CSIRO PUBLISHING

CORRIGENDUM
https://doi.org/10.1071/IB23109_CO

Brain Impairment ASSBI

# *Corrigendum to*: Healing Right Way randomised control trial enhancing rehabilitation services for Aboriginal people with brain injury in Western Australia: translation principles and activities

Neil Drew, Meaghan McAllister, Juli Coffin, Melanie Robinson, Judith Katzenellenbogen and Elizabeth Armstrong

This article corrects *Brain Impairment* **25**, IB23109
doi:10.1071/IB23109

The authors advise of an error in the title shown above and in the published paper.

The correct article title is: Healing Right Way randomised controlled trial enhancing rehabilitation services for Aboriginal people with brain injury in Western Australia: translation principles and activities.

Drew N *et al.* (2024) *Corrigendum to*: Healing Right Way randomised control trial enhancing rehabilitation services for Aboriginal people with brain injury in Western Australia: translation principles and activities. *Brain Impairment*, **25**, IB23109_CO.
doi:10.1071/IB23109_CO

CSIRO PUBLISHING

COLLECTION | BRIEF REPORT
https://doi.org/10.1071/IB23109

Brain Impairment ASSBI

# Healing Right Way randomised control trial enhancing rehabilitation services for Aboriginal people with brain injury in Western Australia: translation principles and activities

Neil Drew[A], Meaghan McAllister[B], Juli Coffin[C], Melanie Robinson[C], Judith Katzenellenbogen[D] and Elizabeth Armstrong[E,*]

For full list of author affiliations and declarations see end of paper

***Correspondence to:**
Elizabeth Armstrong
University Department of Rural Health South West, Edith Cowan University, Bunbury, WA, Australia
Email: b.armstrong@ecu.edu.au

**Handling Editor:**
Dana Wong

**Received:** 4 October 2023
**Accepted:** 21 March 2024
**Published:** 19 April 2024

**Cite this:** Drew N *et al.* (2024) Healing Right Way randomised control trial enhancing rehabilitation services for Aboriginal people with brain injury in Western Australia: translation principles and activities. *Brain Impairment* **25**, IB23109. doi:10.1071/IB23109



## ABSTRACT

**Background.** This report provides the theory, method and practice of culturally secure translation and knowledge exchange in the Healing Right Way Clinical Trial (2017–2022), outlining activities to date. Healing Right Way was a stepped wedge cluster randomised controlled trial conducted in Western Australia, aimed at enhancing rehabilitation services and quality of life for Aboriginal Australians following acquired brain injury. The trial translation plan was aspirational and action-oriented, with its implementation iterative and ongoing. Translational activities aimed to inform service and research planning for Aboriginal people with brain injury. Situated in the intercultural space, the work guards against undertaking activities that are monocultural, colonial and appropriating in favour of work that is authentically viewed through the dual lens of whiteness and Aboriginal and Torres Strait Islander ways of knowing, being and doing, and is strengths-based. **Methods.** Three translational and knowledge exchange components were identified, relating to the role of Aboriginal Brain Injury Coordinators, cultural training of hospital staff and the research process itself. Knowledge plans were developed for key audiences, with potential translation products to be monitored for ongoing impact. **Results.** Results demonstrate that translational and knowledge exchange were iteratively embedded throughout the trial life cycle. Data sources included community engagement, partnership meetings and interviews. Activities involved presentations to diverse audiences including bureaucrats, community and participants. **Conclusions.** This report provides a snapshot of the first translation knowledge exchange plan and activities constructed in relation to brain injury rehabilitation services for Aboriginal people. Challenges encountered, as well as successes to date, are discussed.

**Keywords:** Aboriginal, brain injury, implementation science, Indigenous, rehabilitation, stroke, translation and knowledge exchange, traumatic brain injury.

## Background

This paper outlines the theory, method and practice for ensuring the culturally secure and safe translation and exchange of the outcomes of the Healing Right Way Clinical Trial (2017–2022). It outlines a process for principled practice (Hodgetts *et al.* 2022) in knowledge translation and exchange (KTE) in cultural contexts and settings, and some strategies and actions to achieve authentic KTE. Healing Right Way was a stepped wedge cluster randomised control trial (RCT) aimed at enhancing rehabilitation services and quality of life for Aboriginal Australians following brain injury (stroke and traumatic brain injury). The impetus for Healing Right Way was an under-representation of Aboriginal people in brain injury rehabilitation services, despite brain injury being of relatively high incidence and of concern to many Aboriginal families (Armstrong *et al.*

Collection: Clinical Implementation to Optimise Outcomes

2015, 2021*a*; Bohanna *et al.* 2018; Esterman *et al.* 2018; Katzenellenbogen *et al.* 2018; Balabanski *et al.* 2020). It was based on recommendations for improving the cultural security of rehabilitation services for Aboriginal peoples with brain injury and their families interviewed throughout Western Australia (Armstrong *et al.* 2015, 2021*a*). The translation plan for the trial was aspirational, action-oriented and iterative and its implementation is ongoing.

Healing Right Way was conducted in Western Australia across eight hospital sites (four metropolitan, four regional) (see trial protocol Armstrong *et al.* 2021*b*). It involved multiple partners across the state including universities, health service providers including Aboriginal Community Controlled Health Organisationss (ACCHOs), policy and clinical guidelines planners and Aboriginal people with brain injury. The intervention package for Healing Right Way consisted of two components:

i. Cultural security training for hospital staff surrounding brain injury, including culturally appropriate educational and treatment resources
ii. The introduction of an Aboriginal Brain Injury Coordinator (ABIC) at each site. The ABIC saw the participants in hospital and up to 26 weeks post injury, providing education, support, liaison and advocacy services to the participants and their families.

