

COMMENTARY

TRANSFUSION

Building awareness: Introducing education about blood-product donation in the school curriculum

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1 | EUROPEAN BROADER CONTEXT

Blood and plasma products play crucial roles in the healthcare system, being used for many life-saving treatments such as surgeries, cancer therapies, treating burn victims, and managing chronic conditions such as hemophilia and multiple types of anemia. Because of their importance, they can be considered strategic resources just like energy and water.¹ However, in many countries, there is a critical shortage of plasma donors,^{2,3} alongside a noticeable absence of ethnic diversity within the blood-donor base.^{4–6}

These matters are not mere “logistical concerns” but they touch upon the broader issue of existing and potential healthcare system vulnerabilities and equitable access to healthcare services. Our reliance on plasma imports is particularly concerning, with approximately 40% of the plasma used in Europe being sourced from third parties such as the United States.⁷ The demand for plasma in Europe is growing as there are more patients diagnosed with conditions that require plasma-based medicinal products, and regulatory bodies approve new uses for these products.⁸ The dependency on plasma imports, coupled with a steadily growing demand for plasma⁸

highlights a critical vulnerability in our healthcare system: a lack of autonomy in producing life-saving medicine. This risk could be further aggravated by potential future logistical disruptions, akin to those caused during the COVID-19 pandemic.⁹

Moreover, the ethnic diversity of donors plays a pivotal role in optimizing patient outcomes. A closer match between the antigen profiles of donors and recipients significantly reduces the risk of transfusion-related complications.¹⁰ Unfortunately, existing donor pools fail to mirror the ethnic diversity of the wider population, presenting obstacles in securing compatible or good-fit matches for all recipients. This challenge is not unique to Europe; similar problems are observed in regions such as North America and Australia, where underrepresentation of minority donors is an important issue.^{5,6,11} This underrepresentation causes health disparities, that is, certain groups face worse health outcomes simply because of their ethnic background.¹² The lack of an ethnically diverse donor pool means that patients from minority backgrounds are less likely to receive well-matched blood (red blood cell antigen avoidant units), leading to poorer health outcomes.¹³ By increasing diversity in the blood-donor pool, more optimal treatment outcomes for these patients can be achieved. Addressing these disparities is

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crucial for promoting health equity, which is the principle that everyone should be able to “attain their full potential for health and well-being”.¹⁴

The responsibility for maintaining a stable, diverse, representative and sufficient blood-donor pool should not rest on collection establishments alone but should be seen as a matter of national importance and hence fall under the scope of governmental action. This requires a proactive approach that extends beyond short-term solutions like communication and recruitment campaigns by blood establishments. A more long-term, strategic perspective is necessary as highlighted by the World Health Organization and the International Federation of Red Cross and Red Crescent Societies through the “Global Framework for Action to Achieve 100% Voluntary Blood Donation”.¹⁵ This is a comprehensive guide designed to help countries develop robust blood donation systems with sustainable and sufficient blood-donor pools. The framework emphasizes the importance of fostering a positive culture around blood donation, promoting it as a normal part of a healthy lifestyle (see Strategy 6). Additionally, it underscores the need to educate, motivate, and recruit new blood donors (see, e.g., Strategy 10) and encourages activities targeting the younger segments of the population (see Strategy 11). The document highlights and suggests various educational efforts, including media campaigns, World Blood Donor Day events, and initiatives within schools. Not only this, but as part of the action points for Strategy 11 (p.84) they recommend integrating the subject of blood products donation in the curricula of primary and secondary schools.

In this commentary, we support this idea and argue that by integrating blood product donation into formal education for children and adolescents, we can build a durable foundation for more well-informed and motivated-to-donate future generations. By formal education, we are referring to any structured and systematic way of learning that takes place in state-run or state-accredited institutions (e.g., primary school, high school etc.).¹⁶

2 | LACK OF AWARENESS IS ONE OF THE MAIN BARRIERS TO BLOOD PRODUCT DONATION

One of the main barriers to blood product donation is a lack of knowledge and awareness.^{17–20} This means that people do not donate because they either do not understand what blood and plasma donation entails, do not know how to donate (e.g., how to enroll, and where to donate), or are unaware that they are needed as donors. At a broader level, individuals develop their attitudes,

beliefs, identities, and behaviors largely through socialization, a process that occurs through interactions with family members, peers, and within institutions such as schools.²¹ However, to our best knowledge, blood product donation is rarely addressed within these key socialization contexts in many countries; hence, the lack of knowledge and awareness among the general population about this subject.

