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Article type : Congress Review

**Deferred and deterred: A review of literature on the impact of deferrals on blood donors**

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This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/VOXS.12520](https://doi.org/10.1111/VOXS.12520)

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Running title: The impact of deferrals on blood donors

### **Acknowledgement**

All authors contributed to the conception and plan for the review. TD and CG conducted the literature search. TD drafted the manuscript, with critical revision from BM. The final version has been approved by all authors.

Australian governments fund the Australian Red Cross Blood Service to provide blood, blood products and services to the Australian community.

### **Conflict of interest statement**

The authors have no conflicts of interest to declare.

### **Abstract**

**Background** Potential blood donors can be deferred due to concerns about the impact of the donation on their health or the safety of the blood supply. To date we lack a comprehensive review of the impact of deferrals on donors and how to mitigate adverse effects.

**Aims** The aim of this review was to describe the available literature on deferrals, with a focus on the impact of deferrals on donors' subsequent behaviour, potential reasons for impact, and the effectiveness of strategies to improve deferral processes and facilitate donor return.

**Method** A narrative review of the literature on blood donation deferrals was undertaken.

**Results** Deferral rates vary widely across different contexts, with female, younger, first time, and minority donors more likely to be ineligible to donate. There is clear evidence that deferrals impact on future donation behaviour, particularly for those deferred at their first donation attempt. Deferral has a negative emotional impact if the deferral is permanent or

related to positive test results, while emotions experienced at the time of a temporary deferral are related to donors' willingness to return.

**Conclusion** An understanding of the impact of deferrals from the donor perspective provides key information to improve the blood centre practices. There is preliminary evidence of the effectiveness of strategies to retain donors, including enabling the ineligible donor to make an alternative contribution, providing clear information about the deferral, notifying the donor when they can return to donate, and addressing practical barriers to return.

### **Key words**

Blood donors, deferral, ineligibility

### **Background**

Around the world, blood centres rely on people voluntarily presenting to donate their blood to save the lives of others. However, in some cases, would-be donors are assessed as ineligible to donate – either to protect the safety of the blood supply or to protect the donor's health – and they are turned away. While we most often think of deferrals occurring onsite when donors present to the blood centre, blood centres in many countries engage in telephone or online eligibility screening prior to the donation, which reduces the rate of on-site deferrals. In addition, a small proportion of donors are deferred post-donation, for example, following a positive blood test result. Most donors receive a temporary deferral and are free to return at the end of their period of ineligibility, which typically lasts from a few days to a few months. However, some donors find themselves permanently excluded from blood donation.

Over the past ten years, a substantial number of analyses have been published describing the number and types of deferrals applied within individual blood centres, across multiple sites within an individual jurisdiction, or at the national level. In addition, researchers have explored the impact of deferring donors on the available blood supply, by documenting the poor return rates of donors who receive a temporary deferral. However, to our knowledge, there is no previous review of this literature. Given the impact of deferrals on donor retention there is a clear need for a review of research to determine how and why deferrals affect

impact donors and how blood centres might improve deferral practices to encourage retention.

## **Aims**

In the context of data that documents the rates of deferral in various settings, this paper aims to review the existing literature on donor deferrals, with a particular focus on what is known about the impact of receiving a deferral from the donor's perspective and opportunities to mitigate the negative impact of deferral on donors' return behaviour.

## **Method**

A narrative review approach was adopted. Relevant research papers from journals were identified through an online search on Google Scholar, using search terms 'donation/donor' and/or 'blood', and 'defer/deferral/deferred', as well as existing literature on donor deferrals known to the authors. Reference lists of all selected papers were also examined for additional research reports. Papers were included if the including content relevant to (i) rates and types of deferrals, (ii) the impact of deferrals on donors, or (iii) interventions to mitigate the impact of deferrals on donors.

