Donor Research in Australia: Challenges and Promise

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Keywords

Donor research · Blood services · Collaborative research

Summary

Donors are the key to the core business of Blood Collection Agencies (BCAs). However, historically, they have not been a focus of research undertaken by these organizations. This model is now changing, with significant donor research groups established in a number of countries, including Australia. Donor research in the Australian Red Cross Blood Service (Blood Service) is concentrated in the Donor and Community Research (DCR) team. Cognizant of the complex and ever-changing landscape with regard to optimal donor management, the DCR team collaborates with academics located at universities around Australia to coordinate a broad program of research that addresses both short- and long-term challenges to the blood supply. This type of collaboration is not, however, without challenges. Two major collaborative programs of the Blood Service's research, focusing on i) the recruitment and retention of plasmapheresis donors and ii) the role of the emotion pride in donor motivation and return, are showcased to elucidate how the challenges of conducting collaborative BCA research can be met. In so doing, these and the other research programs described herein demonstrate how the Blood Service supports and contributes to research that not only revises operational procedures but also contributes to advances in basic science.

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The Importance of Donors and Donor Research

Donors are the key to the core business of blood collection agencies (BCAs). Despite significant advances in the science of blood substitutes [1], it remains the case that without donors there is no blood to be collected and no need for BCAs. Yet, donors have been comparatively neglected in transfusion medicine research [2]. With a few notable exceptions [3, 4], the period up to the year 2000 saw transfusion medicine make substantial advances in the application of blood products, yet there was little evidence of a move towards a sophisticated understanding of the motivations of individuals to provide those products on which transfusion medicine depends. That is, the primary focus of BCAs and researchers was not on what motivates individuals to become, and remain, blood donors. This led Stephen and colleagues [5], in a review of the Australian blood banking and plasma product sector, to state: 'although there is a considerable body of literature on donor motivation, much of it is of poor quality' (p. 68).

In the decade or so since that report, there has been a substantial increase in the volume of high-quality research undertaken on donor recruitment and retention. While descriptive survey research dominates [6], experiments [7, 8] and randomized controlled trials [9, 10] are also being conducted to determine effective ways to recruit and retain donors. This refocus on donors comes at a time when research questions are increasingly complex. In Australia, and is the case worldwide, there is a shift in demand away from whole blood towards plasma [11, 12]. Specifically, in Australia, the forecasted decline in red blood cells (of 3% in 2013/2014, 2% in 2015/2016 before plateauing in 2016/2017) is contrasted with a 5% annual increase in plasma targets and a predicted constant demand for platelets through 2016/2017. This means that the recruitment and retention of donors to a single panel is no longer an optimal strategy for many BCAs [13]. Rather, BCAs now need to manage their donors to supply various blood products as demanded [14]. As such, the research agenda in donor research is broadening.

Collaborative Approaches to Donor Research

In response to this, many BCAs now actively invest in donor research. Successful donor research collaborations between BCAs and researchers take a variety of formats. One method is for BCAs to establish an internal donor research division. Sanquin, a BCA in the Netherlands, adopts this approach with their research division employing 120 researchers [15]. Within this division, the Donor Studies section employs social and behavioral scientists to investigate donor recruitment, retention and management [15]. This integrated model has resulted in high-quality research, characterized by high participation rates. Research from the Donor Studies section has, amongst other achievements, quantified retention rates following first-time donor adverse events, predicted deferral rates due to low hemoglobin, explored the impact of educational level and other cultural factors on blood donation behavior, and identified predictors of plasma panel membership [16–19].

BCAs in the USA and Canada take a different approach. Some BCAs have formed productive collaborations with university research laboratories and institutes. For example, Professor Christopher France's laboratory, located at Ohio University, conducts research with the operational support of the Community Blood Service of Greater Kansas City [20] and the American Red Cross [20, 21]. These BCA-university collaborations have advanced our understanding of how recruitment information can be tailored to optimize donor recruitment through modified recruitment brochures and interactive online donor preparation materials [21, 22].

In Canada, Professor Gaston Godin of Laval University has collaborated extensively with Hema-Quebec, a BCA independently serving Quebec province's blood product needs [6, 9, 23]. Further, and in conjunction with the Social Sciences and Humanities Research Council of Canada, Hema-Quebec co-funds a Research Chair on the Social Aspects of Blood Donation at the National Institute of Scientific Research (INSR). Professor Johanne Charbonneau currently holds this chair. This co-funding arrangement has enabled substantial advances in our understanding of the influence of family on donation decisions and explored motivators and barriers to recruiting donors from ethnic minority groups [24–26]. These dynamic collaborations between BCAs and university researchers in Europe and North America have resulted in substantial, important contributions to our basic scientific understanding of donor characteristics, motivations, and behaviors.