The control phase of Healing Right Way began in February 2018 and was extended from an intended 6-month period to 12 months in order to ensure sufficient numbers of recruited participants. During this time, no site received the intervention package. Following the stepped wedge design, the intervention package was introduced at the first two hospital sites in February 2019 with a further two sites being introduced every 6 months until the package had been implemented at all sites. For further details, see trial protocol – Armstrong et al. (2021*b*), with final results to be described in a future publication. An ongoing *in situ* process evaluation of Healing Right Way was performed to provide valuable information to inform and refine the intervention within the confines of the trial protocol. Additional retrospective evaluation once the trial was completed allowed for interpretation of the outcomes of the intervention along with providing an opportunity to reflect on the lessons learned during the course of the trial (see Skoss *et al.* 2021 for protocol). The results of the process evaluation as well as an economic evaluation will be reported in future publications.

## Principled practice in knowledge translation and exchange research

Our approach to KTE is situated in the broad field of Implementation Science (cf. Beidas *et al.* 2022). It is so broad that it sometimes stymies efforts at enacting authentic knowledge exchange. Graham *et al.* (2006) identified 29 terms relating to the process of translating knowledge to action. By 2017 over 90 terms had been identified to describe the use of research knowledge (Jancey *et al.* 2017). A Google search in 2023 by the authors of this paper of the term 'Implementation Science' yielded 1,050,000,000 results and the term 'knowledge exchange' yielded 1,270,000,000 results. We live in a vast data ecosystem wherein the gap between what we know and what we do is far greater than the gap between what we know and what we don't know: the 'know do gap' (Bammer *et al.* 2010). The following provides a brief summary of how we negotiated this vast ecosystem to enact knowledge exchange in a complex cultural setting. The sheer weight of information available to us in the so-called information age can be overwhelming, and authentic translation and exchange practices must be able to 'cut through' the noise. Authentic KTE will help to close this gap.

Broadly speaking Implementation Science is the process of 'getting the research rubber on the road' (Drew 2015). According to the World Health Organization (2016), Implementation Science is the trial of how new learning from research may be used, embedded or implemented in 'real-life' settings. 'Implementation [science] is the constellation of processes intended to get an intervention into use within an organization' (Damschroder *et al.* 2009, p. 3). It is important too, to recognise that Implementation Science is a constellation of social processes within a complex social, cultural, economic and political context enacted in equally complex geographical, organisational and individual settings (Damschroder *et al.* 2009).

It is important to note, however, that the team did not start Healing Right Way with an implementation plan, although it is evident from the implementation journey described below that many elements of authentic and culturally secure translation and knowledge exchange were embedded in the implementation practices of the trial team. The brief introduction to the principles and practices of knowledge translation below outlines some of the key issues and challenges and culminates with the set of principles that guided the KTE process (Beidas *et al.* 2022; Stensland *et al.* 2022). The trial team was committed to principled practice as outlined below.

It is self-evident that KTE is crucial to the successful implementation of new research findings (Beidas *et al.* 2022). Zhang *et al.* (2022) emphasises knowledge exchange as 'knowledge bridging' (p. 531). In clinical trials, knowledge exchange and implementation efforts pose particular challenges and have often suffered from poor implementation practices (Stensland *et al.* 2022). Damschroder *et al.* (2022*a*) also lamented that context often conspires against evidence-based innovations and that our efforts at knowledge exchange must grapple with both describing and analysing the context within which we are attempting to enact knowledge exchange activities. In planning for Healing Right Way we were concerned with the processes for ensuring that the learnings and outcomes from the trial were

adopted and embedded in the everyday practice in complex health settings. In addition to the outcomes of the trial itself (which was in and of itself a knowledge exchange opportunity as suggested by Stensland *et al.* 2022), as noted above, the research process itself was a social, cultural, political and economic practice that offered opportunities (and threats) for more expansive knowledge exchange. McGrath (2012) said that in the field of health this is a 'process concerned with ensuring that information gained from research is made readily available to policy makers, service providers, and consumers in a user-friendly way that maximises the practical application of the findings' (p. 163). McGrath (2012) also went on to say that many researchers lose sight of the fact that research is not an end in itself but should make a contribution to better health outcomes.

A second important issue in research is that of confronting the troubling history of research practices that have ill served Aboriginal and Torres Strait Islander peoples and communities. There is a legacy of research practices that primarily served the interest of the research but delivered little if any dividend to the researched communities (Smith 1999; Fredericks 2008; Gray and Oprescu 2016). While much has been achieved to ameliorate these inappropriate practices, Indigenist scholars have noted that the ills of past practice may be revisited on the burgeoning field of knowledge translation and exchange (Ninomiya *et al.* 2017). Nevertheless it has not escaped the critique that knowledge exchange as a methodology has not fully embraced the complexities of implementation in cultural contexts (Ellison 2014). To guard against this potentiality, KTE should be 'Indigenously led sharing of culturally relevant and useful health information and practices to improve Indigenous health status, policy, service and programs' (Smylie, cited in Indigenous Peoples' Health Research Centre 2005).

