

Experiences of knowledge translation among researchers in transfusion medicine: Findings from an international survey study

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Abstract

Background: Translation of research knowledge is critical to ensure transfusion medicine policies and practices reflect current evidence and so effectively support the health of blood donors and recipients, as well as ensuring ongoing blood supply. The aim of this study was to investigate the barriers and facilitators of knowledge translation (KT) among transfusion medicine researchers and determine what KT supports are needed.

Study Design and Methods: An anonymous, cross-sectional survey was distributed by emailing corresponding authors of papers in four major blood journals, emailing grant recipients in the area of transfusion medicine, posting on social media, and through an international blood operator network.

Results: The final sample included 105 researchers. Participants had a positive orientation toward KT, with few perceiving KT as not relevant to their research or beneficial for their careers. However, many reported facing difficulties practicing KT due to time constraints, competing priorities, or lack of funds or resources. Fostering relationships with stakeholders was seen as a key facilitator of KT but a number of researchers expressed difficulties engaging and communicating with them. Collaboration opportunities, protected time for KT, and access to KT resources were some of the supports researchers felt were required to help their KT efforts.

Conclusion: To minimize the knowledge to practice gap in transfusion medicine and ensure findings from research lead to improved outcomes, organizations need to support researchers in their KT efforts and facilitate interactions between researchers and research end-users.

KEYWORDS

blood, dissemination, knowledge mobilization, knowledge translation, research translation, researchers, transfusion medicine

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1 | INTRODUCTION

In transfusion medicine, a vast amount of research is conducted to address problems faced by blood collection agencies. A survey study¹ exploring research activities in transfusion organizations found that internal research is primarily driven by gaps in knowledge and operational need. Many transfusion organizations employ researchers and/or have formed strong linkages with academic institutions to support their research needs. Further, many who lead research and development programs acknowledge that investments made in research need to have identifiable returns.¹

As such, transfusion medicine has a high potential for knowledge to be translated into policy and/or practice. This pathway from knowledge to action is often referred to as knowledge translation (KT), defined as “a dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health-care system” (p.4).² For transfusion medicine, KT can refer to applying knowledge from basic sciences to produce new blood products, screening methods or devices, or embedding knowledge from research into the policy and practice of collecting, managing, and use of blood.

Researchers can play an integral part in the KT process by producing, communicating, and promoting the uptake of research findings.³ KT activities engaged by researchers may include developing and sustaining relationships with end-users, such as policy-makers, practitioners, and blood donors, and engaging them in the research process. Further, researchers can present research findings in a format tailored to end-users and ensure that they are accessible to this group.^{3–5} However, the ability of researchers to translate knowledge often relies more on the context in which they operate, including policies, structures, and resources for KT activities, rather than solely on the strength of the research evidence.^{4,6}

Little is known about how knowledge from research is being translated into policy and practice in transfusion medicine. Research outside of transfusion medicine has shown that KT is often sub-optimal, with fewer than 50% of clinical innovations ever being translated and taking 17 to 20 years to become routine practice, consequently denying, or delaying community access to effective services.^{6–10} The field of transfusion medicine does not appear to be immune to this problem. A recent review of vasovagal reaction literature showed that KT is in the early stages in this research area, with few studies published on the implementation or evaluation of evidence-based strategies in practice.¹¹ Failure to translate knowledge gained from research can result in missed opportunities to optimize transfusion medicine

policies and practices informed by current evidence. For example, incorporating strategies that have been found to minimize donor risk of vasovagal reactions can increase the number of completed collections, increase the size of the donor panel by preventing donor lapse, reduce donor risk of injury, and reduce costs to the blood collection agency due to preventing product waste, staff time, and efforts to maintain the donor panel.^{12–17} Therefore, it is important to investigate KT in the field of transfusion medicine to ensure that donors, recipients, collection agencies, and the broader community can benefit from the knowledge generated through research.

