Database for Convalescent Plasma Bank

Group ID: 03

Scope of the Database

The system manages all the information of multiple plasma banks from different cities, the bank manager who has all the access to the system, and the one who takes requests from the recipients. It also manages plasma donors, recording staff that registers plasma donors, Lab Testers that manage the blood samples. Hospitals as well as the recipients to which bank is supposed to supply the plasma are to be managed. The system also stores the amount of collected plasma and the plasma supplied with their storing dates.

From collecting to providing plasma, the entire process is to be managed by the system itself.

Description

The system ‘Convalescent Plasma Bank’ is an absolutely a computerized management system. This is an admin-based system. ‘Convalescent Plasma’ defines the plasma which is obtained from a recovered person. Plasma Bank has been created specifically for those who are suffering from Covid-19. Subscribed hospitals and the donors having reports can obtain the plasma directly from the bank.

A donor is the one who voluntarily donates his plasma, to be used further by the bank for the needed one. All the primary validations like age, weight, health history of the donor will be checked. After the arrival of COVID-19, it must be necessarily checked that the donor should not be infected by the CORONA virus to ensure whether the plasma is contaminated or not (Contaminated will not be processed for use). If the donor 'IS' infected then he will not be allowed to process further. And if 'WAS' infected, the system will allow the donor only after ‘14 days’ of the recovery from the virus. Collected plasma is supplied further to the recipients and the hospitals. The system also records the supplied plasma to know the exact amount of stock left in the bank or supplied from the bank.

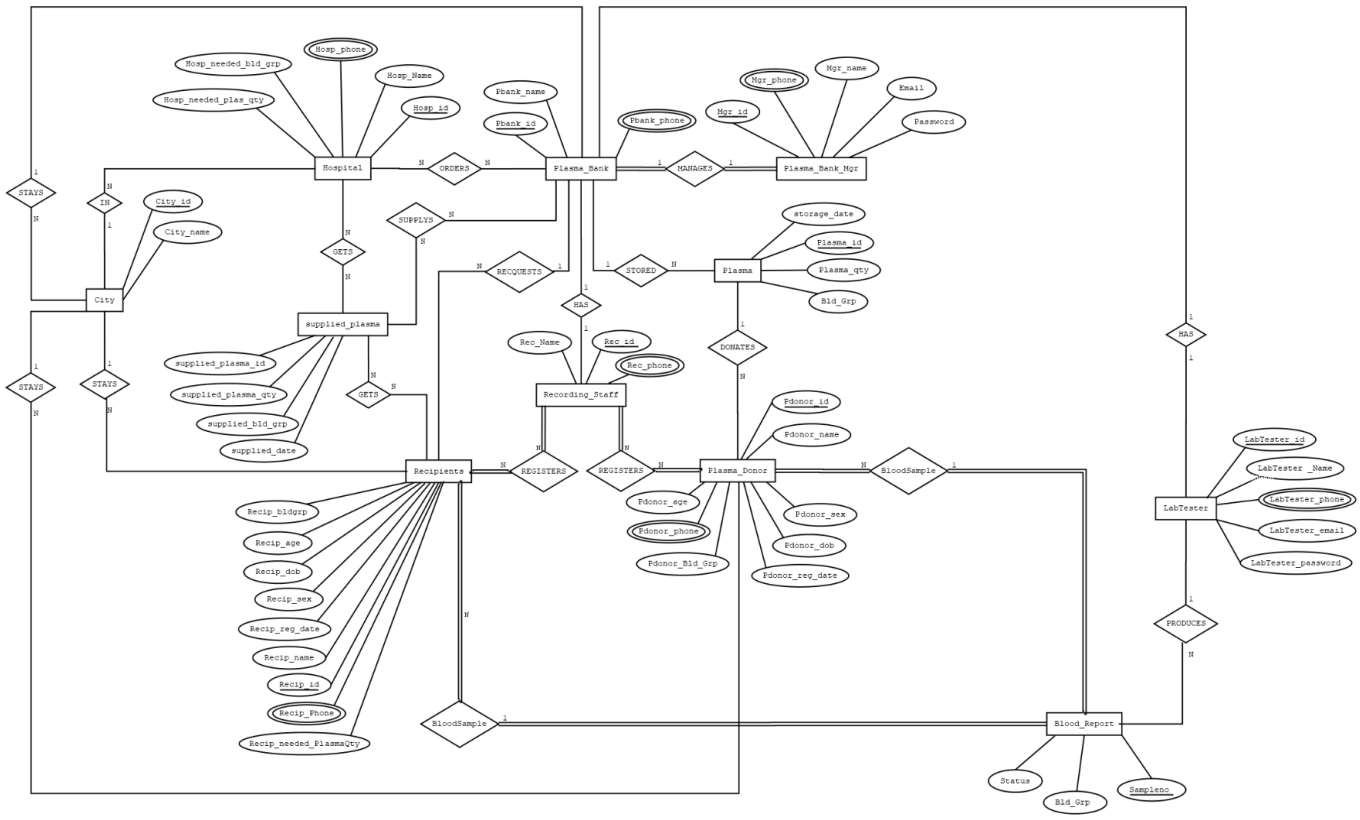
The aim is to make the process of obtaining plasma information by the admin has to be hassle-free. System stores, processes and retrieve the synchronized and centralized records. The system will help various banks whenever needed, this will cut off the time to find the plasma for the patient. At any time, needed plasma can be found easily with quick access.

