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Original Article

Bringing Care Close to Home: Remote Management of Heart Failure In Partnership with Indigenous Communities In Northern Ontario, Canada

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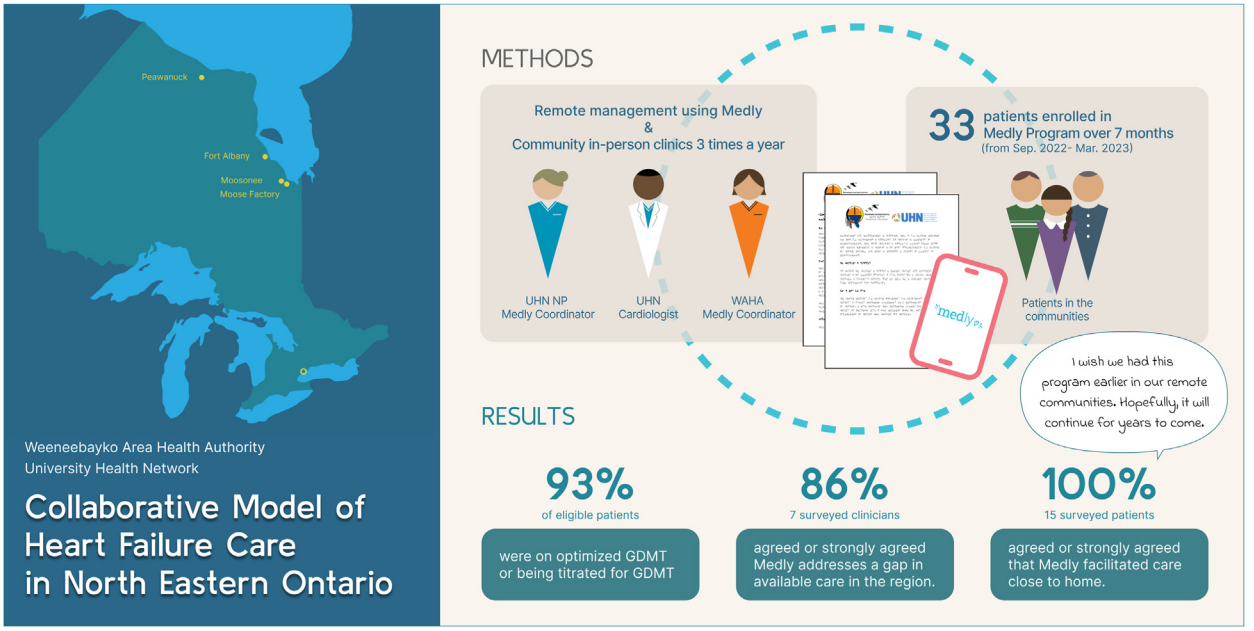

ABSTRACT

Background: The Weeneebayko Area Health Authority (WAHA) is a regional, community-based Indigenous health authority in Northern Ontario, Canada. From September 2022 to March 2023, the WAHA and University Health Network engaged in a partnership that designed a collaborative model of care to address inequities in cardiology specialist access in Northern Ontario. This model implemented a digital therapeutic for heart failure, (the Medly program) and in-person cardiology clinics in the region.

Methods: A WAHA-based Medly program clinical coordinator worked closely with the University Health Network team to deliver care and

RÉSUMÉ

Contexte : La Weeneebayko Area Health Authority (WAHA) est une autorité sanitaire autochtone communautaire régionale située dans le nord de l'Ontario, au Canada. De septembre 2022 à mars 2023, la WAHA et le Réseau universitaire de santé ont conclu un partenariat visant à concevoir un modèle de soins collaboratif pour s'attaquer aux iniquités en ce qui concerne l'accès aux spécialistes en cardiologie dans le nord de l'Ontario. Ce modèle a permis l'instauration d'une solution thérapeutique numérique pour l'insuffisance cardiaque (le programme Medly) et de cliniques de cardiologie en personne dans la région.

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support patient self-management of HF. The use and effectiveness of the Medly program were tracked through app usage and rules-based algorithm alerts, based on patient self-reported data. Distribution of relevant equipment (a scale, a blood pressure cuff, and a mobile device) for the Medly program was recorded. Surveys to assess patient and provider satisfaction with the Medly program also were administered. A retrospective chart audit of electronic medical records and administrative databases was conducted.

