

Remunerating donors to ensure a safe and available blood supply

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The Trauma Hemostasis & Oxygenation Research (THOR) Network's vision is to improve outcomes from traumatic hemorrhagic shock through optimizing the acute phase of resuscitation by developing and implementing best practices.¹ The majority of potentially survivable deaths before arriving at a medical treatment facility are due to hemorrhage.² Evidence suggests these patients need blood products. Therefore the blood collection centers need to increase their collections and production of products that can be used prehospitalization and during the acute phase of resuscitation.³ Currently blood centers are struggling to meet demands for these products, thus, monetary donor reimbursement may address this need.

BLOOD AVAILABILITY

In 2015, eleven million units of red blood cells (RBCs) were transfused in the United States (US), which were donated by 7 million individuals.^{4,5} The number of units transfused, units collected, and blood donors has drastically decreased over the last decade. The decrease in number of units transfused has resulted in a substantial decrease in blood center revenues, resulting in cost saving measures, such as reducing collections staff, eliminating recruitment staff, research & development, and training.⁶

The 30% decrease in blood use is due to advances in medical practice and implementation of patient blood management, which improves patient outcome and decreases hospital and patient costs.^{4,7,27} Key features of a patient blood management program are use of evidence-based guidelines, minimizing blood loss, reducing perioperative transfusion, and creating metrics with focus on continuous improvement. An additional feature of patient blood management programs is transfusing the correct product to the correct patient at the correct time. Thus, requiring the collection of the correct product and ensuring the hospital has that product available to give to the specific patient.

One example of the correct product is the use of low titer group O whole blood for massively hemorrhaging injured patients. In addition, all hospitals need to be prepared to accept a trauma patient, which requires group O RBCs, platelets, and plasma and/or whole blood. While overall blood use has declined, there is a relative increase in certain blood types, including group O RBCs and whole blood, and platelets.^{8,9}

PATIENT SAFETY

Blood is currently collected from nonremunerated volunteer blood donors. The move to nonremunerated volunteer donors was done in the 1970s due to transfusion transmitted hepatitis.¹⁰ This drastically decreased the rate of transfusion transmitted diseases. Over the recent 40 years, the number of infectious agents that blood donors are screened for have increased (HIV, hepatitis C, hepatitis B, HTLV-1/II, WNV, Zika, syphilis, *T. cruzi* [Chagas], and babesia [regionally]), resulting in the risk of the majority of these to be less than 1 in 1,000,000 units transfused. Currently the blood supply is the safest it has ever been. However, as new blood screening tests are added, such as Zika and babesia screening, this adds cost and further strains the system. Additionally, repeat donors have lower risk of being infectious disease positive than first-time donors.

The donor history questionnaire has become less of an important safety measure over time due to improved testing. Notably, donors do not always answer it truthfully. A recent study showed that the percent of donors with male sex with male (MSM) in a defined time frame did not change with decreasing the time frame for donor eligibility (i.e., percent having MSM within the last 6 months did not change with 1 year, 5 years, or since 1977 deferral period) demonstrating no change in noncompliance, and the incidence of HIV positive donations did not change.¹¹ The US has moved from a "since 1977" exclusion criterion to a "last 12 months" exclusion criterion, which has not resulted in increased risk of HIV positive donations.¹² In the US, there is a proposal for accepting MSM donors but pathogen inactivating (which results in over six log reduction of HIV

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and most other viruses and bacteria) those products. Additionally, the FDA is considering adding questions that more appropriately target individuals with high risk behaviors. The FDA also wants a pathogen inactivation system that can be applied to all blood products without adding costs.^{13,14} Pathogen inactivation enables a proactive approach to reduce transfusion transmitted infections.

Source plasma donors are remunerated. A few additional steps are included in the process of making product from source plasma to decrease the risk of transfusion transmitted infections, such as product pathogen inactivation, additional donor testing (both in protecting the donor and the patient) and quarantining the first donation.

DONOR MOTIVATION

An adequate blood supply relies on the community to donate blood, and the community relies on their blood center to have the blood available when needed. In the US, the community has expanded to the entire country as blood centers have merged, creating national systems. Additionally, hospitals have merged into national systems with a single blood supplier. Thus, no longer do we rely on our local community for blood product self-sustainability, but we turn to the nation. This potentially influences donor motivation as there is now distance between the donor and the recipient.