For Plasma Donor we consider the attributes – Pdonor_id(PK) ,Pdonor_name, Pdonor_dob, Pdonor_age, Pdonor_sex, Pdonor_Bld_Grp, Pdonor_reg_date, Plasma_qty, Rec_id (FK), City_id(FK).
To record the Recipient’s detail, we take Recip_id, name, dob, age, sex, blood_group, PlasmaCount, Reg_date.

For the supplied plasma we store supplied_plasma_id, supplied_bld_grp, supplied_plasma_qty, supplied_date, Pbank_id, Recip_id.

The System is expected to answer,
1) Retrieve all the Plasma having Blood Group = ‘AB+’
2) Retrieve all the Plasma whose plasma_qty is > 250ml and Blood Group = ‘A-’
3) Retrieve all the Plasma Donor having Blood Group = ‘A+’ and City = ‘Ahmedabad’
4) Retrieve the Plasma_qty where City = ‘Pune’
5) Retrieve blood_sample where status = ‘Healthy’
6) Retrieve the Plasma and Plasma_qty where Collection_date = ‘1-1-2021’
7) Retrieve the Plasma_Donors, Recip_reg_date where Blood_Group = ‘O+’ and Register_date = ‘20-03-2021’
8) Retrieve the Plasma_qty, City where Plasma_qty is highest.
9) Delete Plasma_Donor whose Blood_Sample_Status = ‘UnHealthy’

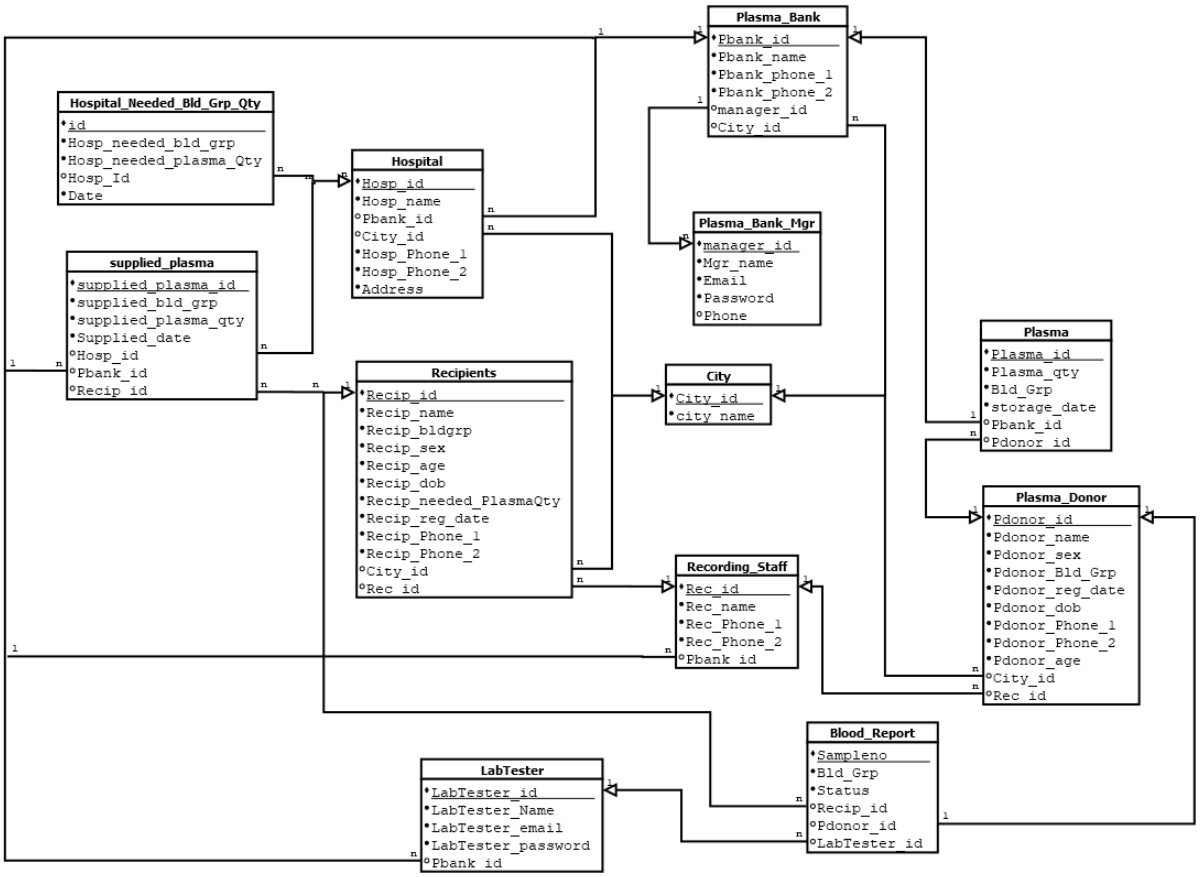
Entity Relationship Diagram [ERD]



