LITERATURE REVIEW
-MANAGEMENT OF PLASMA DONATION SYSTEM

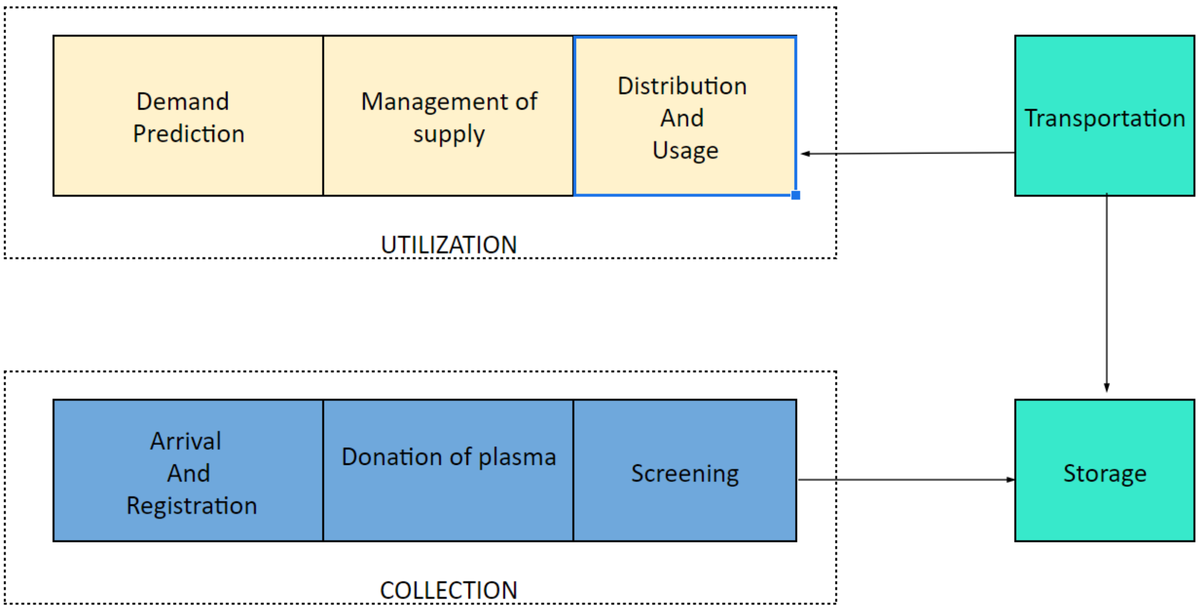
Optimization can address population health problems such as matching organ donors and receivers or designing radiation treatment plans that minimise harm to the patient. Financially, optimization can specify how to allocate funds to various service lines of a hospital. Application of logistic methods is developing as a major area of study in recent times. Numerous healthcare-related issues, from resource management in hospitals to the provision of care services in a territory, have given rise to optimization methodologies. However, optimization strategies can also enhance other healthcare services that have so far received only sporadic attention. One of these is the Plasma Donation (BD) system, which aims to supply hospitals and transfusion centres with an appropriate supply of plasma. Plasma is still a scarce resource but is required for many procedures and therapies. About 10 million units of plasma are required annually in the USA, 2.1 in Italy, and 2 in Turkey. Additionally, there are still deaths related to a lack of plasma products in some nations (World Health Organisation 2014). As a result, BD is crucial to healthcare systems since it aims to ensure that there is enough Plasma available to fulfil demand and save lives.

The two main types of contributions are apheresis, or the donation of specific components, in which a mechanical gathering mechanism degrades the necessary Plasma pieces, and whole-Plasma donation, in which the entire Plasma is immediately collected in a plastic bag.

Because plasma has a short shelf life from donation to use and needs special handling during collection and storage, the system must be continuously refuelled (Greening et al. 2010). Therefore, a good BD supply chain should satisfy Plasma's daily need and adhere to its seasonal cycle. According to Sundaram and Santhanam (2011), the four primary stages of a Plasma bag's life—donor registration, Plasma collection, Plasma screening/evaluation, inventory storage, and delivery—can be used to categorise BD supply chain issues and their associated management issues.

In Pierskalla (2004), a somewhat different classification is suggested, according to which the management of the BD supply chain involves both tactical operational decisions and strategic decisions (such as the location of Plasma centres) (e.g., production of multiple products, control of inventory levels, Plasma allocation to hospitals, and delivery to multiple sites). We use the first classification system in our analysis.

Phases of Plasma Donation System



As shown in Fig. 1, the BD supply chain can be broken down into four primary stages: collection, transit, storage, and usage. First, the plasma is collected; donors are assessed for eligibility in plasma centres, and if so, they make the donation. In order to stop contagious infections, tests are independently carried out on each person's Plasma once the Plasma has been collected (screening process). The Plasma is then moved and kept in storage. On the basis of the hospitals' inventory requirements, components are then supplied to them. It is then given to the intended recipients for transfusion.

The beginning of the BD procedure occurs when the donor shows up to the Plasma centre. The two types of donors are walk-in donors and returning donors, who enter the system rarely or for the first time, respectively. Returning donors give almost regularly. In any case, following a specified rest period from the prior one, as prescribed by law, gifts may be made. Given the significance of donors to the system, both a statistical and a social viewpoint have been used to study their availability, frequency, and motivation.

Social Factors Researchers Bani and Giussani have examined the primary justifications for plasma donation and their relative significance (2011).

Additionally, it is known that the way the plasma collection phase is run may affect the number of available donors. The three main factors that prevent donors from returning are poor care, insufficient staff, and a negative experience (Schereiber et al. 2003). Additionally, long wait times have a bad relationship with BD satisfaction (McKeever et al. 2006; Katz et al. 2007). Therefore, a properly managed donation process has a significant impact on the availability of Plasma bags as well as the motivation of donors, which may increase or decrease their availability.