## **Results**

### **Rates and types of deferrals**

Deferral rates vary substantially between different types of donations and across different settings. While most research has focused on deferrals from whole blood donation, available data indicate that deferral rates for plasmapheresis are substantially lower<sup>1</sup>. Across regions and settings, reported deferral rates for whole blood donors have ranged from 4.3% in Saudi Arabia<sup>2</sup>, to 7.9% to 11.1% in Germany and the Netherlands (median = 9.9%)<sup>1,3,4,5</sup>, 10.4% in sub-Saharan Africa<sup>6</sup>, 7.0% to 16.8% in the US (median = 13.4%)<sup>7,8,9,10,11,12,13</sup>, and 14% in Japan<sup>14</sup>. However, substantially higher deferral rates have also been reported elsewhere, including 22.5% in Brazil<sup>15</sup>, 30.9% in Iran<sup>16</sup>, and 35.6% in Trinidad and Tobago<sup>17</sup>. In India, there is a wide range in deferral rates, from 2.5% to 33.0%, although most studies report low figures (median = 6.2%)<sup>18,19,20,21,22,23</sup>.

While the published literature suggests substantial variability in the overall likelihood of receiving a deferral, there is more consistency in the types of deferrals that are applied. In the majority of reports, low haemoglobin is the most commonly applied deferral, for example,

representing 62.6% of deferrals in one metropolitan area of the U.S.<sup>12</sup>. Donors with indications of an infectious disease (e.g., high temperature, sore throat, feeling unwell), abnormal blood pressure or pulse, or who have recently travelled to a country with endemic malaria, are also commonly deferred. There are some deviations from these broad trends, with high-risk sexual activity the most common deferral type in Trinidad and Tobago<sup>17</sup>, as well as local variation. For example, medication use was the most common deferral type in coastal South India<sup>23</sup>, but alcohol use was the most common deferral applied in central India<sup>20</sup>.

Variation in the number and types of deferrals is likely the result of several factors, including differences in the risk profiles of local donor populations and jurisdictional disparities in eligibility criteria. While it has been suggested that higher deferral rates are found in donor populations of majority replacement donors<sup>17</sup>, other authors have suggested that this doesn't account for the variation across setting<sup>15,16</sup>, and recommended international benchmarking of deferral practices to deferrals to address inconsistencies<sup>24</sup>. Interestingly, some studies report inconsistencies between centres within the same organisation in how deferrals are applied<sup>14,15,25</sup> or between individual staff members<sup>4</sup>. Such variability may reflect a degree of unwanted subjectivity inherent in determining eligibility to donate<sup>4</sup>. From the donor's perspective, inconsistency in the application of deferrals on separate donation attempts or between different staff members reviewing their eligibility on a single attempt (e.g., telephone operators, collections staff and medical officers) may be confusing or frustrating<sup>24</sup>, and may diminish their confidence in the organisation.

Researchers have also explored demographic factors that place donors at a higher risk of deferral. The literature consistently reports a higher deferral rate among female donors<sup>1,10,12</sup>. This is partly explained by the greater risk of iron deficiency in female donors of childbearing age, with Mast et al. showing that female whole blood donors in their U.S. sample were 11 times more likely than men to receive a deferral for low haemoglobin<sup>25</sup>. However, women are more likely to be deferred across multiple categories of deferral, not just low haemoglobin<sup>4,26</sup>. The reasons for this are unclear and warrant further investigation. Younger donors are also at a higher risk of deferral, with the risk of a deferral steadily decreasing with increasing age<sup>10,12</sup>. However, this age effect appears to vary with gender and deferral type, with deferrals for low haemoglobin increasing with age among men, but decreasing after menopause among women<sup>4,27,28</sup>.

