



“Working on a Shoestring”: Critical Resource Challenges and Place-Based Considerations for Telehealth in Northern Saskatchewan, Canada

Joelena Leader · Charles Bighead ·
Patricia Hunter · Roderick Sanderson

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Abstract Rural, remote, and northern Indigenous communities in Canada frequently face limited access to healthcare services with ongoing physician and staff shortages, inadequate infrastructure, and resource challenges. These healthcare gaps have produced significantly poorer health outcomes for people living in remote communities than those living in southern and urban regions who have timely access to care. Telehealth has played a critical role in bridging long-standing gaps in accessing healthcare services by connecting patients and providers across distance. While the adoption of telehealth in Northern Saskatchewan is growing, its initial implementation faced several

barriers related to limited and stretched human and financial resources, infrastructure challenges such as unreliable broadband, and a lack of community involvement and engaged decision-making. Emerging ethical issues during the initial implementation of telehealth in community contexts have been wide ranging including concerns around privacy that have also shaped patients’ experiences and particularly the need to consider place and space within rural contexts. Drawing from a qualitative study with four Northern Saskatchewan communities, this paper offers critical perspectives on the resource challenges and place-based considerations that are shaping telehealth in the Saskatchewan context and provides recommendations and lessons learned that could inform other Canadian regions and countries. This work responds to the ethics of tele-healthcare in rural communities in Canada and contributes perspectives of community-based service providers, advisors, and researchers.

J. Leader (✉)

Edwards School of Business, University of Saskatchewan,
25 Campus Drive, Saskatoon, SK S7N 5A7, Canada
e-mail: joelena.leader@usask.ca

C. Bighead

Northern Inter-Tribal Health Authority (NITHA), 2300 10
Ave W., Prince Albert, SK S6V 5S4, Canada
e-mail: cbighead@nitha.com

P. Hunter

Prince Albert Grant Council, Health & Social
Development, 851 23rd Street West, Prince Albert,
SK S6V 4M4, Canada
e-mail: phunter@pagc.net

R. Sanderson

Lac La Ronge Indian Band Health Services, 334 Wilson
Charles Dr., La Ronge, SK S0J 1L0, Canada
e-mail: rsanderson@LLRIBHS.ca

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Introduction: Rural and Remote Health Inequities and the Emergence of Telehealth

A discussion of rural bioethics in the context of rural and remote Canada would find itself amiss if we

neglected to discuss the landscape of access challenges and the emergent role of telehealth. To begin, people living in rural, remote, and northern communities in Canada, of primarily Indigenous¹ ancestry, have long grappled with limited access to family physicians, specialists, allied health professionals² and healthcare services, facing greater health disparities than people living in urban areas. Even when they do have access, they frequently experience poorer outcomes (Wilson, et al. 2020). Several factors underpin access challenges including geographic remoteness and the clustering of services, resources, and facilities in urban centres, with an ongoing shortage of physicians, healthcare staff and resources, and long distances to health centres making timely access more difficult (Subedi, Greenberg, and Roshanafshar 2019; Laurent 2002; Brassolotto, et al. 2019; Canadian Institute for Health Information 2014; Bosco and Oandasan 2016).

Roughly 60 per cent of Indigenous people in Canada live in rural and remote areas including the northern provincial regions and territories compared to 33 per cent of the non-Indigenous population and are disproportionately affected by access issues (Statistics Canada 2016). Saskatchewan has one of the highest Indigenous populations living in northern and remote regions (87.4 per cent) who self-identify as Indigenous and who are primarily of First Nations and Métis ancestry (Irvine and Quinn 2016). For Indigenous people living in rural and remote communities, ongoing challenges pose comparatively greater difficulties in receiving access to healthcare services and is linked to persistent health inequalities experienced (Bosco and Oandasan 2016). The Truth and Reconciliation Commission (TRC) identified Indigenous health inequity as an ongoing issue that represents a

glaring inaction across the Canadian healthcare system in Canada where considerable systemic change is needed to improve Indigenous health and well-being (Truth and Reconciliation Commission of Canada 2015).