Arrival and registration of donors A donor is asked to supply personal (such as name, address, age, employment, and gender) and medical/health (such as diagnosis, lab results, and therapies) data when they sign up for the first time in the system. These data are digitally captured. From collection to Plasma distribution and transfusion, digital registration offers good cycle traceability. The registration process also involves a doctor's appointment, followed by plasma tests. If a donor is accepted, plasma collecting facilities verify that the donor makes the initial donation within a short period of time after being accepted. Sometimes a donation comes right after the initial visit. Prior to every donation or examination, a visit is also performed, during which the donor is reassessed and his or her personal information is updated.
Numerous management issues occur, both at the planning level (such as the location of the Plasma collection centre or personnel sizing) and at the operational level (e.g., appointment scheduling). Even if the arrival of donors has a significant impact on the performance of the system as a whole, very few studies concentrate on optimization issues that arise in the registration and donation phase. In order to analyse scheduling options for donors arriving to a Red Cross Plasma drive, Michaels et al. (1993) created a simulation study. They then compared various scheduling techniques based on the mean transit time of the donors to identify the most efficient one.

Other publications concentrate on calculating the supply of plasma from donations, taking into account mean quantities of donations per donor and per year, as well as annual donor retention rates, donor recruitment rates, and donor recruitment rates. In order to determine a fair classification strategy for the prediction of donations, Ritika and Pau (2014) looked at a variety of classification algorithms. To calculate the likelihood of a donation occurring within a specified time frame, Flegel et al. (2000) constructed a logistic regression model while taking into account various regression coefficients for walk-in and returning donors. A prospective design was utilised by

Ferguson and Bibby (2002) to forecast the volume of upcoming Plasma donations. Using a questionnaire, Boonyanusith and Jittamai (2012) looked into the behaviour patterns of donors based on what factors affected their decision to donate plasma. Finally, databases and online apps for managing donors' and luggage are also studied (Chau et al. 2010; Khan and Qureshi 2009; Kulshreshtha and Maheshwari 2011).

Plasma Gathering and Inspection In order to increase the efficiency of the entire system, plasma collection centres should be situated based on how easily accessible they are from hospitals. Additionally, governmental oversight of centres is typically required in order to guarantee the highest level of product quality and safety for plasma. To ensure consistency of each product, they guarantee that plasma bags are made using established processes (Council of Europe 2007).
Despite the significance of this stage, there is little literature on planning plasma collection systems (Ofori et al. 2005; WHO 2008; Lieshout-Krikke et al. 2013). De Angelis et al. (2003) suggested a stochastic methodology to analyse and certify the best server architecture for a transfusion centre in Rome by combining simulation and optimization.

Following collection, a short screening phase that includes tests for infectious illnesses like HIV, Hepatitis B and C, and syphilis begins. They are basically the same everywhere in the world and are repeated on every collected Plasma sample. The Plasma bag is either released for clinical and manufacturing use or rejected depending on the screening results (WHO 2008, 2010). In order to provide patients with safe Plasma bags and fulfil the transfusion standards, an efficient, well-organised screening programme, as well as a high-quality system, are necessary.

LITERATURE SURVEY

A Health-IoT Platform Based on the Integration of Intelligent Packaging, Unobtrusive Bio-Sensor, and Intelligent Medicine Box was the subject of an IEEE article published in 2015 and written by Geng Yang, Li Xie, Matti Mantysalo, Xiaolin Zhou, Zhibo Pang, Li Da Xu, Sharon Kao-Walter, Qiang Chen, and Lirong Zheng. This study proposes and implements an intelligent home-based healthcare platform. It entails the connectivity-enabled iMedBox, the RFID-enabled iMedPack, the Biopatch, and the SOC. With IoT, it fuses.
The wearable Bio-Patch can instantly detect and communicate the user's biosignals to the iMedBox. The absence of a complete platform is the only limitation. Additionally, the physical size, rigidity, and short battery life constitute a hindrance to long-term use.

Data Mining for Better Healthcare: A Path Toward Automated Data Analysis? was the title of an IEEE paper published in 2016. by Lia Morra, Silivia Chiusano, Tania Cerquitelli, Elena Baralis, and others. This paper discusses mining from the standpoint of a medical database. With little user involvement, the mining system should be able to identify the knowledge that would be most useful to the user and extract it from a big medical dataset. The system should be able to extract manageable sets of knowledge that can be put to use. To imagine a system capable of assessing and contrasting numerous data-mining technique configurations at once, large parameter spaces must be examined at an abstraction level.

Amiya Kumar Tripathy, Rebeck Carvalho, Keshav Pawaskar, Suraj Yadav, and Vijay Yadav wrote an IEEE article on Mobile Based Healthcare Management using Artificial Intelligence in 2015. The health-care management system that is presented in this study will include mobile heart rate measurement so that the data can be transferred and diagnosis based on heart rate may be immediately delivered with the push of a button. To communicate with a doctor at a distance, a video conferencing technology will be used. Additionally, Doc-Bot and an online Blood Bank will be part of the system. Due to noise in the input data, the heart rate computation in this project differs from the actual one. As a result, the performance is ineffective in real life. Clustering, Text Mining, Pattern Matching, Support Vector Machine, Partitioning Algorithm, and the DonorHART programme were among the methodologies utilised to gather data on donor reactions. Limitations include a lack of adequate security against misuse of personal information and difficulty in resolving emergency situations.