BLOOD MONEY

A Comparison Between Altruistic and Incentivized Blood Donations

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BLOOD IS A VITAL RESOURCE, BUT ONE THAT CANNOT BE MANUFACTURED OR REPRODUCED COMMERCIALLY IN AN EFFECTIVE MANNER. WITH DONATIONS AS THE ONLY METHOD OF SUPPLY, WE OFTEN SEE DANGEROUS IMBALANCES BETWEEN SUPPLY AND DEMAND, WHICH POSES A SERIOUS THREAT TO THE LIVES OF MANY PEOPLE. MANY POLICYMAKERS BELIEVE THAT THIS ISSUE CAN BE MANAGED MORE EFFECTIVELY THROUGH OFFERING INCENTIVES FOR BLOOD DONATIONS, THEREBY HELPING BLOOD BANKS REGULATE SUPPLY. HOWEVER, OTHERS FIND MORAL AND ETHICAL ISSUES WITH PAYING BLOOD DONORS, AND HAVE CONCERNS ABOUT HOW THIS COULD COMPROMISE THE SAFETY OF DONATED BLOOD. TO EXPLORE THE EFFECTIVENESS OF INCENTIVE PROGRAMS, THIS ARTICLE WILL EXAMINE SEVERAL STUDIES, AND ARGUE THAT THE MOST EFFECTIVE METHOD TO IMPROVE THE MARKET FOR BLOOD IN THE UNITED STATES IS EXPANSION OF NON-MONETARY INCENTIVE PROGRAMS.

INTRODUCTION

Ever since the science of blood circulation was first described, scientists have been attempting to create artificial blood. However, none of these artificially-developed products meet all the required functions of blood. Commercial production of a liquid that mimics all functions of natural blood is still a scientific dream, as no oxygen-carrying blood substitutes have been approved for use by the Federal Drug Administration (FDA). Although scientists have made breakthroughs in the creation of artificial blood in recent years (such as ErythroMer, a powdered version of blood that can temporarily extend transfusion therapy, and a line of immortal red blood cell producing stem cells), artificial blood is still at the preliminary stages of development, with many hurdles to clear before we can routinely transfuse artificial blood into human vessels (Gammon, 2017). Some of these hurdles include the risk that the artificial cells could mutate and cause cancer, short cell half-lives, extremely high costs, and the need for blood to match a patient's blood type. Researchers at the United Kingdom's National Health Service say that even if a viable blood substitution product were created, blood donations would still be necessary in the future. Blood substitutes would primarily be used to help people in acute situations of trauma, as well as special medical cases. "It would be unfeasible to make blood in the lab for everyone...but we could make blood for people with very rare blood types or who have reacted to donated blood and so are difficult to match," according to Ash Toye, a biochemist at the University of Bristol (Gammon, 2017). Lab-grown blood cells are not meant to replace blood donors. To fill a national blood service, or even supply a single hospital, will require another major leap in research. Transfusion from donor blood will be much cheaper, readily available, and safe in the foreseeable future.

There are two types of blood donations: the traditional donation of whole red blood cells and the donation of plasma. In the United States, paying for blood of either form is legal; it is a common misconception that any laws ban paying for blood. The law only requires that blood from paid donors be labeled that way. However, the Red Cross and hospitals across the country refuse to accept blood that has been paid for. According to Mario Macis, an economist at Johns Hopkins Carey Business School, "even though it's legal, it's still considered not totally moral or ethical to pay cash to blood donors" (Preston, 2016). Aside from the ethical issue of literal blood money, the FDA fears that incentivized donations may lead to falsified information about health or risk behaviors, and, therefore, a higher risk of infected blood. The science behind this claim is disputed, but the World Health Organization (WHO) finds it convincing enough that they heavily discourage countries from paying blood donors. The risks associated with HIV in the 1980s has made the safety of the blood supply the most prevalent concern for all blood collection today. Many plasma donations, on the other hand, are paid for and not required to be labeled because proteins in the plasma are processed and broken down to create various pharmaceuticals by for-profit corporations (Timmermann, 2017). These proteins are processed several times to remove or kill any viruses, so the risk of infection is much lower. Whole red blood cell donation and plasma donation are distinct and separate industries; this paper will focus on the former.

Amongst the most well-known literature on this topic, Richard Titmuss's 1971 book *The Gift Relationship* came about from the ongoing debate in the 1960s and 1970s about paying donors for blood. Titmuss argues that paying donors would attract higher-risk donors, thus compromising the safety of the blood supply as well as reducing overall donations because volunteers donating for altruistic reasons would be less willing to donate if paid. This book influenced the WHO to issue the guidelines which are still in place today, urging countries to have exclusively volunteer donations. While these guidelines aren't legally binding, they have greatly reduced the frequency of incentives for blood donations in most high-income countries today.