Underlying access issues are reflective of a long history of colonial policies and practices that have introduced significant health challenges for Indigenous people living in Canada broadly. Western-based healthcare systems and models of care have been the dominant norm and are criticized for not being fully responsive to Indigenous community contexts nor cultural approaches to health and well-being (Barnabe 2021). Indigenous conceptions of good health and well-being are inclusive of all aspects of health (mental, physical, spiritual, emotional) which are relational, place-based, and culturally linked to knowledge and language systems, and where familial support systems are rooted (Greenwood and Lindsay 2019; Greenwood, et al. 2017). Far too often policy decisions are guided by urban healthcare models without fully understanding what this means for rural, remote, and northern communities and the potential negative effects on access and delivery. One way forward is Indigenous-focused and rural-based solutions for building regional capacity in areas of training and infrastructure support. There is growing understanding and recognition by scholars, healthcare service providers, community members, and policymakers that approaches need to be responsive to community needs and take into consideration holistic and culturally safe and competent models of care. Both in Canada and globally, there has also been a recognition that cultural safety and anti-racist models in healthcare provide a broader approach.

Telehealth has played a significant role in increasing access to healthcare services for rural and remote communities. Although telehealth emerged as early as the mid-1990's, long before its widespread use in response to the COVID-19 pandemic, it was not until 2004 that First Nations communities in Northern Saskatchewan began to see operational telehealth systems (Gideon, et al. 2009). Pre-pandemic it was report that there were four hundred active telehealth sites across Saskatchewan with approximately twenty thousand patients seen by a healthcare provider over telehealth in 2017/18 (EHealth Saskatchewan, 2018). Telehealth offers

¹ Indigenous people in the Canadian context refers to the original inhabitants of Canada and their descendants which includes First Nations, Inuit, and Métis peoples as defined by Section 35 of the Canadian Constitution of 1982. Throughout this paper, we use the terms “Indigenous People” and “Indigenous communities” to refer collectively to the First Nations, Inuit, and Métis Peoples of this land and in some cases, we also use the terms First Nations, Inuit, and Métis when referring to specific Indigenous groups.

² Allied health professionals include but are not limited to physical and occupational therapists, dietitians, speech pathologists, dental hygienists, diagnostic medical sonographers, radiographers, respiratory therapists.

an alternative means for accessing healthcare at a distance, however, is not meant to replace the local providers and staff within communities. E-Health services and telehealth in Northern Saskatchewan is supported by The Northern Tribal Health Authority (NITHA). NITHA is a First Nations driven organization partnered with the Prince Albert Grand Council, Meadow Lake Tribal Council, Peter Ballantyne Cree Nation, and Lac La Ronge Indian Band that delivers third level services³ to thirty-three First Nations communities in Saskatchewan. They act as a consultant and liaison between government agencies, eHealth Saskatchewan, and First Nations communities on eHealth matters with the mission to improve the quality of health and well-being of its partner community members. E-Health is one key service that they provide and as a third level service they focus on infrastructure and supporting frontline workers and telehealth coordinators who interface with communities by ensuring that critical successful factors are in place.

NITHA works to align its technical and service capacities and requirements with provincial standards within the Saskatchewan Telehealth Network which range from financial and technical to user and client needs by ensuring that technologies are cost-effective, low maintenance and highly reliable as well as easy to run and operate from a user perspective. Human factors such as clinical experience in terms of patient comfort and confidence with using telehealth systems, privacy and confidentiality have been a critical component of their services. Compatibility has played a major role in its success and continues to as the province moves towards virtual care platforms. One key shift in response to the pandemic, is the move towards virtual care for consults directly with patients (home-based), which may present new compatibility requirements are optimization to ensure remote communities continue to have access.

³ Third Level services are delivered directly to Second Level Partners (Northern Multi-Community Bands, Tribal Councils, and in some cases a single Band to the First Level Communities) and include disease surveillance, communicable disease control, health status monitoring, epidemiology, specialized programme support, advisory services, research, planning, education, training, and technical support.