In terms of other characteristics associated with deferral from blood donation, many papers report that first time donors are at a higher risk than repeat donors<sup>1,4,10,14,15,16</sup>. Repeat donors have already passed eligibility screening at a previous donation attempt. However, some studies did not find previous donation to be protective of low haemoglobin deferrals in particular<sup>4,10,28</sup>, as iron stores are depleted through repeat donation<sup>4,10</sup>. Finally, studies that considered donor ethnicity have reported a higher risk of deferral for African American, Asian and Hispanic donors compared to white donors in the U.S.<sup>10,12,25</sup>, with a similar finding of a lower risk of deferral in white donors in Brazil<sup>15</sup>. This increased deferral rate may be one of the factors contributing to the under-representation of people from ethnically diverse communities blood donor panels<sup>10,12</sup>: their attempts to donate are more likely to be unsuccessful.

### **The impact of temporary deferrals on subsequent donor behaviour**

Within the literature there is a growing understanding of how temporary deferrals impact on the likelihood of a donor returning to donate once again eligible. An early paper by Piliavin documented a poor return rate (2.8%) in a small sample of deferred first-time donors, compared to those who were not deferred (27.3%), although the difference in return rates between deferred and non-deferred experienced donors was not significant<sup>29</sup>. A subsequent study by Halperin et al.<sup>11</sup> reported lower return rates in deferred donors (62%) compared to a matched control group (80%). Those deferred donors who did return donated fewer units over the subsequent four-year follow-up period, indicating an enduring impact of deferral on donation behaviour.

Custer et al. tracked donors over a five year post-deferral period using data from a single US blood centre<sup>8</sup>. Consistent with Piliavin's analysis<sup>29</sup>, they reported that deferrals had a small impact on repeat donors (82% of deferred donors returned versus 86% of non-deferred donors), but a large impact on first-time donors (25% of deferred donors returned versus 47% of non-deferred donors). The vulnerability of first-time donor retention to the application of a deferral was also shown in India, with 2.8% of first time donors returning to donate following a deferral, compared with 36.2% of experienced donors<sup>22</sup>. Additional studies in the U.S.<sup>9,13</sup> and with Australian donors deferred for low haemoglobin<sup>28</sup> confirms the substantial risk of deferring first-time donors. Further, Custer et al.'s analysis also showed that application of a deferral at the first donation attempt results in these donors taking a longer

time to return to donate<sup>9</sup>. This is an important consideration given that rapid return in new donors is positively associated with long-term commitment to donation<sup>30</sup>.

There are several possible reasons why people deferred on their first attempt to donate are particularly vulnerable to the effects of a temporary deferral. Without a prior experience of donating successfully, they have not had an opportunity to develop a sense of mastery and competence in being able to donate blood, or to experience directly the positive benefits of donating (such as a feeling of ‘warm glow’<sup>31</sup>), both of which are associated with continued blood donation<sup>31,32</sup>. Further, repeat donors may have developed a sense of identity as a blood donor<sup>33</sup>, which could mitigate the adverse experience of being deferred. In a qualitative study of donors deferred for low haemoglobin, those with a stronger donor identity appeared more likely to return to donate<sup>34</sup>. In addition, first-time donors may also be more likely to over-estimate the likelihood that they will be deferred again at a subsequent donation attempt, or to misinterpret the deferral as permanent. Finally, first time deferred donors may have less positive views of the blood centre; while donors typically describe their interactions with collection staff positively, as noted by Custer and colleagues, “...the experience of deferral in first time donors may create a perception about the way blood centres treat potential donors that cannot be overcome” (p.1195)<sup>9</sup>.

Researchers have explored the effect of several demographic characteristics on post-deferral donor return. Lower return rates are found among donors born outside of the U.S. and non-white donors<sup>7,9,10</sup>, compounding the problem described earlier about the adverse impact of deferrals on minority representation in blood donation. Several U.S. studies have reported an effect of donor age, with younger donors at greatest risk of non-return<sup>8,9,10,13</sup>, while an Australian study found no age effect on the likelihood of donors returning following a deferral for low haemoglobin<sup>28</sup>. This latter study also found no gender effect, in contrast to finding from a U.S. study that men were less likely than women to return to donate after being deferred<sup>13</sup>. The gender effect appears variable, with another U.S. study finding that among first time donors, males were less likely to return, while among repeat donors, males were more likely to return<sup>8</sup>. Adding to the complexity, Custer et al. reported that men were more likely to return following most deferrals than women, but less likely to return after deferral for travel to malaria-endemic areas<sup>9</sup>.