[ER diagram - image link]

The above ER Diagram shows the before normalization scenario.

Schema Diagram



[schema diagram - image link]

The above Schema Diagram shows the after normalization scenario.

BCNF

CITY (CITY_ID , CITY_NAME)
KEY → CITY_ID
City_id -> city_name

BCNF – YES

PLASMA_BANK_MGR (MGR_ID , MGR_NAME , EMAIL , PASSWORD , PBANK_ID)
KEY → MGR_ID
Mgr_id -> Mgr_name
Mgr_id -> Mgr_email
Mgr_id -> Mgr_password
Mgr_id -> Mgr_Phone

BCNF – YES

PLASMA_BANK (PBANK_ID , PBANK_NAME , PBANK_PHONE_1 , PBANK_PHONE_2 , CITY_ID,MANAGER_ID)
KEY → PBANK_ID
Pbank_id -> Pbank_name
Pbank_id -> Pbank_phone_1
Pbank_id ->Pbank_phone_2
Pbank_id ->City_id
Pbank_id ->manager_id

BCNF – YES
(Multivalued attributes are divided into separate attributes**)**

PLASMA (PLASMA_ID, PLASMA_QTY, BLD_GRP, STORAGE_DATE, PBANK_ID, PDONOR_ID)
KEY → PLASMA_ID
Plasma_id -> plasma_qty
Plasma_id -> Bld_grp
Plasma_id -> storage_date
Plasma_id -> Pbank_id
Plasma_id -> Pdonor_id

BCNF - YES

SUPPLIED_PLASMA (SUPPLIED_PLASMA_ID, SUPPLIED_BLD_GRP, SUPPLIED_PLASMA_QTY, SUPPLIED_DATE, HOSP_ID, PBANK_ID, RECIP_ID)
KEY → SUPPLIED_PLASMA_ID
Supplied_plasma_id -> supplied_bld_grp
Supplied_plasma_id -> supplied_plasma_qty
Supplied_plasma_id -> supplied_date
Supplied_plasma_id -> Hosp_id
Supplied_plasma_id -> Pbank_id
Supplied_plasma_id -> Recip_id

BCNF – YES

HOSPITAL (HOSP_ID , HOSP_NAME , PBANK_ID , CITY_ID , HOSP_PHONE_1 , HOSP_PHONE_2, ADDRESS)
KEY → HOSP_ID
Hosp_id -> Hosp_name
Hosp_id -> Pbank_id
Hosp_id -> City_id
Hosp_id -> Hosp_Phone_1
Hosp_id -> Hosp_Phone_2
Hosp_id -> Address

BCNF – YES
(Multivalued attributes are divided into separate attributes**)**

HOSPITAL_NEEDED_BLD_GRP_QTY (ID, HOSP_ID , HOSP_NEEDED_BLD_GRP , HOSP_NEEDED_PLASMA_QTY, DATE)
KEY → id
id -> Hosp_id
id -> Hosp_needed_plasma_qty
id -> Date
id -> Hosp_needed_bld_grp

BCNF – YES
(Keys are separated in two relations**)**

PLASMA_DONOR (PDONOR_ID, PDONOR_NAME, PDONOR_SEX, PDONOR_BLD_GRP, PDONOR_REG_DATE, PDONOR_DOB, PDONOR_PHONE_1, PDONOR_PHONE_2, PDONOR_AGE, CITY_ID, REC_ID)
KEY → PDONOR_ID
Pdonor_id -> Pdonor_sex
Pdonor_id -> Pdonor_name
Pdonor_id -> Pdonor_bld_grp
Pdonor_id -> Pdonor_reg_date

Pdonor_id -> Pdonor_dob
Pdonor_id -> Pdonor_Phone_1
Pdonor_id -> Pdonor_Phone_2
Pdonor_id -> Pdonor_age
Pdonor_id -> City_id
Pdonor_id -> Rec_id
BCNF – YES
(Multivalued attributes are divided into separate attributes**)**