“We’re Always Working on a Shoestring”: Implementing Community Telehealth Services with Stretched Resources

Beginning in 2018 we found ourselves exploring what telehealth meant for communities in Northern Saskatchewan. Drawing from community identified concerns around access to healthcare services and the role of telehealth, we set out on the path of understanding local perspectives on telehealth implementation and utilization, which developed into a community-based collaborative telehealth project with four Northern Saskatchewan communities, primarily Indigenous (First Nations and Métis) communities (Leader 2020). Our research team was a collaboration among four individuals, Indigenous and non-Indigenous, working in diverse fields from academic community-based qualitative research to community health and eHealth services working directly with communities. Offering different perspectives and experiences, one of our team members is a non-Indigenous researcher from the University of Saskatchewan who has ongoing relationships with the partnered communities (Leader), another is employed as NITHA’s eHealth Advisor providing third-level services and originally from Beardy’s and Okemasis Cree Nation (Bighead), and two regional Telehealth Coordinators: one working with the Prince Albert Grand Council (PAGC) currently living and working in Prince Albert, Saskatchewan (Hunter) and another working with the Lac La Ronge Indian Band Health Services (LLRIBHS) and is a member of the Lac La Ronge Indian Band (LLRIB) (Sanderson).

Our collaboration began during the initial planning phase of the project involving biweekly meetings and grew into a partnership that played an essential role in the design, decision-making, and direction of the research project with community stakeholders at the forefront. The expectations and desired outcomes for this project were designed collaboratively; working together to identify project outcomes, best practices, and recommendations to better serve communities with tangible results and we aimed to provide meaningful information back with the goal of increasing telehealth utilization, informing policy proposals, and decision-making. Our approach to understanding community experiences of telehealth was founded on community-based participatory research principles that aim to build respectful relationships in

co-partnership with communities and responded to community-identified concerns around access to healthcare services that were raised by members in all the four communities.

The findings presented in this paper draw on qualitative and exploratory fieldwork from a community-based research project conducted in partnership with four Northern Saskatchewan communities: Île-à-la-Crosse, Pinehouse Lake, Hatchet Lake Denesuline First Nation, and La Ronge. Our critical reflection presented here is based on a snapshot of community perspectives from these four Northern Saskatchewan communities that involved a series of semi-structured interviews (twenty-four in number) and small focus groups with key knowledge users and stakeholders which included patients and family supports (including Elders and community leaders), local and remote healthcare providers and staff (registered nurses and community resource staff, mental health workers, and a family physician), telehealth coordinators (on-site and regional), IT staff, and eHealth advisors. In addition to ethics approval from the University Research Ethics Board, research approval was also obtained from the Saskatchewan Population Health Unit to conduct research with healthcare employees. Community support for the project was provided by community leaders in the form of signed letters of support and research agreements.

Although the groundwork for telehealth to operate is currently in place with increasing supports and engaged participation in needs assessment consults, this wasn't the case from the beginning. During this project it was revealed how systemic issues related to the lack of proper funding and supports during the initial implementation created barriers to the full utilization of telehealth in Northern Saskatchewan. Organizations such as NITHA who work directly with communities are often working on a shoestring budget with limited capability for long-term planning due to the nature of annual proposal processes. Challenges surrounding limited budgets and capacities for long-term planning are important to illustrate and unpack.

Some of the critical factors preventing the full implementation of telehealth early on was under resourcing of key personnel, need for longer-term financial supports, and infrastructure challenges. It was left to communities and NITHA to implement telehealth services that were designed for southern/

urban contexts which differ from northern and rural/remote Canadian contexts in terms of geography, access/infrastructure, and cultural/community factors around technology acceptance, and limited human resources. Related to this was the lack of fully funded positions for key personnel such as telehealth coordinators, onsite facilitators, and IT which resulted in stretched human and financial resources from the start. While these types of resource challenges are not a new phenomenon for northern communities, often underserved and under resourced, this caused significant delays in implementing an operational telehealth system. Limited funding for telehealth to get off the ground along with infrastructure and broadband reliability issues were the main concerns along with limited spatial considerations of the local clinics where telehealth was located.

We found that *where* telehealth technologies are located matters. Arising from discussions about participants' experiences was a range of space-related issues including scheduling challenges with multi-purpose rooms, telehealth units located away from clinical equipment, and difficulties in relocating technology due to limited mobility. In many clinics there are no dedicated spaces for telehealth which created some difficulties in accessing telehealth when the rooms were occupied for other purposes. In some cases, healthcare providers encountered physical challenges with moving larger telehealth units to different rooms or floors to be closer to clinical equipment.

