

how we work together

THE INTEGRATED KNOWLEDGE TRANSLATION RESEARCH NETWORK CASEBOOK

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FOREWORD

Sandy Dunn

The Integrated Knowledge Translation Research Network (IKTRN) is pleased to present the fourth volume of our casebook series. This edition includes 10 cases describing how knowledge users and researchers partnered to achieve their research goals, the challenges of these collaborations and the benefits of an integrated knowledge translation (IKT) approach.



The IKT approach provided the opportunity for problems to be tackled by researchers and knowledge users together as a committed, cohesive team and to share successes collectively.

The projects described in this casebook cover a range of topics, including: COVID-19 (Brouwers, Wood), health systems research in Norwegian nursing homes (Graverholt), Alberta Family Integrated Care (FICare)[™] in neonatal intensive care units (McNeil), midwifery-led birth centres in Ontario (Reszel), and the use of drones in health care (Jeyabalan). A number of disease-specific research projects focusing on diabetes (Helmle), spinal cord injury (Hoekstra & McKay), rheumatoid arthritis (Ma & Ramachandran), and oncology (Stacey) are also presented. Each case includes background information about the project, a description of the researcher and knowledge-user partnership, the IKT activities used and their impact, and lessons learned from the experience.

The partnerships established for these projects involved collaborations between academic faculty and students, clinical experts, early adopters, research funders, industry and patient and family representatives. Planning meetings and working groups were common across all cases. These activities were used to set priorities, establish protocols and outcomes, monitor progress, keep everyone informed, capitalize on the expertise within the group, develop resources and provide oversight. The partnerships between researchers and the diverse group of knowledge users engaged in each project not only ensured that the research conducted was informed by the needs of knowledge users, but that the results were relevant. While researchers contributed their expertise on research methods, the knowledge-user partners helped form connections with other stakeholders, informed the recruitment process and facilitated access to resources, which ultimately enhanced the quality and completeness of the data collected and the relevance of the results. The IKT approach provided the opportunity for problems to be tackled by researchers and knowledge users together as a committed, cohesive team and to share successes collectively.

The authors presented their perspectives on the challenges of researcher and knowledge-user partnerships and the lessons learned that can help to inform planning for future IKT initiatives. The most commonly described barriers to IKT were related to the complexity of and the planning needed to conduct research using an IKT approach. The extra time and resources needed to truly integrate both knowledge users and researchers in the development and implementation of the projects was a challenge. Knowledge users were sometimes unclear of their roles and responsibilities, were surprised by the work involved and sometimes were not available for the duration of the research project. In addition, limited access to IKT expertise was identified as a barrier to the process.

Each case concludes with three recommendations. These take away messages provide words of wisdom for researchers planning IKT initiatives in the future, such as:

- Do not let perfection be the enemy of good;
- Think big picture;
- Hold the sustainability banner high; and
- Remember that your work can have real-world impact.

The authors emphasize the value of including a diverse group of knowledge users on the research team, including patients, caregivers and trainees, but also advise keeping the team small and agile. They recommend investing in relationship-building, engaging early and often to form true partnerships, viewing partnerships as a long-term relationship and finding collaboration opportunities within existing networks. The authors highlight the importance of clear governance processes, using existing contextual structures for IKT activities, allocating sufficient time and resources, not rushing the planning stages and embracing flexibility.

It is notable how many trainees contributed to this casebook: four cases were led by trainees, and two other cases included trainee co-authors. In total, this casebook has 16 trainee authors at the master's, doctoral and post-doctoral levels. This level of involvement challenges the notion that using IKT approaches is not feasible or possible for trainees. These cases highlight significant trainee participation in developing, sustaining and evaluating partnerships, as well as illustrate how trainees contributed to research processes in collaboration with their research mentors and knowledge users. For example, Brouwers *et al.* describe full integration of trainees in their project through development of a master's level course that gave trainees an experiential learning opportunity in IKT by embedding them in a research partnership with knowledge users from the local public health unit.

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This casebook demonstrates the complexity of an IKT approach to research but also provides tangible solutions to address the issues.

This new casebook provides examples of IKT in action based on the authors' experiences in a diverse group of projects. This casebook demonstrates the complexity of an IKT approach to research but also provides tangible solutions to address the issues. This collection illustrates what it takes to create partnerships between knowledge users and researchers and successfully navigate the research process together. Anyone interested in participating in IKT research will find these cases an excellent resource with practical advice on how to plan and manage the process.

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Working with WeRobotics, a not-for-profit organization, to guide and co-develop a master's level research project

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Keywords: not-for-profit partner; drones; health-care delivery; integrated knowledge translation

INTRODUCTION

Drones are increasingly used for health-care purposes: from delivering medicines and diagnostic kits, to flood monitoring, to releasing genetically modified insects for disease control.¹ Despite growing enthusiasm for using drones in remote settings to address a range of health concerns, there is limited literature informing stakeholders (e.g., health teams and policy-makers) about the practical implications of bringing this vision to reality. The study titled “Context-specific challenges, opportunities and ethics of drones for healthcare delivery in the eyes of program managers and field staff: A multi-site qualitative study” aimed to document and clarify the challenges and concerns of introducing drones for health care in remote communities.¹ Vyshnave Jeyabalan co-developed this study with her supervisor, Dr. Elysée Nouvet, and undertook data collection and analysis of findings for her Master’s in Health Information Science at Western University.

The primary research question for this project was: What are the best practices as seen by practitioners for introducing drones for health to communities? The goal of the project was to support future decision-making and health system integration practices related to the use of drones for health care. This research question was co-developed with Dr. Patrick Meier, CEO of WeRobotics, the not-for-profit partner for this

project. WeRobotics aims to shift power to local communities by “ensuring that local experts with local knowledge and lived experience have the leadership opportunities they seek to implement technology for good projects themselves.”²

THE PARTNERSHIP

Partnership initiation and maintenance

Nouvet was the community perceptions lead for a Drone Observed Therapy System (DrOTS) project in Madagascar in 2018.³ This project alerted her to the lack of evidence-based discussion on the ethical, context-specific considerations related to the expanding use of drones-for-health projects worldwide. Upon returning from Madagascar, she reached out to Meier from WeRobotics to discuss potential collaboration opportunities. WeRobotics, and Meier in particular, are unique players in this area of development. On their website and reports they explicitly focus on critically thinking through what is required in order for drones to do good and avoid harm. During the initial contact, Nouvet mentioned reading Meier’s book on digital humanitarians⁴ and appreciated the attention to the ethics and politics of drones he had brought to the 2015 Nepal earthquake response.⁵ Meier was enthusiastic about identifying ways to collaborate and agreed with Nouvet that further research documenting local experiences with drones would be valuable to WeRobotics and other organizations and individuals doing similar work. Meier identified topics of interest that could be

explored to enhance the knowledge and implementation of drones-for-health projects, such as current community engagement practices and the lack of appropriate guidelines to use drones in health projects.

Soon after that conversation, Nouvet undertook Jeyabalan as a master's student. Jeyabalan expressed an interest in conducting research on drones-for-health projects informed by the needs of knowledge users. At that point, Nouvet, Jeyabalan and Meier met and determined research questions, which reflected topics of interest to Meier and WeRobotics.

Team member roles

At the beginning of the project, the research team members and the knowledge user outlined their roles in a memorandum of understanding. This document detailed project goals, a commitment by the researchers to disseminate findings with WeRobotics, plans for publication and co-authorship terms, financial responsibilities of the partners (no costs for WeRobotics) and how data would be collected and handled. The memorandum of understanding specified that the study participants would not have their identifiable data shared with Meier. This condition was important for protecting the confidentiality and privacy of participants, who, recruited mostly from WeRobotics networks, might wish to raise concerns or critique the organization.

The researchers assumed primary responsibility for developing and conducting the project. They developed study tools, recruited participants, analyzed data and disseminated research findings at local and national conferences. Meier contributed to the research process by helping to conceptualize the project, determining appropriate study methods, facilitating participant recruitment by introducing researchers to his colleagues and network, and reviewing the

participant interview guide. He recommended an educational course offered by WeRobotics called "HealthRobotics: Medical Cargo Drones in Public Health," which Jeyabalan completed, to inform the research project and learn more about the initiatives of WeRobotics and others in this field. Meier also reviewed study materials, conference abstracts and research papers. He is a co-author on the publications for this study.¹ Meier was consulted throughout the project so that its findings would be relevant and could be applied by teams using drones in health projects.

IKT ACTIVITIES

The integrated knowledge translation (IKT) approach has many benefits, such as developing research questions relevant to knowledge users, opportunities for mutual learning and improved uptake of research findings.⁶ While an IKT framework was not explicitly used to guide this project, co-leads Jeyabalan and Nouvet operated in ways that aligned with IKT rationales and approaches. They sought to generate knowledge that could be of practical use to this novel field of drones for health. They acknowledged that knowledge users are uniquely positioned to identify research questions most pertinent to their field and enact change. At the beginning of the partnership, the researchers initiated discussions with Meier to clarify his preference for partnership and to determine the nature of his engagement throughout the project. The discussions led to a memorandum of understanding. The researchers wanted to involve Meier whenever possible and appropriate (i.e., while protecting participants' privacy). He was consulted throughout the project and was updated on progress and challenges through bimonthly Skype calls and email. For example, there were recruitment challenges during the first few months, which were resolved by reaching out to the researchers' and Meier's networks.

IMPACT OF IKT ACTIVITIES

The IKT approach allowed the researchers to co-develop and conduct a research project informed by the needs of the knowledge users. The IKT approach enhanced the project as the research team was able to cultivate a productive and mutually beneficial relationship with a key player in the drones-for-health sector.

Meier arranged for the researchers to share findings from this study with Flying Lab personnel and other knowledge users through a [webinar](#) co-hosted by WeRobotics and their partner, the Unmanned Aerial Vehicle Network, in December 2020. The study was published in a peer-reviewed journal in summer 2020,¹ which Meier disseminated through his networks. Western University and WeRobotics are now in the process of trialing an ethics and social considerations task force to respond to emerging challenges in drones-for-health projects. The team members are optimistic that Western University students' interest in drones for health can contribute to research that directly addresses questions and

challenges highlighted by WeRobotics and similar drones-for-health organizations.

WeRobotics facilitated participant recruitment for study interviews. The IKT approach provided researchers access to rich resources (i.e., knowledge and participants) and opportunities for dissemination (i.e., webinars).

LESSONS LEARNED

The IKT approach was successful because the not-for-profit partner, WeRobotics, was enthusiastic about being involved in the project and generating relevant knowledge. Additionally, involving and checking-in with the knowledge user throughout the project allowed the research team to keep the knowledge user engaged in a meaningful way. However, a main barrier to the IKT approach is time. Integrated knowledge translation is time-intensive as relationships need to be built and knowledge users need to be continuously engaged throughout the research project. With additional time, other knowledge users, and even study participants, could have helped co-develop the research project.

THREE RECOMMENDATIONS

- 1 Allocate sufficient time and resources for IKT processes when planning the research project.** It is easy to overlook IKT processes, especially since IKT is a fairly new concept to researchers who usually conduct research projects independently from industry or not-for-profit knowledge users. This could be avoided by including IKT processes during project planning, requiring researchers to consider the resources needed to conduct meaningful engagement initiatives.
- 2 Integrated knowledge translation involves bi-directional learning.** Both researchers and knowledge users could learn from each other. Researchers need to work with knowledge users to define the roles each partner plays and determine what and how they could learn from each other. Defining roles and learning outcomes could prevent top-down approaches and power imbalances between researchers and knowledge users.
- 3 Research teams should collaborate with knowledge users to determine appropriate dissemination strategies so findings are accessible to and reach appropriate knowledge users.** The IKT approach aims to develop research projects that contribute to gaps in the academic literature and generate useful knowledge for knowledge users, so it is equally important to get the findings to knowledge users.

REFERENCES

1. Jeyabalan V, Nouvet E, Meier P, Donelle L. Context-specific challenges, opportunities, and ethics of drones for healthcare delivery in the eyes of program managers and field staff: a multi-site qualitative study. *Drones*. 2020;4(3):44.
2. WeRobotics. Flying Labs. 2018. Available from: <https://werobotics.org/flying-labs/#:~:text=We%20co%2Dcreate%20and%20facilitate,development%20and%20environmental%20solutions%20locally>.
3. Nouvet E, Knoblauch AM, Passe I, Andriamiadanarivo A, Ravelona M, Ainanomena Ramtariharisoa F, et al. Perceptions of drones, digital adherence monitoring technologies and educational videos for tuberculosis control in remote Madagascar: a mixed-method study protocol. *BMJ Open*. 2019;9(5):e028073.
4. Meier P. *Digital Humanitarians: How Big Data Is Changing the Face of Humanitarian Response*. Boca Raton, FL: CRC Press, Taylor & Francis Group; 2015.
5. Back to the Future: Drones in Humanitarian Action. *WeRobotics Blog*. Published November 13, 2019. Available from: <https://blog.werobotics.org/2019/11/12/back-to-the-future-drones-in-humanitarian-action/>
6. Kothari A, McCutcheon C, Graham ID. Defining integrated knowledge translation and moving forward: a response to recent commentaries. *Int J Health Policy Manag*. 2017;6(5):299-300.

Evaluating implementation of COSTaRS symptom practice guides using an integrated knowledge translation approach across studies

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Keywords: cancer symptoms; knowledge tools; clinical practice guides; triage decisions; integrated knowledge translation

INTRODUCTION

In 2012, we established a team of researchers and knowledge users to develop a research funding proposal to evaluate the implementation of the pan-Canadian Oncology Symptom Triage and Remote Support (COSTaRS) practice guides. This case describes how using an integrated knowledge translation (IKT) approach with our first project evolved into an ongoing program of research comprising four externally funded studies with oncology nurses, homecare nurses and radiation therapists in Halifax, Montreal, Sudbury, Ottawa and Eastern Ontario.¹⁻⁴ The purpose of the research program is to improve the quality and safety of cancer symptom management by developing and implementing a set of evidence-informed practice guides. Across the studies, there was the same principal researcher, research coordinator and health systems researcher.

We developed the COSTaRS practice guides for 17 common treatment-related symptoms as an innovative set of knowledge tools to address the gap between nurses' current practice and symptom-management evidence.⁵ The original practice guides were developed by conducting a systematic review to identify clinical practice guidelines and systematic reviews, appraising their quality, establishing a nurse-friendly template and using plain language to facilitate use

with patients.⁶ As part of their development and for evidence updates, we have them validated by registered nurses providing telephone symptom support, managers and educators from oncology programs across Canada.

THE PARTNERSHIP

Collaboration with knowledge users evolved across the four funded studies. We always convened a core team of knowledge users from each study site and once funded, the core team was expanded. For the first study, researchers from three universities on the COSTaRS development team went directly to their key nursing contacts within local ambulatory cancer programs and asked them to participate as co-investigator knowledge users on the grant proposal. Nursing knowledge users included managers, educators and advanced practice nurses. For the first funded grant, we paid for a staff nurse to participate on the local advisory team and facilitate implementation of COSTaRS (one day per week for 12 months). For grant proposals involving cancer programs in Ontario, the only province with a chief oncology nurse, we also invited the chief nursing officer at Cancer Care Ontario to participate as a principal knowledge user. On another Ontario study, nurses invited a medical oncologist and a pharmacist to participate as co-investigators given their interest in improving symptom management.