In Europe, out of 165 million eligible donors, only 15 million donated blood (9%),² which means that the opportunity to learn from someone who donates is quite small. Existing donors play an important role in recruiting others,^{22–24} but any intervention in this socialization space will be inherently limited by the size of these individual networks and might lack diversity both geographically and demographically. In addition, the donation of substances of human origin is not part of the mandatory curriculum in schools, with the exception of the United Kingdom. Out of all socialization spaces where an intervention could be developed, schools might have the biggest impact. By educating young children, knowledge might also indirectly reach their families and communities^{25–27}; an intervention through institutionalized education having the potential to systemically reach a broader and more diverse audience, far beyond existing donor networks.^{28,29}

3 | CITIZENSHIP EDUCATION

Historically, in Europe, the development of public school systems has been closely tied to the emergence of nation-states in the 18th century.³⁰ Schools were initially designed not only to impart basic literacy but also to foster a sense of national identity and citizenship.³⁰ In today's curriculum, this role is evident both implicitly (latent) and explicitly (manifest). Implicitly, teachers act as role models, embodying the ideals of citizenship,³¹ while the culturally informed perspective of the curriculum—such as the historical narrative presented in schools, whether Eurocentric or more inclusive—shapes students' understanding of their place within society and their identity as citizens.³² Explicitly, the citizenship socialization role of schools is reinforced through various courses dedicated to teaching civics and citizenship. As a result of our increasingly globalized world, citizenship education today extends beyond traditional political instruction and patriotic affinities to prepare children to be global citizens; hence, it trains skills such as social responsibility, constructively interacting with others, or thinking critically.³³

Civic education in schools can be especially beneficial for students from disadvantaged backgrounds,

compensating for a lack of civic socialization at home.³⁴ Neundorff and colleagues³⁵ have found that civic courses can effectively bridge gaps in family socialization, with this impact being consistent across different cultures, such as in the United States and Belgium, and across time. We argue that the introduction of education about blood product donation into the school curriculum would therefore increase knowledge for those who are not exposed to the idea of blood product donation within their immediate social circle.

4 | EXPECTED EFFECTS OF EDUCATION ABOUT BLOOD PRODUCT DONATION

Although many of the children and adolescents receiving information about blood product donation will not be immediately eligible to donate, this policy has the potential to generate a variety of positive outcomes that go beyond direct donor behavior and lay the foundation for future engagement. Firstly, it can increase knowledge about the subject and foster positive beliefs and attitudes among children. For example, in light of climate change, ecology is a topic often addressed in children's education, and there is a considerable corpus of research done to evaluate the efficiency of such interventions. In a meta-analysis conducted by Van de Wetering and colleagues,³⁶ it was found that environmental education significantly improved knowledge related to the subject as well as attitudes and intentions among students. Educating students about blood donation may have similar effects, creating a positive predisposition toward donation, which later may translate, under the right circumstances, into blood product donation behavior.

Secondly, increasing knowledge related to blood donation could prevent the emergence of false beliefs and fears that would deter an individual from donating. For example, a study by Alfieri³⁷ revealed that adolescents in Italy fear contracting diseases through donation, an impression that could stem from false beliefs and a lack of clear, factual information about blood donation. The widespread reach of misinformation facilitated through social media (see the study by Swire-Thompson and Lazer³⁸) can further amplify these fears and, in general, deter people from donating blood. In this context, education about blood product donation in schools can be seen as a form of “prebunking.” This is a proactive approach to misinformation, and it involves the strategic presentation of common myths and misconceptions related to blood donation into the curriculum, accompanied by factual information that effectively debunks these myths.³⁹ This approach has been demonstrated to be an effective means

of combating misinformation and false beliefs.³⁹ Thus, by teaching children about blood product donation, we can enable them to distinguish between credible and false information and make better-informed decisions in the future and lower another barrier associated with blood donation: fear.

Furthermore, another effect of such a policy would be to spark conversation within families and the broader communities. Not only do children learn from their parents, but parents learn from their children as well.⁴⁰ Many children share with their parents what they have learned in school and sometimes even influence their parents' behaviors.^{25,26} In this way, this addition to the curriculum would create a ripple effect in local communities, spreading awareness about the subject beyond the classroom.