Where telehealth is located is important. The study identified potential ethical issues related to spatial and privacy concerns with the lack of dedicated rooms for telehealth. For instance, in many communities, telehealth units were centrally located in rooms that lacked adequate soundproofing primarily because they were not designed for medical consults; telehealth was often located in multi-purpose rooms such as kitchens or board rooms. Patients viewed these spaces as offering limited privacy and confidentiality. This led to one key finding—that implementation of telehealth must consider place and space within rural contexts. This was both in relation to patient privacy and considering cultural safety of users but as well as in relation to increasing access and culturally responsive care. While factors such as cultural acceptance of technology use, and perceptions of privacy and cultural safety arose during the project, telehealth was

overwhelming viewed as a benefit. Having local and place-based access to health services via telehealth was viewed as a profound benefit in terms of ease of access without having to leave the community and familiarity with local staff, inclusion of family and supports in health appointments, and greater access to fluent language supports. Responding to the privacy issues noted above, NITHA adapted the units into fully portable systems as a solution for spatial constraints so that the units could be brought to clinic rooms for patient consults. From a technology design and planning point of view, adopting systems designed for southern/urban contexts meant a critical need to understand existing clinic spaces, infrastructure capacity, technical requirements, and community needs for telehealth use. Often, this meant that communities and NITHA would work together to find solutions to already developed systems.

Limited human resources and on-site facilitators were ongoing issues that resulted in the reliance on nurses and healthcare staff such as community resource staff and mental healthcare workers to operate telehealth locally. Local healthcare staff often wear multiple hats serving as technical supports and troubling the systems with the expertise of Regional Telehealth Coordinators. This has resulted in overstretching of available resources and capacity that may not be easily sustained over the long term. Our study identified a distinct need to have community-based super users (user(s) with technical expertise responsible for telehealth locally) and technical staff to support telehealth.

Of critical importance is the need for more engagement and involvement of communities and their supporting organizations in decisions that directly affect the implementation of critical services such as telehealth. For NITHA, and those working directly with communities, there has been a level of feeling left behind. It has been described as feeling like an outsider looking in and having to figure out how to adapt locally to the mainstream provincial system with fewer resources. For service providers, they often feeling like they are a couple steps behind, trying to catch up. A disconnect in engagement and coordination has been the case in many different programme areas in health for rural and remote communities, however this is not a new issue (Bosco and Oandasan 2016; Wilson, et al. 2020). At present, there is no comprehensive (or long-term) national or provincial

healthcare strategies to address the needs of rural and Indigenous communities.

Prompted by the pandemic response, the province has started to shift towards virtual care (web-based) platforms which means telehealth (accessed in local clinics) could be phased out to some degree for preference of direct patient consults with physicians. This has been primarily driven by physicians with consideration for what these platforms can do. The shift towards virtual care, while still early in its implementation, means adapting to provincial standards yet again. There are ethical concerns around potential community specific access issues if virtual care is fully home-based, especially for households with limited broadband access which could disrupt the quality of consults.

If the proposed virtual care model in communities is towards home-based solutions only, one key concern is the varied quality of technology and hardware that individuals will have access to at home (cameras, microphones, connectivity) as well as challenges around navigating processes, registration forms and limited familiarity with technology. While virtual care offers more flexibility, to access healthcare in ones' home, this may only be practical in some homes where quality technology and connectivity are available to ensure smooth consults which could mean less optimal access for those who do not. Figuring out the new systems could also be a challenge that will require local supports. As learned in our study patients' viewed local healthcare staff and Telehealth Coordinators as critical personnel who were instrumental in the coordination and scheduling of appointments and dealing with technical issues. Similarly, having a local nurse translate medical terminology and having cultural and language supports available during consults were most valuable for patients. Moving away from this current model of telehealth-based care accessed in local clinics could mean that local care providers need to find new ways to support patients and develop new processes. In our experience, a blend of both in clinic and home-based virtual care would provide the best solution for implementation—one that does not rule out the current telehealth services offered in communities to ensure access for all.