The aim of this study is to gain insights into the practice of KT among researchers working in transfusion medicine. We conducted an international survey among transfusion medicine researchers to determine barriers and facilitators of KT experienced by researchers, and to identify what supports researchers believe would help facilitate KT practice. In addition, we wanted to explore whether there are differences in KT experiences for researchers working in different areas of transfusion medicine, at varying stages of their careers, and in different work settings.

2 | MATERIALS AND METHODS

2.1 | Study design and procedure

Using a cross-sectional survey, data were collected and managed using REDCap electronic data capture tools hosted by The University of Sydney. Participants were recruited through five main strategies in May 2022. First, corresponding authors listed on articles published in the years 2019–21 in four well-known transfusion medicine journals (Transfusion, Vox Sanguinis, Transfusion Medicine, Blood Transfusion) were sent an email invitation to complete the online survey ($n = 1629$). Second, chief investigators who received a grant in the field of transfusion medicine from the Australian Research Council or the Australian and New Zealand Society of Blood Transfusion in the last 5 years (2017–22) and were not already included in the list of corresponding authors were emailed an invitation to complete the online survey ($n = 14$). Third, an invitation to complete the survey was distributed indirectly through public posts using the authors' personal accounts (A.T., B.M., T.D.) on social media platforms Twitter and LinkedIn. Fourth, the study invitation was circulated within the Alliance of Blood Operators by the International Services team at Australian Red Cross Lifeblood. Finally, the snowballing technique was applied by asking survey respondents and those who received the email invitation to forward the survey to other researchers

working in the field of transfusion medicine. A total of 1643 survey invitations were emailed directly to potential participants (corresponding authors and grant recipients) and a reminder email was sent 2 weeks after the initial invitation. Ethical approval to conduct the study was obtained from The University of Sydney (2021/854).

2.2 | Survey instrument

The questionnaire was informed by studies conducted with researchers, policy-makers, and practitioners on KT in other settings.^{18–22} It was piloted with three individuals working in transfusion medicine as a researcher or end-user. The pilot data was not included in the main study. Relevant survey measures, including demographic and work-related questions, can be found in the Supplementary Materials.

For the assessment of barriers, facilitators, and supports, the study team created statements based on the findings from a qualitative study exploring health researchers' experiences of practicing KT.²² Participants were asked to rate their agreement with 15 potential barriers to KT on 5-point Likert scales (1 = strongly disagree, 5 = strongly agree) following the question "What barriers have you faced when translating or attempting to translate your research findings?" The statements were followed by an open-ended question "Are there any other factors that hindered your ability to translate your research?" Facilitators of KT were captured using a multiple-choice question "What factors have you found support the process of translating research findings?," in which participants were able to select up to seven potential facilitators or to select "none of the above." This was followed by an open-ended question: "Are there any other factors that helped you to translate your research?" Supports for practicing KT were assessed using a multiple-choice question "What could be done to better support your engagement in practising research translation?" Participants could select up to five potential supports or the exclusive option "I don't need any support to translate my research." Participants were then asked an open-ended question: "What else could be done to better support you?"

2.3 | Statistical analysis

Statistical analyses were performed using statistical software IBM SPSS (IBM SPSS Statistics 28.0; IBM Corporation). For descriptive analysis, sample characteristics and survey items were summarized by medians (interquartile range) for continuous variables and by percentages for

categorical variables. In addition, responses to the 5-point Likert scale barriers items were collapsed into two categories for ease of interpretation in the descriptive analysis: affirmative (strongly agree, agree) or not affirmative (neither agree nor disagree, disagree, strongly disagree).

Univariate means testing was performed to determine differences by participant characteristics reported in facilitators and supports using chi-square goodness-of-fit, and barriers using independent *t*-tests and one-way analysis of variance (ANOVA). Significant effects were followed by post hoc Tukey's HSD tests to determine where significant differences occurred between groups. Participant characteristics examined were career stage, work setting, and research focus. To simplify the research focus and increase group size, the categories, "blood transfusion," "patient blood management," and "transfusion complications" were collapsed into a single category (blood transfusion), and "cellular therapy and tissue banking" and "transfusion-transmitted diseases" was merged with "other." Main work setting was dichotomized as academic (university, research institute) versus applied (remainder). Statistical significance was defined as $p < .05$.