A third important point is to understand the distinction between first, second and third generation knowledge production (Graham *et al.* 2006). According to this conceptualisation, knowledge passes through a series of filters to make the knowledge more accessible. First generation knowledge is essentially 'hard' scientific knowledge generally produced in the primary research phase. Second generation knowledge involves a process of synthesising available knowledge on a given topic or area to distil the essentially relevant information and to make it more comprehensible, while third generation knowledge refers to the knowledge tools or products designed to ensure that ideas and practices are adopted and used (Graham *et al.* 2006; Thomson 2012). The KTE activities for this trial aimed to focus on second and third generation knowledge products, though again it is recognised that the research process itself was and is inherently translational.

A number of principles have been identified in the literature that guided the principled practice of KTE for this trial (summarised in Fig. 1). The work of the trial sat in the intercultural space (Dudgeon and Fielder 2006; Nakata 2007) and guarded against undertaking KTE activities that

- An acknowledgement that the research was conducted in the intercultural space, where understanding the impact of the dual lens of whiteness and Indigenous ways of knowing being and doing are an ongoing tension.
- A commitment to wise practice that both recognises and honours Indigenous ways of knowing, being and doing as co-existing in equal partnership to so called 'western' medical practice.
- A commitment to culturally safe practice that is responsive and secure.
- A commitment to co-design, co-construction and co-production of the knowledge exchange materials and products.
- A commitment to contribute to socially transformative and just practice that is strengths based.
- A commitment to enhancing critical health literacy.

**Fig. 1.** Principles of KTE recommended for use in trials within an Aboriginal and/or Torres Strait Islander context.

are monocultural, colonial or appropriating in favour of work that is authentically situated and viewed through the dual lens of whiteness and Aboriginal and Torres Strait Islander Terms of Reference (Indigenous Peoples' Health Research Centre 2005, pp. 5–7; Drew *et al.* 2010; Dudgeon and Walker 2015; Smith 1999).

The trial team committed to wise and principled practice (Ninomiya *et al.* 2017) that was culturally safe, responsive and secure, decolonising, socially just and transformative (Smith 1999; Dudgeon and Walker 2015) and strengths based (Ciofalo *et al.* 2021; Kennedy *et al.* 2022). The technical principles for the production of second and third generation knowledge include a commitment to co-design, co-production and co-construction processes (Ellison 2014; Thackway *et al.* 2017), to produce knowledge products that are timely, accessible and relevant (Jancey *et al.* 2017), that engage multiple modalities including audio, visual, tactile and kinaesthetic, and are fit for purpose.

An overarching goal of knowledge exchange is to enhance the critical health literacy of key audiences. Critical health literacy includes not just fundamental and scientific health literacy but also, and importantly, civic health literacy (the capacity to interrogate, comprehend and respond to the ideological and motivational underpinnings of health policy and practice) and cultural health literacy (the capacity to appreciate the importance of cultural health knowledges and their intersection with the dominant cultural narratives in health policy and practice) (Zarcadoolas *et al.* 2005).

## Methodology

### What did we want to translate from Healing Right Way?

A series of meetings and workshops were held with members of the KTE team in the first half of 2019. It was

identified that the reporting of the statistical outcomes of the trial overall was a specific piece of knowledge that would be exchanged and complemented by the process evaluation results. The economic evaluation would also provide highly relevant knowledge to, for example, the trial's audience of policy makers. It was identified that the knowledge that would emerge from these aspects of the trial would merge with and support the three translational and knowledge exchange components identified by the team. These included the research outcomes, insights and learnings relating to: (i) the role of Aboriginal Brain Injury Coordinators (ABICs), (ii) the cultural security training (CST) and (iii) the research process.

## Who did we want to translate to?

The knowledge needs of different groups and individuals in the research process were diverse. Stakeholders in Healing Right Way ranged from the Aboriginal people with brain injury and their families to health service providers, advocacy groups and policy makers. It is important to identify not only the audiences for the KTE knowledge products, but also their specific needs and learning styles. The knowledge needs of a Senior Policy Advisor to the Minister are likely to be different to the needs of a community advocacy group or a health practitioner. The key questions the trial team asked are outlined in Fig. 2.

## How would we facilitate knowledge translation in complex contexts and settings?

Earlier we identified Implementation Science as a constellation of social processes within a complex social, cultural, economic and political context enacted in equally complex geographical, organisational and individual settings (Damschroder *et al.* 2009). The Damschroder *et al.* (2009, 2022*a*, 2022*b*) Consolidated Framework for Implementation Research (CFIR) was used as the basis for the Healing Right Way Process Evaluation (see Skoss *et al.* 2021) and as such provided a strong basis for translation planning. The CFIR is one of the most cited frameworks for Implementation Science and knowledge exchange and the Damschroder *et al.* (2009) article is listed as one of the top five most accessed articles in Implementation Science (Damschroder *et al.* 2022*b*). The CFIR has five domains, each with a set of elements or constructs to guide thinking and planning for implementation research or practice. These are the Outer Setting (the broad trial context), the Inner Setting (the actual setting in which the intervention occurs), Intervention Characteristics (e.g. content, timing, mode), Individuals (roles and characteristics of people involved), and Implementation/Process (methods and strategies used to implement the intervention). In 2022, Damschroder and colleagues proposed an 'Outcomes Addendum' to the CFIR including implementation and innovation outcomes (Damschroder *et al.* 2022*a*). In essence, the framework provides a systematic process for undertaking an environmental scan of the barriers and enablers of KTE for each intended audience.

1. Who is the audience?
2. What are their knowledge needs?
3. Why do they need the knowledge?
4. How will they be consulted about their knowledge needs?
5. What form/s should the knowledge products take?

