Class: INFX563

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Database Topic: Managing Diabetes System

Database Purpose:

The purpose of the Managing Diabetes System is to allow anyone who is diagnosed with diabetes to access and coordinate his/her blood sugar by storing into a database information such as insulin intake, blood, and urine test results, food intake, weight gain or loss, exercise activities, etc. Doctors, researchers, nurse practitioners, nutritionists, exercise trainers can use the stored data to analyze and to provide feedback to help diabetic patients living well with diabetes. Also, researchers can also use the data to warn the local health department of possible outbreaks.

Business Problems Addressed:

The Managing Diabetes System is designed to improve the lives of all people affected by diabetes. But at the core, this system is intended to help a patient to get exposed by the work being done by experienced doctors and as well as getting the opportunity to be part of medical experiments or nutrition breakthrough that could help better manage diabetes. To that end, it addresses the followings:

- Allow a patient to control his/her care by being able to get real-time feedback from doctors.
- Allow a patient to get treatments from any experienced doctors no matter where those patients or those doctors are located.
- Allow doctors to provide care whether or paid or pro-bono to any patients that need treatments.
- Allow insured and non-insured alike to get the same opportunities to be seen by experienced doctors.
- Allow any patients located anywhere to get the same opportunities to be part of a clinical experiment that was proved to be successful.
- Allow researchers to connect the dots between multiple patients in a specific location to find the cause of possible outbreak or increase of the disease in that area.
- Allow researchers to mine data and provide the health department data regarding the possibility of an outbreak based on zip code, location, ethnicity, occupation.
- Allow researchers to mine data based on the efficacity of a possible drug that may have proved to be effective.
- Allow both doctors and researchers to collaborate on finding a cure to combat both type 1 and type 2 diabetes
- Allow nutritionists to get an insight on what kind of diets are deemed to be successful for teens that are diagnosed with juvenile diabetes
- Allow sports doctors, coaches, and trainers to find out what type of exercises and diets are most useful for athletes who also have diabetes.

Business Rules:

The business rules for this database are set based on the needs of a patient to get the best care necessary managing or living well with diabetes. Our system is agnostic of gender, location, occupation, and holder an insurance health card. These rules instead are motivated by the actions that will be taken the main actors of our system. In this case, patients, doctors, researchers, and trainers are considered to be the key motivators for the development of this system. The rules for this system are:

- A patient is diagnosed as having either type 1 or type 2 diabetes.
- A patient may or may not have an insurance card.
- A patient should have a zip code that identifies the region and or the city where he/she currently resides.
- A patient may or may not taking a pill(s) to manage the diabetes
- A patient may or may not be taking insulin injection to control the diabetes
- A patient may or may not be using an insulin pump to inject insulin to manage diabetes automatically.
- A patient may or may not be using an insulin jet injector to shoots an insulin spray.
- A patient may or may not be using an insulin infuser to insert an insulin tube under the skin.
- A patient can be associated with multiple ethnic backgrounds.
- A patient may be related to other patients who are also in the diabetes system.
- A patient may or may not record any of his/her insulin readings.
- A patient should be associated with one birth location.
- A patient can be associated with multiple living areas.
- A patient may or may not managed his/her diet
- A doctor can provide treatments to one or more diabetic patients.
- One or more doctors can monitor a patient.
- A doctor must be specialized in treating diabetes.
- A researcher using this system must have one or more medical specialties related to diabetes
- A researcher participating in curing diabetes should be engaged in at least one clinical experiments associated with treating diabetes.
- A doctor can be associated with zero more insurance services.
- A doctor must request blood tests to record blood sugar level for a patient.
- A doctor must request urine tests to record.
- A patient may or may not record daily food intake.
- A patient may or may not perform any physical activity.
- A trainer using this system must have training activities for a person with diabetes.
- A nutritionist using this system must have special diets tailored to diabetic

Entities Definition and Relations to Other Entities:

Entity	Definition	Relation to other Entities
Diagnosis	Diagnosis is a supporting table for mapping all the possible diagnosis that could occur to a patient who is found to be a diabetic.	Zero or more diagnosis are associated to a diabetic **patient** (entity)
Diabetes_System	In this database, the diabetes_system entity is the central table. It is used to gather an overall history of patient's health. This table is accessed by patients to enter their data, by doctors to monitor a patient's health progress, by trainers to track progress as far as weight loss or gain, by nutritionists to track patient's diet, and finally by researchers to mine data for particular health concerns.	One or more patients can access the diabetes_system. One or more doctors can access the diabetes_system. One or more researchers can access the diabetes_system. One or more trainers can access the diabetes_system. One or more nutritionists can access the diabetes_system.
Doctor	In the diabetes system database, the doctor **(main entity)** is the person with the skills to monitor the health of a patient. This doctor should have one or more specializations in treating diabetes and should have the experience to provide treatments to one or more patients who are in the system. This doctor should have a unique id that identifies him/her from others. He/she may or may not be associated with an insurance company depending if this is a paid or pro-bono work. He/she should have an email, and a phone number for contact purposes.	A doctor provide treatments to one or more patients (Entity) 2. A doctor should be able to monitor one or more patients in the **Diabetes_System** (Enitity)
Ethnicity	Ethnicity is used to identify a patient's origin and his/her makeup. Researchers will use that information to investigate further if there are any genetic links based on the patient's race backgrounds. Similarly, doctors	A specific ethnicity type is associated with a **patient** (entity).

	may use this information to find out if particular treatments work best based on the patient's race.	
Gender	The gender table is used to identify a patient's sex. A patient should identify himself/herself as having a single-sex even if it is undefined.	A gender is associated with one **patient** (entity)
Insurance	The insurance entity is a supporting table to the patient table. A patient may have one or no insurance card.	A patient can have zero or one insurance card. A doctor is associated with zero or one insurance company.
Injection	The injection entity is a supporting table to the patient table.	A patient can take multiple injections a day.
Location	The location entity is a supporting table to the patient table. It is used as a mapping table to record possible birth and or a patient's current living location.	A patient can have one more locations One or more injection types are available in the diabetes system.
Nutritionist	The nutritionist entity is one of the main tables. It is used by one or more dieticians who specialized in diabetes nutrition.	A nutritionist works with on ore more patients One or more nutritionists can access the diabetes system.
Patient	The patient entity is one of the main tables in this database. It can be used by anyone who is diagnosed with diabetes. This table will have all the pertinent information to uniquely identify a patient.	A patient is associated with one or more diagnosis. A patient can be treated by zero or more doctors. A patient can have one or more living locations. A patient can have zero or more injections. A patient can have zero or one insurance card. A patient can have one or more ethnicities. A patient is associated with one zip code. A patient can be associated with zero or more nutritionists.

		A patient can be associated with zero or more trainers A patient can be associated with zero or more researchers.
Researcher	The researcher entity is one of the main tables. It is used by the person who is a specialist in all thing diabetes. He/she is allowed to perform experiments by analyzing patterns found in the diabetes system database.	One or more researchers can access the diabetes system.
Trainer	The trainer entity is one of the main tables. It is used by one more physical trainers who specialize with helping a diabetic staying in shape.	One or more trainers can access the diabetes system. One or more trainers work with a patient.
Zip	The zip table contains two distinct values that are required to be filled out.	A patient is associated with a zip code.