As indicated by the latter study, the specific nature of the deferral appears to be important in understanding its impact on the subsequent behaviour of donors<sup>11</sup>. To illustrate, Custer et al.

found that donors returned more quickly following a deferral for low haemoglobin, and more slowly for tattoo and piercing deferrals<sup>9</sup>. Overall, deferrals designed to protect the health of donors had a weaker impact on donor return than those designed to protect the recipient of the blood. Consistent with this finding, Zou et al. found the lowest return rate among donors deferred for blood-borne pathogen risk, followed by deferral for miscellaneous blood exposure or malarial risk, while more donors returned after deferral for general donor safety<sup>13</sup>. Of note, Custer et al. found that deferral type was an important consideration in repeat donors only; repeat donors were less likely to return to donate following a longer period of ineligibility, while all deferrals had a strong adverse effect on the return of first-time donors<sup>8</sup>.

### **Why does a temporary donation deferral affect donor behaviour? Considering deferral from the donor's perspective**

Although it is well-established that deferrals negatively impact donors' subsequent donation behaviour, little research has examined why this occurs, and the donor perspective remains a critical, but largely overlooked factor. Several authors have speculated on the reasons for the impact, proposing aspects such as a negative emotional impact<sup>1,8,11</sup>, disruption of habit<sup>34</sup>, confusion regarding eligibility, for example believing the deferral is permanent<sup>10,34</sup>, and a concern about being deferred again<sup>8</sup>. Piliavin suggested that some reluctant donors may feel 'off the hook'<sup>29</sup>, while altruistic donors may feel rejected, disappointed, or annoyed at their time being wasted<sup>29,34</sup>. A qualitative study has described the impact of a haemoglobin deferral on donors<sup>34</sup>, with one donor avoiding returning to donate due to fear of being refused again, while others indicated that the deferral had altered their perceptions of themselves as healthy and capable. Some donors described negative interactions with blood centre staff, and felt that the explanations given for the deferral were inadequate. Donors reporting such unsatisfactory treatment appeared less likely to return to donate. However, the authors suggested that any negative emotional reactions appeared to be short-lived and not clearly related to subsequent donation behaviour.

Despite many authors proposing that donors respond to an unsuccessful donation attempt with negative affect<sup>11</sup>, few researchers have tested this assumption empirically. Gemelli et al. interviewed in-centre and telephone-based staff who apply deferrals, who reported that donors commonly respond in ways that suggest they feel angry, frustrated, rejected, or disappointed<sup>35</sup>. However, when donors were surveyed a few days after being temporarily



deferred from donation, only a minority recalled feeling high levels of these negative emotions at the time of being deferred. Negative emotions were particularly low among those who had been deferred during a pre-donation telephone screen, supporting the importance of identifying ineligible donors before they present to donate in person. Importantly, among those who were deferred on-site, higher levels of anger and lower feelings of calm at the time of the deferral were associated with a lower intention to return to donate again. Thus, while only a minority of deferred donors reported a highly adverse emotional response, the findings suggest the importance of blood centre staff addressing donors' psychological needs in order to maintain their willingness to donate again.

The intensity of a donor's negative emotional reaction to being deferred likely varies with the permanence of the deferral and/or the implications of the reason for the deferral for the donor's own health. To illustrate, Whittaker et al. documented strong negative emotions among permanently deferred donors in Canada, including fear and anger, and feelings of stigmatisation and rejection that endured over several months<sup>36</sup>. Delage et al. reported that donors who were deferred following false-positive screening test results recalled feelings of moderate distress experienced at the time of the notification, which fell to low levels at the time of the survey one month later<sup>37</sup>. In contrast to Whittaker's findings<sup>36</sup>, the authors suggested that these donors became 'reconciled' with their deferral status over time<sup>37</sup>. Another study reported that 75% of donors recalling feeling upset at the time of a notification of a reactive or abnormal disease screening test result, with 36% of donors still feeling upset at the time of the survey<sup>38</sup>. Taken together, the existing literature suggests that the extent to which donors experience highly negative reactions varies with the time at which they are notified of their ineligibility to donate (before presenting, onsite, or post-donation) and the (potential) implications of the deferral for their own health.