**Fig. 2.** Key questions asked by the trial team surrounding translation audiences.

## Measuring the success of the translation and knowledge exchange activities: impact and evaluation

Measuring the impact of KTE activities in complex landscapes is inevitably, and as evident in Healing Right Way, a complex task. The findings of the process evaluation are an important source of data relating to the process elements of the KTE activities. It is also very important to recognise what can reasonably be measured and, as part of this, to recognise the plausible causal pathways of KTE activities. It is unlikely that a causal link in this trial will be demonstrated between KTE activities and health outcomes. At best, the link will be indirect and mediated through the workforce. In Healing Right Way, KTE activities were designed to have an impact on workforce productivity, efficiency, skills development, knowledge and confidence to name a few. Almost all workforce policy and strategy documents make the inferential leap from this to more positive health outcomes.

Impact and evaluation measures included surveys of participants related to their hospital experience ($N = 81$ of total 108 at 12 weeks post injury and $N = 66$ at 26 weeks) and health professionals who participated in the cultural training workshops (surrounding their learnings and the usefulness of the training) ($N = 201$ of 250 total attendees). Interviews were conducted with the research management team ($N = 4$), ABICs ($N = 6$ of total 9) and other research staff assisting in recruitment and data collection ($N = 15$). Measures of rehabilitation service delivery related to occasions of service (allied health) were also undertaken (Skoss *et al.* 2021).

Stensland *et al.* (2022) offers a useful example of how the implementation outcomes of clinical trials such as acceptability, adoption, appropriateness, feasibility, fidelity, implementation cost penetration and sustainability can be assessed. Damschroder *et al.* (2022*a*) also drew a distinction between the anticipated outcomes such as 'adoptability', 'implement ability' and 'sustainability' and actual outcomes such as 'adoption', 'implementations' and 'sustainment.' These principles (elaborated upon in Fig. 3) were incorporated

- Acceptability: How agreeable, palatable or satisfactory is the outcome treatment, service, practice or innovation;
- Adoption: The intention to try or use an innovation or practice (also known as uptake);
- Appropriateness: The 'fit' of a particular innovation to address a particular problem;
- Feasibility: How likely is it that a practice or innovation can be successfully carried out in a given setting;
- Fidelity: Was the innovation or practice implemented as originally intended;
- Implementation cost: The cost of the implementation effort;
- Penetration: How far has the practice or innovation penetrated or saturated the context or setting as intended;
- Sustainability: How is the implementation maintained or institutionalised in the intended setting.

(Lengnick-Hall *et al.* 2022, p. 2)

**Fig. 3.** Principles of implementation as outlined by Lengnick-Hall *et al.* (2022).

into both the trial's main design and the process evaluation and were incorporated into translation planning.

## Results and discussion

The following section outlines the results to date of what is an ongoing process of translation of the Healing Right Way results.

### Knowledge translation and exchange … an ongoing journey

KTE was conceived of as an integral part of the trial engagement processes since inception. As such, there has been a systematic approach to knowledge sharing and exchange throughout the trial. The partnership nature of the trial in a way provided the 'infrastructure' and groundwork for translation in that, in principle, translation was a goal for all involved, and relevant translational relationships were already formed prior to the end of the trial when ultimate results of the trial became available.

The innovative and partnership components of this trial made it complex in that simply by undertaking the trial, effective transformation of services already took place during the trial (Stensland *et al.* 2022). For example, by meeting regularly with partners, their awareness of issues related to Aboriginal patients with brain injury and their families was potentially heightened (knowledge exchange). In discussing patients' eligibility for the trial, some medical staff also started to re-think patients' eligibility for rehabilitation and avoid possible stereotyping of some patients as being ineligible for rehabilitation due to past lack of attendance at appointments or complex medical histories. Assumptions that such patients would not be able to be followed up or that patients with several comorbidities may complicate research findings, when in fact such profiles were common and of great significance to the trial, had parallels with clinical practice. The trial also had the potential of raising the profile of brain injury in the partner Aboriginal Community Controlled Health Organisations which, until recent times (since the advent of the National Disability Insurance Scheme), had not considered rehabilitation, disability or allied health services relating to brain injury as part of primary care core business.

Tension exists within an RCT setting between necessary knowledge exchange/casual information giving/problem solving as part of the partnerships and as exemplified above, and undertaking activities that might contaminate the intervention effects of the trial (Stensland *et al.* 2022). The real-life context can sometimes have an effect as well as the specific trial intervention. Such impact is quite possible/probable and could be viewed as a potential translational impact, although of course not measured as part of the trial.

### What were the key messages to exchange and translation from Healing Right Way?

A number of key messages (see Fig. 4) emerged as the research progressed and as part of the ongoing process evaluation. It was also clear that the translation and exchange of key messages would depend on the audiences identified.

### Prior to the end of the trial

As noted above, a number of translational activities occurred during the trial that represented knowledge exchange in the area under focus. See Appendix 1 for a detailed list of activities that occurred during the trial life cycle that were opportunities for authentic knowledge exchange.

### After completion of the intervention

Following completion of the trial interventions, the research team undertook a number of translation activities with a variety of audiences. These included face-to-face and online feedback sessions with the executive members of the country health services where the trial took place, ACCHOs involved, hospital-based investigators, clinicians and research staff in all regions involved; face-to-face and online meetings with an Aboriginal Health Leadership group comprising leaders of Aboriginal health policy and strategy across country and metropolitan Western Australia; and meetings with representatives of the Stroke Foundation and other brain injury organisations.