BACKGROUND

Every day in the U.S., approximately 36,000 units of red blood cells are required in hospitals and emergency treatment facilities for cancer patients, organ transplant recipients, accident/trauma victims, and those suffering from various other diseases (AABB, 2013). As Figure 1 indicates, keeping a single person alive can require many individual donors. In addition, the number of blood transfusions in the United States has increased from 1.1 million in 1997 to 2.7 million in 2007. Large fluctuations in supply and demand for blood often lead to severe shortages. 4.5 million Americans are saved each year by blood transfusions (Brookhaven National Laboratory, 2014), meaning that these shortages pose a serious threat to the lives of many people. Moreover, as blood's sensitivity to long distance transportation and short shelf life limit the transnational distribution of whole red blood cells, collection systems are generally isolated to individual countries. Within the

United States, regional suppliers provide about half the nation's blood supply, with the Red Cross contributing 45%, and the last 55% being generated through hospitals' own blood drives. It is also important to note that the exact price to produce a unit of blood varies from place to place. Generally, coastal blood is more expensive than blood from the Midwest because the higher cost of living translates into higher overhead and labor costs, which then must get passed on to hospitals. Blood centers in the Midwest can harvest a lot more blood than they need since it is so much cheaper for them to run their operations. "The centers in Iowa, for example, are able to collect from 12 percent of the population, compared to a national average of 3 percent" (Engber, 2006). This surplus can be transported to more populated areas where the demand is higher.

Since there is a lack of market pricing in the market for blood, spikes in donations after natural disasters like Hurricane Katrina in 2005 and the terrorist attacks on September 11, 2001 have caused excess supply, which later had to be destroyed due to short shelf life. In the case of 9/11, an estimated 100,000 to 300,000 units of blood (costing somewhere between $21 and $63 million) were eventually discarded (Mulcahy, 2016). Conversely, there are typically supply shortages during the winter and around other holidays, resulting in dangerous imbalances between aggregate supply and demand (Slonim, 2014). In July 2017, for example, the American Red Cross was forced to issue an emergency call for eligible individuals to donate blood as soon as possible due to a shortage of 61,000 donations

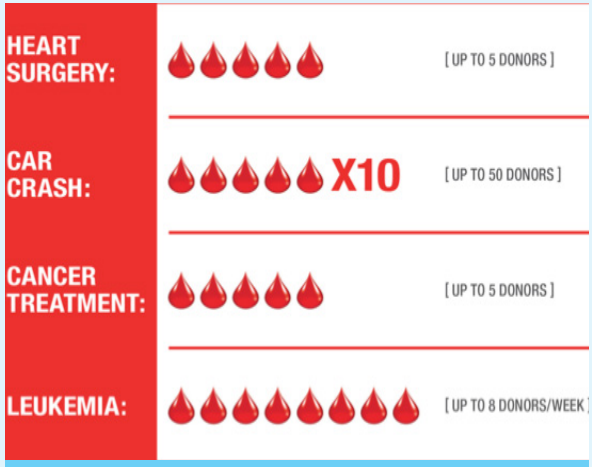

FIGURE 1. AMOUNT OF BLOOD NEEDED FOR A GIVEN DISEASE OR ACCIDENT (COURTESY OF *CANADIAN BLOOD SERVICES*)

(American Red Cross, 2017). The American Red Cross and other organizations that collect blood aim to have, at any given point in time, enough blood for three days of demand at each location and of each blood type, but that target is rarely met. It is estimated that, worldwide, there is currently a shortage of about 22 million units of blood per year (Lacetera et al. 2012).

These statistics make clear that the current system of blood donations in the United States does not adequately match supply with demand. Some economists believe that these issues can be managed more effectively by incentivizing blood donations, thereby helping blood banks regulate supply. However, many people also find moral and ethical issues with paying blood donors, and, like Titmuss, have concerns about how this could compromise the safety of donated blood. In 2006, Professor Roland Benabou conducted a study which provided evidence for these moral concerns, finding that people often refuse to enter in transactions which seem to have economic benefit for them, as they judge such transactions to be insulting to their dignity. A 2001 study found that 56% of American blood donors already received some kind of incentive, including items of appreciation (~30%), paid time off work (~20%), blood credits (~10%), and cash (0.2%) (Abolghasemi, 2010). After an introduction to the market for blood and how it functions, as well as an explanation of the issues within it, it is important to examine the methods and results of several studies seeking to improve this market, which leads to the conclusion that expanding offerings of non-monetary incentives is the most effective way to improve the market for blood in the United States.

