**
Entity Relation: This entity correlates with Patient entity and saves all the patient insurance information for easy coverage information access whenever patients require it. Given a particular insurance registration record it relates to mandatorily only one patient.
Description: This entity stores all the insurance information of a patient, including premiums and coverage with Insurance Registration ID as the primary identifier. When the hospital requires a patient can choose to share their insurance registration info for claims process. It also has PatientID as a foreign to maintain referential integrity.

10) Entity: Staff

Primary key: **InstitutionStaffID**
Foreign Key: **InstitutionID**
Entity Relation: This entity correlates with Healthcare Institution entity and saves all the staff information that works at an institution. Given a particular staff member they work at mandatorily only one institution
Description: This entity stores all the staff information, to ensure that the system has all the

information of the staff members who might also have access to patient records. This was added keeping in mind the overall system security. It has InstitutionID as foreign key to save where the staff member is working