RECIPIENTS (RECIP_ID , RECIP_NAME , RECIP_BLDGRP , RECIP_SEX , RECIP_AGE , RECIP_DOB , RECIP_NEEDED_PLASMAQTY , RECIP_REG_DATE , RECIP_PHONE_1 , RECIP_PHONE_2 , PBANK_ID , CITY_ID , REC_ID)
KEY → RECIP_ID
Recip_id -> Recip_name
Recip_id -> Recip_bldgrp
Recip_id -> Recip_sex
Recip_id -> Recip_age
Recip_id -> Recip_dob
Recip_id -> Recip_needed_PlasmaQty
Recip_id -> Recip_reg_date
Recip_id -> Recip_Phone_1
Recip_id -> Recip_Phone_2
Recip_id -> Pbank_id
Recip_id -> City_id
Recip_id -> Rec_id

BCNF – YES
(Multivalued attributes are divided into separate attributes**)**

RECORDING_STAFF (REC_ID , REC_NAME , REC_PHONE_1 , REC_PHONE_2)
KEY → REC_ID
Rec_id -> Rec_name
Rec_id -> Rec_Phone_1
Rec_id -> Rec_Phone_2
Rec_id -> Pbank_id

BCNF – YES
(Multivalued attributes are divided into separate attributes**)**

LABTESTER (LABTESTER_ID , LABTESTER_NAME , LABTESTER_EMAIL , LABTESTER_PASSWORD, PBANK_ID)
KEY → LABTESTER_ID
LabTester_id -> LabTester_name
LabTester_id -> LabTester_email

LabTester_id -> LabTester_password
LabTester_id -> Pbank_id

BCNF – YES

BLOOD_REPORT (SAMPLENO, BLD_GRP, STATUS, PBANK_ID, RECIP_ID, PDONOR_ID, LABTESTER_ID)
KEY → SAMPLENO
Sampleno -> Bld_grp
Sampleno -> status
Sampleno -> Pbank_id
Sampleno -> Recip_id
Sampleno -> Pdonor_id
Sampleno -> LabTester_id

BCNF – YES

Minimal FD set

Mgr_id -> Mgr_name
Mgr_id -> Mgr_email
Mgr_id -> Mgr_password
Mgr_id -> Mgr_Phone

City_id -> city_name

Pbank_id -> Pbank_name
Pbank_id -> Pbank_phone_1
Pbank_id ->Pbank_phone_2
Pbank_id ->City_id
Pbank_id ->manager_id

Plasma_id -> Plasma_qty
Plasma_id -> Bld_grp
Plasma_id -> storage_date
Plasma_id -> Pdonor_id
Plasma_id -> Pbank_id

Supplied_plasma_id -> supplied_bld_grp
Supplied_plasma_id -> supplied_plasma_qty
Supplied_plasma_id -> supplied_date
Supplied_plasma_id -> Hosp_id

Supplied_plasma_id -> Pbank_id
Supplied_plasma_id -> Recip_id

Hosp_id -> Hosp_name
Hosp_id -> Pbank_id
Hosp_id -> City_id
Hosp_id -> Hosp_Phone_1
Hosp_id -> Hosp_Phone_2
Hosp_id -> Address

id-> hosp_id
id -> Hosp_needed_plasma_qty
id -> Date
id -> Hosp_needed_bld_grp

Rec_id -> Rec_name
Rec_id -> Rec_Phone_1
Rec_id -> Rec_Phone_2
Rec_id -> Pbank_id

Pdonor_id -> Pdonor_name
Pdonor_id -> Pdonor_sex
Pdonor_id -> Pdonor_Bld_Grp
Pdonor_id -> Pdonor_reg_date
Pdonor_id -> Pdonor_dob
Pdonor_id -> Pdonor_Phone_1
Pdonor_id -> Pdonor_Phone_2
Pdonor_id -> Pdonor_age
Pdonor_id -> City_id
Pdonor_id -> Rec_id

Recip_id -> Recip_name
Recip_id -> Recip_bldgrp
Recip_id -> Recip_sex
Recip_id -> Recip_age
Recip_id -> Recip_dob
Recip_id -> Recip_needed_PlasmaQty
Recip_id -> Recip_reg_date
Recip_id -> Recip_Phone_1
Recip_id -> Recip_Phone_2
Recip_id -> Pbank_id
Recip_id -> City_id
Recip_id -> Rec_id

LabTester_id -> LabTester_name
LabTester_id -> LabTester_email
LabTester_id -> LabTester_password
LabTester_id -> Pbank_id

Sampleno -> Bld_grp
Sampleno -> status
Sampleno -> Pbank_id
Sampleno -> Recip_id
Sampleno -> Pdonor_id
Sampleno -> LabTester_id