Donor Research in Australia

In Australia, the Australian Red Cross Blood Service (hereafter, the Blood Service) has an internal donor research group that collaborates extensively with university-based researchers across Australia. These collaborations began in response to the review of the extant knowledge about donors

and donor behavior by Stephen et al. [5]. The review highlighted 'a need for strategic research partnerships between the ARCBS and academic units' (p. 69) [5]. The Blood Service responded by investing in the foundations of the Donor and Community Research (DCR) team located within the Research and Development division of the Blood Service. As of early 2014, the DCR team comprises two postdoctoral research fellows and five research assistants led by a Program Leader. The group conducts high-quality research that results both in academic output and revisions to standard operating procedures within the Blood Service with the ultimate aim of ensuring a sustainable and safe supply of blood products within Australia.

A diffuse 'hub and spoke' model characterizes the Blood Service's collaborative research. The Blood Service serves as the 'hub,' with 'spokes' reaching out to many Australian universities. This model allows the Blood Service to benefit from the expertise of researchers at the forefront of relevant disciplines such as psychology, education, marketing, economics, statistics and public health. This model also gives the Blood Service the opportunity to lever additional funding from the Australian Government, through the Australian Research Council's Linkage Project grant scheme (which involves financial contributions both from an industry partner and the government) as well as through university-based funding schemes.

The DCR investigates two broad areas – first, understanding donors in the context of their (potential) interaction with the Blood Service, and second, supporting donor recruitment, retention, and reactivation. Some of the projects in these topics are detailed below.

One key focus of the research centered on understanding donors' interactions with the Blood Service has been on understanding how (potential) donors from emerging cultural minority groups interact with the Blood Service. While donation rates from established migrant groups (e.g., those from Europe and Asia) are broadly satisfactory, the donation rate of members of emerging migrant groups (e.g., Africa) has been identified as less than optimal [27]. Working alongside the DCR team and funded jointly by the Blood Service and the Australian Research Council, researchers at Deakin and Monash Universities are developing and evaluating a culturally adaptable social marketing intervention to increase blood donation rates among African migrant communities. This research builds on prior work on inhibitors and motivators of blood donation within this group [27–29]. This research will contribute to a sustainable blood supply in terms of rare blood types found in individuals from these communities [30].

Collectively, donor recruitment, retention, and reactivation comprise the second key area of research for the DCR team. To maintain a cost-effective sustainable blood supply, it is critical for BCAs to maximize donor retention [31, 32] and reactivate those who lapse. Within this area, the DCR team collaborates with university researchers to examine affective influences on donor retention [7], the initiation and mainte-

nance of plasma donation [33–35], the role of social media in donor retention, and the effectiveness of a critical blood donation registry.

Challenges to Collaborative Research

Research within these topics comprises programs that address the different needs of those involved in the collaboration. However, conducting research with donors remains a challenge. BCAs have traditionally focused on manufacturing and, as such, many established internal processes and systems are ill-suited to conducting social and behavioral research.

Challenge 1: Balancing the Tension between Operational Outcomes and Contribution to Science

The historical focus of BCAs on manufacturing highlights a fundamental tension for applied researchers – that is, how to conduct scientifically rigorous research that contributes to basic knowledge in a timeframe that allows the outcomes to be relevant to the ever-changing operational demands of industry partners such as BCAs. Within this context, academic researchers must demonstrate how basic scientific findings can be applied to the day-to-day operations of a BCA. Further, programs of collaborative research need to be structured in such a way as to allow incremental outcomes that can be disseminated both internally at the BCA to inform operations and externally via academic journals and other professional outlets.

Challenge 2: Adaptability of Research Questions to Current BCA Needs

The landscape of blood donation research is constantly shifting – thus collaborative research needs to be able to adapt when the need arises. One aspect of this challenge is the rapidity with which research answers can be obtained. Often, BCAs require donor research that can provide a ‘quick’ answer to a particular operational question. While research to address such questions has traditionally fallen within the remit of marketing and ‘test and learn’ procedures [36], this kind of research question can also be answered effectively by research and development teams.

Challenge 3: Conducting Research within the Complex Research Environment of Donor Behavior

Challenges in conducting research with blood donors also occur in relation to the form and methodology of the research, particularly in the domain of participant recruitment. A balance must be reached between protecting donors from burdensome contact (which may drive them away from the BCA) and the desire to recruit them into research. In the Australian context, donors are protected from excess contact by a donor contact process that requires checks of the eligibility of donors for recruitment prior to approaching them to participate. Further, research on ‘in-center experience’ (as

with the research on donor pride detailed below) raises practical challenges with regard to collecting data from donors in often space- and time-constrained donor centers.