While most studies measuring the impact of deferral have relied on donor self-report, a study in the Netherlands examined blood pressure, as an indicator of stress, in repeat donors who had been deferred at their previous donation attempt<sup>5</sup>. The authors reported that an earlier experience of deferral was associated with a small but significant increase in whole-blood donors' pre-donation blood pressure at the next donation. This effect was described as an anticipatory stress response to the negative experience, but notably, a deferral had a smaller effect than a previous experience of fainting or dizziness, and no effect on blood pressure was found in plasma donors.

There are several indications in the literature of confusion or misunderstanding of donation deferrals among donors. Confusion appears to very high among donors receiving test notifications<sup>38</sup> and among permanently deferred donors<sup>36</sup>, but is also reported in broader samples of deferred donors<sup>34</sup>. In qualitative research with lapsed donors, several people incorrectly viewed themselves as permanently – rather than temporarily – deferred<sup>39</sup>. Of concern, given the high rates of confusion, only a minority appear to contact the blood centre for more information<sup>38</sup>.

### **How can blood centres mitigate the impact of deferrals on donors?**

The studies reviewed suggest a number of promising avenues to improve deferral practices, including the development of communication strategies to facilitate calmness among donors during the deferral conversation. Clear information for donors about the nature of the deferral, their eligibility, and when they may be eligible to return is required<sup>12</sup>. Targeted re-recruitment efforts after the deferral has expired<sup>8,10,12</sup>, ideally soon after the donor becomes eligible again<sup>28</sup>, has also been recommended.

Despite these recommendations, there are only a few studies evaluating the impact of strategies to improve deferral practices on donor return. Clement et al. tested several approaches to improving the experience of being deferred<sup>3</sup>. They found high return rates among donors who were provided with a new appointment card designed to increase their commitment to return (71% return rate within 4 months of becoming eligible), compared to donors who received a thank you gift for their attempt to donate (52-53% return rates). Another promising strategy was inviting donors to do an alternative good deed, i.e., paint a picture for children in hospital (73% return rate), which the authors suggested helped donors to achieve the hoped-for feelings of warm glow on the day of the attempted donation.

This positive effect of allowing deferred donors to do something else when they cannot donate blood to help others has also been more broadly documented. Waller et al. found that 96% of surveyed Australians who were permanently deferred due to risk of Creutzfeldt-Jakob disease (vCJD) responded positively to the idea of being able to donate blood for research<sup>40</sup>. Further, Masser et al. reported that the receipt of a deferral did not defer whole blood donors from being willing to convert to plasma donation<sup>41</sup>. These strategies enable deferred donors to remain engaged with the blood centre throughout the period of ineligibility and maintain their self-identity as a blood donor, which may facilitate their later return.

Other researchers have focused on improving the quality of information provided to deferred donors. Based on an assumption of high distress among donors who are deferred following false-positive test results, Delage et al. redesigned the information letters provided to donors, making it clear that they could still give blood if they returned negative results on additional tests<sup>37</sup>. While distress levels were no lower in donors receiving the revised versus the original letter, those receiving the new letter reported more positive views of the information provided and a better attitude towards blood donation, and were more likely to return to donate.