Although telehealth utilization has increased since its inception, particularly once increased supports and processes were in place, there has been slower uptake

during the pandemic in remote communities generally. Interestingly, the telehealth programme was suspended by eHealth Saskatchewan during the peak of the pandemic in relation to travel restrictions which meant a decline in telehealth consults in many remote Saskatchewan communities. This was unexpected especially given the move to remote consultations provincially and across Canada. One explanation may be that due to social distancing measures, patients were unable to or perhaps fearful to come to the community clinic to use telehealth services as they still meant coming in person.

What we learned from the telehealth project is that provincial initiatives will only have limited success if they do not involve Indigenous people in the development. Indigenous communities can contribute to this success by making sure the infrastructure is in place and concerns are identified for smooth implementation. This approach would ensure that the new platform is communicated to communities to build awareness and uptake, that communities are involved in the development of policies and procedures, and the ability to make adjustments to clinical workflows locally as a way to enable capacity to support these new systems. The best approach the development and implementation of a new technical system at the community level is to try to reach harmony through collaborating together rather than having already built systems implemented without community considerations and cultural contexts. Partnering early on with Indigenous people and local providers and knowledge users that serve the communities will be critical to the success of telehealth.

The Ethical Space of Engagement for Community Telehealth

Ethical considerations for telehealth to succeed in rural, remote, and northern Indigenous communities means reconciling health inequalities and creating meaningful partnerships. That is, ensuring that communities are fully participating in assessments and decision-making for greater self-determination over their own health. Reading and Wien (2013) identified that self-determination is one of the most important and critical determinants of Indigenous health and well-being. In relation to telehealth in Saskatchewan, cultural, socio-technical, and place-based

considerations for technology implementation, decision-making, and involvement of communities is critically needed to address access concerns. Specifically, First Nations and Métis people in Saskatchewan need to be involved in healthcare decision-making when it comes to new technology implementation. Models driven by Indigenous communities, based on Indigenous knowledges and cultures are more likely to be successful (Chino and DeBruyn 2006) and increased control over the planning, development, and distribution of digital technologies can facilitate and lead to self-determination (Budka 2015). Implementation strategies should be guided from Indigenous perspectives that adopt holistic approaches based on traditional knowledge, healing, and cultural connectedness. Reconceptualizing approaches in this way aims towards decolonizing mainstream healthcare models for improving the health and well-being of Indigenous people. As we have identified, an integral part of this process involves communities directly in the decision-making process to support self-determined participation. This is dependent on Indigenous peoples gaining greater control in determining their own health and well-being to find solutions that work (Assembly of First Nations 2017; National Collaborating Centre for Aboriginal Health 2019; Halseth and Murdock 2020; *The Lancet* 2020). Implementing successful telehealth programmes goes beyond inclusion and towards supporting Indigenous self-determination in health. This is achieved through decision-making and guidance in relation to community capacity and infrastructure and ensuring that processes are community-driven, culturally responsive, driven by Indigenous knowledge, and considers community realities.

Challenges in decision-making and competing ethical tensions surrounding telehealth prior to and during the pandemic are wide ranging. We suggest that more thought needs to go into healthcare technology integration for rural and remote Indigenous communities in Saskatchewan and more broadly in Canada. The concept of the “ethical space of engagement” outlined by Willie Ermine, a Cree scholar and educator, is a valuable guiding point for understanding the ethics of tele-healthcare (Ermine 2007). Ermine’s (2007) concept of ethical space envisions creating space for different knowledge systems to interact with mutual respect. Without a community-first approach and a telehealth strategy driven by local communities, these challenges will continue to affect the long-term

sustainability of telehealth programmes and services leaving First Nations, Métis, and Inuit communities behind. Ermine's concept reveals the importance of co-creating spaces of engagement between western and Indigenous systems. Such a concept can be applied to telehealth planning and implementation for greater equity and improved outcomes. In following Ermine's ethical space of engagement, this means co-developing and co-planning the new virtual care model with communities to address ethical implications around community access, acceptance, and use. Co-creating spaces of engagement where provincial eHealth planning teams and Indigenous community members, leadership, and service providers such as NITHA, come together to re-envision tele-healthcare models. This would signal a community-first approach that may be better positioned to restore trust and address emerging ethical issues.