Finally, early exposure to blood donation education can reduce the psychological distance (see the study by Trope and Liberman⁴¹) between students and the act of donating, making it more likely that they will see it as a normal civic responsibility and maybe even engage with it once they are eligible to donate. Thus, this strategic focus on youth in donation education is based on the recognition of the dual potential of shaping future donors and leveraging their influence to engage the broader community.

5 | FORMAL EDUCATION COMPARED TO OTHER FORMS OF INTERVENTION

Many European blood collection agencies have developed numerous informational materials and campaigns, including lesson plans for teachers and other informal learning opportunities, such as museum exhibitions and video games. Even if some of these initiatives have been proven to be highly effective, for example, the video game developed by Author⁴² it is important to recognize the lack of a systematic and inclusive approach that these initiatives and interventions have compared to a state-driven educational program. Communication campaigns often fail to reach a broad audience due to the limited resources available to blood establishments. Not all educators are aware of the importance of blood or plasma donation and hence might not consider the subject when planning their lessons. Moreover, museums, where some of the informal learning initiatives have been tested, often attract a specific, unrepresentative demographic, primarily middle-to upper-class families from predominantly white backgrounds^{43,44} (also see Figure 4 from Eurostat⁴⁵). Hence, these learning initiatives created by blood establishments, while valuable, are insufficient

alone and highlight the necessity for a more formal educational framework to ensure wide-reaching access to this information for the whole population (see Strategy 11 from the framework for 100% voluntary blood donation¹⁵).

6 | CURRENT INITIATIVES REGARDING THE INTRODUCTION OF MANDATORY EDUCATION

The United Kingdom offers a case study in this area, having recently introduced education about blood, organ, and stem cell donation into the secondary school curriculum. This initiative implies educating students aged 11–16 (Key Stage 3 and 4) about the importance of blood, organ, and stem cell donation.⁴⁶ The curriculum was developed collaboratively by NHS Blood and Transplant (NHSBT) in partnership with the blood cancer charity Anthony Nolan and with input from practicing teachers.⁴⁶ Teaching resources about donation are available online and are designed to be easily integrated into the classroom setting, requiring thus minimal preparation and effort from educators⁴⁶ and facilitating the integration of the subject in the “normal” lessons. The aim of this policy is not just to empower future generations to make well-informed decisions about donation, but it also targets sparking conversations about donation in the wider community, particularly at home, thereby broadening the impact beyond the classroom.⁴⁶ The United Kingdom's example demonstrates that implementing mandatory education about blood products is not only a “nice idea” but a feasible, strategic step for the future.

7 | CRITICISM, CONCLUSIONS AND THE PATH FORWARD

We began by highlighting two emerging health crises: the lack of donor ethnic diversity and the shortage of plasma donors, emphasizing that these challenges are not limited to Europe but also affect regions like North America and Australia. We then argued that a major barrier to donation is the lack of awareness and knowledge, which stems from the limited socialization opportunities most people have regarding blood products donation. While blood collection agencies have developed educational materials, their reach is limited compared to the national coverage and consistency provided by formal education. Drawing on the research on the effects of environmental education, we presented evidence to

support the potential effects of introducing blood donation education into school curricula. Although children and adolescents are not yet eligible to donate, this education would not only increase knowledge and positive attitudes but also combat misinformation and reduce fears. Additionally, it would spark conversations within families and communities, extending the intervention's influence beyond the classroom. Our proposal aligns with WHO's and International Federation of Red Cross and Red Crescent Societies' recommendations for building a sustainable donor pool by fostering a donation culture across generations, with awareness as the first step.

