

# **Blood Bank System**

- **AbssZy**

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## **Abstract**

This project gives you the complete layout for the formulation and actuation of a website for blood donation. We have tackled the common day problem of managing blood donations with the help of an interactive, user-friendly and vibrant platform as an integrated solution for bringing together donors and receivers.

**Keywords**

- Blood
- Website
- Donors
- Receivers
- Donations
- Interactive
- Chat-bot
- Userfriendly
- People

## **Introduction**

The application of optimization methods to health care management and logistics is a developing research area with numerous studies. Specifically, facility location, staff rostering, patient allocation, and medical supply transportation are the main themes that has been analysed. Optimization approaches have been developed for several healthcare related problems, ranging from the resource management in hospitals to the delivery of care services in a region. Optimization approaches can also improve other services in the health system that have been only marginally addressed, yet.

One of them is the Blood Donation (BD) system, aims at providing an adequate supply of blood to Transfusion Centres (TCs) and hospitals.

Blood is necessary for several treatments and surgeries, and still a limited resource. The need for blood is about ten million units per year in the USA, 2.1 in Italy and 2 in Turkey; moreover, people still die in some countries because of inadequate supply of blood products (World Health Organization 2014).

Hence, BD plays a fundamental role in healthcare systems, aiming at guaranteeing an adequate blood availability to meet the demand and save lives. In Western countries, blood is usually collected from donors, i.e., unpaid individuals who give blood voluntarily. Blood is classified into groups (A and subgroups, B, O or AB) and based on the Rhesus factor (Rh+ or Rh-), and each donor should be correctly matched with the patient who receives his/her blood. Moreover, as it may transmit diseases, blood must be screened before utilization. Generally, there are two types of donation: whole-blood donation, in which the whole blood is directly collected in a plastic bag, and apheresis, i.e., the donation of specific components in which a mechanical gathering unit decays the required blood parts. Blood requires particular precautions for collection and storage, and its shelf life from donation to utilization is limited, thus requiring a continuous feeding of the system. Hence, a successful BD supply chain should meet the daily demand of blood and follow its temporal pattern.

## **Literature Review**

Data processing and analysis for Blood Donation Data collection and organisation.

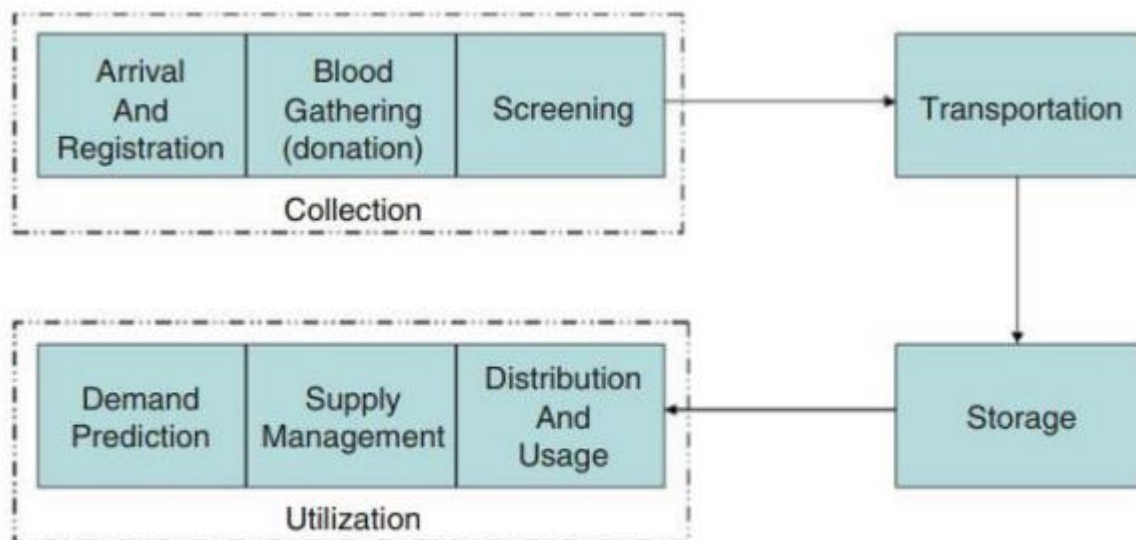
Data were entered into EpiData Version 3.1 (EpiData Software, Odense, Denmark) and exported into Stata Version 11.0 (Stata Corp. Ltd., College Station, TX, USA) for data processing and analysis. Then, the data were analyzed using appropriate descriptive and bivariate statistical tests, such as proportion, mean, crude odds ratio, and Pearson chi-square tests.

