

Why are blood centers not celebrating their success in meeting the blood needs of the United States?

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Abstract

Purpose – This paper reviews the evidence presented in the HHS report and challenges its characterization of the state of the market. The recent US Department of Health and Human Services (HHS) report on the blood industry, *Adequacy of the National Blood Supply*, provides evidence of and acknowledges that the industry has successfully met demand for blood. And yet the tone and takeaway message of the report of the industry is on the verge of collapse.

Design/methodology/approach – The approach of this paper is a critical review of the evidence presented in the HHS report as well as other recent analyses of the blood industry.

Findings – While acknowledging the successful performance of the industry to date, the HHS report offers hypothetical disaster scenarios and a lack of centralized data as the main causes for concern. These criticisms ignore the satisfactory response of the industry to prior disasters and fail to recognize that centralized information is not necessary for the efficient operation of a decentralized industry.

Originality/value – This paper offers a fresh assessment of a report repeating prior forecasts of doom for an industry which to date has very successfully met the United States' demand for blood.

Keywords Disasters, Blood supply, Economic planning

Paper type Viewpoint

Introduction

The US Department of Health and Human Services (HHS, 2021) recently released a report on the blood industry, *Adequacy of the National Blood Supply*. This report to Congress was mandated by Section 209 of the Pandemic and All-Hazards Preparedness and Advancing Innovation Act of 2019. Prepared by HHS staff and industry experts based on presentations, submitted evidence, interviews and existing research, the report depicts an industry in dire need of significant Congressional assistance despite outstanding performance to date. These two sentences in the Executive Summary set the tone of the report:

This loose network of blood centers has served our country well in the past, ensuring the safety and availability of blood needed everyday for more than 6,000 hospitals throughout the country. However, the continued availability of a robust blood supply faces significant threats and challenges in the current environment (HHS, p. 1).

According to this report, an industry which has performed well for decades needs funding from Congress to maintain its donors (Recommendations 3.2 and 3.3), ensure the quality and



safety of the blood it supplies (Recommendation 5.1), prepare for potential emergencies (Recommendation 4.2) and develop new products (Recommendation 6.1).

The report reconciles the excellent record of performance to date and looming disaster without significant Congressional assistance through a series of threats or potential disruptions which have yet to befall the industry. The specific threats involve donors, disaster and data. This paper will review the evidence offered for each in turn.

The report identifies inadequate prices for blood paid by hospitals as the underlying cause of the specific perils (HHS, pp. 2, 4–5). The low recent prices for blood are a consequence of new technology reducing the amount of blood needed for transfusions, or “appropriate changes in medical practice that reduced blood utilization” (HHS p. 4). The reduction has been around 30% and appears to be permanent (HHS, Figure 5, p. 17), resulting in excess capacity among blood centers. Yet this does not reflect a fundamental flaw in the market or a market failure. Markets respond to decreases in demand by reducing the quantity supplied, so blood centers should deliver less blood (and consequently receive less revenue) and some centers may cease operations entirely (or exit the industry).

The HHS report echoes the warning from [Klein, Hrouda and Epstein \(2017\)](#) of a “crisis” in an industry with a great performance record. Klein *et al.* observe that, “blood supplies nationwide have proved remarkably resilient even in the face of train wrecks, terrorist attacks, and natural disasters.” And yet they then contend, “The US blood pipeline is now in danger of disruption,” (p. 1485) and similarly cite inadequate revenues as the industry’s underlying problem.

A car that has run smoothly for years may always fail to start one morning. Satisfactory past performance of a market does not prevent future problems. This paper assesses whether the HHS report has identified fundamental problems or failures in the market for blood or if the feared contingencies are like monsters under the bed. I review the evidence for the three sets of contingencies identified and do not find a challenge the market should not be able to meet. The primary underlying cause, insufficient revenue, is the expected market response to a decrease in demand. I do not believe that a convincing case for market failure requiring extensive government intervention has been made.

Dwindling blood donors

The first threat is an aging population of blood donors. As documented (HHS, Figure 1), the age distribution of blood donors changed between 2001 and 2017 from a modal donor age of 41 to 45 years to 55 to 60 years. As the largest group of donors continues to age, they will become unable to continue to donate. The implied threat is clear: the industry has too few young donors to replace the aging cohort and requires federal assistance in recruiting new donors.

We find this concern overblown for two reasons. First, recruiting donors is perhaps the core component of the normal operation of blood centers. This concern essentially implies a lack of a core competence on the part of blood centers. Businesses that have survived for years must understand the basics of their industry. An extensive academic literature on the motivations of blood donors exists, and the industry also conducts its own market research. To claim that successful businesses need help with a core function requires a high standard of evidence, one not met here. Indeed, the evidence shows that each of the seven youngest age cohorts in the age distribution presented by HHS (Figure 1) contributed at least 5% of 2017 platelet donations. The industry is still attracting younger donors.

