Team 2

Design Document

Akanksha Telagam Setty – 002131614
Mayannk Kumaar - 001537115
Shashank Siripragada - 002193773
Ghanashyam Laxman Vibhandik - 002984660
Sumit Patil – 002985101

Database Purpose:

The purpose of the database is to provide a patient-centered healthcare system to the hospitals that facilitate monitoring and improvement of their services. We achieve that by maintaining the medical history of patients, analyzing their symptoms, diagnosis, medications, and providing a seamless billing experience.

Business Problems Addressed:

Through this database system we plan to address the following business problems,

- Allow Hospital staff to generate descriptive reports of patients.
- Provide information to enhance or improve patient treatment (e.g., consideration of symptoms, lab results when treating the patient).
- Supply insights to healthcare providers to improve patient outcomes (e.g., to cater to specific market segments such as geographic regions, age- or gender-based populations or other demographic-based
- campaigns).
- Allow seamless claims from the healthcare system to insurance providers and hassle-free billing for family members of patients.
- Permit hospital care provider staff to analyze and refine patient treatment pathways.

Business Rules:

- Each patient may have one or more patient encounters.
- Each patient may have zero or more vaccination record.
- Each patient encounter has one or more insurance providers.
- Each patient encounter has one or more diagnosis.
- Each patient encounter has one or more vital signs record.
- Each patient encounter has one or more symptoms.
- Each patient encounter has zero or more lab results.
- Each healthcare provider attends zero or more patient encounters.
- Each healthcare provider gives zero or more prescriptions.
- Each patient encounter has a billing record.
- Each patient encounter gets a prescription.

Design Rules:

- Use Crow's Foot Notation.
- Specify the primary key fields in each table by specifying PK beside the fields.
- Draw a line between the fields of each table to show the relationships between each table. This line should be pointed directly to the fields in each table that are used to form the relationship.
- Specify which table is on the one side of the relationship by placing a one next to the field where the line starts.
- Specify which table is on the many side of the relationship by placing a crow's feet symbol next to the field where the line ends.

Design Decisions:

Entity Name	Why Entity Included	Relationship to others
Patient	One of the primary purposes of the database is to collect information about factors related to patients. The important patient data to collect include name, address, contact, and SSN. This Patient ID helps us to maintain a record of the patients, vaccination details, demographic details, and Emergency point of contact details.	This entity has an identifying relationship with patient demographics and Emergency POC. And non-identifying with vaccination and insurance provider.
Patient Demographics	This entity holds the demographic details of patients such as age gender, age, ethnicity etc..., which help us to better understand patient background.	This entity identifying one-to-one relationship with the Patient entity.
Patient Encounter	This is the core entity in the database. It holds the data of all patient encounters in the hospital and is used to track the diagnosis assigned, medications prescribed, lab tests done to the patient. This entity helps us track the patient through the stay at the hospital and understand his well-being.	As the core entity in the database, it holds the identifying relationship to diagnosis, symptoms, Lab Results and Vital signs. It also holds a non-identifying relationship with patient, prescription, healthcareprovider & billing entity.
Prescription	This entity holds the medicine/test prescriptions provided by the doctor. Prescription details give us an understanding of the medicines the patients must take and their dosage.	Prescription has a non-identifying relationship with PatientEncounter, Medication Details.
Medication Details	Medication Details entity holds the information regarding the medicines, as to which medicine id corresponds to which medicine.	This entity is only related to prescription, to give a better understanding of the medication prescribed.
Patient Vital Signs	This entity holds the vital sign details gathered by the doctor. Vital sign details	Vital Signs entity holds a relationship with Patient Encounters, since they are

	give us a better understanding of the key health factors of the patients for quick diagnosis and treatment.	recorded every time, a patient visits a hospital
Vital Sign Details	This entity is responsible for holding the information regarding the vital signs gathered for the patient. It gives us a better understanding of the vital signs since it provides the description for vital signs based on their IDs.	This entity holds a relationship only with Patient Vital Signs, to give a better understanding about the vital signs recorded.
Patient Symptoms	This entity is responsible for storing the symptoms of the patients if any, and the duration for which they have been lasting for. This would help the doctor to better understand how to proceed with the diagnosis.	Patient Symptoms entity holds a relationship with Patient Encounters, since they are recorded every time, a patient visits a hospital
Diagnosis	This entity holds information regarding the diagnosis a particular patient has undergone in an encounter. It also stores information about the health care provider whom the patient consulted.	Diagnosis holds an identifying relationship with patient encounter, and healthcareprovider.
Diagnosis Details	This entity is responsible for holding the information regarding the diagnosis gathered for the patient. It gives us a better understanding of the identification of diagnosis since it provides the description for diagnosis based on their IDs.	This entity holds a relationship only with Diagnosis, to give a better understanding about diagnosis identified.
Patient Lab Results	Patient Lab Results play a significant role in the understanding of how to proceed with the diagnosis. This entity holds information related to the lab test the patient undergoes, the timestamp of the test, result and the quantifying metrics which are involved in the test.	This entity holds an identifying relationship with patient encounters as well as with healthcareprovider since healthcareprovider suggests lab test.
Lab Result Details	This entity is responsible for holding the information regarding the lab results performed for the patient. It gives us a better understanding of the further steps of diagnosis since it provides the description for all lab results based on their IDs.	It has a single relationship with lab tests since it provides details regarding the results that are generated after that patient undergoes the lab test.
Healthcare Provider	This entity holds information regarding the Employees who manage the work related to test/diagnose the patients	Healthcare provider holds an identifying relationship with diagnosis, and labresults. It also holds a non-identifying relationship with prescriptions.

Insurance Provider	This entity has information regarding the insurance provider covering the medical bill of the patient for an encounter.	This entity holds an non-identifying relationship with patients.
Vaccination	This entity holds the record of vaccination of the patient visiting the hospital including information related to vaccination status, vaccination name and booster status.	This entity connected to the Patient by a non-identifying many to one relationship.
Billing	This entity holds information of the invoice generated and the payment status	It holds a non-identifying one to one relationship with the patient encounter. Since every encounter has a unique billing invoice

Entities Relationship:

From	**To**	**Relationship**
Patient	EPOC	One to Many
Patient	Vaccination	One to Many
Patient	Insurance Provider	One to Many
Patient	Patient Demographics	One to One
Patient	Patient Encounter	One to Many
PatientEncounter	Symptoms	One to Many
PatientEncounter	Diagnosis	One to Many
PatientEncounter	LabResults	One to Many
PatientEncounter	HealthCareProvider	Many to One
PatientEncounter	Prescription	One to One
PatientEncounter	VitalSigns	One to Many
PatientEncounter	Billing	One to One
Prescription	MedicationDetails	One to One
LabResults	LabResultsDetails	One to One
VitalSigns	VitalSignsDetails	One to One
Diagnosis	DiagnosisDetails	One to One
Symptoms	Symptom Details	One to One
HealthCareProvider	Prescription	One to Many
HealthCareProvider	LabResults	One to Many
HealthCareProvider	Diagnosis	One to Many