

# Lessons learned from the COVID-19 pandemic blood supply crisis

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In the United States, a blood transfusion occurs every 2 s with a total of 30 million blood components transfused per year.<sup>1</sup> Globally, there are more than 100 million blood donations annually, with significant disparities between supply and demand in high- and low-resource countries, resulting in ongoing challenges to ration this critical resource.<sup>2-4</sup> Despite many advances in medicine, there remains no manufactured substitute for blood. Meeting the unpredictable and continuous needs for blood products relies upon a steady and reliable donor pool able to replenish the supply to keep a positive balance in the blood "bank." Even in times of plenty in a high-resource setting such as the United States, blood products are a limited resource with tremendous work by the American Red Cross and local blood centers to recruit and encourage donors and share the limited resources across regions, depending on local need. As in many areas of medicine, the COVID-19 pandemic has further stressed an already stressed system, resulting in a critical shortage of blood products. This has led to difficult clinical considerations of who *really* needed blood and how much blood they truly needed. While it appears, for the moment, that we have weathered this storm, it is important to reflect upon how we got there in the first place and how we can use this experience to improve our stewardship of this precious resource

## COVID-19 AND THE BLOOD SUPPLY: FROM SHORTAGE TO CRISIS

Blood donation occurs in outpatient or hospital-based collection facilities and relies upon a relatively limited staff to collect, process, and transport donated blood to the healthcare facilities, which will administer the blood products. The COVID-19 pandemic led to mandated quarantine and general avoidance of hospitals and healthcare facilities to prevent infection and spread of disease. This resulted in a reduction in the already limited pool of blood donors, as people were afraid to come to the hospital or donation center. High

schools and colleges are important sites of blood drives, but with nearly 2 years of virtual schooling, according to the Red Cross, there was a 62% drop in school blood drives during the pandemic. During the second half of the pandemic, particularly with the spikes of the omicron and delta variants, the rapid spread of infection and mandated postinfection quarantine led to a further strain on the available donor pool as well as staff shortages at blood donation centers and hospitals. This coincided with the reopening of many aspects of the healthcare system that were previously closed or limited, resulting in an increased number of elective surgeries and other procedures for which blood transfusion may be required. The combination of these factors led to a tremendous strain on the blood supply and the worst national blood shortage in over a decade. There was not enough blood to meet the demand, highlighting the inherent difficulties in syncing supply with demand. Although there is a paucity of published evidence to date analyzing the real-world impact of the blood shortage, there certainly was an impact on day-to-day clinical care. Patients who would otherwise be transfused for acute anemia due to trauma or chemotherapy were not transfused, surgeries were canceled due to the lack of emergency blood products, and patients with sickle cell disease were unable to have their routine monthly blood transfusions or erythrocytapheresis to prevent stroke or other severe complications. While the tenuous nature of the blood supply has been continuously emphasized by the Red Cross and local blood donation centers before COVID-19, this crisis, which had a significant impact on clinical management for many patients, has highlighted the gravity of the situation.

## IMPROVING THE DONOR POOL

Despite many nuances regarding the availability of specific blood products and blood types, the blood supply is determined by the simple ratio of blood donated versus blood transfused. To maintain a

positive balance, donations need to always exceed, ideally by a comfortable margin, the demand for blood products. Annually, 6.8 million people in the United States donate blood and less than 10% of those are eligible to do so.<sup>5</sup> Eligibility criteria include healthy adults who are  $\geq 17$  years of age and weigh at least 110 pounds. There are many restrictions on who can and cannot donate blood to ensure the safety of the blood supply. During the COVID-19 pandemic, amidst excessive strain on the donor pool, the FDA loosened several blood donor restrictions to increase the potential donor pool. One important restriction that was loosened but not lifted limits blood donations from individuals who have had sex with gay or bisexual men in the past 3 months (previously was 12 months). This policy is outdated and unnecessarily excludes and stigmatizes more than 10 million healthy individuals. This restriction, initially a lifetime prohibition, was first enacted in 1983 amidst the early and uncertain days of the HIV/AIDS epidemic. In 2022, we have rapid and reliable tests for HIV with all blood donations undergoing antibody screening for HIV-1 since 1985, and HIV-2 since 1992. HIV occurs in individuals of any sexual orientation, making even a 90-day restriction unjust and inequitable. While it will be important to develop strategies to mobilize the 90% of eligible individuals who choose not to donate, we must also make changes in federal policy to reduce these stigmatizing restrictions and increase the number of eligible healthy blood donors. This discriminatory practice was dissolved in France in March 2022 based on a calculated risk of HIV transmission of 1 in 11.6 million donations (equivalent to one potentially HIV-infected donation every 4 years), if a donation is made in the "silent window" between infection and detection of antibodies. Italy, Israel, Hungary, The Netherlands, the United Kingdom, Brazil, and Greece have also ended this exclusionary practice. Although these policy changes have all been enacted relatively recently, early data from both Spain and Italy suggest that updating donor eligibility criteria did not result in an increase in HIV-positive donations.<sup>6-8</sup>