Ongoing liaison with policy makers aims to achieve sustainability of the Aboriginal Brain Injury Coordinator positions within the WA Department of Health, and partnering

1. Aboriginal Brain Injury Coordinators (ABIC):
   (a) The role and its responsibilities should be well defined.
   (b) Networks to support ABIC activity with clients are very important as clients move and transition through their rehabilitation journey, particularly in rural areas.
   (c) Optimal operational and cultural supports, including peer support, need to be in place for the ABIC role.
   (d) ABICs need to be provided with knowledge regarding services available across primary health, community care, disability and social services, as well as the health system.
   (e) ABICs need to be carefully selected with qualifications suitable for the role.
2. Cultural security training (CST):
   (a) It should be obligatory for hospital staff to attend training, with time allocated within work hours.
   (b) Training should emphasise unique cultural contexts at different sites across the state.
   (c) Opportunities should be provided by health services for reflection and ability to make culturally secure changes both personally and as an overall workplace.
   (d) Aboriginal Hospital Liaison Officers should be included during the staff training sessions.
   (e) Online components of CST need to be technically feasible and well piloted.
3. The research process:
   (a) Aboriginal leadership and participation in all aspects of the study is essential.
   (b) Close links and partnerships between the research team, primary health care services and Aboriginal community networks are essential to increase success of follow-up.
   (c) There is a particular need for the research team to be culturally responsive in all trial processes and in challenges as they arise.
   (d) Capacity building should be inherent in all activities – including opportunities for increasing cultural responsiveness for non-Aboriginal health service providers, and knowledge of research methodology for both Aboriginal and non-Aboriginal health professionals and community members.
   (e) Piloting of all research processes is recommended, in particular piloting of:
      (i) identification of pool of potential Aboriginal people to recruit particularly with complex conditions e.g. traumatic brain injury and support for clarification of inclusion/exclusion criteria.
      (ii) recruitment processes.

**Fig. 4.** Examples of key messages to be exchanged and translated.

organisations that hosted the ABICs, which included an independent community nursing service and ACCHOs. Future endeavours include the embedding of the Cultural Security Training package within organisations such as the WA Department of Health and continued input into national clinical guidelines and dissemination of results through publications and conferences. A video or animation of key messages and findings of the Healing Right Way trial is to be developed, which will be shared on social media and online, with partner organisations being able to share and disseminate; this was a modality also requested by trial participants.

### Impact and evaluation

Discussions regarding incorporation and modifications of the ABIC position and CST package into services with policy makers and managers are ongoing. Translational challenges include transfer/changes of senior staff who originally supported the project and the multiple management structures to engage with across multiple service responsibilities. While budget restrictions limit funding of new services, the economic evaluation will develop the future business case to enhance rehabilitation services for Aboriginal patients. A strategy is being developed to facilitate meetings with time-poor policy makers and bureaucrats, with the first level feedback to services being positive thus far.

While translation and knowledge exchange were perceived as inherent in the nature of this partnership trial from the outset, one of the trial's limitations was the lack of initial budgetting for translation activities. Hence, the activities undertaken to date were funded within the existing budget and staffing for the RCT administrative management. We do not claim to be undertaking all of the additional recommendations above, given limited resources, but are endeavouring to undertake at least some. Since the planning of Healing Right Way, the funding climate has changed and it is now more usual for trials to include translation funding. This is strongly recommended in future projects from the outset of planning in order to accommodate the increasing need for, but complexity of measurement of, impact.

## Conclusion

This report provides a snapshot of the first translation knowledge exchange plan and activities formally constructed in relation to rehabilitation services for Aboriginal people after brain injury and within the context of a clinical trial. Documentation of forward planning for translation and knowledge exchange at the outset of clinical trials and research projects in general is sparse, and even more so in the area of Aboriginal health research. With an increasing emphasis on implementation science, this situation will hopefully change in the near future.

As part of reflective interactive practice in research, it is important to assess the extent to which the research honoured the principles of principled practice. Recall the key knowledge exchange principles summarised at the outset and in Fig. 1. In addition to these ethical and moral commitments the research also reflected on the social, political, organisational and economic context of the research utilising the CFIR (Damschroder *et al.* 2009, 2022*a*).

It is clear that achieving the gold standard of principled practice is aspirational and unlikely to be achieved in its entirety, yet it remains a yardstick against which the moral and ethical responsibilities of the research may be assessed.

In this trial some important steps have been taken and the journey continues.

Recognition that the work was situated in the intercultural space and that the research team grappled with the dual lens of whiteness and Indigenous terms of reference is embodied in the strength of partnerships and collaborative relationships developed throughout the research. The researchers, and by extension the ABICs, developed and nurtured strong enduring relationships at the trial sites. Unlike many research teams, they were not 'seagulls' who fly in, poop all over everything and then leave the community to tidy up the mess (Drew 2006). These relationships were authentically collaborative, and displayed depth and commitment to Aboriginal and Torres Strait Islander people and non-Indigenous researchers 'living, learning and walking together'. Of course, they were complex and at times contested, yet the burgeoning levels of trust and respect allowed for difficult conversations, if required, to ensure the success of the research during and beyond the formal research process. The investment and commitment to relationships in the intercultural space also led to culturally safe and wise practice. For example, all cultural security material and, importantly, the presentation of the training was co-designed, constructed and produced with Aboriginal leadership, stewardship and ownership.