3 | RESULTS

A total of 131 people responded to the survey. However, 20% ($n = 26$) did not complete the relevant survey sections, leaving 105 eligible responses available for analysis. An overview of the characteristics of the 105 study participants is presented in Table 1. The sample consisted almost equally of men (51%) and women (47%). Participants resided in 29 different countries, including Australia, the United States, the Netherlands, Canada, the United Kingdom, Cameroon, Argentina, Saudi Arabia, and South Korea (a detailed overview can be found in Table S1 in the Supplementary Materials). Most worked at a blood collection agency (34%), followed by a hospital setting (25%) or at a university (23%). Participants were quite experienced, with 44% having worked in the area of transfusion medicine for more than 15 years (range 1–50 years). The sample was diverse in their research focus and the type of methods they used in their research. A third (32%) reported having received some form of KT training.

3.1 | Barriers to knowledge translation

Participants were asked about the barriers they faced when translating or attempting to translate their research (see Table 2). The three systemic barriers were the most frequently endorsed: having too many competing priorities, not having the time, and not having sufficient funds

TABLE 1 Participant characteristics ($n = 105$).^a

Demographic variables	n (%)
<i>Gender</i>	
Man/Male	54 (51.4)
Woman/Female	49 (46.7)
Non-binary	1 (1.0)
Prefer not to say	1 (1.0)
<i>Main work setting</i>	
University	24 (22.9)
Research institute	9 (8.6)
Government department or agency	2 (1.9)
Blood collection agency	36 (34.3)
Hospital setting	26 (24.8)
Healthcare service (other)	1 (1.0)
Other	6 (5.7)
Missing	1 (1.0)
<i>Main research focus</i>	
Blood components	18 (17.1)
Blood donation	27 (25.7)
Blood transfusion	30 (28.6)
Immunohematology and blood genomics	11 (10.5)
Other	19 (18.1)
<i>Type of methods (MC)</i>	
Animal studies	10 (9.5)
Biospecimen analysis research	35 (33.3)
Data linkage research	30 (28.6)
Epidemiological research	44 (41.9)
Interventional/clinical trials research	35 (33.3)
Qualitative research	43 (41.0)
Quantitative research	51 (48.6)
Other	5 (4.8)
<i>Career stage</i>	
Years active in transfusion medicine	15 (9–25)
Early (1–5 years)	15 (14.3)
Mid-career (6–15 years)	41 (39.0)
Established (16–50 years)	46 (43.8)
Not specified	3 (2.9)
<i>Knowledge translation training</i>	
Yes	34 (32.4)
No	61 (58.1)
Unsure/Do not know	10 (9.5)

Abbreviation: MC, multiple choice.

^aYears active in transfusion medicine presented as median (interquartile range).

or resources to translate research. About a third of participants indicated experiencing difficulties translating research because of the current emphasis on training academics to conduct but not translate research, difficulties translating a very large body of evidence, and concerns that their research findings will not be applied or translated correctly. Organizational barriers were reported by a quarter of participants, with the highest-rated barrier in this category being not feeling supported by their organization/institution to translate their research. Further, one in five participants felt they lacked the skills or ability to translate research. On the other hand, fewer participants reported having concerns regarding intellectual property and commercialization. Finally, the three attitudinal barriers were not often endorsed.