STUDIES AND RESULTS

One potential method for improving the market for blood without incentives is to increase the number of donations under the current system using pre-donation education and training. A study conducted by Balegh et al. (2016) consisted of 244 eligible young adults who had never previously donated blood, and 4 different treatments: applied tension instruction , relaxation instruction, web browsing, and a no treatment control scenario. After 20 minutes of exposure to one of the treatments, half of the subjects watched short videos about injection and blood drawing, while the others did not. Each subject's intention to donate blood was then measured using a Theory of Planned Behavior questionnaire. The results showed large increases in intention to donate compared to controls, and follow up analysis revealed a statistically significant association be-

tween the degree of within-session increase in intention to donate and subsequent blood clinic attendance. This suggests that simple interventions can be effective in increasing non-donors' attendance at blood collection drives. Further analysis suggests that these interventions could be optimized by selectively targeting different psychological barriers associated with blood donation. While this study provided no direct experimental effect on blood clinic attendance, it would be reasonable to predict a positive impact on actual attendance given the impact on intentions and the positive association between intention to donate and subsequent attendance. It is difficult, however, to tailor this solution to spikes in demand, which is a critical part of the issue. Solutions of this type may help increase overall levels of donation, but they fail to address sudden changes in demand. It is apparent that incentives are a crucial component of improving the market for blood in the United States, as they are the only method which can be adjusted to meet demand.

Standard economic theory suggests that adding extra incentives should increase donations by adding to the altruistic motivations of donors, but other studies bring up concerns that incentives may actually deter donors or decrease the quality of donated blood. Lacetera et al. seek to provide robust evidence from both observational and field-experimental data that offering non-cash incentives increases blood donations, without increasing the fraction of donors who are ineligible to donate. Their evidence comes from blood drives conducted by the American Red Cross in northern Ohio between May 2006 and October 2008, totaling about 500,000 individual blood donations. They noted that 37% of all drives offered an incentive, and 78% of all drives took place at a location where there had previously been both incentives offered and no incentives offered. This is important to their regression, as it creates variance in incentives being offered while holding location and host constant, allowing them to more easily isolate the effects of the incentives across different types of organizations and neighborhoods. The American Red Cross does not assign incentives in a purely random fashion; they attempt to apportion them across all blood drive hosts in a nonsystematic way in order to treat all hosts fairly. Lacetera et al. were able to confirm this by showing that the actual distribution of incentives across hosts cannot be distinguished from a simulated, random distribution. A regression analysis with host and location as fixed effects, therefore, would allow one to identify the relationship between the presence of rewards and the outcome at a blood drive.

The most common item offered by the American Red Cross at nearly 50 percent of all drives was T-shirts. Overall, there are 13 distinct items that the American Red Cross offered to donors at more than 40 drives. The results of the study showed that "the number of donors who attempt to donate and the number of units of blood collected significantly increase when incentives are offered. On average, offering incentives leads to between 5.0 and 6.7 extra donors presenting at a drive—an increase of 15-20 percent" (Lacetera et al. 2012). They also found that giving incentives to donors did not increase the fraction of donors being deferred, suggesting that the quality of the donor pool did not change. They also found a significant positive relationship between the cost of the incentives and the number of units collected, with no negative effect on the percentage of deferred donors. The results show that items of higher monetary value generally attract a larger number of donors. It is also worth noting that "T-Shirts, which cost $2.95, attract 6.5 extra donors; sweatshirts, which cost $6.67, attract 13.2 additional donors; and jackets, which cost $9.50, attract almost 25 extra donors" (Lacetera et al. 2012). All three coefficients are statistically significant at the one percent confidence level. Because all three of these items are nearly identical in shape, size, and design, we can reasonably assume that they have extremely similar social image value. However, the impact on turnout and units collected increases with their economic costs, suggesting that it is the item's cost that explains the increasing effect of incentives on donor behavior.

A SIGN ADVERTISING AN AMERICAN RED CROSS BLOODMOBILE DONATION CENTER (COURTESY OF *WIKIMEDIA COMMONS*)

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Following this observational study, the same researchers conducted a natural field experiment at 72 American Red Cross drives between September 2009 and August 2010. In this case, they were able to randomly divide drives into control conditions, and treatment conditions of $5, $10, and $15 gift cards for a variety of stores were offered. When comparing outcomes between control and treatment drives, there was statistically significant higher turnout and units collected under treatment conditions, with increasing effects in correspondence with higher gift card value. Once again, there was no impact on the percentage of deferred donors. However, the researchers also found that when incentives were offered at a given drive, the subsequent turnout at nearby drives diminished over the course of the year-long study, especially when those nearby drives didn't offer incentives. Therefore, the incentives didn't have as much of a positive effect on donor turnout as the regression originally predicted. If one additional neighboring drive among potential alternatives within two miles offers an incentive, the turnout will decline by an estimated 0.25 donors. Drives that offer incentives but are located further away do not have any effect on turnout. Column 3 estimates the effect of the monetary value of incentives offered across various drives, which results in a negative, somewhat significant coefficient, indicating that for every $1 increase in the highest monetary value of incentives offered at drives within 0-2 and 2-4 miles, 0.1 fewer donors turn out. We must therefore take these displacement effects into account, otherwise we risk overestimating the total effect of incentives. Taking displacement into account, the incentives used by the American Red Cross "seem to be highly cost-effective, on average costing 4 percent or less of the social benefit ..." of one extra unit of blood (Lacetera et al. 2012). There are clearly positive effects on the number of units collected at blood drives through non-monetary incentives.

