

INFO 6210: Data Management and Database Design

Project Team 17

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Database Topic: Blood Donation Management System

Database Purposes:

The Blood Donation Management System will help coordinate blood donors, hospitals, and blood banks. The purpose of this database is to maintain details about the available units of blood from all the possible hospitals, medical centers, and blood bank so that any patient can get the details quickly and without having to connect and enquire at multiple places. As a result, the system will facilitate access to blood for patients who urgently require it. It is going to allow people to donate blood and help those who need it. All valuable information, such as patient information, blood test results, blood bank information, and patient history, will be retained effectively.

Business Problem Addressed:

1. Maintain data for available units of blood.
2. Maintains donor and recipient information such as name, address, telephone number, date of birth, and medical history.
3. Retain data from donation drives to assist in emergency cases.
4. Maintain transaction details between donor and recipient to track blood consumption.
5. Keep donor card information current to facilitate future access.
6. Analyze the data to understand how many patients have received blood in a timely manner.
7. Use the data to analyze the blood requirements in Boston based on the demographics and share this information with hospitals and blood banks so that the efficacy of the system can be increased.
8. Use the data to determine whether the blood collected was never donated.

Business rules:

1. There can be more than one donor, recipient or donor residing in a location.
2. A single donor may choose a recipient to receive future donations of blood at no charge.
3. A donor may donate blood several times, but only after a fixed period specified by the state/country.
4. Blood is only gathered at donation clinics run by organizations, and it is only preserved in hospitals.
5. Hospitals have several blood donor organizations.
6. At a minimum, there should be a blood donation at Donation Drive.
7. An organization may arrange donations across various locations.
8. A donated blood sample will not be eligible for consumption until the blood quality test has been successfully completed.
9. Blood availability will be maintained at the hospital at which the test is performed.
10. Blood is not donated to the recipient until after payment.
11. The amount of the payment is nil if the beneficiary is designated by a donor as a family member.
12. The blood type of the sample that is used for a patient may be different from their blood group but will be among those that they are compatible with.
13. Every donor-recipient operation is overlooked by a nurse from a hospital where the patient is admitted. This hospital is identical to the hospital where the blood was stored after the test results.

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Design Decisions:

Entity Name	Why is Entity Included	How is entity related to other entities
Person	This entity defines the basic details of the donor and recipient such as name, address and other contact details. This is quite necessary to maintain the uniqueness of the entries.	In an individual entity, the primary Person Id key holds the direct link with the family member entity and the foreign key address identifier allows us to inherit data from the person's address entity. The PersonID is then tied to the donor and the beneficiary to get their basic information.
Person Address	It contains the address of the donor and the recipient, which includes the address, postcode, state, country, etc. information. The Address Id primary key helps to access an individual's location.	Person Address is linked with Person entity using a foreign key named as AddressID. This is done so that the composite attributes can be kept separately from the Person information.
Donor	The donor entity defines the donor's basic information, such as donor identity and availability for the next donation campaign. The primary donor identification contains all details about the donor.	The donor entity connects with the Person entity, which holds the general information of a person. It has access to family member entity from which family members linked to a donor can be accessed.
Family Member	The family entity maintains a comprehensive record of each family member of the donor. The relative ID acts as both a primary and foreign key and is directly linked to the donor's primary key.	The donor information is linked to the associated family member of that entity. The foreign key donor id allows us to access the donor's information and if the donor's ID matches that of a family member, the family member is entitled to be a recipient at no cost.

Donation History	The Donation History entity holds the detailed record of donation drive and donor information. The primary key drive id holds the information about donor, and the type of blood and next possible donation date.	The Donation History entity is responsible for tracking donation campaigns and donor intelligence. The primary key drive ID contains details on the donor, the blood type, and the next potential donation date.
Donation Drive	The charity that collects donations is identified by the donation drive entity. The Primary Key Drive ID contains information about the date of the drive, the location and the name of the organization that runs the drive.	The location of the donation collection and the history of the donation collection are related by this entity. Information about the organization that organized can be obtained with the assistance of identifying the key foreign organization. In addition, the location ID may be used as a foreign key to access the location of the donation drive.
Location	Donation drive and organization addresses are maintained by the location entity. The detailed address of the location can be retrieved with the Primary Key Location ID.	This entity gives the details regarding the organization and the drive that took place under it and the hospital related to the process. This entity acts as a foreign key in the hospital entity to link the address with that of the hospital.
Blood Sample	The blood sample entity defines donation drive date and expiry date of the blood. The blood sample is forwarded to screening tests before being stored for use.	This entity links up to donation history, sample screening and availability of blood in blood bank. As this is linked up with donation history, the entire details of the donor and the donor's history and availability of the blood can be accessed, after the sample passes the screening test.

Sample Screening	The sample screening entity defines the test result of a donor's blood sample, that ensures if that sample can be used for transfusion or not. This entity links up the details of blood samples with the hospital for availability.	Here the HospitalID acts as a foreign key that holds the details regarding the hospital. The BloodSampleID acts both as primary and foreign key in the entity and holds test report of the sample.
Blood Availability	Blood Availability entity defines blood type. BloodSampleID gives details regarding blood type and the test report of the sample.	This entity has a HospitalID as a foreign key, it helps to link up information like hospital name, id, contact information with the blood availability entity. BloodSampleID acts both as primary and foreign key
Organization	This entity defines organization details that conduct blood donation drives. Here OrganizationID acts as a primary key which holds the information regarding the name and the address where it is located.	Here LocationID acts as a foreign key which holds the address of the organization. This entity is linked up with donation drive entity where information of organization is stored as a foreign key.
Hospital	The hospital entity is required to hold hospital details like name, contact info and email and location.	Hospital Entity is linked with SampleScreening, BloodAvailability, Nurse and TransfusionRecords to conduct test on blood samples collected in donation, store and maintain blood, and to provide the facilities for the patients to receive blood under the hospital staff supervision.

Receiver	The entity holds the details of the patients who have received or requested the blood.	This entity is linked with the Person entity using a foreign key called PersonID, to get the basic details of the patient. Also, the primary key of this table serves as foreign key in TransfusionRecords entity to link the transaction with Receiver and to identify multiple transactions in case a patient requires blood frequently.
Payment Information	The PaymentInformation entity is added to hold the details of the transaction where a patient has collected the blood from a hospital. It has attributes to specify the date, units and amount that was paid to complete the transaction.	PaymentInformation Entity is linked with TransfusionRecords entity to maintain the payment information in donor-receiver transactions. The primary key from this table acts as foreign key in TransfusionRecords Entity.
Transfusion Records	This entity is required to capture the donor receiver transactions and to identify the blood sample which was used for the patient. It also contains the related attributes for transactions like date, payment details.	This entity is linked with BloodSample, Hospital, Nurse, Receiver entities to store information about the blood used, the hospital and the nurse who assisted the specified patient in the process. Also, it is linked with the PaymentInfo using the foreign key as PaymentID to connect the payment details.
Nurse	This entity is included to hold information about the hospital nursing staff containing details like nurse information and which hospital they work in. This is necessary as the system should have the info to identify the hospital staff under whose supervision the blood transfer took place.	This entity is linked with TransfusionRecords and Hospital Entity. It holds the HospitalID as foreign key to get information about the hospital where the Nurse works. Also, the TransfusionRecords Entity holds the NurseID as foreign key to capture the Nurse's data under whose supervision the blood transfer has happened.