To evaluate implementation of the COSTaRS practice guides in homecare nursing, we initially approached nurse leaders in the regional health-care authority responsible for contracts with agencies providing homecare nursing services. Once funded, the nurse leaders invited the nurse managers representing each of the six agencies and identified a family caregiver to join the research team. Before agreeing to participate, the invited family caregiver met with the principal researcher to learn more about the study and discuss role expectations. This meeting helped establish a working relationship. Despite funding to evaluate implementation in three agencies, all six agreed to participate. Given this group already met regularly, we formed the team of researchers and knowledge users at this regional level. We encouraged managers to invite other knowledge users from their agencies; this included nurses responsible for orientation of new staff, continuing education and ongoing clinical oversight for practice.

At a site where COSTaRS practice guides were used with nurses, radiation therapists approached the nurses and researchers to inquire about using COSTaRS within their discipline. We applied for funding and established the working team that included researchers, graduate students, nurses and radiation therapists (manager, educator, advanced practice radiation therapist). We asked the nurses and radiation therapists to identify a family caregiver or patient for the team. A family caregiver volunteered but caregiving commitments and personal health issues limited engagement to the start of the study.

Knowledge users participated in grant proposal submissions. Once funded, we expanded the team to include additional knowledge users and graduate students. Unfortunately, one of the graduate students was diagnosed with cancer and shifted into a dual role of patient and graduate student.

IKT ACTIVITIES

For our first study, we obtained funding from the Knowledge to Action competition at the Canadian Institutes of Health Research, an IKT funding opportunity. A requirement for this funding was ensuring knowledge users were appointed as co-investigators on the research team and co-determined the study research objectives. In our proposal, we described establishing a knowledge-user advisory team at each of the three settings to guide the implementation, handle arising study issues and ensure an IKT approach.¹ Our justification for using an IKT approach was supported by a systematic review of interventions for increasing research use by nurses.⁷ Later, we used Bowen and Graham's description and justification for IKT.⁸

Our primary IKT approach in the first study and subsequent studies was ensuring study governance at each site included researchers, graduate students and knowledge users. Governance involved regular team meetings to operationalize the study and make decisions as equal partners. More specifically, we had team meetings to launch the project, knowledge users collected the data and together we discussed findings in team meetings at each step of the implementation process. Each team discussed local adaptations of COSTaRS practice guides (e.g., institutional logos added), chose interventions to overcome locally identified barriers interfering with their use and discussed implications of other study findings. Our patient/graduate student knowledge user, who happened to be concurrently undergoing chemotherapy, analyzed nurse interactions with simulated and real patients. All team members, including knowledge users, were invited to participate as authors on research publications and presentations. We have indicated knowledge-user authors with an asterisk (*) in our reference list at the end of this case.

IMPACT OF IKT ACTIVITIES

Using the IKT approach and the Knowledge to Action framework⁹ worked well because we were able to build capacity within each site for tailoring implementation of COSTaRS practice guides. We believe our outcomes were directly related to having used an IKT approach. For example, although we developed training resources (e.g., workshop, online tutorial, video), each site was responsible for providing staff training and incorporating COSTaRS into new staff orientation. In our first study, this resulted in over 90 per cent of nurses receiving training¹⁰ and sustained use of the free online tutorial. Knowledge-user participation also facilitated integration of COSTaRS practice guides into local documentation (e.g., filed on health records or integrated into telephone documentation form or the electronic medical record).

An important facilitator was ongoing knowledge-user leadership support. COSTaRS practice guide use lasted beyond the study, as they continued to be promoted and routinized within the settings. Having a patient receiving chemotherapy co-analyze the quality of symptom management in taped calls between nurses and patients enriched the findings, heightening awareness of the patient experience and enhancing sensitivity to how unwell patients respond to information – truly interpreting quality from a patient-centred perspective.

LESSONS LEARNED

Working with nurses as knowledge users was a natural fit for the research program, as the COSTaRS practice guides were designed for use by nurses. Partnering with the nurses ensured the findings of each study were relevant and useable. For example, to increase the likelihood that nurses would use COSTaRS practice guides, the studies were conducted by engaging teams within sites rather than focusing on individual nurses. These

teams included both managers providing leadership and educators responsible for clinical practice. It was challenging to involve frontline nurses as part of the team at two of the three sites because they were not the usual nurses responsible for implementing changes into nursing practice. We did not continue to solicit this type of knowledge user for subsequent studies. In the homecare environment, there were large-scale organizational changes (e.g., mergers) and changes in the nurse knowledge users that interfered with study participation.

During the barriers assessment in the radiation therapist study, the research team realized symptom management by radiation therapists is focused on the body area receiving radiation,³ whereas nurses are more extensively trained in providing whole person care. Having knowledge users on the team helped clarify the process for patients presenting with symptoms not directly related to their radiation therapy. Where nurses and radiation therapists both provide symptom management to patients, we discussed how to avoid duplication across health professionals.

Having patients and caregivers as members of the research team influenced our team meetings. For example, adding a caregiver to the homecare team (with knowledge users from across seven distinct, interconnected organizations) was described as positively changing the dynamic of this long-established homecare team. The symptom management needs of patients quickly became the central focus, which promoted more respectful interchange between agency representatives and a willingness to learn together.

The involvement of patients and caregivers was better when there was more intensive engagement and when the principal investigator and other team members worked to establish a relationship built on understanding and trust with the patients and caregivers. When the team did

not make this effort, it resulted in lower levels of involvement.

In summary, having knowledge users on the team improved the team's understanding of the practice environment, helped interpret the research findings and built knowledge users' capacity to support implementation beyond the study.

THREE RECOMMENDATIONS

- 1 Establishing research teams of knowledge users (patients and caregivers, providers at point of care, managers) in each practice setting and mentoring them to co-create implementation strategies directly affects uptake. These teams that buy-in require less convincing to make changes.
- 2 Ensuring optimal involvement of patient and caregiver partners requires building and maintaining relationships with others on the team.
- 3 Using an IKT approach can lead to ongoing relationships with knowledge users and generation of new research ideas that ultimately contribute to a successful and ongoing program of research.

REFERENCES

(* knowledge users)

1. Stacey D, Bakker D, *Ballantyne B, *Chapman K, *Cumming J, *Green E, et al. Managing symptoms during cancer treatments: evaluating the implementation of evidence-informed remote support protocols. *Implement Sci*. 2012;7:110.
2. Stacey D, *Jolicoeur L, Balchin K, *Duke K, *Ludwig C, Carley M, et al. Quality of telephone nursing services for adults with cancer and related non-emergent visits to the emergency department. *Can Oncol Nurs J*. 2020;30(3):193-199.
3. Ludwig C, *Renaud J, *Barbera L, Carley M, Henry C, Jolicoeur L, et al. Factors influencing the use by radiation therapists of cancer symptom guides: a mixed-methods study. *Curr Oncol*. 2019;26(1):56-64.
4. Stacey D, *Ludwig C, Truant T, Carley M, *Bennis C, Gifford W, et al. Implementing practice guides to improve cancer symptom management in homecare: a comparative case study. *Home Health Care Manag Pract*. 2019;31(3):139-146.
5. Stacey D, Carley M, *Newton J. Pan-Canadian Oncology Symptom Triage and Remote Support (COSTaRS) practice guides –what's changed in version 2020? *Can Oncol Nurs J*. 2020;30(4):269-276.
6. Stacey D, Macartney G, Carley M, Harrison MB, The Pan-Canadian Oncology Symptom Triage and Remote Support Group (COSTaRS). Development and evaluation of evidence-informed clinical nursing protocols for remote assessment, triage and support of cancer treatment-induced symptoms. *Nurs Res Pract*. 2013;2013:171872.
7. Thompson DS, Estabrooks CA, Scott-Findlay S, Moore K, Wallin L. Interventions aimed at increasing research use in nursing: a systematic review. *Implement Sci*. 2007; 2:15.
8. Bowen S, Graham ID. Integrated knowledge translation. In: Straus SE, Tetroe J, Graham ID, eds. *Knowledge translation in health care: Moving from evidence to practice*. Oxford: Wiley Blackwell; 2013. p. 14-23.
9. Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006;26(1):13-24.
10. Stacey D, *Green E, *Ballantyne B, *Tarasuk J, *Skrutkowski M, Carley M, et al. Implementation of symptom protocols for nurses providing telephone-based cancer symptom management: a comparative case study. *Worldviews Evid Based Nurs*. 2016;13(6):420-431.

An integrated knowledge translation approach to evaluate the first year of operations of two new freestanding, midwifery-led birth centres in Ontario

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Keywords: birth centres; midwifery care; mixed-methods evaluation; integrated knowledge translation

INTRODUCTION

In 2012, the Ontario government invited proposals for two new freestanding, midwifery-led birth centres. With the safety of out-of-hospital births well established for low-risk women,^{1–4} these new birth centres were expected to provide a safe, community-based and lower-cost alternative for midwifery clients. Ottawa and Toronto were selected as the locations, and in 2014 both centres opened.* The government chose the Better Outcomes Registry & Network (BORN) Ontario to evaluate the first year of operations of the two new birth centres. The evaluation objectives were to assess (1) the maternal and newborn outcomes,⁵ (2) the experiences of the health-care providers,⁶ and (3) client experiences and satisfaction.⁷ The evaluation team comprised six knowledge users and 11 researchers (Figure 1).

THE PARTNERSHIP

Partnership initiation and maintenance

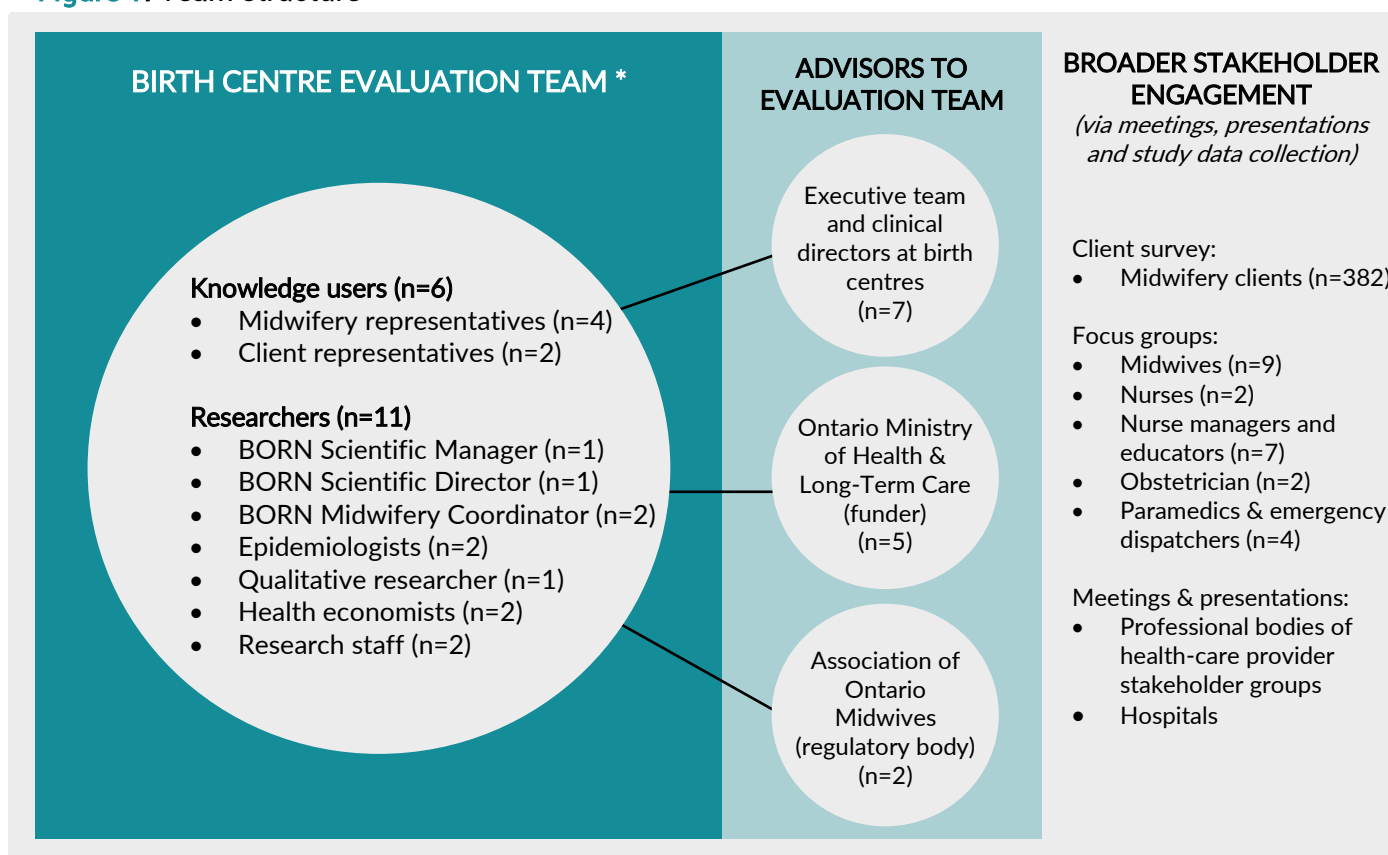
The research partnership was initiated by the scientific manager at BORN Ontario. As a provincial resource, BORN had an existing Maternal Newborn Outcomes Committee with representatives from stakeholder groups such as maternal-child health-care providers (e.g.,

obstetrics, midwifery, nursing, neonatology). The midwifery representative on this group was a key partner and champion who advised on whom to approach, leading to another three midwives joining the team. The four midwifery knowledge users held multiple professional roles: three were practicing midwives, with two having privileges to deliver at one of the new birth centres; one was an advisor at the provincial midwifery professional body, providing a policy lens; and all four were or had been faculty members in the Ontario Midwifery Education Program.

We had a “kick-off” meeting to introduce the initial team members and plan the evaluation framework. A key meeting outcome was identifying other members that should be invited to join, including midwifery clients and researchers with expertise in qualitative methods and economic analysis. The initial team members agreed that midwifery clients should join the team to provide a consumer perspective. We specifically wanted to involve an Indigenous midwifery client as it was expected that the centres would be providing care to priority populations, including Indigenous families. The midwifery team members helped identify

*The only other birth centre in the province was the Tsi Non:we Ionnakeratstha Ona:grahsta’ birth centre, which opened in 1996 as part of the Six Nations Health Service (<http://www.snhs.ca/bcBackground.htm>)

Figure 1. Team structure



**Some members changed over the evaluation period.*

consumer representatives. Interested midwifery clients were asked to describe their interests, skills and experience. We invited two consumer representatives to keep the project team small and agile, with plans to engage additional midwifery clients as study participants.

The evaluation team developed terms of reference. The chairperson from BORN was selected by consensus and was assisted by one of the midwifery coordinators. The evaluation team reported to BORN leadership, as BORN held the project funds and was accountable to the funders for meeting project deliverables.

Team member roles

The researchers on the team contributed methodological expertise in their respective fields to inform the design and implementation of the

evaluation. For example, the epidemiologists led the study on safety outcomes, whereas the qualitative researchers led the study looking at health-care provider experiences. However, the larger team (researchers and knowledge users) was continually updated on all evaluation objectives and provided feedback from different viewpoints.