Critical science and technology studies writers have emphasized the need to capture the socio-cultural and political dimensions of technologies in practice to highlight tensions and complexities that arise in specific contexts shaping user-technology relations and technology design/implementation decisions (Oudshoorn and Pinch 2005; Oudshoorn, et al. 2004; Suchman 2007; Winner 1980; Wyatt 2005; Law 1991; Barad 1999). Postcolonial Science and Technology Studies and Indigenous Science, Technology and Society scholars have also problematized western scientific practice and technological design, arguing that Indigenous perspectives are often missing, "othered," and minimized (Harding 2011; Kolopenuk 2020). As the telehealth project unfolded, it was clear that there may also be opportunities for decolonizing participatory design in technology adoption and implementation that are founded on ethical spaces of engagement. Challenges can arise when technologies are not designed, implemented, or operated with the needs, perspectives, and interests of the users in mind.

In our telehealth project, we learned how space and place were critical to ethical telehealth use. The familiarity with telehealth, working with local providers and access to fluent language speakers and supports were all critical components for telehealth to succeed which were specific to each community. Beyond this, ease of technology use, broadband reliability, and quality of hardware for assessments made the sessions smooth and near to that of in person care. We have been wondering what the move towards a

virtual care model might look like moving forward for improving access to healthcare especially if they are not integrated with Indigenous perspectives, community involvement, and guidance. We might ask: what needs to happen to ensure virtual care will meet the needs of communities? Critical questions surrounding this new mode of delivery should focus on the ways in which technologies can foster positive patient-provider relationships in a culturally safe way and meaningfully improve the quality of care and well-being of Indigenous people. Building from Ermine's framing of ethical spaces of engagement, this involves co-creating a respectful space of engagement in the design and implementation of virtual care models and moving towards Indigenous self-determination.

There are cultural, socio-technical, and place-based dimensions of care that factor into the discussion of implementation that should not be taken for granted. As Kelly (2003) points out,

... adequately conceptualizing rural health experience and ethics, addressing the ontological separation of subjects and place, and urban bias of mainstream bioethics theory, calls for more than adding place in, but rather requires attending to the integration and relationality of places, bodies, identities, and cultures. (2287)

In the local Saskatchewan context, rural and Indigenous identities associated with these places are needed for conceptualizing rural health experiences and ethical practice. Place also infers the relational aspects of cultural and historical factors that have shaped healthcare in this province and Canada. Embracing and practicing ethical spaces of engagement can build understanding and guide us closer to this goal.

Conclusion: Recommendations for Telehealth Transitions

To ensure future telehealth system developments and virtual care models meet the needs of communities, we propose some key recommendations. The first is the need for long-term planning, community engagement, and shared decision-making in the implementation of telehealth and virtual care models in the province. Specifically in Canada, we recommend the development of a *five-year*

Indigenous telehealth strategy be in place to consider new technology implementation and to ensure Indigenous (First Nations, Métis, and Inuit people and their communities) priorities, needs, and interests are met. This plan would ensure the interests of Indigenous people in Saskatchewan are at the forefront as the province goes through a paradigm shift from traditional telehealth to virtual care. The focus would be to prioritize the needs of communities with their involvement. Forming a more robust telehealth strategy may also be relevant beyond the Canadian context, particularly in other countries which have experienced colonization, the long-term effects that continue to minimize the voices of Indigenous peoples. Second, new systems should reflect the needs of communities to ensure the services are accessible, enhance ease of use, and follow cultural protocols and supports. At present, there are monthly meetings scheduled with First Nations Telehealth Coordinators led by the First Nations and Inuit Health Branch (FNIHB) and eHealth Saskatchewan Telehealth Managers as an effective forum for raising and addressing telehealth issues. **Continued support through this forum is critical** to current and future telehealth strategies and addressing community-based solutions. More broadly, there may be national and international supports through similar forums that provide critical learning opportunities. Third, larger structural and infrastructural factors need to be considered in relation to **broadband access/reliability and hardware quality needs to be in place** to ensure equitable services. This is especially important when considering virtual care models at the community level and home-based options. This is not a Canada only concern, as accessibility in many regions around the world (both developed and developing) have struggled with high quality and reliable broadband for telehealth to be feasible. Finally, a plan for supporting virtual care needs to be in place including proper **community consultations and building awareness of the new systems** to build familiarity and confidence in these new systems at the community level. While the goal is to build supports based on community needs, planning requires long-term commitments and processes to be in place. Given the important role of local staff identified by patients in our telehealth study, this should include implementing virtual care in the clinical context as an option for clients who require access to stable or reliable broadband, hardware (computers,