Results: A total of 33 patients in the WAHA were enrolled in the Medly program during a 7-month period, surpassing the enrollment goal of 25 patients. A total of 93% of eligible patients were on optimized guideline-directed medical therapy or were being titrated for it. Of 15 surveyed patients, 100% agreed or strongly agreed that the Medly program facilitated delivery of care close to home, and 86% of surveyed clinicians (n = 7) agreed or strongly agreed that the Medly program addresses a gap in available care in the region.

Conclusions: The implementation of the Medly program in partnership with the WAHA has demonstrated success in terms of the volume of referrals, the quality of care, adherence to evidence-based best-practice guidelines, and satisfaction with the program.

Méthodologie : Un coordonnateur clinique du programme Medly faisant partie de la WAHA a travaillé en étroite collaboration avec l'équipe du Réseau universitaire de santé pour dispenser des soins et apporter du soutien aux patients dans l'autoprise en charge de leur insuffisance cardiaque. L'utilisation et l'efficacité du programme Medly ont fait l'objet d'un suivi au moyen d'une application et d'alertes par un algorithme reposant sur des règles ainsi que sur des données rapportées par les patients. La distribution du matériel pertinent (un pèse-personne, un brassard de tensiomètre et un appareil mobile) pour le programme Medly a été consignée. Des sondages visant à évaluer la satisfaction des patients et des prestataires de soins ont été réalisés. Une vérification rétrospective de dossiers médicaux électroniques et de bases de données administratives a été menée.

Résultats : Un total de 33 patients dans la WAHA ont été recrutés dans le cadre du programme Medly durant une période de 7 mois, ce qui était supérieur à l'objectif de 25 patients. Au total, 93 % des patients admissibles suivaient un traitement médical optimisé axé sur les lignes directrices ou y étaient préparés. Parmi 15 patients interrogés, 100 % étaient d'accord ou fortement d'accord que le programme facilitait la prestation des soins près de leur domicile et 86 % des cliniciens interrogés (n = 7) étaient d'accord ou fortement d'accord que le programme Medly comblait une lacune dans la prestation des soins dans la région.

Conclusions : L'instauration du programme Medly en partenariat avec la WAHA a été une réussite quant au nombre de patients orientés, à la qualité des soins, à l'adhésion aux lignes directrices des pratiques exemplaires fondées sur des données probantes et à la satisfaction à l'égard du programme.

Indigenous populations across Canada experience a higher burden of cardiovascular disease morbidity and mortality, compared to the general Canadian population.[1,2] Despite the need for care, a 2022 review demonstrated that Indigenous people experience greater delays in seeking care, reaching care, and receiving care, and in the disparities in care they encounter.[3] Along the Western coast of the James and Hudson Bays (JHB) in Northern Ontario, Canada, the impact of these health disparities may be exacerbated further, as Indigenous communities there reside in remote areas with limited access to primary care or specialized cardiac care. A report published in 2019 by the JHB Minomathasowin Public Health Department states that "In most age groups, our community members are more likely to have a history of heart failure when they die compared to Ontario overall."[4] The Weeneebayko Area Health Authority (WAHA), an Indigenous health authority, provides specialist cardiology access through 1-2 general cardiologists who visit select communities in the region, once a month on average. The scope of community care available for patients with heart failure (HF) is limited, and it varies among communities. For most diagnostic testing or interventions, patients in the region are required to travel 3-9 hours to the south to receive care or testing, with priority based on urgency, and they often go without accompaniment. The number of consultations that require transportation out of the community, to complete a cardiologist visit in the Weeneebayko region, has increased by 29% in the most-recent fiscal year reported (2018) and has more than doubled since 2012, based on internal fiscal reports.

HF is a morbid chronic disease that requires coordinated teamwork across the continuum of care.[5] The WAHA strives to provide optimum healthcare as close to a patient's home as possible. Digital therapeutic tools have the unique ability to remove the barrier of geography while improving access to care using a common technology.[6,7] From September 2022 to April 2023, the WAHA partnered with the Peter Munk Cardiac Centre, part of the University Health Network (UHN), to implement Medly, a digital therapeutic program for people living with HF.[8] "The Medly program has been standard of care at UHN since 2016. In a pre-test, post-test study design, it was found that Medly decreased heart failure related hospitalizations."[9]

Implementation efforts for the Medly program were initiated in tandem with 4 in-person cardiology clinics run by UHN in Peawanuck, Moosonee, and Moose Factory, in September 2022 and January 2023, and in Fort Albany in February 2023. Together, the in-person clinics and the remote management through the Medly program aimed to increase access to specialist cardiology care in the JHB

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See page 1432 for disclosure information.

region. The project was funded by Ontario Health and Boehringer Ingelheim, through their Health Care Innovation Challenge Funding competition. This descriptive study summarizes relevant project outcomes and implementation processes.