Knowledge users on the team were involved in developing the evaluation plan, data collection, analysis and dissemination. They ensured we selected outcome indicators that were meaningful to policy-makers, health-care providers and clients. They helped us to identify feasible ways to collect data from our broader stakeholder groups, ensured our data collection tools were appropriate and usable, reviewed and advised on findings, and contributed to knowledge dissemination.

For example:

- **Selecting the indicators:** Knowledge users contributed input from their perspectives as practicing midwives and clients. They also facilitated connections between the project team and their broader networks for additional stakeholder feedback as we developed the indicators.
- **Facilitating the collection of high-quality data for the evaluation:** Our evaluation relied on BORN registry data,⁸ which is entered by midwives providing client care. We also had to add new screens in the BORN Information System to support data collection at the birth centres. The midwives helped define and test these new screens and supported development of communications with information and tips on birth-centre data entry to optimize the reception and understandability of this information for their midwifery colleagues.
- **Facilitating recruitment of clients to complete online survey:** The midwives facilitated connections with midwifery practice groups as recruitment sites for our client survey. They used their experiential knowledge about midwifery clinic operations to develop feasible and acceptable recruitment procedures.

IKT ACTIVITIES

Our working definition of integrated knowledge translation (IKT) is research driven by a core team of knowledge users and researchers that work together as equal partners to shape the research process from conceptualization through to dissemination.⁹ This approach was applied through strategies such as continual information sharing and consensus decision-making. We held regular teleconference meetings, with some in-person meetings in different cities to facilitate attendance.

In the planning phase, team meetings were more frequent (five meetings in the first six months), while the group became established and the evaluation was planned. All team members were invited to participate in these meetings; however,

not all members could attend each session, and a meeting summary and action items were distributed after each meeting. If a key decision was required, then review and approval occurred through direct communication. Sub-groups also met for specific project objectives. Email was used between meetings to ensure team members were kept up to date and engaged throughout the project.

We had regular meetings with our advisors ([Figure 1](#)) and consulted with them on an as-needed basis if issues arose between meetings. Broader stakeholder engagement was achieved by having evaluation team members speak at meetings of professional associations and other stakeholder groups (e.g., hospitals acting as transfer sites, obstetricians, neonatologists, family physicians, nurses, emergency services). While the evaluation team's primary role was to evaluate the birth centres, we were also interested in the integration of the centres into the maternity care system, and broader stakeholder engagement was critical in supporting this. Furthermore, members from these stakeholder groups were recruited as study participants to formally collect data on client and health-care provider experiences with the birth centres.

IMPACT OF IKT ACTIVITIES

The study would not have been possible without our knowledge users. With the overarching goal being to assess and inform the optimization of quality of care, it would have been impossible for researchers alone to determine what that concept means to the people who actually fund, offer and use the health service.

The partnership between researchers and knowledge users enhanced both the quality and completeness of the data. While the researchers contributed their expertise on methods, registry data and informed consent processes, in many cases it was the knowledge-user partners who used these items in “real-world” settings during

the project, facilitating connections with practicing midwives to support entering the needed registry data, and recruiting and enrolling clients in our survey. Ultimately, we met our target sample sizes within the study timeframe.

The interpretation of our data would have been different without our knowledge-user partners. For example, when researchers observed a surprising trend in the data, they suspected it was related to misinterpretation of a survey question. However, through discussion with the midwifery knowledge users, we learned of alternate explanations for this observation. Without insider knowledge of midwifery care, a researcher alone would have undoubtedly interpreted this data differently.

LESSONS LEARNED

A facilitator to using an IKT approach was having BORN Ontario, a well-known and respected provincial organization, leading the project. BORN facilitated the formation and maintenance of a credible team that had previous experience evaluating provincial change in maternal-newborn care¹⁰⁻¹² and was well-connected within the academic, maternal-newborn care and policy spheres.

Maintaining client engagement was a challenge. Pregnant people and new mothers are busy and finding volunteers for a two-to-three year journey is challenging as life circumstances change. Including more than one client partner may be helpful to share responsibilities. Furthermore, while we successfully engaged midwives and clients, we encountered challenges engaging other groups (hospitals, physicians), some of whom expressed more resistance to the birth centre model. One potential strategy to alleviate this barrier is to engage more representatives from these groups on the core team or in an advisory capacity.

THREE RECOMMENDATIONS

- 1 Keep your team small and agile.** Identify key stakeholder groups and invite members representing those groups, but ensure your team is small and agile enough to efficiently meet, communicate and make decisions. Engage others in advisory roles or as study participants.
- 2 Consider including knowledge users with alternate views.** While having a cohesive team can facilitate decision-making, consider how to engage those with alternate viewpoints that challenge your project goals. Engaging these people early may improve project outcomes and implementation downstream.
- 3 Think big picture.** Although our main goal was to conduct a rigorous evaluation, we leveraged the connections and passion of our team to support the integration of the birth centres into our health system. Consider the larger impact your partnership may have on the health system beyond your immediate project goals.

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REFERENCES

1. Li Y, Townend J, Rowe R, Brocklehurst P, Knight M, Linsell L, et al. Perinatal and maternal outcomes in planned home and obstetric unit births in women at “higher risk” of complications: secondary analysis of the Birthplace national prospective cohort study. *BJOG*. 2015;122(5):741-753.
2. Hutton EK, Reitsma AH, Kaufman K. Outcomes associated with planned home and planned hospital births in low-risk women attended by midwives in Ontario, Canada, 2003-2006: a

- retrospective cohort study. *Birth*. 2009;36(3):180-189.
3. Hutton EK, Cappelletti A, Reitsma AH, Simioni J, Horne J, McGregor C, et al. Outcomes associated with planned place of birth among women with low-risk pregnancies. *CMAJ*. 2016;188(5):E80-E90.
 4. Stapleton SR, Osborne C, Illuzzi J. Outcomes of care in birth centers: demonstration of a durable model. *J Midwifery Womens Health*. 2013;58(1):3-14.
 5. Sprague AE, Sidney D, Darling EK, Van Wagner V, Soderstrom B, Rogers J, et al. Outcomes for the first year of Ontario's Birth Center Demonstration Project. *J Midwifery Womens Health*. 2018;63(5):532-540.
 6. Reszel J, Sidney D, Peterson WE, Darling EK, Van Wagner V, Soderstrom B, et al. The integration of Ontario birth centers into existing maternal-newborn services: health care provider experiences. *J Midwifery Womens Health*. 2018;63(5):541-549.
 7. Reszel J, Weiss D, Darling EK, Sidney D, Van Wagner V, Soderstrom B, et al. Client experience with the Ontario Birth Center Demonstration Project. *J Midwifery Womens Health*. 2020;In press.
 8. Better Outcomes Registry & Network (BORN) Ontario. About BORN. 2019. Available from: <https://www.bornontario.ca/en/about-born/about-born.aspx>.
 9. Canadian Institutes of Health Research (CIHR). Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches. Ottawa, ON:CIHR; 2012. Available from: https://cihr-irsc.gc.ca/e/documents/kt_lm_ktplan-en.pdf.
 10. Sprague AE, Dunn S, Fell DB, Harrold J, Walker MC, Kelly S, et al. Measuring quality in maternal-newborn care: developing a clinical dashboard. *J Obstet Gynecol Canada*. 2013;35(1):29-38.
 11. Peterson WE, Sprague AE, Reszel J, Walker M, Fell DB, Perkins SL, et al. Women's perspectives of the fetal fibronectin testing process: a qualitative descriptive study. *BMC Pregnancy Childbirth*. 2014;14:190.
 12. Fell DB, Sprague AE, Grimshaw JM, Yasseen AS, Coyle D, Dunn S, et al. Evaluation of the impact of fetal fibronectin test implementation on hospital admissions for preterm labour in Ontario: a multiple baseline time-series design. *BJOG*. 2014;121(4):438-446.

Alberta Family Integrated Care (FICare)[™]: From engaged clinicians in a cluster randomized controlled trial to health system partnership in scale and spread across a province

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Keywords: neonatal intensive care; stakeholder engagement; adaptability; flexibility; integrated knowledge translation

INTRODUCTION

Alberta Family Integrated Care (FICare)[™] is an evidence-informed approach to integrating families into the care of their newborn in the neonatal intensive care unit (NICU). We describe moving from engaging stakeholders as part of a cluster randomized controlled trial (cRCT)^{1,2} to full partnership with clinicians as part of current scale and spread of Alberta FICare across all 14 NICUs in the province. The Maternal Newborn Child and Youth Strategic Clinical Network[™] (MNCY SCN)³ enhanced this unique collaborative opportunity first as the knowledge user in the cRCT and then as full partner for scale and spread.

The partnership occurs on three levels: (1) a core project team (including researchers and knowledge users); (2) scale and spread committees; and (3) local implementation teams at each site led by patient care administrators and physicians, with allied health professionals, staff nurses, parents and nurse educators as members. The core project team serves as consultants to the local implementation teams. The scale and spread committees oversee the whole project for consistency across the 14 NICUs in the province.

THE PARTNERSHIP

Partnership initiation and maintenance

After careful deliberation and extensive review of preliminary Alberta FICare cRCT results by the MNCY SCN, a joint funding proposal was submitted and awarded for scale and spread. This proposal was co-led by the cRCT researcher and the scientific director of the MNCY SCN (knowledge user), with support from Senior Operating Officers in the health system. This was an equal partnership bringing together their combined experience with the cRCT and knowledge of the health system. The cRCT was run as a collaborative grant including research-related engagement with parents, families and the health system. This engagement provided the basis for establishing the partnership for scale and spread. Both MNCY SCN and health system staff were engaged with the cRCT in the three years prior to the scale and spread project. These relationships facilitated ease of access to NICUs and their enthusiastic cooperation. Membership on scale and spread committees was solicited by the core project team through already established MNCY SCN committee structures. Partnership is maintained by commitment of the core project

team, implementation funding and knowledge-user commitment.

Team member roles

In addition to the scale and spread project co-leads, the remainder of the core project team includes a senior consultant from the MNCY SCN (knowledge user), a university project manager and a data analyst (researchers). The senior consultant role was to liaise with individual NICU staff and committees and contribute to ongoing implementation design decisions. The Senior Medical Director and Senior Provincial Director of the MNCY SCN contributed content to the funding proposal along with final authorization for submission. An executive sponsor committee of knowledge users (policy-makers) formed prior to submission of the scale-and-spread grant proposal ensured that senior level leadership within the health system was aware of and supported key project decisions. A provincial steering committee chaired by the project co-leads, with clear terms of reference, includes parent advisors and NICU representatives from across the province. The committee meets quarterly and as needed to guide major project and implementation decisions at the provincial level.

Decision-making is shared between the core project team and the sites. For example, at the site level, local implementation teams determine the timing of implementation content, processes for their context and the sequence for implementing Alberta FICare components. Implementation resources developed by the core project team are adapted to be context specific and relevant as deemed by local teams who also develop their own unit-specific resources. There is commitment to embed the work with sustainability and continued fidelity as a focus. For example, identification of indicators and

generation of data were jointly designed by the core project team, the MNCY SCN Senior Medical Director and health system analysts to ensure dashboards will be available when the project is completed. Together, the core project team and representatives from all NICUs are working to incorporate Alberta FICare principles into the new electronic documentation record. The core team is also collaborating with parents to develop family indicators of relevance that can be collected in the health record.

IKT ACTIVITIES

Our working definition of integrated knowledge translation (IKT) is based on the Canadian Institutes of Health Research, with knowledge users as equal partners alongside researchers in all phases of the project.⁴ All grant proposal components were jointly written and approved by both knowledge users and the university researcher. We used the Knowledge to Action cycle⁵ as a starting point to guide our work. Key components included adapting the innovation to the local context and addressing barriers and facilitators identified from the cRCT, which used the Consolidated Framework for Implementation Research.⁶

The innovation was desired by the health system and there was a “pull” from stakeholders.⁷ Some control sites wanted to start implementing even without knowing the results of the cRCT, while others would only consider implementing if there was a potential for cost savings. By communicating with evidence briefs, we reinforced the positive outcomes obtained from the cRCT and the potential for significant cost avoidance through reduced length of stay.

We continue joint planning and implementation locally and provincially and rely on sites to share challenges and successes with each other. Unit

educators and other staff were selected by their managers as champions to promote Alberta FICare. As challenges emerge, the core project team is committed to address them with the MNCY SCN as an experienced convener. For example, two parent advisory councils were instrumental in planning and participating in a provincial meeting, along with unit managers from across the province, to identify strategies to better integrate select Alberta FICare components across all sites. The core project team uses a consultancy model, providing key tangible supports in planning meetings and developing useful implementation resources based on local needs. The core team also uses a deliberative approach with local implementation teams geared to the level of need and capitalizes on the positive strategies and steps achieved at the local level.

IMPACT OF IKT ACTIVITIES

The relationships we formed between researchers and knowledge users during the cRCT accelerated the timelines from completion of the cRCT to provincial scale and spread. As we plan a formal evaluation of the many IKT strategies we used, we continue to adjust and adapt strategies by maintaining ongoing contact with our committees and local implementation teams.

We learned many important lessons about working together in the initial cRCT, which we continue to apply through local implementation teams and provincial committees for scale and spread, including: adaptability to context, active stakeholder engagement and enabling sites to hear about the great work they are already doing. These positives, reinforced at site meetings, enhance success through enthusiastic, engaged uptake of Alberta FICare and resources as demonstrated in our fidelity visits. The cRCT provided evidence of positive outcomes, and it also provided analogous evidence of the

importance of engaged stakeholders, as can be seen by the large number of knowledge users (approximately 275) that are active and engaged in the project. Without this engagement and commitment of knowledge users, we would not be able to maintain the aggressive timeframe of full implementation within two years. The embeddedness of the core team allows us to reach out proactively to other health service departments to address barriers or potential opportunities to enhance the innovation. The outcomes that will be reported are meaningful to, and were shaped by, knowledge users. The partnership has provided the university researchers with an intimate understanding of the complexities of the health system that will influence the shape and conduct of future research.

LESSONS LEARNED

The innovation pipeline in Alberta Health Services provided funding, networks and support structures to identify gaps, generate evidence and then rapidly move to provincial scale and spread. The main facilitator for using the IKT approach was the “pull” from care providers that created the impetus for engaged knowledge users in all aspects from proposal development to implementation. Implementing an innovation of this scale would not have been possible without the active engagement of stakeholders and their belief in the benefits of the innovation. Despite stakeholders’ commitment to the project, the complexity of the organization and the time it takes to work through institutional systems and processes are barriers. Competing institutional and unit priorities, such as the impact of COVID-19 and the new provincial electronic health record, created challenges in meeting timelines, requiring flexibility and negotiation to ensure tasks were completed without compromising the support needed.

THREE RECOMMENDATIONS

- 1 Engaging early and often contributes to stakeholder knowledge and understanding.** Engagement strategies need to be specifically tailored. For example, early interaction with physicians is important and requires significant time investment to foster and maintain relationships.
- 2 Listening, emphasizing the positive, and being genuine, adaptable and practical contributes to stakeholder trust and commitment.** The care taken by the core team to hear concerns and meaningfully respond to leverage facilitators and mitigate barriers is key to maintaining engagement and facilitating trust.
- 3 Forming a true partnership with knowledge users is key to negotiating and mitigating barriers.** Establishing local implementation teams made the difference between “letting it happen” and “making it happen.”⁵ Knowledge users provide an internal structure to support and contribute subject matter and technical expertise to inform and facilitate implementation priorities and pace, ensuring that the infrastructure is effectively used.