Comparative analysis indicated significant differences in perceived barriers by research focus and work setting. First, those focusing on genomics experienced insufficient funds or resources for KT to a greater extent than those working in other areas of transfusion medicine (4.10 ± 0.74 vs. 3.11 ± 0.68 , $p = .020$), $F(4, 97) = 3.351$, $p = .013$. Second, those focusing on components experienced the concern that their research findings will not be translated correctly to a greater extent than those in transfusion (3.39 ± 1.09 vs. 2.53 ± 0.86 , $p = .037$) or other areas (3.39 ± 1.09 vs. 2.42 ± 0.69 , $p = .027$), $F(4, 100) = 3.154$, $p = .017$. Third, those focusing on components experienced the concern regarding intellectual property and commercialization to a greater extent than those in donation (2.94 ± 1.09 vs. 1.93 ± 0.78 , $p = .009$) or genomics (2.94 ± 1.09 vs. 1.78 ± 1.09 , $p = .037$), $F(4, 91) = 4.163$, $p = .004$. Finally, compared to researchers working in an applied setting, those in an academic setting experienced difficulties translating a large body of evidence to a lesser extent (2.63 ± 1.04 vs. 3.19 ± 0.98), $t(93) = -2.602$, $p = .011$, and felt that translating research is not beneficial for their career to a greater extent (2.30 ± 1.05 vs. 1.84 ± 0.86), $t(101) = 2.358$, $p = .020$. No significant differences were found by career stage.

When asked if there are any other factors that hinder their ability to translate research, some participants commented on the “gap between research and practice” and that “the perception of two silos is probably the biggest barrier.” A few also mentioned experiencing barriers with end-users “not interested or willing to act on research findings” and feeling like they have limited power to change policy and practice without the support of management or senior clinicians. However, a few also reported a lack of interest in KT among (senior) researchers who they

TABLE 2 Agreement with barriers faced when translating or attempting to translate research^a.

	n (%)	Median (IQR)
Systemic barriers		
I do not have enough funds or resources to translate my research	53 (50.5)	4 (3–4)
I do not have the time to translate my research	55 (52.4)	4 (3–4)
I have too many competing priorities to translate my research	60 (57.1)	4 (3–4)
Individual barriers		
I am worried that my research findings will not be applied or translated correctly	32 (30.5)	3 (2–4)
I do not have the skills or ability to translate research	20 (19.0)	2 (2–3)
I experienced difficulties translating research because of the current emphasis on training academics to conduct but not translate research	36 (34.3)	3 (2–4)
Organizational barriers		
I do not feel supported by my organization/institution to translate my research	28 (26.7)	3 (2–4)
I do not know who is responsible for translating research	21 (20.0)	2 (2–3)
End-users (e.g., policy-makers, practitioners) do not understand the research	24 (22.9)	3 (2–3)
I do not know how to make contact with end-users (e.g., policy-makers, practitioners)	24 (22.9)	2 (2–3)
Logistical barriers		
I experienced difficulties translating a very large body of evidence	33 (31.4)	3 (2–4)
I have concerns regarding intellectual property and commercialization if I were to (attempt to) translate my research	16 (15.2)	2 (2–3)
Attitudinal barriers		
I do not have any interest in translating research	4 (3.8)	2 (1–2)
Translating research is not relevant to my research	1 (1.0)	2 (1–2)
Translating research is not beneficial for my career	8 (7.6)	2 (1–2)

^aRated as Strongly disagree (1) to Strongly agree (5). For frequencies, “Agree” and “Strongly Agree” pooled together as “Agree.”

thought believed that “*policy makers should do it themselves.*” Participants also felt they lacked experience in working with KT tools and did not know how to engage with end-users to facilitate KT. As one participant commented: “*There are really no organizational structures (guidelines/policies/roles/incentives) to bring different people together to work on research translation in the present context.*”

3.2 | Facilitators of knowledge translation

Participants were asked what they found supported the process of translating research findings (see Table 3), with the highest scoring facilitator being maintaining good relationships with end-users. Personal traits, including drive, passion, and enthusiasm, were also rated highly. More than half of the sample indicated end-users valuing research, access to resources such as funding and personnel, experience and training in KT, and working with trained communications personnel as facilitators of KT. Two out of five participants reported having clear

roles in translating research as a factor that supports the process of KT. Endorsement of the facilitators did not differ by research focus, career stage, and work setting.