In addition to increasing the number of eligible donors, it is also essential to mobilize more than the scant 10% of eligible individuals who donate per year. Given that blood donation often occurs in healthcare facilities, healthcare workers are a captive and typically empathic audience. Even during the pandemic, healthcare workers came to work and could have provided a source for increased donations. While paying blood donors is an outdated and ethically questionable practice, hospitals could consider incentivizing healthcare workers to donate blood in some way, such as allowing them to donate blood during a paid shift. The Red Cross has increased its digitalization through tools such as the Blood Donor App, which simplifies and streamlines the donation process through tools, such as reminders, appointment searches, and lifetime tracking of donations to further emphasize the impact and importance of repeat blood donation. In addition, social media has become an increasingly utilized resource to mobilize masses for philanthropic campaigns and maybe a tool used to encourage donations through campaigns or friendly competitions.

## BLOOD STEWARDSHIP: USE BLOOD WISELY

The COVID-19 blood shortage provides an important reminder for the entire medical community that blood is a truly valuable resource. The decision to transfuse should not be based on laboratory values, such as hemoglobin or hematocrit alone, and the volume transfused should be the minimum necessary to achieve the desired clinical outcome. There have been many clinical trials investigating liberal versus conservative blood transfusion strategies and most have concluded that there is no benefit, and potential harm, to liberal transfusion.<sup>9-13</sup> Despite this, many hospital policies and individual practices continue to lead toward more liberal thresholds, often transfusing without clear clinical indications. Surgeons or anesthesiologists may demand that the hemoglobin is above a certain threshold before surgery. Blood may be ordered routinely and instinctively for an asymptomatic oncology patient with a hemoglobin of 7.9 g/dl while tolerating hemoglobin of 8.1 g/dl the day before. In the clinical management of patients, blood should be treated as a valuable and scarce resource, to be used with careful thought and consideration using a patient-centered approach to transfusion decisions.<sup>14</sup> The American Association of Blood Banks developed excellent and specific recommendations for the Choosing Wisely campaign of the American Board of Internal Medicine, including not transfusing more red blood cells or other components than absolutely necessary, not transfusing clinically stable patients without evidence of inadequate tissue oxygenation, not transfusing patients with iron deficiency who are hemodynamically stable, and not performing serial blood counts on clinically stable patients.<sup>15</sup> Within the hospital there is great opportunity to optimize stewardship of blood. There should be no hospital policies or check boxes on overnight sign-out to routinely transfuse based on a specific laboratory value without careful consideration of the clinical indication. In addition to conserving the blood supply, we must also remember that although most blood transfusions are administered safely, there are known and serious risks with transfusion. Blood is a scarce resource and the risk-to-benefit ratio must be assessed every time a blood transfusion is considered.

## CONCLUSION

The transfusion of blood products has been and will remain an integral and lifesaving tool for the management of medical and surgical patients. The COVID-19 pandemic has brought to light many of the inherent challenges and threats to the blood supply that existed before the pandemic and will remain unless we mobilize change. We have illustrated several tangible opportunities for change on the policy, health system, and individual levels, summarized in Table 1, that we must work together to enact and sustain. Blood is precious and we need it to be available for those patients whose lives depend upon it.

**TABLE 1** Recommendations for maintaining an adequate blood supply.

Policy level	Health system level	Individual provider level	General public level
Remove the restrictions limiting LGBTQ+ individuals from donating.	Incentivize healthcare workers to donate, such as allowing them to donate blood during a paid shift. Monitor the use of transfusions through hospital-wide quality improvement and safety infrastructure to ensure appropriate usage.	Transfuse for clinical indications and not laboratory values alone. Transfuse only the volume necessary to achieve the clinical goal. Utilize a patient-centered approach to blood transfusion decisions.	Social media-led blood donation campaigns. Increased utilization of Red Cross digital technologies, such as the Blood Donation mobile application to simplify donation, particularly to schedule repeat donations. Increase large volume of blood drives through initiatives led by large employers.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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