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REFERENCES

1. Benzies KM, Shah V, Aziz K, Isaranuwachai W, Palacio-Derflinger L, Scotland J, et al. Family Integrated Care (FiCare) in level II neonatal intensive care units: study protocol for a cluster randomized controlled trial. *Trials*. 2017;18:467.
2. Benzies KM, Aziz K, Shah V, Faris P, Isaranuwachai W, Scotland J, et al. Effectiveness of Alberta Family Integrated Care on infant length of stay in level II neonatal intensive care units: a cluster randomized controlled trial. *BMC Pediatr*. 2020;20(1):535.
3. Kromm S, McNeil D, Johnson D. Maternal, Newborn, Child and Youth Strategic Clinical Network: improving health outcomes and system efficiency through partnerships. *CMAJ*. 2019;191(Suppl):S33-S35.
4. Canadian Institutes of Health Research (CIHR). Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-grant Approaches. Ottawa, ON: CIHR; 2015. Available from: <https://cihr-irsc.gc.ca/e/45321.html>.
5. Gagnon M. Section 5.1 Knowledge dissemination and exchange of knowledge. Knowledge translation in health care: moving from evidence to practice. 2010. Available from: <https://cihr-irsc.gc.ca/e/41953.html>.
6. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009;4:50
7. Rushmer R, Ward V, Nguyen T, Kuchenmüller T. Knowledge translation: key concepts, terms and activities. In: Verschuuren M, van Oers H, eds. *Population Health Monitoring*. Switzerland: Springer; 2019. p. 127-150.

Co-developing strength-training behaviour change interventions for people with rheumatoid arthritis

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Keywords: Patient Engagement In Research (PEIR) Framework; rheumatoid arthritis; strength training; intervention development; integrated knowledge translation

INTRODUCTION

Strength training is an essential but underused strategy for managing rheumatoid arthritis. Despite the benefits of strength training,^{1–6} only one to 14 per cent of people with rheumatoid arthritis report participating in strength training regularly.^{7,8} To support people with rheumatoid arthritis to participate in strength training, we developed the I START⁺ (Improving Strength training and Tailoring among people with rheumatoid ARthritis) project. The I START project aims to: (1) identify intervention strategies to support people with rheumatoid arthritis to strength train and (2) develop methods to tailor or customize physical activity interventions for people with rheumatoid arthritis. We conducted a scoping review and a systematic review to address the two project aims, respectively. Qualitative interviews with arthritis patients were conducted to explore the factors that affect their participation in strength training. The findings

from these reviews and the interview study were then triangulated using a theory-based, collaborative process to identify future directions for research.⁹ We then conducted another scoping review to identify strength-training prescription recommendations for people with rheumatoid arthritis.

The research team consists of two clinician researchers and eight knowledge users. The knowledge users included the founder and president of Arthritis Consumer Experts[‡] and seven members from Arthritis Research Canada's[§] Arthritis Patient Advisory Board,^{**} two of whom are also clinicians and a knowledge broker.^{10,11} Arthritis Consumer Experts is a patient-led arthritis organization that provides information and educational resources for people with arthritis. The Arthritis Patient Advisory Board members are patients who partner with Arthritis Research Canada scientists in arthritis research.

* Contributed equally

† For more information about the I START project, refer to its description at <https://www.arthritisresearch.ca/research/lift-love-live-strength-training-that-you-enjoy-for-a-healthier-lifestyle-2/>.

‡ More information about Arthritis Consumer Experts can be found at <https://jointhehealth.org/>.

§ More information about Arthritis Research Canada can be found at <https://www.arthritisresearch.ca/>.

** More information about the Arthritis Patient Advisory Board can be found at <https://www.arthritisresearch.ca/our-team/arthritis-patient-advisory-board/>.

THE PARTNERSHIP

Partnership initiation and maintenance

The project lead introduced the early project concept at a trainee research presentation night hosted by the Arthritis Patient Advisory Board. Interested members contacted the project lead and were invited to attend group meetings. The first two meetings were used to orient partners to the topic and build the foundation for the researcher and knowledge-user partnership. The

Patient Engagement In Research (PEIR) Framework and its associated workbook,* consisting of eight components for fostering meaningful patient engagement, were used to guide the partnership development discussion.^{12–14} For examples of how the PEIR Framework elements were applied and sample strategies used to support the inclusion of these elements in the partnership process, see [Table 1](#).

Table 1. Examples of the Patient Engagement In Research (PEIR) Framework elements discussed by researchers and knowledge users in the early phases of the project and strategies used to target each element

PEIR element	Example questions	Sample strategies used to meet PEIR elements
Benefits	What do partners want to gain from participating in the project?	<ul style="list-style-type: none"> • Presentations and email updates on current evidence on strength training to partners. • Opportunities to co-present at conferences. • Development of resources and materials for individual and organizational use (e.g., strength-training programs, exercise videos).
Convenience	What meeting times, frequency, location and modes of communication are preferred by partners?	<ul style="list-style-type: none"> • Tailor communication to each individual's preferred method (i.e., phone, in-person, teleconference). • Hold separate meetings for those unable to attend group meetings.
Value	How would partners like to be compensated?	<ul style="list-style-type: none"> • Co-authorship on manuscripts and conference abstracts. • Annual honorarium.
Contributions	Which phases of the project are partners interested in being involved with? What skills or perspectives would partners like to bring to the table?	<ul style="list-style-type: none"> • Google document used to sign up for preferred phases to contribute to. • Emphasis on contributing "at the right time" (e.g., to accommodate for fluctuations in disease activity or work or to ensure contributions suit strengths).
Team interactions	How can we demonstrate respect, trust and good communication/rapport?	<ul style="list-style-type: none"> • Prompt response to emails. • Documenting how feedback is incorporated into outputs. • Offering adequate time (at least two weeks) and opportunity to review research outputs (e.g., grant proposals, manuscripts, etc.).
Research environment	How can we encourage participation from all and discourage feelings of hierarchy?	Project lead: <ul style="list-style-type: none"> • Opens the floor for each individual to provide input during meetings. • Uses summaries and reflective listening.
Procedural requirements	What are reasonable time commitments, relevant/interesting parts of the project?	<ul style="list-style-type: none"> • Updates and emails on research timelines with reminders for deadlines. • Maximum meeting length of one to two hours. • Presenting opportunities to contribute on a continual basis.
Support	What sort of training or support can we provide to help you participate fully?	<ul style="list-style-type: none"> • Explain research methods and theory in plain language. • Offer individual meetings to explore a learning more deeply if interested.

* The PEIR workbook can be found here: <https://www.arthritisresearch.ca/wp-content/uploads/2018/06/PEIR-Plan-Guide.pdf>

To sustain the partnership, we garnered partners' feedback by systematically evaluating our patient-engagement process using the PEIR Scale* (PEIRS) questionnaire and conducting patient-partner interviews guided by the PEIR Framework at the one-year mark of the project.^{12,13,15,16} Findings from the questionnaire and interviews were analyzed and immediately used to make adjustments to strengthen the partnership. For example, partners identified challenges distinguishing among the different research projects they partner in; we therefore introduced a brief project summary in every communication to address this challenge. In addition to using evaluation to sustain the partnership, we prioritized the development of personal relationships. This included having group dinners, meeting for coffee, sending personally relevant resources or social acknowledgments, as well as supporting our partners' goals for participating and personal work (e.g., providing strength-training programs for our partners, collaborating on a partner's blog post,[†] co-presenting our work at an international conference,¹⁷ developing at-home exercise videos for people with arthritis[‡]).

Team member roles

The researchers were responsible for leading the I START research activities (e.g., obtaining funding and ethics, data collection and analysis, manuscript writing, facilitating meetings and monitoring the partnership process). Our partners made substantial contributions to the research process by refining research questions, writing letters of support, reviewing grant applications, critiquing and conducting the methods, writing manuscripts and disseminating findings.¹⁸ Here we highlight our co-developed scoping review of

strength-training behaviour change interventions and semi-structured interviews on factors that affect strength training among people with arthritis to provide specific examples of team members' contributions.

In both the scoping review and interview study, we held initial meetings with partners to discuss the research question, develop the methods and interpret the findings. The co-developed scoping review process included partners identifying sources to search for grey literature and refining the data extraction parameters. The researchers presented a summary of the findings and the patient partners suggested topics for discussion and future directions. Two patient-clinician partners chose to be further engaged by contributing to the manuscript writing process. A total of three meetings were held and were supplemented by email communications to circulate drafts of the methods and manuscript to provide feedback. All members were listed as authors or in the acknowledgments section, as appropriate.¹⁸

In the development of our semi-structured interviews, partners refined the interview script and recruited almost the entirety of our sample of participants through their social media accounts. Once the researchers conducted and analyzed the interviews, partners provided feedback on the coded themes by providing context and confirming whether there were missing themes or if theme labels should be modified. This process was conducted over three meetings and supplemented by email communications. These findings were co-presented by a researcher and patient partner at an international conference.¹⁷

* The evaluation tool, PEIRS, can be viewed at <https://tinyurl.com/PEIRscale>.

† Eileen Davidson's blog post on the CreakyJoints webpage is available at <https://creakyjoints.org/diet-exercise/rheumatoid-arthritis-strength-training-overcoming-barriers/>.

‡ At-home exercise videos are available through Arthritis Consumer Experts at <https://www.jointhehealth.org/arthritisathome.cfm>.

IKT ACTIVITIES

We describe integrated knowledge translation (IKT) as involving the right people, at the right time, in the right way. In order to involve the *right people* for our project, we engaged two types of knowledge users – patients and deliverers (a patient-led organization and clinicians) of strength-training interventions. Involvement at the *right time* is the process of involving partners in as many phases of the research process as possible while respecting their interests and availability at the forefront. Lastly, involving our partners in the *right way*, or engaging partners meaningfully, was facilitated through use of the PEIR Framework and Scale.^{12,13} These tools have been the guiding structure for the conduct and evaluation of this project.

IMPACT OF IKT ACTIVITIES

The use of IKT prioritized the evaluation of our partnership and broadened the scope of our research. First, several IKT frameworks identify the importance of evaluating the engagement process.¹⁹ Results from the PEIRS evaluation supports the effectiveness of the engagement strategies used throughout our research process. Partners rated each of the components of the PEIRS highly (mean scores for domains ranged from 6.5±0.6 to 6.8±0.4 on a 7-point Likert scale). These findings were supported by the results of

the PEIR Framework-guided interviews with patient partners (to be published after measures are repeated at the two-year mark).¹⁵ It is also worth noting that the I START grants have been funded through both a Tri-Council agency and private organization funders. We attribute this funding success in part to the co-development process.

Second, our IKT activities have positively impacted our scope of research. For example, we had initially planned for the next phase of research to test the feasibility of an intervention to support strength-training behaviour change among patients with rheumatoid arthritis. However, following discussion of the evidence and findings from our research, partners identified the need for concrete strength-training prescription parameters that address rheumatoid arthritis-specific barriers before developing an intervention. This led to the development of a second scoping review to address this gap in knowledge.²⁰

LESSONS LEARNED

The primary barrier to using an IKT approach was the additional time needed to modify research processes that were not designed to include patient stakeholders. Specifically, the systematic nature of certain processes was incongruent with

THREE RECOMMENDATIONS

- 1 Plan on being a good partner.** Having a plan for evaluating your partnership and communicating this plan with your partners (e.g., PEIRS, interviews) can help hold the team accountable to sustaining and improving the partnership.
- 2 Encourage authenticity but speak the same language.** Encourage your own and your partners' strengths to promote authenticity in contributions. While each individual will bring unique expertise, it is still important to communicate in a way that is understandable by all.
- 3 View your partnership as a long-term relationship.** A partnership is a two-way street. Prioritize ways to give back to your partners (e.g., compensation, authorship, offering your time and expertise in their personal work and interests).

the less structured and divergent discussion style that our partners find useful in understanding and providing feedback on a given topic. Creating patient-directed resources and being flexible to modify processes (while still maintaining fidelity to core components) so that partners can contribute to their full potential were facilitators in this example and throughout the project.

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REFERENCES

1. Canadian Institute for Health Information (CIHI). Seniors and the health care system: what is the impact of multiple chronic conditions? Ottawa, ON: CIHI; 2011.
2. Centers for Disease Control and Prevention. Arthritis: Comorbidities. Atlanta, GA: CDC; 2014. Available from: https://www.cdc.gov/arthritis/data_statistics/co-morbidities.htm
3. Cooney JK, Law R, Matschke V, Lemmey AB, Moore JP, Ahmad Y, et al. Benefits of exercise in rheumatoid arthritis. *J Aging Res*. 2011; 681640.
4. Flint-Wagner HG, Lisse J, Lohman TG, Going SB, Guido T, Cussler E, et al. Assessment of a sixteen-week training program on strength, pain, and function in rheumatoid arthritis patients. *J Clin Rheumatol*. 2009;15(4):165-171.
5. Han C, Robinson DW, Hackett MV, Paramore LC, Fraeman KH, Bala MV. Cardiovascular disease and risk factors in patients with rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis. *J Rheumatol*. 2006;33(11):2167-2172.
6. Seneca T, Hauge EM, Maribo T. Comparable effect of partly supervised and self-administered exercise programme in early rheumatoid arthritis – a randomised, controlled trial. *Dan Med J*. 2015;62(8):A5127.
7. Iversen MD, Frits M, von Heideken J, Cui J, Weinblatt M, Shadick NA. Physical activity and correlates of physical activity participation over three years in adults with rheumatoid arthritis. *Arthritis Care Res (Hoboken)*. 2017;69(10):1535-1545.
8. Demmelmaier I, Bergman P, Nordgren B, Jensen I, Opava CH. Current and maintained health-enhancing physical activity in rheumatoid arthritis: a cross-sectional study. *Arthritis Care Res (Hoboken)*. 2013;65(7):1166-1176.
9. Michie S, Stralen MM Van, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci*. 2011;6(42).
10. Arthritis Consumer Experts. JointHealth. 2020. Available from: <https://jointhehealth.org/>.
11. Arthritis Research Canada. Arthritis Patient Advisory Board. Richmond, BC: ARC; 2017. Available from: <https://www.arthritisresearch.ca/our-team/arthritis-patient-advisory-board/>
12. Hamilton CB, Hoens AM, Backman CL, McKinnon AM, McQuitty S, English K, et al. An empirically based conceptual framework for fostering meaningful patient engagement in research. *Health Expect*. 2018;21(1):396-406.
13. Hamilton CB, Hoens AM, McQuitty S, McKinnon AM, English K, Backman CL, et al. Development and pre-testing of the Patient Engagement In Research Scale (PEIRS) to assess the quality of engagement from a patient perspective. *PLoS One*. 2018;13(11):e0206588.
14. Hamilton CB. Workbook to guide the development of a Patient Engagement In Research (PEIR) Plan. Richmond, BC: Arthritis Research Canada; 2018. Available from: <https://www.arthritisresearch.ca/wp-content/uploads/2018/06/PEIR-Plan-Guide.pdf>.
15. Ma JK, Shu H, Jiwa S, Tsui K, Sequeira L, Collins J, et al. Stronger muscles start with stronger partnerships: evaluating the patient engagement process using the Patient Engagement In Research Framework. Oral presentation at: BC SUPPORT Unit Conference - Putting Patients First 2020: Connecting Face to Face in Virtual Space; October 8, 2020; Online.
16. Hamilton CB. Patient Engagement In Research Scale - PEIRS. 2018. Available from: <https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0206588.s004&type=supplementary>.
17. Ma JK, Collins JA, Davidson E, English K, Hoens A, Tsui K, et al. Strength training for people with rheumatoid arthritis: barriers, facilitators, and tailoring considerations [abstract]. *Arthritis Rheumatol*. 2019; 71 (suppl 10). Available from:

<https://acrabstracts.org/abstract/strength-training-for-people-with-rheumatoid-arthritis-barriers-facilitators-and-tailoring-considerations/>.