Second, the economics of investment offers insight on the “aging” donor population. Recruiting new donors and increasing contributions from existing donors requires resources and yields benefits in the future; in other words, it is an investment. This investment should not be undertaken too long before needed as time is money. Energy economics offers a

parallel. As M. A. Adelman repeatedly emphasized, proven reserves are an economic good which must be produced; resources must be expended to prove the existence and quantity of recoverable reserves in an oil field. This investment is never undertaken too far in advance of when the oil will be used (Adelman, 1995). Reserves will not grow too large but will not dwindle away either. The blood supply is currently sufficient and younger donors are being identified. We should not expect significant investment in ramping up donations from younger donors until the large cohort of donors is near retirement.

Compensated donations in the plasma industry may at some point undermine unpaid donations for whole blood, as HHS suggests. The tradition of blood donation in America goes back to Second World War, and was portrayed as a patriotic act (Slonim, Wang, & Garbrino 2014). Young people who grow up in an environment where some firms pay for donations may be unwilling to give their blood away for free. The monetary compensation of plasma donors touches on the issues of intrinsic versus extrinsic incentives and monetary versus nonmonetary compensation, which have been extensively researched (Benabou & Tirole, 2003; Frey & Oberholzer-Gee, 1997, Lacatera, Macis, & Robert, 2012). The impact of paid donations on the quantity of quality of blood donations has also been widely investigated (Shaz, Domen, & France, 2020; Domen, 1995; Grabowski & Manning, 2016). An examination of these questions is beyond the scope of this paper. We can note, though, that even should monetary payment for whole blood become necessary, this would not spell doom for the blood industry. The US supplies 70% of plasma for the world supply and charges prices sufficient to cover the cost of paying donors (and earning profits on invested capital; Slonim *et al.*, 2014; Shaz *et al.*, 2020). Furthermore, blood donors already receive nonmonetary compensation (gifts) and so the cost of securing voluntary donation is not zero. Even should payment for whole blood prove necessary in the future, this need not cause a crisis for the industry; prices should rise to cover long run cost.

Sustainability in the face of disaster

Inadequate preparation for a natural disaster or public health emergency is a second category of vulnerability cited by HHS as requiring government intervention. The report notes:

Blood transfusions are critical to the American public during both emergency and non-emergency periods. (p. 3)

Natural hazards and emerging infectious diseases continue to pose threats to the availability and safety of the nation's blood supply. (p. 12)

To ensure the US has an adequate blood supply in the case of public health emergencies, Congressional funding and support is needed. (p. 12)

Extreme events always have the potential to cause large increases in the quantity demanded or decreases in quantity supplied, creating temporary shortages. A temporary shortage of blood or blood products and can have serious consequences. This is a frightening prospect, but scary stories not closely tied to facts so not provide a solid basis for policy action. By contrast, the recent study by the Rand Corporation (Mulcahy *et al.*, 2016) explored a variety of potential disaster scenarios and examined three in detail: a natural disaster, a terrorist attack, and a global pandemic. They assessed each as offering a high, medium or low threat to four different elements of the blood industry plus an overall risk score for the system as a whole. Simonetti, Ezzeldin, Walderhaug, Anderson and Forshee (2017) offer another example of a careful evaluation of emergency scenarios, and in their simulations the market does not experience shortages. HHS offers primarily concern over the availability of data (see below) and some facts about the supply chain which seemingly imply vulnerability.

HHS also ignores the performance of the blood industry during disasters and emergencies to date. The industry met demand for transfusions in the aftermath of Hurricanes Katrina and Sandy and the Oklahoma City and 9/11 terrorist attacks. Indeed, excessive donations have more frequently been the “problem” than a shortage. And the industry surmounted the enormous challenges of blood-borne pathogens of the HIV and Zika viruses.

The HHS report mentions several places that the COVID-19 pandemic revealed the blood industry’s inherent weaknesses. And yet the industry’s response was successful. For example, HHS (Figure 11, p. 35) reports blood collections and demand between January and June 2020, allegedly showing a surplus in March and a shortage in April. This is misleading. As [Carden, Beard and Ford \(2021\)](#) explain, a surge in collections occurred after US Surgeon General Jerome Adams publicly appealed for blood donations on March 19; combined with restrictions on elective surgical procedures imposed by hospitals, this drove supplies to “unheard” of levels. The April “shortage” simply involved a rational market response to the surplus, drawing down this stock. Overall [Carden *et al.* \(2021\)](#) find that the industry handled the changing conditions and fluctuations in demand and supply like the cancellation of mobile blood drives quite well.