It is also important the research contributes to socially just practice that recognises the evident health inequalities experienced by Aboriginal and Torres Strait islander peoples and communities (Australian Indigenous HealthInfoNet 2023). Interventions into complex cultural settings must also strive to enact wise practice. The pursuit of wise practice also reinforces that research is not value free. This does not abrogate the responsibility for high-quality scientific evidence but does recognise that research should be purposefully, responsibly and positively impactful. Again, the evidence from the evaluation trial supports the view that the research team strived for and, to some degree at least, engaged in wise practice.

Adopting the CFIR as a reflective and evaluative tool was also very useful. It provided a framework within which the research team could assess the impact of the research within complex settings. As noted earlier, implementation research is a social, political, cultural, economic and psychological process. Using the framework enabled a purposeful reflection on the impact of stakeholders and processes within an extraordinarily complex constellation of influences. Clearly, the success of the research depended, and continues to depend, on the interplay among the inner and outer settings, including the dynamics of organisational opportunity and constraint, individual championship and the implementation plans.

The more practical elements of the knowledge exchange research in the trial, such as developing the knowledge needs plans for the diverse audiences is still a work in progress. The knowledge needs plans will carefully determine what second and third generation knowledge products are appropriate to the need of the different audience segments. For community members, infographic summaries or animations may be best suited, whereas policy makers and funders may require evidence or policy briefs. Organisations considering the role of ABICs may be more interested in the cost–benefit analysis of the roles. All these knowledge products are produced with the aim of enhancing the critical health literacy of all audiences. Enhanced critical health literacy is crucial to all stakeholders, not just patients or consumers. In particular, a better understanding of civic and cultural health literacy will contribute to the development of improved policy and practice. Lessons from this research will lead to the development of knowledge products that challenge a range of audiences to more thoroughly interrogate and reflect on their work.

Looking to the future of Healing Right Way, more general impact and evaluation measures regarding the effects of the trial beyond the RCT results themselves should involve mixed methods and include impact narratives, interviews and focus groups, collection of proxy measures such as Google Analytics, and contribution mapping. Contribution mapping recognises that the impact of resources such as KTE products is not an end state but rather a cumulative and iterative process of user engagement, adoption and dissemination (Kok and Schuit 2012; Kok *et al.* 2016).

This article has outlined translation and knowledge exchange activities that took place during and after a complex clinical trial and, in so doing, hopefully contributes to discussion regarding challenges inherent in the endeavour as well as possible avenues for future exploration. The translational and knowledge exchange activities in this research have also been linked back to the principles of principled practice in an endeavour to make a contribution to the future development of knowledge exchange research practice. We particularly hope that this example will encourage other researchers engaged in community-based RCT research to more enthusiastically embrace the complexity of the setting and context within which they work as an opportunity, not a research variable to be controlled.

## References

Armstrong E, Hersh D, Hayward C, Fraser J (2015) Communication disorders after stroke in Aboriginal Australians. *Disability and Rehabilitation* **37**(16), 1462–1469. doi:10.3109/09638288.2014.972581

Armstrong E, Coffin J, Hersh D, Katzenellenbogen JM, Thompson SC, Ciccone N, Flicker L, Woods D, Hayward C, Dowell C, McAllister M (2021*a*) "You felt like a prisoner in your own self, trapped": the experiences of Aboriginal people with acquired communication disorders. *Disability and Rehabilitation* **43**(13), 1903–1916. doi:10.1080/09638288.2019.1686073

Armstrong E, Coffin J, Hersh D, Katzenellenbogen JM, Thompson SC, Flicker L, McAllister M, Cadilhac D, Godecke E, Rai T, Hayward G, Drew N, Lin I, Woods D, Ciccone N (2021*b*) Healing Right Way: study protocol for a stepped wedge cluster randomised controlled trial to enhance rehabilitation services and improve quality of life in Aboriginal Australians after brain injury. *BMJ Open* **11**(9), e045898. doi:10.1136/bmjopen-2020-045898

Australian Indigenous HealthInfoNet (2023) 'Overview of Aboriginal and Torres Strait Islander health status 2022.' (Australian Indigenous HealthInfoNet: Perth, WA)

Balabanski AH, Goldsmith K, Giarola B, Buxton D, Castle S, McBride K, Brady S, Thrift AG, Katzenellenbogen J, Brown A, Burrow J, Donnan GA, Koblar S, Kleinig TJ (2020) Stroke incidence and subtypes in Aboriginal people in remote Australia: a healthcare network population-based study. *BMJ Open* **10**(10), e039533. doi:10.1136/bmjopen-2020-039533

Bammer G, Michaux A, Sanson A (Eds) (2010) 'Bridging the 'Know-Do' Gap: Knowledge Brokering to Improve Child Wellbeing.' (ANU Press: Canberra, ACT, Australia)

Beidas RS, Dorsey S, Lewis CC, Lyon AR, Powell BJ, Purtle J, Saldana L, Shelton RC, Stirman SW, Lane-Fall MB (2022) Promises and pitfalls in implementation science from the perspective of US-based researchers: learning from a pre-mortem. *Implementation Science* **17**, 55. doi:10.1186/s13012-022-01226-3

Bohanna I, Fitts MS, Bird K, Fleming J, Gilroy J, Esterman A, Maruff P, Clough AR (2018) The Transition from Hospital to Home: Protocol for a Longitudinal Study of Australian Aboriginal and Torres Strait Islander Traumatic Brain Injury (TBI). *Brain Impairment* **19**(3), 246–257. doi:10.1017/BrImp.2018.1