cameras, mobile phones). Additionally, having virtual care in the clinic would provide additional support regarding registration systems and language or cultural supports. Similar recommendations may be valuable in other contexts where community protocols and awareness of virtual care platforms may be limited.

The above recommendations represent ways to address the critical resource challenges described in this paper. Specifically, we suggest through greater support models, long-term planning and strategies that engage and are led by Indigenous communities. Through taking a community first approach and working through place-based considerations such as infrastructure needs for new technology adoption, we anticipate greater success for much needed remote health services. Our research has pointed to the need for Indigenous voices and perspectives to be at the forefront of decisions around technology adoption projects such as telehealth. Our findings suggest that these considerations would enable telehealth success through fully integrating these services in clinic that serve the residents of Northern Saskatchewan. We argue that practicing ethical spaces of engagement through mutual respect can guide us closer to this goal.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

References

- Assembly of First Nations. 2017. First nations health transformation agenda. https://www.afn.ca/uploads/files/fnhta_final.pdf. Accessed January 25, 2023.
- Barad, K. 1999. Agential realism: Feminist interventions in understanding scientific practices. In *The Science Studies Reader*, edited by M. Biagioli, 1–11. New York: Routledge.
- Barnabe, C. 2021. Towards attainment of indigenous health through empowerment: Resetting health systems, services and provider approaches. *BMJ global health* 6(2): 1–5.
- Bosco, C., and I. Oandasan. 2016. Review of family medicine within rural and remote Canada: Education, practice, and policy. *College of Family Physicians of Canada*. https://www.cfpc.ca/CFPC/media/Resources/Rural-Practice/ARFM_BackgroundPaper_Eng_WEB_FINAL.pdf. Accessed April 2, 2022.