Finally, multivariate logistic regression model was used to determine the predictors of outcome and control of confounding variables. Both the crude odds ratio and adjusted odds ratios (AORs) were reported with their 95% confidence interval (CI), and P-value  $\leq 0.05$  was considered for statistical significance for all statistical tests. The overall knowledge about voluntary blood donation was assessed using a scoring system. A score of 1 was given to correct responses, and 0 was used for incorrect/do not know responses. Mean value was used to categorize the study participants into two categories. Scores less than the mean value were considered as low knowledgeable, while scores greater than the mean value were considered as high knowledgeable.

## Implementation

### Phases of Blood Donation System

BD supply chain can be divided into four main steps, collection, transportation, storage and utilization. First, the blood is collected, the donors are checked in blood centres to assess their eligibility and, if eligible, they make the donation. Once the blood is gathered, tests are independently performed on each individual's blood in order to prevent infectious diseases. Afterwards, the blood is transported and stored. Components are then distributed to the hospitals based on their inventory needs. Finally, it is transferred to the final users for transfusion.



### Donors, Blood Collection and Screening

BD process starts with the arrival of the donor at the blood centre. Donors can be divided in returning donors, who donate on an almost regular basis, and walk-in donors, who are entering the system occasionally or for the first time.

Social Aspects: - It is documented that the organization of blood collection phase may have an impact on donors' availability. Poor treatment, poor staff skills, and a bad experience are the main reasons of not returning to donate. Also prolonged queuing times are negatively correlated to BD satisfaction.

Hence, a well-organized donation management has a strong impact on the availability of blood bags, and also on donors' motivation, thus possibly increasing/decreasing their availability.

### Donor Arrival and Registration

The website serves the purpose of delivering and maintaining records of all the blood bank transfer and wants of its customers. We can access it from wherever we want to at any time we want. This makes it helpful accessory in the case of emergency.

- 1) Firstly, we go to the site Online blood donation system
- 2) Enter the user name and password if required.
- 3) Fill in your personal details considering the blood group
- 4) And click on the donate bar.

For receiving,

- 1) Do the first two procedures as mention above
- 2) Enter the required blood group and select search option
- 3) A blood receiver form will open
- 4) Enter the details of the receiver and register

You will be formatted to a page where you enter the required details and submit.

### The Website

The attributes of the website are as follows

- i) The means to take blood donation at an international level.
- ii) An integrated virtual platform for blood donation.
- iii) A cloud-based blood bank system.
- iv) Connecting donors and acceptors in real time situations.
- v) A chat box where user can directly chat with the admin
- vi) A flexible system for administrator to login and check the donors and receiver data and sort them according to there needs

## Future Work

While having a brain-storming discussion with team members and the faculty in-charge of the subject, we drew upon the idea of implementing the website for blood-donation in VIT primarily. VIT, VELLORE has its very own club, Youth Red Cross (YRC), that works for the benefit of the general public. They active organize blood donation camps and blood drives for awareness and supply and demand fulfilment in and around the campus.

But YRC VIT VELLORE, doesn't have appropriate means to connect, organize and segregate the said blood donations on their own which hinders the progress of the life-saving work that they carry out. They needed a versatile, user-friendly and interactive platform for awareness generation and actually collect and store blood donation data from the people who are willing and able to donate blood inside of as well as outside of the campus area. We reached out to the current PR of the YRC club of VIT and put forth the idea of implementing our website as a plausible solution for the data collection, storage and organization problem that YRC VIT faces. The PR was extremely optimistic in the meeting and has agreed to let us pitch the idea to the entire YRC board.

We are truly humbled by the thought of our project turning from just a Power-Point presentation into actuality that can help the general public on a daily basis.



*Fig g. Our team members Bindav Bakhale and Satyajeet Bhoite met with the PR of YRC VIT Elroy Lawrence Coelho.*

The team's idea is under debate with the current board of the YRC. We hope to achieve a fruitful outcome out of the meetings that are conducted with the YRC VIT board.



## **Conclusion**

World-wide statistical data dictates that an average of 40,000 blood transfusions are required per day spanning over a total of 8 versatile blood groups depending on the crisis at hand. May it be an accident, a calamity or blood disorders the amount of blood transfusions per day on an average are increasing with the exponential increase in human population. It's quite simple actually, quick math even, we as humans it's in our nature to get hurt and loose blood which then needs to be replenished.

The wonders science and medicine can do in the modern world are unfathomable. Given the rarity of some of these blood groups the catering to the needs of these 40,000 the amount of blood in units considering the standard of one unit per transfusion is a very tough job. It becomes a chaotic business in general, the procuring and supplying of these many units of blood to basically save and nourish human lives on a daily basis. In India itself, on an average of 50 million transfusions are required per year but only 25 million are sustained successfully. So also connecting a blood donor to a needy acceptor, both being compatible in the cases of emergencies and severe trauma situations is again a very tough job indeed.

We have successfully tackled this problem by creating a website capable of handling massive amounts of blood donation data simultaneously organizing, prioritizing and effectively handling the same on a daily basis whilst providing an interactive and user-friendly platform for a common person.

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