Ciofalo N, Dudgeon P, Nikora LW (2021) Indigenous community psychologies, decolonization, and radical imagination within ecologies of knowledges. *American Journal of Community Psychology* **69**, 2883–2293. doi:10.1002/ajcp.12583

Damschroder LJ, Aron DC, Keith RE, *et al.* (2009) Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science* **4**, 50. doi:10.1186/1748-5908-4-50

Damschroder L, Reardon C, Widerquist O, Lowery J (2022*a*) Conceptualizing outcomes for use with the Consolidated Framework for Implementation Research (CFIR): the CFIR Outcomes Addendum. *Implementation Science* **17**, 2–10. 7. doi:10.1186/s13012-021-01181-5

Damschroder LJ, Reardon CM, Widerquist MAO, Lowery J (2022*b*) The updated Consolidated Framework for Implementation Research based on user feedback. *Implementation Science* **17**(1), 75. doi:10.1186/s13012-022-01245-0

Drew N (2006) The Seagull Imperative. *The Australian Community Psychologist* **18**(1), 40–41.

Drew N (2015) Social and emotional wellbeing, natural helpers, critical health literacy and translational research: connecting the dots for positive health outcomes. *Australasian Psychiatry* **23**(6), 620–622. doi:10.1177/1039856215604979

Drew N, Adams Y, Walker R (2010) Issues in mental health assessment with Indigenous Australians. In 'Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practices'. (Eds N Purdie, P Dudgeon, R Walker) pp. 91–104. (Commonwealth of Australia: Canberra, ACT)

Dudgeon P, Fielder J (2006) Third spaces within tertiary places: indigenous Australian studies. *Journal of Community & Applied Social Psychology* **16**, 396–409. doi:10.1002/casp.883

Dudgeon P, Walker R (2015) Decolonising Australian Psychology: discourses, strategies, and practice. *Journal of Social and Political Psychology* **3**, 276–297. doi:10.5964/jspp.v3i1.126

Ellison C (2014) 'Indigenous knowledge and knowledge synthesis, translation and exchange (KSTE).' (National Collaborating Centre for Aboriginal Health: Prince George, BC, Canada)

Esterman A, Thompson F, Fitts M, Gilroy J, Fleming J, Maruff P, Clough A, Bohanna I (2018) Incidence of emergency department presentations for traumatic brain injury in Indigenous and non-Indigenous residents aged 15–64 over the 9-year period 2007–2015 in North Queensland, Australia. *Injury Epidemiology* **5**, 40. doi:10.1186/s40621-018-0172-9

Fredericks B (2008) Making an impact researching with Australian Aboriginal and Torres Strait Islander peoples. *Studies in Learning, Evaluation, Innovation and Development* **5**(1), 24–33.

Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, Robinson N (2006) Lost in Knowledge Translation: Time for a Map? *The Journal of Continuing Education in the Health Professions* **26**, 13–24. doi:10.1002/chp.47

Gray MA, Oprescu FI (2016) Role of non-Indigenous researchers in Indigenous health research in Australia: a review of the literature. *Australian Health Review* **40**(4), 459–465. doi:10.1071/AH15103

Hodgetts D, Rua M, Groot S, Hopner V, Drew N, King P, Blake D (2022) Relational ethics meets principled practice in community research engagements to understand and address homelessness. *Journal of Community Psychology* **50**(4), 1980–1992. doi:10.1002/jcop.22586

Indigenous Peoples' Health Research Centre (2005) 'Knowledge translation and Indigenous knowledge symposium and consultation sessions'. pp. 1–37. (Indigenous Peoples' Health Research Centre: Saskatchewan, Canada)

Jancey J, Binns C, Smith J, Barnett L, Howat P (2017) Health Promotion leads the way in 'knowledge translation': but just a new coat? *Health Promotion Journal of Australia* **28**, 89–90. doi:10.1071/HEv28n2_ED1

Katzenellenbogen JM, Atkins E, Thompson SC, Hersh D, Coffin J, Flicker L, Hayward C, Ciccone N, Woods D, Greenland ME, McAllister M, Armstrong EM (2018) Missing voices: profile, extent, and 12-month outcomes of nonfatal traumatic brain injury in Aboriginal and non-Aboriginal adults in Western Australia using linked administrative records. *Journal of Head Trauma Rehabilitation* **33**(6), 412–423. doi:10.1097/HTR.0000000000000371

Kennedy A, Sehgal A, Szabo J, McGowan K, Lindstrom G, Roach P, Crowshoe L, Barnabe C (2022) Indigenous strengths-based approaches to healthcare and health professions education – Recognising the value of Elders' teachings. *Health Education Journal* **81**(4), 423–438. doi:10.1177/00178969221088921

Kok MO, Schuit AJ (2012) Contribution mapping: a method for mapping the contribution of research to enhance its impact. *Health Research Policy and Systems* **10**, 21. doi:10.1186/1478-4505-10-21

Kok MO, Gyapong JO, Wolffers I, Ofori-Adjei D, Ruitenberg J (2016) Which health research gets used and why? An empirical analysis of 30 cases. *Health Research Policy and Systems* **14**, 36. doi:10.1186/s12961-016-0107-2

Lengnick-Hall R, Gerke D, Proctor E, Bunger A, Phillips R, Martin J, Swanson J (2022) Six practical recommendations for improved implementation outcomes reporting. *Implementation Science* **17**, 16. doi:10.1186/s13012-021-01183-3

McGrath P (2012) The important role of knowledge translation. *Australian Asian Journal of Cancer* **11**(3), 163–165.