18. Ma JK, Leese JL, Therrien S, Hoens AM, Tsui K, Li LC. A scoping review of strength training behaviour change interventions: Future directions and practical applications. *Under Review*.
19. Jull J, Giles A, Graham ID. Community-based participatory research and integrated knowledge translation: advancing the co-creation of knowledge. *Implement Sci.* 2017;12(1):150.
20. Wu M, Hoens AM, Tsui K, Li LC, Ma JK. A scoping review of strength training prescription parameters that address rheumatoid arthritis-specific barriers. *In preparation*.

A trainee perspective on an integrated knowledge translation approach to developing the first Integrated Knowledge Translation Guiding Principles for the spinal cord injury research system

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Keywords: training and mentorship; spinal cord injury; guiding principles; integrated knowledge translation

INTRODUCTION

We, Dr. Femke Hoekstra (post-doctoral fellow) and Rhyann McKay (PhD student), work in the [Applied Behaviour Change \(ABC\) Lab](#) under the supervision of Dr. Heather Gainforth at the University of British Columbia Okanagan. Our lab aims to conduct and disseminate research in partnership with knowledge users through an integrated knowledge translation (IKT) approach.¹ Despite the growing importance and potential impact of IKT,^{2,3} best practices for optimally conducting research in partnership between spinal cord injury (SCI) researchers and knowledge users remain limited.⁴ To address this gap, the ABC Lab partnered with a North American multidisciplinary team of SCI researchers, SCI knowledge users (for example, people with SCI, clinicians, representatives of community organizations) and research funders to develop the first [IKT Guiding Principles](#) for the SCI research system.⁵

THE PARTNERSHIP

Partnership initiation and maintenance

As trainees in the ABC Lab, we have the unique opportunity to be involved in the co-development

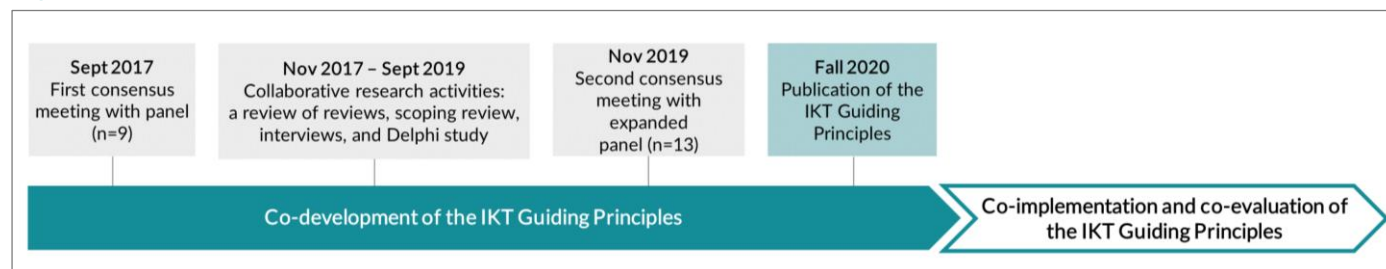
of the SCI IKT Guiding Principles,⁵ which aim to facilitate collaborative research between researchers and knowledge users. Since 2017, we have worked with a multidisciplinary team using an IKT approach to systematically and rigorously co-develop these principles. Gainforth initiated this partnership through informal and formal conversations with potential partners (researchers, knowledge users and funders), building on her previous interactions and existing relationships. The call for IKT guidance came primarily from SCI knowledge users. The first conversations about this project partnership started in spring 2016. Gainforth asked each partner who else should be part of the partnership (which we called "the panel"). Through these discussions, the panel identified missing groups and indicated the need to expand. [Figure 1](#) provides an overview of our IKT project.

Team member roles

The initial panel meeting consisted of nine members who met in Vancouver in September 2017. During this meeting, the panel co-created the vision for the IKT Guiding Principles, agreed upon terms and definitions, planned each stage of

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Figure 1. Project overview



A detailed description of the co-development of the IKT Guiding Principles, including the finalized principles, is described elsewhere.⁵

Note: The expanded panel includes 17 members, of which 13 attended the two-day consensus meeting in November 2019.

the co-development process and developed the governance structure to support the IKT approach. A key decision was that all collaborative research activities (i.e., sub-studies in the project) would be co-led by a researcher with relevant expertise (e.g., qualitative methods for interview studies) and a knowledge user with decision-making authority. The panel also established a team to support knowledge translation activities throughout the project. The knowledge translation team includes panel members with experience in SCI research, knowledge translation and implementation science, graphic design, community advocacy and public policy. As trainees, we have the opportunity to work with the knowledge translation team to plan the dissemination of the principles. For example, we are working with a student and faculty member from the Faculty of Creative and Critical Studies to develop promotional material, including a logo and website. A more detailed description of the partnership, including members' roles and expertise, can be found elsewhere.^{5,6}

The panel decided that the IKT Guiding Principles should be developed through four interrelated studies: two reviews, an interview study and a Delphi study.⁵ As trainees, we had leading roles in these studies. Examples of how knowledge users were engaged in the various stages of the studies included: (1) providing feedback on research methods in the planning phase, (2) engaging in the

interpretation of the findings, and (3) assisting with dissemination of the findings through co-authored abstracts and manuscripts. As trainees, we kept track of all engagement strategies throughout the process (e.g., conference calls, feedback rounds via email) and reported this information in our manuscripts. Gainforth was involved in decision-making on how, when and why knowledge users are engaged in the project and showed us the importance of thinking this process through. The major milestone and engagement strategy for synthesizing the interrelated studies was a two-day meeting held in Vancouver in November 2019 with the expanded panel (n=17) to co-develop the IKT Guiding Principles. The additional new panel members included researchers, representatives of funding agencies and staff members of SCI community-based organizations.

IKT ACTIVITIES

The panel established its own definition of IKT as "meaningful engagement of the right research user at the right time throughout the research process."⁵ The IKT Guiding Principles project is guided by the Knowledge to Action framework,⁷ which includes two phases: a knowledge creation phase and an action cycle. The knowledge creation phase guided the co-development of the principles. The action cycle will guide the implementation and evaluation of the principles

within the North American SCI research system (Figure 1).

Both consensus meetings were guided by the Appraisal of Guidelines, Research & Evaluation (AGREE) II Instrument.⁸ The AGREE II instrument is an internationally accepted instrument to guide the development of clinical practice guidelines. We used an adapted version of this instrument to guide the co-development of the IKT Guiding Principles to ensure a systematic, engaged and rigorous process. Gainforth explained the domains of the instrument at panel meetings to ensure all members understood the process. In addition to in-person meetings, the panel used a variety of communication and engagement activities including conference calls, email updates and surveys.

IMPACT OF IKT ACTIVITIES

Based on our IKT experiences and interactions with SCI research users, we strongly believe that the co-development of the IKT Guiding Principles would not be successful without the input and engagement of a diverse group of knowledge users. We experienced how the discussions between the researchers and knowledge users improved the quality and usefulness of the principles. In-depth conversations about the implications and meaning of certain principles with our panel ensured that the final set of principles have the potential to be useful and relevant for the diverse group of knowledge users within the SCI research system. As a result of their engagement, partnership members will be “early adopters”⁹ of the IKT Guiding Principles and committed to disseminating related tools and resources outside the partnership.

The IKT approach also builds capacity for research partnerships within the research system. As trainees, the opportunity to engage with people with diverse backgrounds exposed us to perspectives and skills that we may not have

otherwise experienced. Collectively, the panel has expertise in research spanning the spectrum from bench to social sciences, as well as the application of research, policy making and research funding. Overall, this large and multidisciplinary partnership enhanced the research methodology of this project and our research skills as trainees. Throughout the project, we received mentorship and training on IKT from Gainforth, who continuously encouraged us to think through our IKT approach. While our supervisor laid the groundwork for our partnership and had a leading role in the IKT strategies, she always engaged us in decision-making processes on what strategies would work the best for collaborative research activities. Our supervisor led most meetings with our partners, but we played a role in preparing meeting agendas and meeting minutes. This form of involvement allowed us to observe and reflect on the engagement process while allowing us to think through important decisions independently.

LESSONS LEARNED

As trainees, the main facilitators to using an IKT approach were the support and guidance we received from our supervisor and the knowledge gained about IKT through reading literature and attending conferences. The main barriers we experienced were the additional complexity and planning needed to conduct research using an IKT approach. Below are some tips for other trainees:

- **Observe:** Ask your supervisor if you can observe and take notes during meetings with partners.
- **Know:** Read IKT literature and attend knowledge translation and IKT conferences (e.g., KT Canada).
- **Plan:** Think through and discuss your IKT strategies with your supervisor and partners. A key discussion question is: “What is meaningful engagement for this project?”

- **Do:** Interact and engage with your partners. Get to know each other, even when you were not engaged in the initiation of the partnership.
- **Monitor:** Keep track of all meetings, emails, feedback moments and interactions with your partners, and report on it.
- **Reflect:** Discuss and ask yourself what went well and what would you do differently next time?
- **Communicate:** Try to understand the dynamics of your partnership so you can better facilitate conversations and integrate everyone's views.

THREE RECOMMENDATIONS

- 1 Think through, monitor and reflect on the IKT approach of your projects.** Monitoring your IKT approach will help you evaluate when, how and why your IKT approach was successful (or not) and ultimately contribute to advancing the science of IKT.
- 2 Learn more about IKT approaches.** An IKT approach is different for each partnership and project. Learning more about IKT approaches (e.g., IKT principles, strategies, outcomes, impacts) may help you to tailor your approach to your context.
- 3 Enjoy the experience and remember that your work can have real-world impact.** When you interact with your partners, you will be reminded about the importance and potential impact of your work!

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REFERENCES

1. Canadian Institutes of Health Research (CIHR). Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-grant Approaches. Ottawa, ON: CIHR; 2012. Available from: https://cihr-irsc.gc.ca/e/documents/kt_lm_ktplan-en.pdf.
2. Gagliardi AR, Berta W, Kothari A, Boyko J, Urquhart R. Integrated knowledge translation (IKT) in health care: a scoping review. *Implement Sci*. 2016;11:38.
3. Camden C, Shikako-Thomas K, Nguyen T, Graham E, Thomas A, Sprung J, et al. Engaging stakeholders in rehabilitation research: a scoping review of strategies used in partnerships and evaluation of impacts. *Disabil Rehabil*. 2015;37(15):1390-1400.
4. Gagliardi AR, Kothari A, Graham ID. Research agenda for integrated knowledge translation (IKT) in healthcare: what we know and do not yet know. *J Epidemiol Community Health*. 2017;71(2):105-106.
5. Gainforth HL, Hoekstra, F, McKay R, McBride CB, Sweet S, Martin Ginis KA, et al. The Integrated Knowledge Translation (IKT) Guiding Principles for conducting and disseminating spinal cord injury (SCI) research in partnership. *Arch Phys Med Rehabil*. In press.
6. Hoekstra F, Mrklas K, Khan M, McKay R, Vis-Dunbar M, Sibley K, et al. A review of reviews on principles, strategies, outcomes and impacts of research partnerships approaches: a first step in synthesising the research partnership literature. *Health Res Policy Syst*. 2020;18(1):51.
7. Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006;26(1):13-24.
8. Brouwers MC, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G, et al. AGREE II: advancing guideline development, reporting and evaluation in health care. *CMAJ*. 2010;182(18):E839-E842.
9. Rogers EM. Diffusion of innovations. New York, NY: Free Press; 2003.

A partnership to foster knowledge translation in Norwegian nursing homes

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Keywords: nursing home; knowledge to action; integrated knowledge translation

INTRODUCTION

The IMpLementation and Action for Knowledge Translation (IMPAKT) project is an ongoing multi-method knowledge translation study that aims to address the knowledge-to-action gap within Norwegian nursing homes.¹ The successful implementation of knowledge translation in long-term care settings has proven difficult to achieve and is largely under-researched.²⁻⁴

Using an integrated knowledge translation (IKT) approach,⁵ we sought to unwrap this challenge in the context of a Norwegian nursing home organization with 23 public facilities and a total of 1,300 long-term and short-term beds for the elderly. The core IKT partnership was established early between the principal investigator and the top management of the nursing home organization and remained throughout. Additional knowledge users were not initially recruited, but others became involved as the project progressed and crystallized. Levels of knowledge users included management of the nursing home organization (core IKT partnership), directors of nursing homes (n=23), practice development nurses, ward managers and clinical group leaders. Practice development nurses in nursing homes hold an advanced role for managing clinical care changes and staff education and thus had a pivotal role in this project.

In this case, we report how the IKT approach shaped the development and implementation phases of the IMPAKT intervention. In the development phase, researchers explored the nursing home organization for roles, barriers, facilitators and needs specific to knowledge translation in a context analysis, where we utilized existing avenues with relevant participants, as suggested in core team meetings. This phase included a mapping of clinical areas of uncertainty that resulted in one common knowledge-to-action gap across the nursing homes and clinical disciplines. Through a researcher-facilitated process, practice development nurses, physicians and nursing home administration decided to implement the National Early Warning Score-2 (NEWS2), a simple aggregate scoring system of vital signs, which allows standardization of the assessment and patient response to acute illness. In the second phase, nine nursing homes participated in a tailored intervention consisting of a knowledge translation educational component and a facilitation-upon-implementation component.

THE PARTNERSHIP

This partnership was initially formed in response to a call for proposals by The Research Council of Norway that asked for contributions to strengthen evidence-based clinical practice by linking

academic and clinical environments. Our working definition of IKT was “a model of collaborative research, where researchers work with knowledge users who identify the problem and have the authority to implement research recommendations.”⁵

Partnership initiation and maintenance

On the initiative of researchers from an academic centre for evidence-based practice, a core partnership was established with the director of the nursing home organization and his closest advisors. This core team was defined in the proposal and committed the partners throughout a three-year development and implementation period. The core team met biweekly for 18 months during the development phase of the intervention, then every six weeks during the implementation of the intervention. This decision was made based on evidence suggesting that leadership commitment is crucial in implementation endeavors.⁶⁻⁹ Past joint experiences made the initial contact effortless, and partnership formation was facilitated by the awareness of each other’s interests, policies and knowledge translation competencies. This core governed the project, with the director of the nursing home organization holding the authority to include nursing homes in the project and the researchers managing the funding. We have found this commitment from the top management to be key to the identification and involvement of knowledge users lower in the hierarchy and to researchers’ access to nursing homes and participants in the different sub-studies.