Methods

Project area and period

The Western shores of JHB in Northern Ontario are home to many diverse Indigenous communities. Several Cree dialects are spoken in the region, but no other Indigenous languages are commonly spoken. The prominent Indigenous populations in the JHB region are the Mushkegowuk, the Omushkegowuk, and the MoCreebec. The regional centres are in Moosonee and Moose Factory. Both communities sit on the Moose River, with Moose Factory being an Indigenous community (two-thirds of the island land is designated as "Factory Island 1," set aside for the Moose Cree through the signing of Treaty No. 9 in 1905 with the British Crown).[10] The Weeneebayko General Hospital in Moose Factory serves the whole region, although JHB patients routinely travel to Kingston, Sudbury, and Timmins for care. Please refer to Figure 1 for a map of Ontario, with Toronto, Timmins, Moose Factory, Fort Albany, Attawapiskat, and Peawanuck, Ontario included for scale.

The Medly program

The Medly program is a Health Canada class II medical device that combines a patient-facing smart phone in-app, powered by an expert, clinically validated, bluetooth-enabled, rules-based algorithm using measurements and symptoms with a nurse-led model of care. The program provides patients with real-time, personalized self-care directives to manage their HF and symptoms (including diuretic instructions when triggered). Simultaneously, the healthcare team is alerted via a clinician dashboard, enabling the team to actively manage patients remotely.[11] The Medly program has been shown to improve optimization of use of guideline-directed medical therapy.[12] The Medly app lives on patients' phones, and its use requires a blood pressure (BP) cuff, a weight scale, and a mobile device. The Medly program also has been shown to decrease the incidence of hospitalizations and mortality for patients with HF, and it is the standard-of-care at UHN.[9,13] Patient data are stored in secure servers, including Medly alert and adherence data, and they are accessed by clinicians through use of a dashboard (the "Medly dashboard").

Project design and population

Building a model of care for patients with HF in the JHB region was the result of a 5-year partnership between the WAHA and UHN that began in 2017 and was maintained through the COVID-19 pandemic. Remote management of patients with HF, as well as in-region cardiology clinics, was possible due to sustained engagement with the WAHA and approaches grounded in the WAHA's values, practices, and vision. Patients were referred to the WAHA and/or UHN regional cardiology clinics through various pathways—via WAHA family physicians, nursing-station staff, visiting cardiologists and/or specialists, and self-referral. Health services in the region receive both federal and provincial funding, with both WAHA and out-of-region services, notably specialty services, rotating through communities. Referred patients included those with existing or new HF, as well as those with concerning risk factors for HF, such as uncontrolled hypertension. Education and awareness relating to the Medly program were approached through the advocacy for the program by local champions, such as the Medly program clinical coordinator, presentations at virtual and in-person WAHA physician rounds, and meetings with health directors of the region. The patient population varied. Medly program patients had clinical

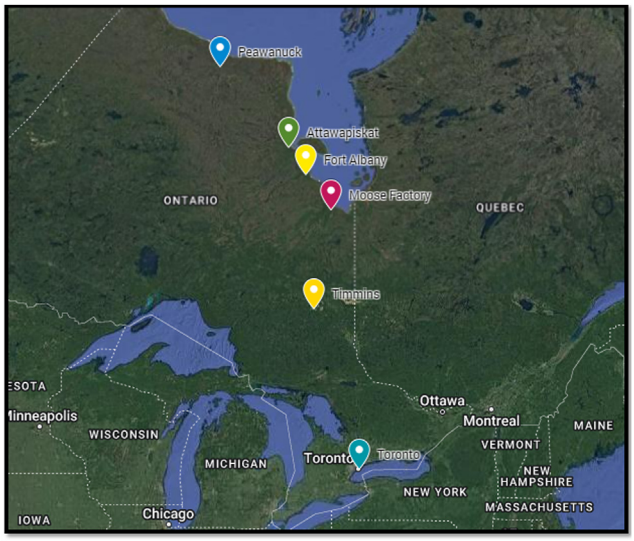

Figure 1. Map of Ontario, Canada, showing the Weeneebayko Area Health Authority communities included in the Medly program pilot project, and several communities visited by the University Health Network (based in Toronto, about 850 km south of Moose Factory, and 1326 km south of Peawanuck) cardiology team. Figure courtesy of Google Maps 2023, accessed June 2023.

manifestations of HF across the New York Heart Association functional class spectrum (I-IV),[14] as well as general cardiovascular concerns, such as hypertension.