Nakata M (2007) The Cultural Interface. *The Australian Journal of Indigenous Education* **36**, 7–14. doi:10.1017/S1326011100004646

Ninomiya ME, Atkinson D, Brascoupé S, Firestone M, Robinson N, Reading J, Smylie JK (2017) Effective knowledge translation approaches and practices in Indigenous health research: a systematic review protocol. *Systematic Reviews* **6**, 34. doi:10.1186/s13643-017-0430-x

Skoss R, White J, Stanley MJ, Robinson M, Thompson S, Armstrong E, Katzenellenbogen JM (2021) Trial protocol for a prospective process evaluation of a culturally secure rehabilitation program for Aboriginal Australians after brain injury: the Healing Right Way trial. *BMJ Open* **11**, e046042. doi:10.1136/bmjopen-2020-046042

Smith L (1999) 'Decolonizing methodologies: Research and indigenous peoples.' (Zed Books: London, UK)

Stensland KD, Sales AE, Damschroder LJ, Skolarus TA (2022) Applying implementation frameworks to the clinical trial context. *Implementation Science Communications* **3**, 109. doi:10.1186/s43058-022-00355-6

Thackway S, Campbell D, Loppacher T (2017) A long-term, strategic approach to evidence generation and knowledge translation in NSW, Australia. *Public Health Research & Practice* **27**(1), e2711702. doi:10.17061/phrp2711702

Thomson N (2012) 'Translational research and the Australian Indigenous HealthInfoNet.' (Australian Indigenous HealthInfoNet: Perth, WA)

World Health Organization (2016) 'A guide to implementation research in the prevention and control of communicable disease.' (World Health Organization: Geneva)

Zarcadoolas C, Pleasant A, Greer DS (2005) Understanding health literacy: an expanded model. *Health Promotion International* **20**(2), 195–203. doi:10.1093/heapro/dah609

Zhang J, Fedder B, Wang D, Jennerjahn TC (2022) A knowledge exchange framework to connect research, policy, and practice, developed through the example of the Chinese island of Hainan. *Environmental Science & Policy* **136**, 530–541. doi:10.1016/j.envsci.2022.07.016

**Data availability.** Further detail of translation activities that support the discussion in this trial is available on request from the corresponding author (EA).

**Conflicts of interest.** The authors declare no conflict of interest.

**Declaration of funding.** This work was supported by the National Health and Medical Research Council (# 1132468), Western Australian Department of Health and the Royal Perth Hospital Medical Research Foundation, with the in-kind support of the Neurological Council of Western Australia, Bega Garnbirringu Health Services, Geraldton Regional Aboriginal Medical Service, Warrika Maya Health Service Aboriginal Corporation, Kimberley Aboriginal Medical Services Council, Broome Regional Aboriginal Medical Service and the Stroke Foundation.

**Ethics standard.** The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

**Author affiliations**
[A]Kurongkurl Katitjin, Edith Cowan University, Perth, WA, Australia.
[B]School of Medical and Health Sciences, Edith Cowan University, Perth, WA, Australia.
[C]Ngangk Yira Institute for Change, Murdoch University, Broome, WA, Australia.
[D]School of Population and Global Health, University of Western Australia, Perth, WA, Australia.
[E]University Department of Rural Health South West, Edith Cowan University, Bunbury, Australia.

## Appendix 1. Knowledge exchange activities during the trial

- Regular meetings with partners
- Regular written trial progress reports sent to partners
- Newsletter to hospital site contacts and partner investigators
- Stroke Week activities promoting ABIC role
- State, national and international conference presentations regarding trial progress
- Seminars given in hospitals to promote the trial, potentially raised the profile of Aboriginal people with brain injury at that site
- Invited national webinars related to the trial protocol and cultural security
- Publications regarding protocols for trial overall and for the process evaluation
- Publication regarding establishment of ABIC positions
- Promotion of impacts of ABICs in the workplace to government department of health (surrounding Aboriginal workforce)
- Responding to email inquiries from across Australia regarding methodologies used in the trial
- Discussions with research colleagues raising awareness of inclusion of Aboriginal Australians in ongoing studies that might not have focused on this population in the past
- ABICs located in non-Aboriginal organisations potentially influencing the workplace in terms of cultural awareness/security e.g. NAIDOC week celebration for first time or modification of assessment tools for use with Aboriginal clients
- ABIC located in the hospital potentially raised the profile of Aboriginal people with brain injury at that site
- Liaison with health ethics and governance offices at hospitals and government potentially raised the profile of Aboriginal people with brain injury at that site/prompted sites to think of issues related to Aboriginal people not previously considered — e.g. new government legislation introduced surrounding consent, process discussions, ethics amendment approvals surrounding remote recruitment procedures
- Responding to inquiries from clinicians about services for Aboriginal patients outside of the trial context
- Requests from organisers of conferences regarding suggestions of potential Aboriginal community members with an investment in brain injury to deliver a Welcome to Country
- Liaison with relevant brain injury organisations highlighting issues relevant to Aboriginal brain injury survivors — e.g. Injury Council of WA, State Head Injury Unit service
- Ongoing conversations with Aboriginal Liaison Officer (ALO) teams in hospitals regarding brain injury specifically
- Facilitating meetings within organisations — e.g. between rehabilitation teams and ALO teams, rehabilitation teams and Aboriginal Community Controlled Health Organisations