The industry also met the need for convalescent plasma during the COVID-19 pandemic. HHS acknowledges this success while arguing that it demonstrates a need for “modernization” to allow adoption of “new technology.” After stating that the pandemic “highlighted the magnitude of . . . shortcomings” (p. 2), the report states:

A critical example of rapid modernization and innovation was the speed at which the FDA, BARDA, other HHS leaders and blood centers collaborated to produce COVID-19 convalescent plasma. . . . These innovation and technology responses require novel regulatory approaches that maintain safety and foster expansion of the blood donor base and the blood supply while reducing costs so that investments can be made in new and better blood components. (p. 3)

The industry met an unexpected and substantial demand shock for a new blood product during a time of significant economic disruption. This represents a success rather than demonstrating a “critical need for remediation” (p. 2).

Data deficiencies

The inadequacy of data is a third category of potential disaster for the blood industry. As HHS puts it:

At this time, there is no comprehensive source of data collection for the national blood supply. Such a system is needed to enable monitoring of trends, evolution of population health, and utilization of risk-based decision-making for new rules and regulations. A national data system that monitors the blood supply from vein to vein – or from donor to patient – is critical to our nation’s preparedness infrastructure and is essential to ensuring the adequacy of the blood supply in the case of public health emergencies. (p. 41)

The report recommends that Congress fund the creation of a national data system (Recommendation 4.1).

The paucity of data presents an apparent paradox. The supply of individual components must be harmonized in various locations across the nation. A shortage at any place and time can lead to a life lost. If the quality of data in the industry is so low, how can hospitals and blood centers balance supply and demand so consistently well?

As HHS notes, the US has a free-market blood supply (p. 34). The economics of information resolves the paradox and reveals the call for centralized data as a call to centrally direct the industry. As economist Friedrich Hayek explained in his paper “The Use of Knowledge in Society,” economic knowledge – or the data plus the information necessary to understand the meaning of numbers – is decentralized in any economy. “The peculiar character of the

problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all separate individuals possess.” (1948, p. 77) The fundamental economic challenge “is a problem of the utilization of knowledge which is not given to anyone in its totality.” (1948, p. 78). There are two ways by which economic activity can be coordinated: planning or markets. As Hayek continues:

Planning in the specific sense in which the term is used in contemporary controversy necessarily means central planning – direction of the whole economic system under one unified plan. Competition, on the other hand, means decentralized planning by many separate persons. (1948, p. 79)

Markets do not attempt to centralize knowledge. Instead decentralized decision-making allows market participants to use the knowledge they possess. Markets coordinate activity by providing participants some additional knowledge, most prominently (though not exclusively) through prices. Prices do not convey all information, only enough to enable adjustments. Hayek notes that market participants can conserve on the use of a good when its price rises without understanding why the good is scarcer now than before.

Because knowledge is never centralized in a market, the sum total of knowledge at a time can never be measured. It is impossible to judge the adequacy of this sum directly, as the sum does not exist. The adequacy of knowledge is revealed in performance. “The continuous flow of goods and services is maintained by constant deliberate adjustments, by new dispositions made everyday in light of circumstances not known the day before, by B stepping in when A fails to deliver” (1948, p. 83). The blood market unambiguously provides evidence of this coordination. [Mulcahy et al. \(2016, pp. 86–96\)](#) mentions the adjustments the industry accomplishes regularly. For instance, blood is frequently shipped between regions to meet needs. [Klein et al. \(2017\)](#) acknowledge the existence of spot markets for blood. [Shaz, Domen and France \(2020\)](#) describe what is effectively a national market for blood and its components. None of this would be possible without hospitals and blood centers knowing exactly which products were needed at each hospital each week and supplies available at blood centers. The numerous small adjustments needed to balance supply and demand would not occur if enough data did not exist in the system.

The US blood market has the information architecture it requires to function. Aggregated national totals for transfusions of different types of blood need not be compiled in real time or even in any aggregate statistics at all, for the needed blood products to be transfused to save lives. HHS observes this lack of data as a fatal flaw of the market.

To fill this critical data gap, public and private stakeholders must collaborate to design a comprehensive data infrastructure that ensures that the data supports the needs of blood centers, hospitals, supply chain manufacturers, accreditors, regulators, payers and other organizations throughout the blood community in times of public health emergencies. . . . This system must include implementation of a model for oversight by a public-private partnership, rooted in legislation, which in the event of a disaster with significant impact to the blood supply, *provides blood centers and hospitals with disaster-related governance, coordination, and communication, resources and financial support to ensure blood transfusion needs are met for the American people.* (pp. 41–42, emphasis added)

If the top-down planning of the market is contemplated, then as Hayek argues, information must first be centralized. The data structure may be inadequate for centralized governance, but enough information is processed and transmitted to allow the smooth operation of the existing *market*. Hayek offers a take-away perspective on such criticisms: “The common idea now seems to be that all such knowledge should as a matter of course be ready at the

command of everybody, and the reproach of irrationality leveled against the existing economic order is frequently based on the fact that it is not available.” (1948, p. 81).