Early trials of interventions to encourage previously deferred donors to return to donate have been reported in three conference abstracts. Firstly, Noonan et al. found attempts to reactive these donors were largely unsuccessful, with only 20 donations resulting from 585 mailed letters (3.4%), none of which were first time donors<sup>42</sup>. In addition, only 3.8% of deferred donors contacted by telephone returned to donate. However, a second study found that telephoning donors soon after the deferral and asking them to either schedule an appointment or agree to another call at the end of their deferral period had more encouraging results<sup>43</sup>. Although the published abstract does not report the proportion of participants who responded positively, the authors indicated that the subsequent show rate for these deferred donors was higher than the blood centre's overall telephone recruitment show rate. A third abstract described a positive effect of telephone solicitation six months after the deferral, with the authors indicating that the rate of return doubled compared to an earlier control period<sup>44</sup>.

Considering more recent research, a study in India described a call back for donation that was applied at the completion of the deferral period<sup>22</sup>. The authors reported that 31.2% of donors returned to donate; however, data on typical return rates for deferred donors in that setting were not reported. A recent Australian study tested the effectiveness of an email or SMS communication to notify donors that their deferral period was ending and invite them to return to donate in a randomised controlled trial<sup>45</sup>. Overall, donors who received this message were significantly more likely to attempt to return to donate within four weeks of becoming eligible (18.3% attempted return rate) compared to a no-message control group (12.8%). The communication was most effective when received one week prior to the end of the deferral period.

Finally, Godin et al. tested an implementation intention intervention which sought to help donors overcome barriers to return after a deferral by asking them to make a concrete plan for their next donation<sup>46</sup>. This approach was tested with deferred donors at the time when they

were eligible to return and a blood drive was nearby, addressing barriers such as forgetting to attend, fitting the appointment into their schedule, and organising transport. First time donors who formed implementation intentions had a 19% greater likelihood of returning to give blood again.

## **Conclusion**

This narrative review did not aim to identify all published research documenting deferral rates, and a systematic review of this literature is warranted. Future collaborative research comparing deferrals across different countries using the same analytic approach would also be valuable to confirm similarities and differences in deferral rates. However, it is clear from the review that deferrals are commonly applied and have a substantial negative impact on donor behaviour and the maintenance of the blood supply. There are substantial costs associated with ineligible donors presenting to donate; both missing collections and lapsed donors need to be replaced<sup>1</sup>. Considering the impact at the national level, Zou et al. estimated that more than 3.7 million donors in the U.S. were lost following deferral over a six-year period<sup>13</sup>.

The research indicates that deferrals particularly affect those donors who are already more challenging for blood centres to retain, such as first-time, younger, and ethnically diverse donors. Many authors have called for improvements in the sensitivity, reliability and validity of eligibility screening procedures<sup>4,24</sup> or questioned the need to defer donors for some donation types, including blood pressure and pulse, age, tattoos and piercings, travel, male to male sexual behaviour, and vCJD<sup>13,24,47,48,49,50</sup>. Further, it has been argued that simplifying eligibility criteria and removing unnecessary restrictions on donors could improve their compliance with health screening and reduce confusion among both donors and blood centre staff, with positive impacts on blood safety<sup>48,49</sup>. Complex deferral criteria may also increase the likelihood of potential donors 'self-deferring', i.e., not presenting at a blood centre due to misperceptions that they are ineligible to donate blood<sup>52</sup>. Further research is required to quantify the understanding of eligibility to donate within the general community.

While these debates continue, we need greater focus on how to minimise the impact on donors who are deferred. Further research is required to develop and evaluate improved processes for use at the point of deferral, including sensitive communication strategies that enable donors to understand and accept the reason they cannot donate at that time, as well as new mechanisms to keep them engaged throughout the period of ineligibility. Evaluations

should address the methodological limitations of much of the earlier research, for example, by using a randomised controlled trial or cluster randomised trial design. Collection of follow-up behavioural data is recommended, to determine the effect of these strategies on donor return, as well as data on the underlying mechanisms targeted by the interventions, such as donor attitude, affect, or knowledge of deferrals, to improve our understanding of the most effective donor management practices. The emergence of evidence to support reactivation strategies also provides blood centres with cost-effective mechanisms to bring these donors back once they are eligible. Further research refining these approaches for key donor segments, with cost-benefit analyses, may encourage take-up of these practices.

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