When asked if there are any other factors that help them to translate research, one of the most frequently mentioned factors was ensuring their research aligns with the priorities of end-users and is seen by end-users as relevant to “*everyday problems.*” For example, one participant commented, “*Ensuring that the research proposal and plan is driven by needs of patients makes translation more likely.*” Participants also commented on the need for support from policy-makers as well as senior researchers and colleagues. Active stakeholder engagement was frequently mentioned, with one participant highlighting that they invested “*a lot of personal effort in learning about the end-user needs and how to communicate in their ‘language.’*” Others indicated that they worked with implementation researchers or created partnerships with specialist KT organizations. Finally, one participant mentioned “*fortunate timing*” as a facilitating factor and having the research ready to be translated when there is organization need.

TABLE 3 Selected facilitators and supports for knowledge translation.

	<i>n</i> (%)
Facilitators	
Maintaining good relationships with end-users (e.g., policy-makers, practitioners)	82 (78.1)
Personal traits including drive, passion, and enthusiasm	65 (61.9)
End-users (e.g., policy-makers, practitioners) valuing research	62 (59.0)
The ability to access resources for research translation such as funding and personnel	59 (56.2)
Experience and training in practicing knowledge translation	56 (53.3)
Trained communications personnel working on or alongside my team	56 (53.3)
Clear roles in translating research	44 (41.9)
None of the above	5 (4.8)
Supports	
Opportunities to collaborate through facilitated networks	72 (68.6)
More protected time to practice knowledge translation	68 (64.8)
Access to resources to increase awareness, promotion, and discussion of knowledge translation	61 (58.1)
Access to education and training	57 (54.3)
Recognition for knowledge translation efforts in promotion and tenure consideration	54 (51.4)
I do not need any support to translate my research	3 (2.9)

3.3 | Supports for practicing knowledge translation

When asked what could be done to better support their engagement in practicing research translation (see Table 3), most participants indicated opportunities to collaborate through facilitated networks. Participants also wanted more protected time to practice KT, access to resources to increase awareness, promotion, and discussion of KT, access to education and training, and recognition for their KT efforts in promotion and tenure consideration. Only a few participants indicated not needing any support to translate their research.

A significant difference was found in the proportion of participants who wanted access to education and training by research focus, $\chi^2(4) = 15.349$, $p = .004$. In particular, fewer researchers in the other category selected this support (26.3%) compared to researchers working in

components (88.9%), genomics (63.6%), donation (51.9%), and transfusion (50.0%). No further significant differences were found in supports by research focus, career stage, and work setting.

When asked what else could be done to better support them, a few participants emphasized the need for organizational support and organizational readiness for change. Some suggested having a dedicated KT department, whilst others wanted more training on KT and stakeholder engagement to translate the knowledge themselves. One participant commented on embedding KT in the research process to help clarify what resources, training, and involvement are needed from the outset: “*knowledge translation should be part of the whole research process from research proposal to study phase, reporting and other forms implementation.*”

4 | DISCUSSION

In order to provide optimal care to blood donors and blood recipients, it is crucial that knowledge gained from research is translated into policy and practice. This study is the first to our knowledge to investigate experiences of KT among researchers working in transfusion medicine. We identified barriers faced by researchers when translating or attempting to translate their research as well as exploring factors that have helped to facilitate KT and the supports needed to practice KT. Researchers working in different areas of transfusion medicine and at varying stages in their careers were relatively similar in their KT experiences indicating that many of our findings relate to the broader area of transfusion medicine.