The director of the nursing home organization expressed a struggle to implement local and national policies aimed at provision of evidence-based health care. An explicit motivation of the nursing home organization’s management team was to get support in identifying context-specific and modifiable challenges to knowledge translation, as opposed to the unnuanced tendency of ascribing lack of time as the chief

barrier.^{10,11} Another explicit motivation of the nursing home organization was the opportunity to develop an intervention that was feasible, cost-effective and relevant to clinical staff.

All participants agreed that sustainability was a guiding principle for all project activities. Both partners were interested in developing an intervention that could persist outside of a generously funded research context. One example that demonstrates this principle was that most project activities, including communications, meetings and data collection, took place within existing structures in the organization, such as already established meeting places and routines.

Upon securing the grant, a “point-of-no-return” meeting was organized, where all expectations and commitments were made explicit and documented.

Team member roles

The researcher team was the driving force of the project, led by the formal grant holder, with responsibilities and milestones set in the proposal. The academic side of the partnership demonstrated flexibility in terms of accommodating the knowledge-user side of the partnership. For instance, all the core partnership meetings (biweekly for two years) took place at the premises of the nursing home organization. A key role for the researchers was to identify relevant implementation science and clinical research, preferably systematic reviews, to inform the direction of the project. The nursing home organization influenced the direction of IMPAKT at key moments. First, they identified relevant participants for the intervention’s capacity-building program. Second, they directly contributed to the design of the program, by voicing their learning needs. Finally, they made the decision to focus on NEWS2 for the knowledge translation project within each nursing home in a process facilitated by the project researchers.

The research team is experienced teaching evidence-based practice to clinicians, and the ideas for the outline of the educational component had its source from their past courses. Still, the research team members were committed to thinking differently to meet nursing home staff needs that were discovered in the context analysis. Two major changes were made to the short courses delivered to clinicians. First, we emphasized the usefulness of highly synthesized evidence sources, such as systematic reviews and clinical guidelines. Second, using the Knowledge to Action (KTA) framework,¹² we focused on the evidence-based practice step of implementation. All course requirements were linked to the second phase of the intervention, the implementation of NEWS2.

The core partnership was involved in the entire chain of activities from identification of the challenge to the development and implementation of the intervention. This was essential to gain reciprocal ownership of the project between researchers and knowledge users and to give researchers timely access to the formal meeting structure of the organization.

The usual nursing home meeting structure was used as the main strategy to integrate relevant knowledge users in different phases of the project. We utilized these fora for extensive dissemination and feedback activities, workshops and data collection.

The director of the nursing home organization prepared the 23 nursing home directors for the upcoming activities and expectations, including their chance of being randomized to the intervention one year down the road. It was communicated clearly that the project was a high priority for the Division of Nursing Homes over a three-year period. Appointment of knowledge users at different phases of the project was always snowballed from and authorized in the core partnership meetings. For instance, practice development nurses emerged early as key to knowledge translation in nursing homes and were involved in multiple aspects of the project.

IKT ACTIVITIES

The IKT activities used by the team are summarized in [Table 1](#).

Table 1. IKT activities used by the team

Phase	Timeline	IKT activities
Development of IKT intervention	Aug 2017	<ul style="list-style-type: none"> Organized “point-of-no-return” meeting to specify expectations for partners. Biweekly meetings with core governance partnership. Joint decisions to uncover knowledge translation needs and develop the intervention.
	Dec 2019	<ul style="list-style-type: none"> Identified participants for exploratory research studies and intervention. Appointment of person in every nursing home to organize recruitment of participants. Prepared facilities for intervention and possibility of being randomized to participate in a year-long program. Hired practice development nurse to work with researchers once per week. Researchers obtained access to existing meeting structure in organization to disseminate project outline, expectations and implications. Refined the needs analysis and proposed solutions. Arranged workshops and meetings with knowledge users to decide the clinical question for knowledge translation.

Implementation of IKT intervention	Jan 2019	Part 1: Educational component <ul style="list-style-type: none"> Researcher met with each intervention nursing home to clarify site knowledge translation needs, expectations for study participation and opportunities for engagement. Ensured that course curriculum echoed the needs of participants and work requirements linked to the Action Cycle in the KTA framework.¹²
	Mar 2020	
		Part 2: Facilitation component <ul style="list-style-type: none"> Workshop with practice development nurses to map clinical areas of uncertainty. Results discussed with physicians and nursing home administration. Agreement reached to implement NEWS2. Researcher had start-up meeting with each intervention nursing home to discuss action plan for implementing NEWS2, including resources, expectations and potential challenges. Researcher conducted biweekly follow-up telephone conversations with practice development nurses to discuss status of action plan, unplanned challenges and facilitators, and to provide support. Interviews with practice development nurses between part 1 and part 2 to hear their views on the educational component and how they translated their learning into the planning and tailoring of the implementation of NEWS2 in their own facility. Organized bimonthly learning networks for practice development nurses in intervention nursing homes to share status of implementation, situations in nursing homes suited to NEWS2, and ideas for spread and uptake. Researchers supported practice development nurses to use the Organizational Readiness for Implementing Change (ORIC) survey in their local context to assess implementation of NEWS2. Preparation of conference abstract submissions with practice development nurses as co-authors.

IMPACT OF IKT ACTIVITIES

The IKT approach has affected the research process in several noteworthy ways. For instance, it has eased the recruitment of participants to the studies in the development phase of the intervention. Further, none of the nine intervention nursing homes withdrew during the year-long intervention. Finally, our investment to work with clinicians who made the decision about the clinical topic area for knowledge translation has likely contributed to the lack of resistance during the intervention phases.

LESSONS LEARNED

There were several facilitators to using an IKT approach in this project. From the nursing home view, the idea of being an equal partner to influence and define the proposed challenge and its solutions was appealing and represented a

shift from earlier research experiences. From the researchers' perspective, this approach generated unique access to the context of study.

The main barrier for using IKT as an approach is the amount of time and resources it takes to truly integrate knowledge users and researchers in the development and implementation of the project. Clinical settings are impatient and want the conclusions of the research early. In our case, the knowledge users higher up in the leadership hierarchy were less invested in the development phase of the intervention and were more interested in the true effectiveness of their investment over time. It is challenging to budget for a true IKT approach, and likewise to obtain funding for an IKT project, when many variables, including the knowledge users and clinical topic, are yet to be defined.

THREE RECOMMENDATIONS

- 1** **Organize a “point-of-no-return” meeting between partners to clarify reciprocal expectations and commitments.** Integrated knowledge translation projects involve high levels of investments over time, and shared ownership and commitment is pivotal.
- 2** **Hold the sustainability banner high to maximize the generalizability of the project.** Integrated knowledge translation partnerships are particularly equipped to result in realistic solutions for health care.
- 3** **Use existing contextual structures for IKT study activities, such as dissemination, data collection, involvement, workshops and the interpretation of findings.** Utilizing existing structures during an IKT project is likely to increase commitment and the transferability of methods to others.

REFERENCES

1. CRISTIN (Current Research Information System In Norway). IMPAKT - IMPLementation and Action for Knowledge Translation. 2017. Available from: <https://app.cristin.no/projects/show.jsf?id=550905>.
2. Boström A-M, Slaughter SE, Chojecki D, Estabrooks CA. What do we know about knowledge translation in the care of older adults? A scoping review. *J Am Med Dir Assoc*. 2012;13(3):210-219.
3. Diehl H, Graverholt B, Espehaug B, Lund H. Implementing guidelines in nursing homes: a systematic review. *BMC Health Serv Res*. 2016;16:298.
4. Gagliardi AR, Berta W, Kothari A, Boyko J, Urquhart R. Integrated knowledge translation (IKT) in health care: a scoping review. *Implement Sci*. 2016;11:38.
5. Kothari A, McCutcheon C, Graham ID. Defining integrated knowledge translation and moving forward: a response to recent commentaries. *Int J Health Policy Managt*. 2017;6(5):299-300.
6. Gifford W, Davies B, Edwards N, Griffin P, Lybanon V. Managerial leadership for nurses' use of research evidence: an integrative review of the literature. *Worldviews Evid Based Nurs*. 2007;4(3):126-145.
7. Elliott N, Begley C, Sheaf G, Higgins A. Barriers and enablers to advanced practitioners' ability to enact their leadership role: a scoping review. *Int J Nurs Stud*. 2016;60:24-45.
8. Birken S, Clary A, Tabriz AA, Turner K, Meza R, Zizzi A, et al. Middle managers' role in implementing evidence-based practices in healthcare: a systematic review. *Implement Sci*. 2018;13(1):149.
9. Sandström B, Borglin G, Nilsson R, Willman A. Promoting the implementation of evidence-based practice: a literature review focusing on the role of nursing leadership. *Worldviews Evid Based Nurs*. 2011;8(4):212-223.
10. Solomons NM, Spross JA. Evidence-based practice barriers and facilitators from a continuous quality improvement perspective: an integrative review. *J Nurs Manag*. 2011;19(1):109-120.
11. Scurlock-Evans L, Upton P, Upton D. Evidence-based practice in physiotherapy: a systematic review of barriers, enablers and interventions. *Physiotherapy*. 2014;100(3):208-219.
12. Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006;26(1):13-24.

Be the change:

The journey to improve inpatient diabetes care across Alberta

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Keywords: inpatient diabetes management; basal bolus insulin therapy (BBIT); barrier and facilitator mapping; integrated knowledge translation

INTRODUCTION

Diabetes is common in hospitals, and the use of outdated, reactive protocols for treatment is frequent despite longstanding guideline recommendations promoting proactive treatment using basal bolus insulin therapy (BBIT).¹ While prior local initiatives with structured order sets and supporting educational material showed significantly improved patient outcomes, change was not sustained.² Patients themselves identified “improved medication and blood sugar management in-hospital” as a priority.³ This prompted the formation of the Diabetes, Obesity and Nutrition Strategic Clinical Network (DON SCN) Improved Glycemic Management In-hospital Initiative team, which facilitates the uptake, spread and scale of best practice.⁴

The core team and early-adopter knowledge users

Under the leadership of the DON SCN, the core team completed the initial phases of the project. The core team included four knowledge users, who were all members of the DON SCN. The medical lead, Dr. Julie McKeen, is an endocrinologist and the Medical Director of the Diabetes Centre Calgary. There were two nursing co-leads, Glenda Moore and Leta Philp, both registered nurses. The pharmacy lead was Dr. Rhonda Roedler, a certified diabetes educator and provincial inpatient pharmacy champion. The lead

researcher on the project was Dr. Karmon Helmle, an endocrinologist who has led local pilot initiatives and conducted research on the barriers and facilitators to uptake and utilization of inpatient diabetes order sets in electronic systems. The core team worked with knowledge translation consultants on methodology and the mapping of barriers and facilitators to behaviour change tools. The DON SCN scientific office supported the formal project evaluation, facilitated by a dedicated data analyst. Several organizational collaborators were also critical to the success of the project.

The core team then worked with seven early-adopter teams to facilitate the spread of this initiative, which spanned four health zones across Alberta and included sites of varied sizes and acuties. Early-adopter site teams consisted of local knowledge users who served as administrative, physician, nursing and pharmacy champions, integrating with the core team and any prior early-adopter teams.

THE PARTNERSHIP

The core team recognized that prior attempts to bring about practice change had been unsuccessful and therefore chose an integrated knowledge translation (IKT) approach to address

this persistent practice gap differently. All major stakeholders were included from the beginning of the project, and they shared the goal of developing an evidence-informed implementation toolkit to support improved glycemic management in hospital. Core team partnerships were initiated through the DON SCN and formed quickly, with early partnerships between expert knowledge users and researchers forming organically through past connections and working relationships. Later, partnerships were increasingly motivated by new policy directives. Relationships were fostered through effective and sincere collaboration, with equal ownership of both project tasks and successes.

Members of the core team participated equally in direction-setting, establishing priorities and responsibilities and completing the necessary work. Given extensive existing data supporting BBIT, the core team agreed to prioritize implementation, scale and spread of established best practice. To accomplish this, the core group worked together to:

- Identify barriers to BBIT implementation through a national environmental scan and literature review.⁵
- Derive barriers from the Theoretical Domains Framework and map them to potential mitigating strategies using the Capability, Opportunity, Motivation-Behaviour (COM-B) model and Behaviour Change Wheel.^{6,7} The result was a set of core tools, which came to be called the BBIT Knowledge Translation Toolkit, including training documents and an implementation guide.
- Develop a provincially standardized order set and glycemic documentation for nurses.
- Develop the “site readiness assessment,” leveraging validated tools and tailoring them for the multidisciplinary teams implementing BBIT.
- Facilitate a train-the-trainer workshop to share content expertise with early-adopter

champions and begin exploring site-specific barriers and facilitators.

- Collect and disseminate data. Data was a major facilitator of provider behaviour change, and it highlighted patient-centred and process outcomes. Partnerships with provincial point-of-care testing enabled a review of site-wide patient glucometer results, and chart audits allowed assessment of insulin ordering and glucose outcomes. A dashboard and accompanying infographics were developed by the core team to share synthesized data.
- Develop an evaluation framework based on patient-centred outcomes, audit data and a qualitative review of acceptability and user experience.

Expert knowledge users on the core team worked with multidisciplinary stakeholders to develop an evidence-informed provincial glycemic policy-suite supporting recognition and management of both hyperglycemia and hypoglycemia and promoting the use of BBIT. Collaboration also assisted a provincial review of the diabetic diet by Nutrition Food Services, and insulin formulary standardization and patient-specific dispensing by Alberta Health Services Provincial Pharmacy.

Once preliminary work was completed, the core team began to work with new groups of knowledge users at early-adopter sites to optimize tools and processes to best support implementation. While an organized, sequential and iterative implementation was planned, flexibility was required as each site tackled different issues in the pre-implementation phase (e.g., engaging appropriate champions and organizing baseline data collection).

Sites identified local knowledge users who were asked to form an early-adopter implementation team. These knowledge users were typically not experts in diabetes management but offered a multidisciplinary perspective on the

implementation. The role of the early-adopter implementation team was to:

- Complete readiness work.
- Attend core team meetings to identify and negotiate local priorities.
- Identify context-specific needs and barriers to successful implementation.
- Share evidence and experiences with the core team at meetings and the train-the-trainer workshops.
- Facilitate local peer-to-peer education and training.
- Evaluate tools and processes. Enriching the toolkit with local context was encouraged, and novel ideas were welcomed. This input enhanced the robustness and generalizability of the toolkit. This feedback led to several iterations of the order set, glycemic documentation, web tools, auditing tools, data content and format.
- Meaningfully participate in the process evaluation through focus groups, surveys, data sharing and team meetings.
- Individualize data requirements and communicate progress to point-of-care knowledge users. Using data customized to the local context improved buy-in and sustainability.

IKT ACTIVITIES

We defined IKT as an equally engaged partnership between researchers and knowledge users in a collaborative, iterative process to identify and address research priorities. The Knowledge to Action framework⁸ was leveraged in this work, highlighting the importance of knowledge co-creation and application. The core team shared expert knowledge, experience and research expertise to build the infrastructure required to bridge an established practice gap. Knowledge users at early-adopter sites shared context-specific experiences and learnings to put research into action.