Primary motivators to donate blood are convenience, prosocial behavior, and personal values.¹⁵ Blood donation is part of prosocial behaviors—volunteering and donating money—in order to help others.¹⁶ In the last decade significant shifts have been made. First, the generation most dedicated to giving blood are aging. Second, the US has increasingly relied on high school donors, who are more likely to have adverse events and take longer to recover their iron stores after donation.¹⁷ Many blood centers are implementing policies to limit teenage blood donation for these reasons, putting an additional strain on the US blood supply. Notably some countries do not allow individuals under age 18 to donate blood.¹⁸

Although blood donation is commonly viewed as an altruistic activity, it is worth noting that a variety of incentives are nonetheless routinely provided. A recent review on the impact of incentives on donation behavior by Chell et al. identified many of the incentives currently in use in the US as monetary payments (e.g., travel compensation, charity donation, discounts, and gift cards).¹⁹ In contrast, small gifts, time off work or school, tickets for events, and health checks were classified as nonmonetary incentives. Thus, many items which blood centers currently offer non-remunerated donors are arguably paid incentives. Although Chell and colleagues also suggest that nonmonetary incentives are particularly well-received among younger and less experienced donors, a prior review by Lacetera and colleagues provides compelling evidence that

people may express a preference for non-monetary incentives in survey studies but are more likely to respond with actual donation behavior when monetary incentives are provided.²⁰ Although more research is needed due to the limited existing literature, provision of incentives does appear to promote donation behavior and may help to encourage recruitment and retention of early career and younger donors as they develop internal motivation for giving.

Motivating donors varies by demographics, including age, sex, donor status, and type of donation.²¹ With the change in the population and the donor population as well as change in blood center operations, new tactics are needed. One recent survey of German donors demonstrated remuneration as motivation reason was more likely in repeat, male, and young adult donors.²¹

Source plasma is a rapidly growing business, and a major US export.²² The US supplies over 60% of the world's plasma for further manufacturing.²³ The world depends on the US to supply the material to make life-saving products, such as albumin, intravenous immunoglobulin, and clotting factors. However, as the source plasma industry grows, there is concern that volunteer non-remunerated blood donors will move to become source plasma donors.

It may be the balance the US and other developing countries had past achieved in using voluntary, non-remunerated donors for whole blood and other blood products and using paid, compensated donors for plasma for further manufacturing, may now be upset.²⁴ This balance depended on each sector, usually the not-for-profit community blood center and the for-profit plasma collection center, each meeting its need and the community needs. Maybe, for the US, as the plasma centers have grown, as have their locations and collections, while the community blood centers have shrunk as have their location, collections, and resources, this balance is off.

DONATION VERSUS PRODUCT NEED

There is a disconnect between what is being altruistically donated and what is being demanded from the customers to best care for their patients. Although the number of RBC units being distributed is decreasing, the percent of group O, Rh negative (the universal blood product) units being distributed is increasing.²⁵ Blood centers request these donors to donate more frequently, while encouraging donors with other blood types to donate platelet or plasma products because, for example, group AB RBCs are infrequently desired compared to group AB plasma or platelets which are frequently desired. However, these platelet and plasma apheresis collections mostly occur at fixed sites versus mobile drives and take longer, thus blood centers are asking more of these donors.

Additionally, special patient populations require precisely matched RBC units. For example, patients with hemoglobinopathies (sickle cell disease or thalassemia) require

antigen matched RBCs to prevent alloimmunization. Currently, not enough of these matched units are donated to meet the needs of this patient population.²⁶

Lastly, as more knowledge is gained from understanding the product impact on patient outcome, then more precisely matched products will be needed for a particular patient.²⁷ Vein-to-vein databases are assisting in answering the question of what is the best product for a particular patient. The blood suppliers will then need to make sure the patient has access to these products. This will require improved information systems that connect the hospital to the blood center.

ETHICS

There are a few ethical concerns regarding monetary payment of donors. One concern is monetary incentivized donors, although they are voluntarily donating, will donate despite potential risks to their health as they may be dependent on the money. However, the industry can implement extra donor safety and care measures, such as ensuring appropriate iron stores, vaccination, and health screening. Maybe resources that are spent on the inefficiencies of the current volunteer system (e.g., recruitment, low donor return rates, and product wastage) can be used to benefit the donors and the blood collection agencies.

A second concern is that current volunteer donors may no longer participate. However, there is evidence that monetary incentives actually increase overall donation behavior and that this effect is strongest among older and more frequent donors.²⁸ Importantly, there are also ways to minimize the threat that a transition to external incentives may represent for existing donors. For example, support for the internal motivation of existing donors could be promoted by enhancing their sense of autonomy (e.g., allowing donors to choose their preferred incentive from an array of options, such as cash payment, gift cards, or an equivalent charitable donation) as well as their sense of relatedness to the wider blood collections community (e.g., by engaging them in the conversation about the need for a transition and allowing them to provide input regarding their views and preference regarding appropriate payments). In this fashion, it may be possible to provide external incentives to all donors while supporting the internal motivation of existing donors.

Lastly, then we, as a society, must determine what is reasonable to pay for versus what should be voluntary, such as kidney donation.

CONCLUSION

In conclusion, a potential blood sustainability strategy would be to reimburse blood donors to ensure a safe and adequate supply while protecting the donors and meeting the patients' needs. Additionally, we will need to

understand the cost and benefits, the targeted populations (all or only for certain products), and society's acceptance. However, with many changes in blood safety, population demographics, social norms, and economics, it is time we embrace remunerated donors.

CONFLICT OF INTEREST

The authors have disclosed no conflicts of interest.

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