The highest-rated barriers to KT related to systemic issues such as having too many competing priorities, lack of funding or resources or not having the time to translate research. These issues have also been identified by researchers working in areas outside of transfusion medicine.^{3,22,23} The selected supports reflect this need, with two of the highest-rated supports by our participants relating to more protected time and resources for KT. A recent survey found that protected time and a dedicated KT practitioner or team are perceived as the most effective strategies to support KT in pediatric health centers and research institutes.²⁴ Organizations can help facilitate KT by building capacity for researchers to engage in KT. One potential approach is to encourage researchers to develop a KT plan as part of their grant or project proposals to ensure dedicated funding, resources, and time for KT activities. Further, research funders or regulatory agencies can further facilitate KT by monitoring implementation outcomes, dissemination of knowledge, and advocating the importance of KT.²⁶

Maintaining good relationships with end-users was seen as essential by researchers to support the process of KT. However, almost a quarter of our participants expressed difficulties in contacting end-users or felt that end-users did not understand their research, with similar experiences reported across research focus area, career stage, and work setting. Further, some researchers reported a disconnect between research and practice, and perceived a lack of interest in research among end-users. This finding aligns with the experiences of researchers working outside of transfusion medicine who have expressed difficulties engaging policy-makers in their research without an existing relationship.²³ This is an important issue as end-user engagement throughout the research process has been found to improve implementation outcomes.^{27–29} Organizations can address this issue by establishing networks between researchers and end-users, by providing stakeholder engagement training to researchers, by upskilling end-users in research, and by encouraging or incentivizing the involvement of end-users in grant or research proposals.^{4,5} On the other hand, researchers can look to existing frameworks to assist with end-user engagement, such as integrated KT.^{25,30} By facilitating end-user engagement, the likelihood will increase that the knowledge produced is useful, usable, and therefore more likely to be translated.³⁰

A lack of support from their organization or institution to translate research was a key organizational barrier reported by researchers. Further, many researchers reported that they lacked the time to translate their research or felt they had too many competing priorities. Organizations can support researchers in their KT efforts by providing resources or structures to enable research evidence to become more accessible to end-users such as a database of plain English summaries or journal subscriptions.^{4,5} In addition, they can establish dedicated roles that facilitate research use, such as “knowledge brokers,” to connect researchers and end-users, and provide expertise in KT strategies.^{4,31,32} Further, organizations can provide training to build researchers’ KT capabilities as more than half of our sample wanted access to education and training. Organizations can also embed the value of research in their mission, vision, values, and strategic plan to further emphasize their support for KT.⁴ Studies have shown that having tools, resources, and systems to support research use in place is associated with greater use of research in policy and practice.^{4,33–36}

Opportunities to collaborate through facilitated networks were the most frequently selected support for KT desired by participants. Blood collection agencies and affiliated organizations can set up networks or use existing networks to connect researchers and end-users to facilitate the interaction between research and policy and

practice.^{4,5} Further, conference organizers could organize working groups where attendees can share their KT experiences. In addition, journal editors could put out a call for papers or even a special issue about KT in transfusion medicine to facilitate this exchange of knowledge.

The main strength of this study is the international perspective on KT in transfusion medicine it provides, as our survey was completed by people from a broad range of countries. However, there are a number of limitations. First, participants included in the sample were likely those interested in or with experience of KT. Our study invitations clearly indicated our research topic and researchers who did not perceive KT as relevant to their work or have any interest in KT may have opted out of participating. Further, the topic may have influenced the decision to stop completing the survey as some participants stopped after answering the demographic section. Second, our sample was relatively small considering the number of email invitations sent, the likely visibility of our social media posting, and potential forwarding of study invitations to colleagues. However, the sample was diverse in terms of participants’ locations, sex, research focus, career stage, and research methods used. Finally, the presentation of more barriers than facilitators as well as barriers being presented before facilitators may have prompted participants to engage in more cognitive elaboration about barriers than facilitators.

This study provides insights into researchers’ experiences of translating the knowledge gained from their research, and highlights strategies that can be used to facilitate KT in transfusion medicine. Few differences were found between research focus area, work setting, and career stage, indicating that our findings are reflective of the broader area of transfusion medicine. Ensuring appropriate support for researchers in KT will ensure that blood donors, blood recipients, blood collection agencies, and the broader community can optimally benefit from current evidence.

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CONFLICT OF INTEREST STATEMENT

The authors have disclosed no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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