Regarding the ethics of the implementation of such a policy, we would like to highlight that while the long-term goal is to increase the donor pool, the focus of the present proposal is primarily on building foundational knowledge and awareness about donation and promoting health literacy, rather than recruiting donors. Models such as the Norm Activation Theory⁴⁷ or the Trans-theoretical Model⁴⁸ present awareness of the problem as the first step in adopting prosocial behavior; hence we expect that this policy change would create a possibility that for many does not exist simply because of lack of knowledge. Therefore, our proposal aligns with the ethical principle of justice by allowing equitable access to information for all individuals regardless of the presence of a donor in their network, social status, or ethical background.⁴⁹ Other interventions aimed at the adult population can have as their main objective donor recruitment. Moreover, in order to respect the ethical principle of autonomy, we strongly recommend that the curriculum does not veer into the territory of advocacy or persuasion, but only offers fact-based information about the subject (e.g., what plasma is, what is used for, how patients and donors are matched based on their antigen profiles etc.). Importantly, the content and delivery of this education should respect the diverse backgrounds and beliefs of students. It is essential to acknowledge that attitudes toward blood donation can be influenced by cultural, religious, and personal beliefs (e.g., Piersma and colleagues¹⁸). As such, the curriculum should present donation as one of many choices available and respect students' rights to hold differing views. Ultimately, regarding implementation, we intentionally do not propose a one-size-fits-all model as we acknowledge that the final policy will be shaped by national stakeholders to reflect their unique cultural, social, and ethical norms.

Another aspect to be considered is that in recent years, there has been considerable debate regarding the content of school curricula. These discussions reflect not only the current needs and values of society but also our aspirations for the future. What we teach children today

mirrors what we consider essential for tomorrow. A parallel example is climate change. Initially, including climate change and environmental conservation in the curriculum was viewed by some as unnecessary or burdensome. However, as the pressing nature of environmental challenges has become undeniable, education on such subjects is now viewed as essential. A similar urgency surrounds the topic of blood product donation. Waiting until the situation reaches a critical juncture leaves us scrambling for last-minute solutions that, in reality, do not exist. The practice of issuing emergency calls for blood and plasma donations can only serve as a temporary measure; over time, potential donors become desensitized to such appeals, reducing their efficacy.^{50,51} Furthermore, the European principle of voluntary and unpaid blood product donation⁵² should not be forgotten when we discuss issues of securing a sufficient and representative donor pool. Education is fundamental for cultivating donation-aware generations, in the present and future alike; generations who are motivated not by external rewards but by an inner sense of responsibility, membership, and civic duty.

The journey toward establishing new habits and behaviors is lengthy, as demonstrated by the slow, difficult acceptance of sustainability practices among the general population. It requires sustained exposure, support, and time. The first step in this process is to ensure widespread awareness and knowledge of blood and plasma donation. Statewide educational programs should not be seen as burdening students but as essential components of their development as informed citizens and active participants in societal well-being. In addition, we would like to highlight that blood donation is a complex behavior shaped by many interwoven factors. While awareness, the focus of this proposed policy change, is a critical first step in fostering prosocial behaviors, other factors also play a significant role in influencing donor behavior. These include individual factors, such as donor demographics and life course,⁵³ as well as contextual factors, such as the opening hours of donation centers and their proximity to potential donors.^{18,54} Introducing blood donation education into the formal curriculum is an important initial step in encouraging donor behavior. However, to achieve full engagement, this must be complemented by policies that enhance both the competency (e.g., blood donor iron management⁵⁵) and opportunity to donate (e.g., centers opened in easily accessible locations^{56,57}).

Finally, the reception of such an initiative may vary significantly depending on the educational system (centralized with limited teacher autonomy or decentralized with greater flexibility),⁵⁸ its overarching goals (whether

focused on economic efficiency or holistic personal development),⁵⁹ and the prevailing personal and institutional philosophies (e.g., utilitarian, essentialist, holistic).⁶⁰ Different stakeholders may perceive the introduction of blood donation education as an opportunity, a burden, or a challenge. Our aim with this commentary is to invite reflection and consideration of this initiative. We believe that extended discussions among all stakeholders (students, educators, parents, blood establishments, etc.) should be organized as part of developing a codesigned intervention and implementing such a change.^{61–63} Our perspective is that if the role of the education system is to develop well-rounded members of society, we must go beyond traditional academic subjects. Schools already teach children the responsibility to safeguard essential resources like water, air, and the earth, instilling values of sustainability and environmental stewardship. It is time to expand this understanding of essential resources to include blood products. Due to their critical role in healthcare, blood, like clean air and water, is essential for life, and the well-being of our society depends on maintaining a sufficient and diverse supply. By raising awareness of blood product donation through formal education, we can cultivate generations that recognize blood donation as a civic responsibility, thereby contributing to the health and well-being of our communities.

CONFLICT OF INTEREST STATEMENT

No conflict of interest to declare.

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