Integrated knowledge translation activities were selected based on need and used within the core team and between the core and early-adopter teams. Most important was co-developing, revising and implementing the Knowledge Translation Toolkit. Knowledge Translation Toolkit elements included evidence briefs, educational resources, websites (www.bbit.ca, www.kttoolkit.ca), resources for sites to undertake their own barrier and facilitator assessment as well as dedicated resources linked to each common barrier outlining how to overcome them. Further IKT activities included: priority setting; determining research and implementation methodologies; training sessions (train the trainer); iterative review with a multidisciplinary, provincial steering committee; meeting with the members of all teams at any stage of implementation; and participating in the development and execution of the evaluation.

All participants made valuable contributions to their own site, but they also improved the process for other sites, increasing the sense of community, ownership and pride. Further, individualized data promoted engagement and sustainment. While three of the seven sites had previously implemented tools to improve diabetes care with initial success, none had been able to sustain practice change. In contrast, through the IKT-supported approach all sites showed significant, sustained practice change over 18 months of follow-up. As part of our process evaluation, we conducted a survey of the implementation teams and providers at the sites. Results indicated that 97 per cent of respondents felt satisfied or very satisfied with the process. Most importantly, the success, generalizability and applicability of these processes and tools are best measured through their spontaneous uptake and success. Over the last two years, the Knowledge Translation Toolkit has supported effective and efficient implementation in over 80 sites in Alberta.

LESSONS LEARNED

We found many benefits to using an IKT approach. Leveraging evidence-informed processes while integrating site learnings promoted credibility and confidence that practice change would occur, particularly in the context of past failed implementation attempts. Researchers and knowledge users tackled problems together, developing and enacting solutions as a committed, cohesive team, with the shared goal of improving patient-centred outcomes. Challenges and successes were shared collectively.

The project also encountered barriers. With each new site, it took time to build trust in the IKT approach and commit to the complex process required. At times, knowledge users were unclear of their roles and responsibilities, and they were surprised by the amount of work involved. Specifically, physician champions were critical for project success but, at times, difficult to engage. Final outcomes were somewhat complex as each early-adopter site used individualized data and timelines. Finally, our team would have benefited from a dedicated researcher with IKT expertise throughout the project, rather than intermittent consultations.

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THREE RECOMMENDATIONS

- 1 Invest in relationship-building early.** Include multidisciplinary leadership with representative expertise, and connect with an IKT expert early to increase efficiencies.
- 2 Don't rush the planning stages!** Early planning with researchers and major stakeholders ensures everyone is moving toward a collective goal, understands its importance and knows their role in progressing toward it.
- 3 Embrace flexibility.** Our project was shaped most by our knowledge users at our early-adopter sites. While the core team set an initial direction, the shared experiences of our early-adopter sites took our project on unanticipated diversions, travelling much farther than anticipated.

REFERENCES

1. Diabetes Canada Clinical Practice Guidelines Expert Committee. Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Can J Diabetes*. 2018;42(Suppl 1):S1-S325..
2. Helmle KE, Dechant AL, Edwards AL. Implementation of a multidisciplinary educational strategy promoting basal-bolus insulin therapy improves glycemic control and reduces length of stay for inpatients with diabetes. *Clin Diabetes*. 2019;37(1):82-85.
3. O'Connell P, McKeen JA, Helmle KE, Moore G, Rogers E. A patient survey of diabetes patients in hospital: implications for quality improvement strategies. *Can J Diabetes*. 2015;39(6):541.
4. Helmle KE, Chacko S, Chan, T, Drake A, Edwards AL, Moore GE, et al. Knowledge translation to optimize adult inpatient glycemic management with basal bolus insulin therapy and improve patient outcomes. *Can J Diabetes*. 2018;42(5):505-513.
5. Helmle KE, Edwards AL, Kushniruk AW, Borycki EM. Qualitative evaluation of the barriers and facilitators influencing the use of an electronic basal bolus insulin therapy protocol to improve the care of adult inpatients with diabetes. *Canadian J Diabetes*. 2018;42(5):459-464.
6. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci*. 2012;7:37.
7. Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care*. 2005;14(1):26-33.
8. Graham I, Logan J, Harrison M, Straus S, Tetroe J, Caswell W, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006, 26(1): 13-24.

Ottawa Public Health and School of Epidemiology and Public Health Collaborative: The Ottawa Collaborative

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Keywords: Public health; COVID-19; integrated knowledge translation

INTRODUCTION

The Ottawa Collaborative, hereafter referred to as the Collaborative, is a partnership between Ottawa Public Health (OPH) and the University of Ottawa's School of Epidemiology and Public Health (SEPH). Emerging in response to the COVID-19 pandemic, the Collaborative had two main goals: (1) to facilitate collaboration between faculty and students from SEPH with OPH partners to offer advice and practical support on a project prioritized by the OPH Medical Officer of Health, Dr. Vera Etches; and (2) to create a practical, in-the-field and for-credit learning opportunity for students in SEPH's graduate epidemiology program related to the design and execution of a public health project that embraced a community-based integrated knowledge translation (IKT) approach.

The Collaborative focused on a three-stream project aimed at studying physical distancing among youth and young adults (16-29 years) as a tactic to curb COVID-19 infection. Specifically, the project objectives were to: (1) systematically identify existing physical distancing, public health messaging strategies used across Canada; (2) assess the presence of evidence-informed behavioural techniques used in the messaging;

and (3) design focus groups to identify the enablers and barriers to physical distancing among youth and young adults, analyze these data and propose evidence-informed implementation strategies for future OPH activities.

THE PARTNERSHIP

Partnership initiation and maintenance

The Collaborative was established as a result of two independent responses to the COVID-19 pandemic. The SEPH graduate-student body expressed interest in specific practical learning opportunities that would contribute to the COVID-19 public health response. Simultaneously, Etches, Medical Officer of Health at OPH, established a Thought Leaders Committee in the city of Ottawa. Composed of leaders from business, health, academia, community and government, the Thought Leaders Committee served as a sounding board for, and provided advice to, Etches. Dr. Melissa Brouwers, Director of SEPH, was invited to serve on this committee. Given the unprecedented professional demands on public health personnel, Etches and Brouwers discussed ways in which SEPH faculty and students could contribute to the OPH response and support OPH activities, leading to the three-stream project.

A series of actions throughout March 2020 led to the Ottawa Collaborative. Brouwers was linked with Elaine Medline, who was the COVID-19 Special Projects lead at OPH. They served as the key points of reference in each of their respective organizations, responsible for defining the project scope and governance, drafting the protocol, recruiting team members and overseeing project implementation.

Brouwers also designed a special topics graduate course to be available in the spring term (May 2020), titled *COVID-19: Public Health Research in Action*. Within three weeks, the Collaborative was established with a governance structure and project outline in place. A new graduate course was designed, approved and student enrollment was at capacity. Five additional faculty members at SEPH with relevant expertise were then recruited to participate.

Team member roles

Table 1 describes the members of the Collaborative and their roles. Figure 1 illustrates the governance of the Collaborative and how it functioned.

IKT ACTIVITIES

A formal IKT definition was not used in this collaboration. Instead, the Collaborative relationship was defined by key principles that reflected our IKT commitment. For example, the project priorities and outcomes were determined by OPH (i.e., knowledge user) needs. We also aimed to use high-quality but flexible methods to achieve our study objectives, while remaining committed to respecting and using evidence (methods and content). Finally, we optimized all existing levers and areas of excellence among the team members, such as professional knowledge, research knowledge and best practices. These principles were determined at the outset of the project and were discussed with all members of the Collaborative.

Integrated knowledge translation was operationalized by frequent project meetings. From the project theme, *physical distancing among youth 16 to 29 years*, Medline and Brouwers initially developed three project streams. These were further developed and refined with the coordinating committee. Throughout the duration of the project, the

Table 1. The Ottawa Collaborative team members

Ottawa Public Health team (Name, Role)	SEPH faculty team (Name, Area of expertise)	SEPH student team ^a
<ul style="list-style-type: none"> Elaine Medline, COVID-19 Special Projects^{b,c} Erinn Saleswski, OPH, Program Manager^{c,d} Jason Haug, Supervisor, Public Information and Health Communication^c Vera Etches, Medical Officer of Health^e Other members of OPH, as required 	<ul style="list-style-type: none"> Melissa Brouwers, Implementation science (IS)^{b,c,e} Andrea Patay, IS^f Justin Presseau, IS^c Jamie Brehaut, IS^c Lynne Leonard, Community-based research^c Monique Potvin Kent, Health policy^c 	<ul style="list-style-type: none"> Arum Han Baies Haqani Emily Thompson Hira Khan Irina Podinic Nathan Cantor Omar Dewidar Samantha Lancione Sheryll Dimanlig-Cruz

^aGraduate students from SEPH, University of Ottawa, MSc Epidemiology program

^bPoint person

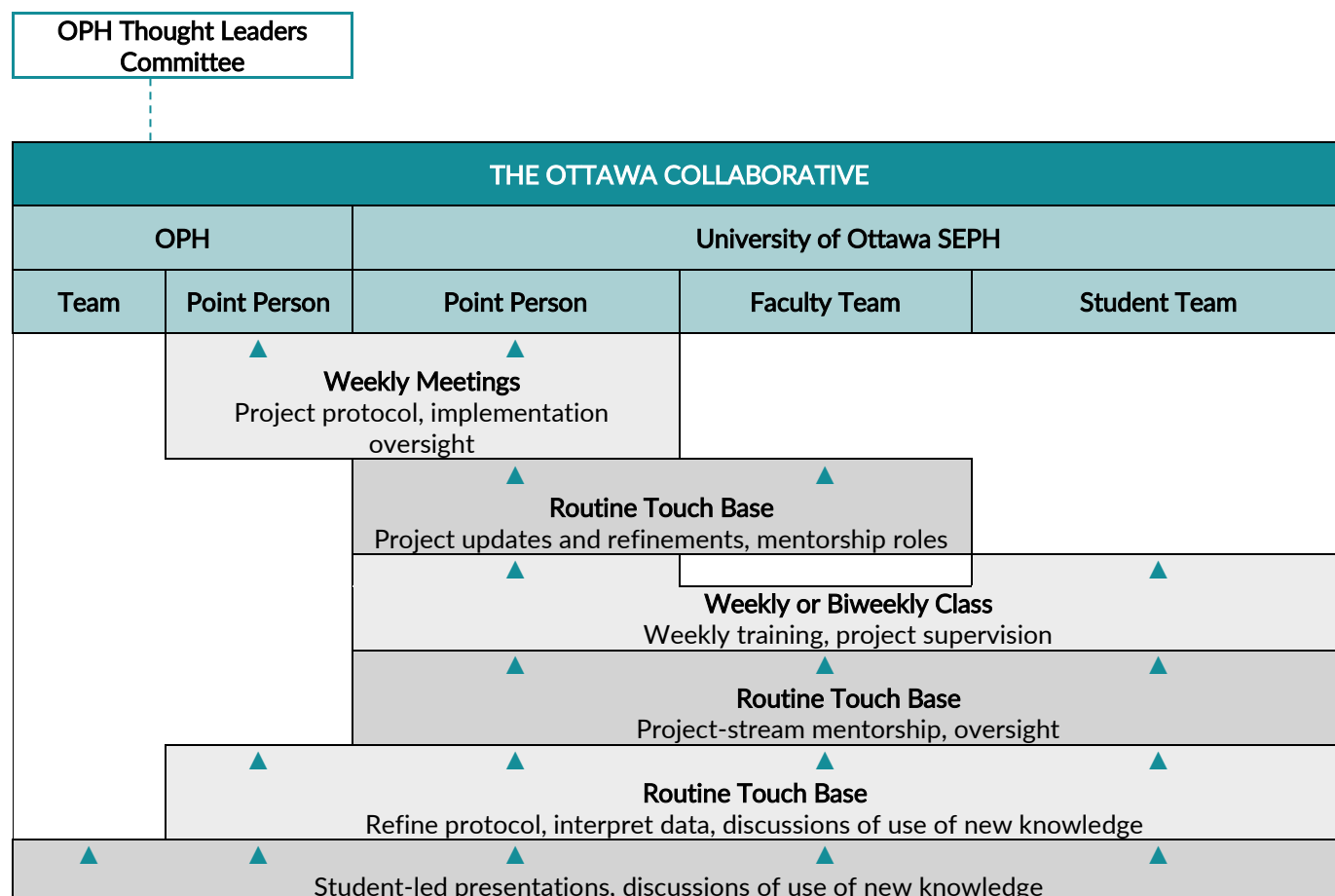
^cCoordinating Committee

^dErinn Saleswski joined the group in summer 2020 in anticipation of the departure of Elaine Medline from OPH

^eOttawa Public Health Thought Leaders Committee

^fAndrea Patay is a Research Associate and provided training to the graduate students

Figure 1. The Ottawa Collaborative Governance



coordinating committee met to discuss each of the project-stream protocols, progress made on goals and any course corrections required to produce a rigorous but timely response. The SEPH students also provided additional ideas to refine and improve the protocols. Medline and Brouwers provided routine updates to the Thought Leaders Committee. With mentorship, the students led the presentations and sharing of outcomes to the larger OPH community (including implementers).

IMPACT OF IKT ACTIVITIES

From the outset, the principles underpinning the Collaborative and the methods by which the team

interacted enabled the team members to capitalize on the skills and expertise of all involved. The SEPH team (faculty and students) were there to support the priorities of OPH. Ottawa Public Health is responsible for the pandemic response in the Ottawa region, and their ability to take on all potential projects was simply not possible due to insufficient resources and people. The SEPH team offered expertise in research methods and implementation science, as well as additional human resources to augment the work of OPH and support its COVID-19 response. In the absence of the Collaborative, it is unlikely the project would have been undertaken by either party.

There were several key learnings for all parties. The OPH members were introduced to tactics that could strengthen the rigour by which data can be collected and analyzed so that new knowledge would be more relevant and usable for their purposes. Of particular interest to OPH was the introduction of implementation science frameworks and methods to study the barriers and enablers of the behaviours of the target audience. In addition, learning about implementation interventions and evidence of their effectiveness was useful. Furthermore, SEPH faculty members were given the opportunity to work with community partners and learn ways to modify gold standard methods that ensured rigour while meeting the in-the-field demands of the pandemic crisis context. It was an authentic applied health research experience. Finally, SEPH students were given the opportunity to apply their in-class learning to the field. As with the faculty members, the need to be flexible and make trade-offs when implementing a research protocol in an applied context were of particular importance.

The relationship between the parties involved in the Collaborative developed quickly out of necessity. The activities continue with the writing of academic papers in which the entire Collaborative will be authors; submission is scheduled for 2021. The students provided evaluations of the experience through the formal graduate course evaluation mechanism (data not yet available). A final debrief has yet to occur, but anecdotal feedback suggests the Collaborative was a positive experience that led to mutually satisfying outcomes for all parties.

LESSONS LEARNED

The enabling factors of this initiative were commitment by OPH and SEPH to work together, the guiding principles, and the establishment of clear roles and responsibilities at the outset. Support from leadership (Etches at OPH and Brouwers at SEPH) was essential to establish the project. Participation was rewarded and reinforced by ensuring the project followed the

THREE RECOMMENDATIONS

- 1 Prioritize governance and terms of reference.** Be clear about who is involved, their roles and responsibilities, key milestones and agreed upon deliverables. When difficult choices must be made and consensus cannot be reached, who are the ultimate decision makers? Allow governance and terms of reference to be dynamic so that refinements can be made to reflect context changes and to ensure the needs of the knowledge users are at the forefront.
- 2 Do not let perfection be the enemy of the good.** Graduate students (and academics) are taught gold standard methods to mitigate bias and ensure rigour in the research enterprise. The spirit of flexibility and nimbleness is a requirement in IKT. Gold standard methods, especially for projects in the field, often require modifications to ensure the approaches are appropriate and timely for the context. Excellent and credible new knowledge can still emerge when this happens.
- 3 Involve trainees.** With any IKT initiative, provide opportunities for trainees to participate fully. It is important that they learn to listen, communicate and negotiate with knowledge users and to design and implement projects that are rigorous, of high quality and yet appropriate for the context.

needs, priorities and preferences of OPH; providing experience and course credits for students; providing teaching workload credits for faculty; creating practical and academic deliverables for all parties; and contributing meaningfully to the COVID-19 response.