Another challenge is the handling of donor data. As recent research suggests question-behavior effects in donor research [6, 9, 31], it is important not only to model measured constructs amongst the recruited donor sample but also to compare behavior of the recruited sample to a matched donor sample who did not participate in the research. Fortunately, collaboration with a BCA enables this type of comparison, as BCAs maintain detailed donor records. Finally, challenges arise with regard to the ‘duty of care’ of donor behavior researchers. This is best illustrated with regard to reporting of adverse events (AEs) [37]. BCAs have a strong and appropriate desire to track and record donor AEs, not only for protective care reasons but also because AEs predict donor return [38, 39]. Because of this, collaborative research teams who assess donors’ self-reports of AEs (e.g., via the BDRI) [40] must decide upon procedures and practices that ensure proper back-reporting to donor care teams.

Two recent projects arising out of collaborations of the Blood Service with the University of Queensland, exploring plasma donation, and the University of New South Wales, exploring pride as motivation for whole blood donation, demonstrate how these challenges can be met. In describing these projects, we highlight how we have handled such challenges in both a creative and dynamic manner.

Research Focus – Initiating and Maintaining Plasma Donation

While much has been written in the transfusion medicine journals on plasma and platelet apheresis, the typical focus has been on the physiological effects of donating [41, 42]. For BCAs operating in voluntary, non-remunerated contexts, there is no established literature on what motivates donors to become and remain plasma and/or platelet donors. In contexts such as these, behavior and decision-making theories are critical tools [43]. Adopting and augmenting the current dominant theoretical framework in blood donor research (the Theory of Planned Behavior; [44]), Barbara Masser at the University of Queensland and colleagues have undertaken a systematic program of research in collaboration with the Blood Service to understand the psychological antecedents of successful conversion of donors from whole blood to plasma donation. This research is co-funded by the Blood Service and the Australian Research Council, and employs a full-time research fellow located at the National Office of the Blood Service. The location of the research fellow in the National Office allows for full integration of the research within standard Blood Service operation as well as allowing for the fast dissemination of key findings– challenge 1.

The aim of this research program is to understand plasma donation from the donor's perspective [33–35, 47] and to identify factors that predict whether whole blood donors become plasmapheresis donors [34, 45]. Current research within this program is focused on identifying factors that promote flexible donor loyalty – that is retention in the context of being willing to move between panels [47]. This re-orientation away from the originally planned focus on plasma panel retention is in direct response to an emerging need to balance short- and long-term demand and supply [14] – challenge 2. In line with the recommendations of [8], an intervention to promote flexible loyalty will be developed and evaluated in a field experiment.

This program of research has already yielded insight into donors' perspectives on plasmapheresis and has contributed to revised operating procedures. Bove et al. [36] determined that the key trigger to conversion to plasmapheresis was a personal request to convert. As a result of this, standard Blood Service plasmapheresis conversion practices now frequently include personal approaches to donors – challenge 1. Bagot et al. [30] identified key deterrents to conversion and provided preliminary strategies for agencies to recruit and retain to the plasmapheresis panel. These recruitment strategies were further clarified by Bagot et al. [47] who identified that the key ingredients to successful 'conversion conversations' are that they occur early in the donor's whole blood career, are donor-centric, and are, whenever possible, donor-initiated.

In line with the aim of contributing to both basic science and operational practice, Masser et al. [45] suggested a more complicated role of donor (role) identity in plasmapheresis donation than previously assumed. The development of a donor identity has frequently been promoted as the ultimate end goal [3, 48]. Those who view their role as a donor as an important part of their self are inherently motivated to keep donating. However, Masser et al. [45] found donor role identity to be a significant negative predictor of intention to convert. Masser et al. [45] suggested that, for current whole blood donors, plasmapheresis was a behavior incongruent with their whole blood donor role identity, and recommended that BCAs encourage donors, through the use of strategic agency cues, to extend their sense of personal responsibility to encompass all forms of donation – challenge 1.

While descriptive research using survey methodology is important in contexts where knowledge is under-developed, such as plasmapheresis, there is also a pressing need to show causal relationships. To this end, experiments are invaluable. However, experiments are difficult to conduct in applied settings, particularly in field settings that are heavily regulated such as donor centers, and can be costly in terms of participant hours – challenge 3. The DCR team at the Blood Service actively supports research involving tightly controlled laboratory studies augmented with field research, as in this project on plasma donation. Further, this type of collaboration with the Blood Service allows for the access to objective data on subsequent donation behavior, eliminating problems associated with self-report data – challenge 3.