- Brassolotto, J., C. Haney, L. Hallstrom, and D. Scott. 2019. Continuing care in rural Alberta: A scoping review. *The Canadian Geographer* 63(1): 159–70.
- Budka, P. 2015. From marginalization to self-determined participation. *Journal des anthropologues* 142–143: 127–153.
- Canadian Institute for Health Information. 2014. Supply, distribution and migration of physicians in Canada, 2013: Methodological notes. https://publications.gc.ca/collections/collection_2015/icis-cihi/H115-23-2013-eng.pdf. Accessed April 5, 2022.
- Chino, M., and L. DeBruyn. 2006. Building true capacity: Indigenous models for indigenous communities. *American Journal of Public Health* 96(4): 596–99.
- EHealth Saskatchewan. 2018. Annual Report 2017–2018. Regina, Saskatchewan. https://www.ehealthsask.ca/about/Annual%20Reports/2017-18%20Annual_Report.pdf. Accessed January 25, 2023.
- Ermine, W. 2007. The ethical space of engagement. *Indigenous Law Journal* 6(1): 196–203.
- Gideon, V., Nicholas, E., Rowlandson, J., and F. Woolner. 2009. Enabling and accelerating first nations telehealth development in Canada. *The Journal of Community Informatics* 5(2).
- Greenwood, M., and N. Lindsay. 2019. A commentary on land, health, and indigenous knowledge(S). *Global Health Promotion* 26(3_suppl): 82–86.
- Greenwood, M., N. Lindsay, J. King, and D. Loewen. 2017. Ethical spaces and places: Indigenous cultural safety in British Columbia health care. *AlterNative: An International Journal of Indigenous Peoples* 13(3): 179–189.
- Halseth, R., and L. Murdoch. 2020. Supporting indigenous self-determination in health: Lessons learned from a review of best practices in health governance in Canada and internationally. *National Collaborating Centre for Indigenous Health (NCCIH)*. <https://www.nccih.ca/Publications/Lists/Publications/Attachments/317/Ind-Self-Determine-Halseth-Murdoch-EN-web-2020-12-02.pdf>. Accessed April 20, 2022.
- Harding, S.G., ed. 2011. *The postcolonial science and Technology Studies Reader*. Durham, NC: Duke University Press.
- Irvine, J., and B. Quinn. 2016. Northern Saskatchewan health indicators, community characteristics: Geographic and political profile. https://www.populationhealthunit.ca/mrws/filedriver/Health_Indicator_reports/Community_Characteristics_Geographical_and_Political.pdf. Accessed February 3, 2022.
- Kelly, S.E. 2003. Bioethics and rural health: Theorizing place, space, and subjects. *Social Science & Medicine* 56(11): 2277–2288.
- Kolopenuk, J. 2020. Miskâsowin: Indigenous science, technology, and society. *Genealogy* 4(1): 21.
- Laurent, S. 2002. Rural Canada: Access to health care. Ottawa: Library of Parliament, Parliamentary Research Division, Economics Division, Report PRB 02-45E. <http://publications.gc.ca/collections/Collection-R/LoPBdP/BP/prb0245-e.htm>. Accessed March 08, 2022.
- Law, J., ed. 1991. *Sociology of monsters: Essays on power, technology, and domination*. London: Routledge.
- Leader, J. 2020. Mutual shaping of tele-healthcare practice: Exploring community perspectives on telehealth technologies in Northern and Indigenous contexts. Dissertation, University of Saskatchewan. <https://harvest.usask.ca/handle/10388/12889>. Accessed April 29, 2022.
- National Collaborating Centre for Aboriginal Health. 2019. *Fourth national forum on Indigenous determinants of health: “Nakistowinan (Stop in) – Pimicisok (Stock up) – Kapesik (Stay over)”—Proceedings report*. Prince George, BC: National Collaborating Centre for Aboriginal Health. <https://www.nccih.ca/docs/determinants/RPT-StockStopStay-SDOH-EN.pdf>. Accessed April 19, 2022.
- Oudshoorn, N., and T. Pinch, eds. 2005. *How users matter. The co-construction of users and technologies*. Cambridge: MIT Press.
- Oudshoorn, N., E. Rommes, and M. Stienstra. 2004. Configuring the user as everybody: Gender and design cultures in information and communication technologies. *Science, Technology, & Human Values* 29(1): 30–63.
- Reading, C., and F. Wien. 2013. Health inequalities and the social determinants of Aboriginal Peoples’ health. <https://www.nccih.ca/docs/determinants/RPT-HealthInequalities-Reading-Wien-EN.pdf>. Accessed April 3, 2022.
- Statistics Canada. 2016. *2016 Census of Population*. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm>. Accessed April 12, 2022.
- Subedi, R., T.L. Greenberg, and S. Roshanafshar. 2019. Does geography matter in mortality? An analysis of potentially avoidable mortality by remoteness index in Canada. *Health Reports* 30(5): 3–15.
- Suchman, L. 2007. *Human-machine reconfigurations: Plans and situated actions*, 2nd edition. New York: Cambridge University Press.
- The Lancet*. 2020. Self-determination and indigenous health. *The Lancet* 396(10248): 361.
- Truth and Reconciliation Commission of Canada. 2015. Truth and reconciliation commission of Canada: Calls to action. https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/indigenous-people/aboriginal-peoples-documents/calls_to_action_english2.pdf. Accessed May 1, 2022.
- Wilson, R.C., J. Rourke, I.F. Oandasan, and C. Bosco. 2020. Progress made on access to rural health care in Canada. *Canadian Family Physician* 66: 31–36.
- Winner, L. 1980. Do artifacts have politics. *Daedalus* 109(1): 121–36.
- Wyatt, S. 2005. Non-users also matter. The construction of users and non-users of the internet. In *How users matter. The co-construction of users and technologies*, edited by N. Oudshoorn and T. Pinch, 67–80. Cambridge: MIT Press.

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