Blood center
success

Contracts and revenue adequacy

According to the HHS report, the underlying cause of the threats to the blood market examined in the previous sections, as well as other limitations like the lack of a national registry of ineligible donors or little research on safety improvements, is inadequate revenues for blood centers. This is described variously as “the inability to raise prices for services to hospitals,” (p. 2), a “dramatic loss of revenues, operating margins, and capital required to maintain and replace the current infrastructure and to invest in technology and innovation,” (pp. 4–5), “blood centers have not realized any significant increases in pricing of blood components, (p. 27), and “the current financial approach to reimbursement/payment for blood components is inadequate” (p. 66). The report proposes creation of a panel to propose changes to the funding model to increase revenues for blood centers (Recommendation 6.2). Yet given the extensive public–private partnership and Congressional funding the report envisions, and the potential to avoid Congressional appropriations to support blood industry operations if centers receive more revenue for the blood they supply, a more generous funding formula may well then be forced onto hospitals and insurers.

At one level this criticism of the reimbursement contracts is ridiculous. Market transactions are entirely voluntary. No party can compel another to participate, nor can they force acceptance of inadequate compensation on another. Prices in markets and the other terms of a contract emerge from bargaining between buyers and sellers, subject to the voluntary participation of each party. Unacceptable terms cannot be imposed by a buyer on a seller, or vice versa. Economists know that under conditions of sufficient competition, prices get bid down to the suppliers’ cost. And market prices will respond to changes in demand and supply.

As economists not working in the blood industry, we have not tried to negotiate contracts with hospitals. We will not, therefore, try to offer advice on negotiating better deals. But comparative statics in the supply and demand model offer an alternative perspective on low prices and inadequate revenues the HHS report decries. Innovations in transfusion technology have, as noted, reduced the demand for blood significantly, by an estimated 25 to 40% (HHS, Figure 5; [Mulcahy et al., 2016](#)). A reduction in demand leads to reductions in price and quantity, and the latter may involve a decrease in the number of firms. Textbooks gloss over how exactly this reduction occurs, but it clearly involves pain for the affected firms. The specificity of capital and investments, a point emphasized in transaction cost economics, will lengthen the adjustment process. Specific capital involves investments of different forms tailored for and largely only of value in one industry. Although many resources are reallocated to more productive uses when a firm goes out of business, specific assets represent largely nonrecoverable investments ([Williamson, 1985, pp. 47–67](#); [Rubin, 1990, pp. 4–17](#)). In the blood industry, a blood center will have built a reputation and knowledge of the local market, including the donor population and how best to reach them, financial donors and the hospitals they serve. These investments cannot be easily redeployed to other types of businesses.

Because of asset specificity, a firm will accept a lower price to remain in operation than required to enter the market and begin operations. This means that the price may need to fall below long run average cost for some time to induce firms to exit the market. Contributing to the length of time (or amount of pain) required to produce this adjustment is a managerial inefficiency noted by [Manne \(1965\)](#): managers resist closing their business and putting themselves out of a job. The not-for-profit status of blood centers may also lengthen the adjustment process. In a for-profit-firm, investors or creditors not receiving an acceptable return on their investment counter managers’ reluctance to close a business.

Technology has reduced demand for blood resulting in overcapacity in the industry. A period of prices below cost will be required to reduce industry capacity. Blood center operators will perceive their revenues inadequate, and competition will render efforts to negotiate higher prices fruitless. This does not threaten the long run viability of the industry. Once capacity declines, prices should rebound to cover costs again as we find it highly unlikely that hospitals would allow patients to die for lack of blood for transfusions. Hospitals will pay the price required for the quantity and quality of blood needed for normal operations. Claims that government should invest to ensure adequate reserve surge capacity for some potential emergency should be viewed as self-serving and ultimately delaying the needed reduction in quantity supplied.

Conclusion

Physicists cannot prove if the sun will rise tomorrow morning. We must simply wait and see what happens. Economists similarly cannot prove that a market will not break down next month. We can search for sources of recognized market failure and evaluate the track record. When observers wish to contend that a market which has worked well for decades is about to collapse, however, they should be held to a high standard of evidence.

HHS acknowledges the efficient performance of the blood market and yet contends that the market faces a grave danger of failing in the near future. We have critically examined three of the channels of failure offered by the report – donors, disasters and data – as well as the underlying alleged problem of inadequate revenues. We believe that their evidence fails to meet even a modest standard. Klein *et al.* (2017) offered a similar criticism of the blood industry in 2017, labeling the situation a “crisis.” The sky has not fallen on the industry in the past four years; indeed it proved robust to a major public health emergency with the COVID-19 pandemic. Economic systems inevitably face challenges, and the robustness of the system determines whether the challenges will produce failure. The blood market, like most markets, should be up to the challenges of the future.

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