Research Focus – Pride and Donation Motivation

Most research on the psychological antecedents to donation has focused on donors' cognitions about donating. Recently, research has begun to explore the role of emotion in blood donation decision-making. For example, fear, anxiety, and regret all impact donor intention and behavior (see [49, 50] for recent meta-analyses). In line with this trend, Lisa Williams at the University of New South Wales commenced a project with the Blood Service in 2012 investigating the role of pride in motivating and maintaining blood donation.

Pride stands as a strong candidate for a source of blood donation motivation. Pride arises from situations of success across a wide range of domains (e.g., academic, career, and athletic). Most relevant to blood donation, pride also arises from performance of moral behaviors. Feelings of pride motivate future goal-directed behaviors aimed at achieving future success and/or having success recognized by others [51, 52]. Further, just as anticipating a joyful outcome can elicit anticipatory happiness [53], contemplating a future success can elicit anticipated pride.

Combining a longitudinal study of donors recruited in-center with a laboratory-based experimental study of anticipated pride, a new program was developed to cultivate an empirical understanding about the role of pride in motivating blood donation. This program of research had the concurrent aim to inform the Blood Service's future donor communication strategies – challenge 1.

Recruiting participants for longitudinal research present operational challenges for researchers and BCAs. For the longitudinal study in this project, donors were recruited in the refreshment area center post donation. Donors were asked to complete a survey immediately and three follow-up surveys online. Recruitment for this project was challenging as donors had to be recruited whilst avoiding impacting normal operations, and had to be willing to participate in multiple surveys investing significant amounts of their time – challenge 3. Another component of challenge 3 arose in this phase: reviewing and back-reporting of severe AEs. Even though these instances were extremely rare, and were corroborated by Blood Service staff at the time of donation, duty of care required that the research staff consistently reviewed participants' responses to the BDRI [40] and took appropriate action when needed.

The trajectory of a longitudinal study such as this is quite lengthy. Recruitment is time-intensive; it took 9 months to recruit 300 donors who completed all four surveys. The full dataset for each participant was finalized 6 months after the final survey date, in order to include objective behavioral data showing if, and when, donors returned to donate again. To facilitate outcomes for the Blood Service, data coding and analysis was done concurrently with data collection, thus allowing the project team to extract findings of key interest to the Blood Service as they became available – challenge 1. Approaches like this allow the Blood Service to implement operational changes on the basis of research findings as soon as possible.

The trajectory of the laboratory study also speaks to accommodating the changing operational needs of a collaborating BCA – challenge 2. At the commencement of this stage of the project, there was substantial interest from the Blood Service in identifying emotional responses to blood donation imagery and how those emotions subsequently affect donation intention. In response, the original experimental design was modified in three ways: i) a within-subjects design was adopted in order to account for person-specific variability in responses, ii) the experimental task was changed, so participants viewed images that varied along operationally relevant dimensions, and iii) future intentions to donate were measured. While the focus remained on pride, the scope of the project was increased to meet the current operational demands of the Blood Service. The project team then confirmed support from other divisions within the Blood Service (e.g., marketing), to facilitate design and launch of the laboratory study.

Across both the longitudinal and laboratory studies, flexibility and close collaboration have been the key to the success of this project. Further, support from a variety of divisions within the Blood Service, beyond the DCR team, has been an integral part to the project's success. For example, the longitudinal study would not have been possible without support from donor center managers and staff. As such, this project represents a vibrant collaboration that will produce rigorous findings relevant to the scientific community as well as providing operational tools for BCAs.

Conclusions

Reflecting international trends, donor research is now part of the core business of the Blood Service in Australia. Through strategic collaborations, the DCR team is able to fa-

cilitate a broad research program that addresses needs across the organization. Further, through a diffuse 'hub and spoke' model, the Blood Service levers significant academic contributions while minimizing internal costs. There are many challenges to conducting donor research in BCAs including i) balancing the tension between operational outcomes and contribution to basic science, ii) the need for research questions to be quickly adapted to ever-changing BCA needs, and iii) practical challenges emerging from attempts to conduct social and behavioral research with donors. As evidenced by the program of research on plasma donation led by Masser and the program of research on the motivational effects of pride led by Williams, these challenges can, however, be met. This allows researchers both within the Blood Service and external to it to contribute to advances in basic science and to operation. Cognizant of the different needs of the Blood Service, the DCR team and collaborators pursue research that allows an empirically based contribution to discussions and changes to procedure in response to both short- and long-term challenges to the blood supply.

Acknowledgements

This research was supported by the Australian Research Council (LP100100408) and the Australian Red Cross Blood Services (the Blood Service). We would like to acknowledge the Australian governments that fully fund the Blood Service for the provision of blood products and services to the Australian community.

Disclosure Statement

In producing this article the authors certify that they have no conflict of interest beyond the research funding and employment (Dr. G. Smith) declared.

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