Use of the Medly program has been shown to be effective for medication titration to achieve guideline-directed medical therapy (GDMT).[12] Medly program patients enter their symptoms into the device, as well as their weight and BP, and a rules-based algorithm gives them instructions, and sends an alert to the Medly program clinical coordinator, a nurse, or a nurse practitioner who reviews the "caution" or "critical" alerts and responds. Delivery of critical alerts is escalated to a cardiologist also, who works with the Medly program clinical coordinator to manage patients who have urgent or emergent HF events.

To implement the Medly program within the JHB region, a model of care grounded in the WAHA's values and principles was codeveloped before enrollment of patients in the program commenced. A key aspect of the Medly program is the clinical coordinator position, which is crucial for facilitating care of patients, including the escalation of care to other clinicians or the troubleshooting of issues, such as need for medication changes and adjustments. A WAHA-based clinical coordinator (practicing out of Moose Factory) was hired to ensure that the provided care took into account the local context. The Medly program clinical coordinators reviewed caution alerts and responded to them in real time. In the event of a critical alert, patients were phoned almost immediately—in $<$ 1 hour from the time of the alert. When appropriate, referrals to other specialists (such as endocrinologists and ophthalmologists) were facilitated for patients who had multiple conditions. Evaluation of the implementation was conducted under a quality-improvement approval process through UHN (UHN quality improvement [QI] ID: 22-0514).

In addition to the creation of the WAHA-based clinical coordinator position, significant effort was dedicated to adapting Medly program material and documentation to the JHB region. Early in the implementation, the WAHA and UHN teams recognized that some patients are more comfortable reading the Cree language than English. To maximize the program's reach and address issues of health literacy, Medly program documentation, such as a 1-page information sheet and a patient agreement, were translated from English into Cree. A Cree elder was engaged to read the 1-pager aloud in Cree and was interviewed in both Cree and English to provide a patient perspective on the Medly program. All English and Cree materials were uploaded to the WAHA website for public use.

Ethical considerations

Patient and provider surveys were prepared to both satisfy funder reporting requirements and evaluate the program. The surveys and programmatic evaluations, such as a retrospective chart audit and analysis of Medly program data, were reviewed and approved by the UHN QI Department (UHN QI ID: 22-0514). The WAHA QI team also was consulted, and a completed report on the project was shared with them. Data were treated in accordance with the Ownership, Control, Access, and Possession (OCAP)[15] principles under the WAHA's direction. The utmost caution was taken to ensure that data on Indigenous people were deidentified and were reviewed by only approved members of the WAHA and/or UHN teams. Surveys were completed anonymously. Demographic information was not collected, as it could be potentially identifiable, given the small sample of surveyed participants. A retrospective chart audit was conducted for eligible patients with HF, to assess titration of GDMT. All personal health information was reviewed under secure circumstances, in adherence with the Ownership, Control, Access, and Possession principles, and it is presented in an anonymous, aggregate format.

Sampling methods

Programmatic data included data for all 33 patients enrolled in the Medly program. Patient surveys were distributed to patients who had been enrolled in the program for at least 1 month, to ensure that they could provide feedback effectively (n = 21). Similarly, providers were surveyed only if they had an interaction with or had referred a patient to the Medly program. Both patients and providers received a follow-up reminder to complete the survey 2 weeks after the original invitation was sent. A total of 21 patients and 19 providers were asked to complete the survey. A total of 15 patients and 7 providers completed the surveys (response rates of 71.4% and 36.8%, respectively).

Data collection and analysis techniques

Use of the Medly program was tracked through program data, such as alerts and counts of self-reported readings. These readings were used to calculate patient adherence to the program. Partial adherence to the digital therapeutic program was defined as a patient completing 1 reading (pulse, BP, weight) per day while enrolled in the Medly program; full adherence was defined as a patient completing 3 readings (pulse, BP, weight) per day while enrolled in the program. Distribution of the equipment (a scale, a BP cuff, a mobile device) was recorded. Alert data also were tracked, and trends regarding alerts at the normal, caution, and critical levels, as triggered by the Medly program algorithm, were observed.