There are also studies which have been conducted using cash as an incentive. Research by Mellstrom and Johnnassen (2005) presents evidence that the altruistic appeal of charitable giving can be spoiled by cash rewards. A person who may be eager to donate blood may also be concerned that the value of their contribution could be tainted by the inference that material gain played a role in their decision to donate. Following in the footsteps of Titmuss, Mellstrom and Johannesson seek to verify his findings through their own field experiment. Their study points to one of the primary reasons why many people think a direct cash per unit market for whole blood would not work. They studied the willingness of 238 Swedish subjects to join a blood donor program and offered one of three treatments: no payment, a SEK 50 payment (roughly $7), and a choice between accepting SEK 50 of payment and donating that same money to charity. They found that results differed largely between men and women; there is a significant crowding out effect for women when they are offered an incentive (with the supply of blood donors decreasing by almost half) but no statistically significant effect on the participation of men. They hypothesized that it is more important for women to be perceived as caring and compassionate human beings, which is what lead to this result. Interestingly, they also found that offering the option of donating the money to charity fully counteracts the crowding out effect for women and returns their level of supply to the original level. This suggests that the potential problem of introducing monetary payments could be resolved by simply adding an option to donate the money to charity. However, there are still concerns about the safety of the blood supply in the presence of cash donations.

Although studies referenced above showed no significant effects on the quality of the blood supply using non-cash incentives, there are several studies which provide concerning results when using monetary incentives. A 2009 study compiled information from many previous studies about the safety of paid blood donation, and noted that "some studies have shown that paid donors have a higher risk of transfusion-transmitted infections. Paid donors are also more likely to disguise risk factors of infection, such as drug abuse" (Buyx, 2009). It is also worth noting that a

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significant portion of paid donors in the compiled studies came from populations with higher risk profiles, especially from low-income groups, and it is expected that cash payments will continue to attract these high-risk groups. However, some empirical data indicates that, unlike cash payment, non-cash incentives are not problematic in terms of blood safety, as they are not necessarily tied to groups with problematic risk profiles (Glynn, 2003). Non-cash incentives ranging from tokens of appreciation, T-shirts, mugs, food, and gift cards to stores or restaurants have all been shown to work, similar to the items used by Lacetera et al. in their 2012 study. With increased research, it is thought that a well-designed and specifically tailored incentive program could be developed based upon local demographics and donation setting. Younger populations might be more attracted to things such as iTunes gift cards, video game bonuses, or other kinds of software, whereas older populations might be drawn to wellness class vouchers, non-transferable theatre tickets, or restaurant gift cards.

It is vital to note that this approach may only be useful temporarily in anticipation of (or during) shortages, as permanent incentives may cause donors to assocciate blood banks with selfish goals. According to Ariely (2008), the reason for publically contributing to pro-social activities like blood donation is to be well-regarded by others. The long-term presence of incentives would dilute the idea of blood donation as a pro-social act, which could discourage individuals to take part in such activities. Another study conducted by Ellingsen (2008) showed that the motives of the counterparty are important to people taking part in an activity. The permanent presence of incentives may make blood donors change their perception of blood banks from non-selfish institutions to selfish ones. This could then lead to blood donors being less likely to act in a way that benefits the blood banks, because the incentives undermine their contribution.

COLLECTING BLOOD FROM A DONOR (COURTESY OF *WIKIMEDIA COMMONS*)

CONCLUSION

With the recent upward trend in critical season blood shortages, coupled with increasing demands for blood transfusions, the importance of this issue grows every day. On the basis of various studies, I argue that the United States needs to more widely implement non-cash incentives in order to more effectively meet both increased and changing demands for blood. Many studies indicate that offering incentives has a positive impact on blood donors' contributions, but the impact may become negative when offering money or cash-equivalent incentives. Based on this, non-cash incentives are a more effective solution than monetary incentives. Due to concerns that long-term, permanent presence of incentives may alter social perception of blood donation from a prosocial activity to a selfish one, I believe it is also important to introduce these incentive programs strategically, such as when shortages occur. This provides a middle ground between the two polar ideologies: completely altruistic donations and direct cash payment. In order to optimize the market for blood in the United States, this solution would also rely heavily on paying attention to donor motives and the construction of effective incentive programs. With more money and research devoted to this idea, the goal of a safe and sufficient blood supply may be attainable.

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