Some momentum was lost later in the summer when the course was officially over. Routine meetings were interrupted by summer holidays of

team members, personnel changes were made at OPH and other activities began to compete for attention and priority. In addition, although the project was in response to the pandemic, trying to execute a project in this context with so many other competing demands for all parties was challenging. Some of these barriers were not modifiable; however, a more explicit articulation of when the project should end and timing of final deliverables would have mitigated some of the barriers.

Mobilizing an integrated knowledge translation collaboration during COVID-19 in Northwestern Ontario

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Keywords: northern and rural health system; collaborative research; COVID-19; integrated knowledge translation

INTRODUCTION

Northern, rural regions of Ontario continue to demonstrate resilience during the novel coronavirus (COVID-19) pandemic, with relatively fewer COVID-19 cases and hospitalizations.^{1–4} The heterogeneity of COVID-19 risks across people, places and time requires that regions contextualize their responses⁵; however, Northwestern Ontario health systems lack dedicated expertise, data infrastructure and resources to rapidly produce and act on relevant evidence for COVID-19.^{6–8} These barriers are amplified by significant distance between communities, disproportionate investment in rural research and the siloed efforts of municipalities, the health system and academia.^{7,9–11} Efforts to monitor and make decisions about COVID-19 are usually facilitated by experts in larger, urban centres^{5,12} and often exclude the needs, priorities and knowledge of northern and rural communities.^{3,8,12} To support rapid knowledge translation with a northern, rural and remote lens, educators, researchers and health-care professionals from the Northern Ontario School of Medicine (NOSM) and Thunder Bay Regional Health Sciences Centre (TBRHSC) – an academic

health sciences centre – formed a collaboration to learn from the unique stresses of COVID-19 in Northwestern Ontario. Our transdisciplinary team shares a common goal of creating and sharing knowledge relevant to responding to COVID-19 in Northwestern Ontario and a larger goal of developing a learning health system.¹³

THE PARTNERSHIP

Partnership initiation and team member roles

In February 2020, Dr. Brianne Wood, a post-doctoral health services researcher, reached out to Jessica Logozzo, Wood's former health system supervisor and current decision maker at the academic health sciences centre, about the Canadian Institutes of Health Research (CIHR) Health System Impact Fellowship.* Wood and Logozzo organized a teleconference with three colleagues to strategically determine a research program. This team included: Dr. Erin Cameron, a medical education scholar and Wood's post-doctoral supervisor; Dr. Christopher Mushquash, a clinical psychology scholar and decision maker at the TBRHSC; and Kelly Meservia-Collins, a decision maker at the health sciences centre.

*CIHR Health System Impact Fellowship Program Details: <https://www.researchnet-recherchenet.ca/rnr16/viewOpportunityDetails.do?prog=3203&language=E>

Several team members had previously worked together in other capacities. The two researchers (Wood and Cameron) are current research partners. The three knowledge users (Logozzo, Meservia-Collins, Mushquash) are colleagues at the academic health sciences centre. Each researcher had previously collaborated with at least one of the knowledge users, and there were also new collaborations formed between members of this core group. These existing relationships accelerated the team building because members were aware of each other's portfolios, assets and interests. By March 2020, academic and health institutions rapidly shifted to respond to COVID-19 demands. The fellowship program was subsequently postponed, and health system knowledge demands rapidly and dramatically increased. Given the rapidly changing environment and state of evidence, our five-member team decided to continue meeting twice a week to identify urgent health system priorities that researchers could support.

Individual and collective benefit from the collaboration likely enhanced the motivation to participate in the team, especially during the COVID-19 emergency. The researchers were motivated to build capacity for research and to conduct "socially accountable" research,¹⁴⁻¹⁶ and the health system leaders needed to know COVID-19 information that could not be answered through current organizational resources. Most of the health-professional trainees and clinical teachers in Northern Ontario originate from, train and practice in the region¹⁷; therefore, representation from health-professional education was critical to contextualize, generate and apply COVID-19 knowledge. Wood facilitated the meetings, with the conversation somewhat unstructured to discuss questions and strategies to address knowledge gaps.

There is currently no formal governance structure, as the collaboration resembles a "community of practice"¹⁸ with two objectives: (1) sharing

knowledge (from research, education and administration perspectives) during the COVID-19 response; and (2) creating new knowledge related to COVID-19 and ongoing health system transformation in Northwestern Ontario. The existing relationships between individual team members offered a trusting foundation for the partnership to grow, and representation from multiple institutions distributed power, leading to more open discussions.¹⁹ As the collaboration evolves to include new stakeholders, including patients, we will need a strategy to avoid power imbalances and nurture the curious, open nature of the collaboration.¹⁸⁻²⁰

IKT ACTIVITIES

Our team formed because of shared goals and acknowledgment of the importance of a transdisciplinary team. This mutualistic arrangement closely aligns with a *Mode 2 Research* approach, defined as research activities that are "socially distributed, application-oriented, trans-disciplinary and subject to multiple accountabilities."^{21,22} The rapid changes to individual portfolios and an ethical imperative to support the local COVID-19 response enhanced the appetite for collaboration and the speed at which the partnership grew.

Initially, two former colleagues — a health system decision maker (Logozzo) and a researcher (Wood) — co-produced research-informed insights for COVID-19 capacity planning in Northwestern Ontario. The entire team then used a national funding opportunity to establish a research protocol to support a learning health system approach^{13,23} in Northern Ontario during COVID-19. Specifically, we aimed to strengthen existing data infrastructure and learning processes to rapidly generate and apply knowledge specific to Northern Ontario. The researchers assumed the bulk of the grant writing, given their expertise in research methodologies. Health system knowledge users identified key

organizational and system-level priorities to ensure that the research questions captured the information gaps and contextual reality. They also highlighted the types of available data that could support the research questions (e.g., a log of improvement opportunities identified by organizational managers) and connected team members with other key stakeholders.

After submission, Wood facilitated weekly meetings among the team to identify opportunities to advance the research projects. Key learnings from our group between May and August 2020 are shown in [Table 1](#).

Table 1. Strengths, challenges and opportunities for integrated knowledge translation identified by the team

Strengths	<ul style="list-style-type: none"> • Individual and collective curiosity to use research to drive local action. • Previous collaborations among team members help build trust and provide foundation for new projects.
Challenges	<ul style="list-style-type: none"> • No resources allocated to advance new collaborative research. • Research processes difficult to integrate into rapid operational activities (e.g., research ethics approval).
Opportunities	<ul style="list-style-type: none"> • Informal collaboration (i.e., non-institutional). • Involvement of patients, community members and health-care professionals. • Developmental evaluation of collaborative research model.

Our collaboration has applied for three CIHR grants and supported operational planning, evaluation and quality improvement for Northwestern Ontario. Currently, our team is participating in a rapid literature review and planning a research study about patient engagement in decision-making during COVID-19.

IMPACT OF IKT ACTIVITIES

Participation in IKT activities has been opportunistic, such that team members contribute what they can when relevant and lead activities based on their priorities and expertise. For example, researchers supported COVID-19 infection modelling to support capacity planning for Northwestern Ontario hospitals, and knowledge users contributed to research grant applications about COVID-19 impacts. Given that we have not finished a research study, we cannot comment on study processes or outcomes. While our team agrees that collaborative research is intrinsically appealing^{21,24} and might build health services research capacity in a typically under-resourced context,⁷ we also agree that we need to critically examine the function and impacts of this model.^{18,25} Our team has designed a developmental evaluation specific to the collaborative research model during the COVID-19 response, although this will require additional resources to implement. While our team continues to apply for research funding, we will advance some of the “quick wins” and continue knowledge sharing through our virtual meetings.

LESSONS LEARNED

Our team leveraged our individual networks and a research training opportunity to mobilize IKT in Northwestern Ontario. As the COVID-19 pandemic demanded rapid decision-making from health system leaders, our team realized this opportunity to generate contextualized evidence to address COVID-19 knowledge gaps. With multiple perspectives from research, education and health system administration, our collaboration offers a medium for sharing curiosities and knowledge while searching for resources to execute these ideas. In the absence of designated funding to move forward on some of these research projects, the team has found it challenging to advance a research project from start to finish.

THREE RECOMMENDATIONS

- 1 Find collaboration opportunities within your existing networks to advance a shared goal.** The foundations of a strong IKT partnership are trusting relationships between team members, so strengthening existing relationships might offer an access point for individuals wishing to collaborate. Our team resembles a community of practice that aims to create knowledge related to COVID-19 in Northwestern Ontario.
- 2 Creativity and generosity are important when trying to secure resources to advance a project, especially in the early stages of IKT.** Operational activities usually take precedence over research activities, particularly with the uncertainty and urgency introduced by a public health emergency.^{11,26} At this point, team members are volunteering their time and expertise to advance collaborative, relevant research.
- 3 Integrated knowledge translation can mean more than singular researcher and knowledge-user perspectives.** Bringing together diverse perspectives (research, education, administration) can enhance the relevance of the research questions and build capacity in the knowledge creation and translation process.²⁷ Including patient and community voices is a critical next step.

REFERENCES

1. #HowsMyFlattening Team. #HowsMyFlattening. 2020. Available from: <https://howsmyleftening.ca/#/home>
2. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Weekly epidemiologic summary: COVID-19 in Ontario – focus on September 13, 2020 to September 19, 2020. Toronto, ON: Queen's Printer for Ontario; 2020. Available from: <https://files.ontario.ca/moh-covid-19-weekly-epi-report-en-2020-09-19.pdf>
3. Richardson L, Crawford A. COVID-19 and the decolonization of Indigenous public health. *CMAJ*. 2020;192(38):E1098-E1100.
4. Mainstreet Research, Forum Research, Lapointe-Shaw L. COVID-19 Study Ontario - Wave 2. 2020. Available from: [http://poll.forumresearch.com/data/4df43c37-916c-42a2-8a6b-ebc7314f6cc8Wave%20%20Release%20\(FINAL-2\)%20-%20April%2022%202020.pdf](http://poll.forumresearch.com/data/4df43c37-916c-42a2-8a6b-ebc7314f6cc8Wave%20%20Release%20(FINAL-2)%20-%20April%2022%202020.pdf)
5. Mishra S, Kwong JC, Chan AK, Baral SD. Understanding heterogeneity to inform the public health response to COVID-19 in Canada. *CMAJ*. 2020;192(25):E684-E685.
6. Dunick L. DeMille optimistic about area's best-case scenario. TBNewsWatch.com. Published April 10, 2020. Available from: <https://www.tbnewswatch.com/local-news/demille-optimistic-about-areas-best-case-scenario-2243031>
7. Rourke J, Wilson R. Research funding by the Canadian Institutes of Health Research: more rural needed! *Can J Rural Med*. 2020;25(1):11-13.
8. McMahon M, Nadigel J, Thompson E, Glazier RH. Informing Canada's health system response to COVID-19: priorities for health services and policy research. *Healthc Policy*. 2020;16(1):112-124.
9. Brown AD. The challenge of rural and northern health systems. *Healthc Pap*. 2018;17(3):3-4.
10. Grudniewicz A, Tenbensel T, Evans JM, Steele Gray C, Ross Baker G, Wodchis WP. 'Complexity-compatible' policy for integrated care? Lessons from the implementation of Ontario's Health Links. *Soc Sci Med*. 2018;198:95-102.
11. Bowen S, Botting I, Graham ID, MacLeod M, Moissac D, Harlos K, et al. Experience of health leadership in partnering with university-based researchers in Canada – a call to "re-imagine" research. *Int J Health Policy Manag*. 2019;8(12):684-699.
12. DeBruin D, Liaschenko J, Marshall MF. Social justice in pandemic preparedness. *Am J Public Health*. 2012;102(4):586-591.

13. Menear M, Blanchette MA, Demers-Payette O, Roy D. A framework for value-creating learning health systems. *Health Res Policy Syst.* 2019;17(1):79.
14. Boelen C. Coordinating medical education and health care systems: the power of the social accountability approach. *Med Educ.* 2018;52(1):96-102.
15. Buchman S, Woollard R, Meili R, Goel R. Practising social accountability: from theory to action. *Can Fam Physician.* 2016;62(1):15-18.
16. Boydell V, McMullen H, Cordero J, Steyn P, Kiare J. Studying social accountability in the context of health system strengthening: innovations and considerations for future work. *Health Res Policy Syst.* 2019;17(1):34.
17. Strasser RP, Lanphear JH, McCreedy WG, Topps MH, Hunt DD, Matte MC. Canada's new medical school: The Northern Ontario School of Medicine: social accountability through distributed community engaged learning. *Acad Med.* 2009;84(10):1459-1464.
18. Li LC, Grimshaw JM, Nielsen C, Judd M, Coyte PC, Graham ID. Use of communities of practice in business and health care sectors: a systematic review. *Implement Sci.* 2009;4:27.
19. Roberts J. Limits to communities of practice. *J Manag Stud.* 2006;43(3):623-639.
20. Cundill G, Roux DJ, Parker JN. Nurturing communities of practice for transdisciplinary research. *Ecol Soc.* 2015;20(2):22.
21. Nguyen T, Graham ID, Mrklas KJ, Bowen S, Cargo M, Estabrooks CA, et al. How does integrated knowledge translation (IKT) compare to other collaborative research approaches to generating and translating knowledge? Learning from experts in the field. *Health Res Policy Syst.* 2020;18(1):35.
22. Gibbons M, Limoges C, Nowotny H, Schwartzman S, Scott P, Trow M. *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies.* London: SAGE Publications Ltd; 2020.
23. Lavis J, Gauvin F-P, Reid R, Bullock H, Wodchis W, Hayes A. Creating a Rapid-Learning Health System in Ontario. Hamilton, ON: McMaster Health Forum; 2018. Available from: <https://www.mcmasterforum.org/docs/default-source/product-documents/rapid-responses/creating-a-rapid-learning-health-system-in-ontario.pdf>
24. Oliver K, Kothari A, Mays N. The dark side of coproduction: do the costs outweigh the benefits for health research? *Health Res Policy Syst.* 2019;17(1):33.
25. Graham ID, Kothari A, McCutcheon C, on behalf of the Integrated Knowledge Translation Research Network Project Leads. Moving knowledge into action for more effective practice, programmes and policy: protocol for a research programme on integrated knowledge translation. *Implement Sci.* 2018;13(1):22.
26. Angus DC. Optimizing the trade-off between learning and doing in a pandemic. *JAMA.* 2020;323(19):1895-1896.
27. Jull J, Giles A, Graham ID. Community-based participatory research and integrated knowledge translation: advancing the co-creation of knowledge. *Implement Sci.* 2017;12(1):150.