Program data were pulled directly from the Medly program server at UHN, before being cleaned and analyzed, using Excel (Microsoft, Redmond, WA). Patient and provider surveys were built, using the secure software Research Electronic Data Capture (REDCap, Vanderbilt University, Nashville, TN) at UHN, and were distributed via e-mail.[16] Survey data were analyzed using REDCap, as well as Excel. A retrospective chart audit was conducted to assess the titration of GDMT, using encounter information from 2 electronic medical records—Epic (Epic Systems, Verona, WI) and PS Suite (TELUS Health, Calgary, Alberta, Canada), as well as the Medly program dashboard. With regard to electronic medical records (EMRs), the Epic EMR is used by UHN, and the PS Suite EMR is used by the WAHA. This information then was analyzed and collated, using Excel (Microsoft).

All patients were assessed, and medications were reviewed at the time of referral to the Medly program, serving as the baseline timepoint for assessing GDMT, focusing on quadruple therapy. Three months post—Medly program enrollment, the WAHA and UHN Medly program clinical coordinators conducted a chart review of each patient's

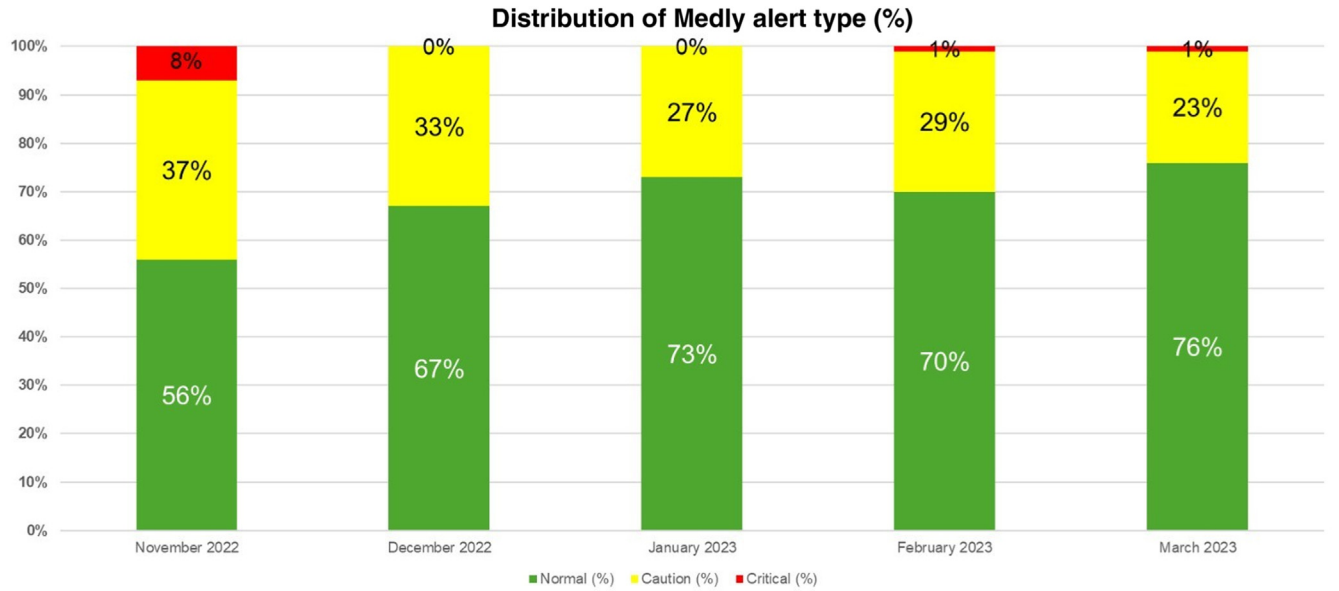

Figure 2. Distribution of Medly program alerts, from November 2022 to March 2023. The increase in the proportion of normal alerts and the decrease in the proportions of caution alerts and critical alerts could indicate better heart failure management.

medication and/or titration against GDMT targets. Based on their clinical judgement, a determination was made as to whether the patient either was being effectively titrated for GDMT, or already was receiving optimized treatment.

Surveys were distributed to both patients and providers, to evaluate their perception of the Medly program. Patients were surveyed only after they had been enrolled in the program for 1 month, to ensure that their interaction with the Medly program was sufficient to facilitate their provision of quality feedback. Providers were surveyed if they had previously referred a patient to the Medly program. Respondents were offered an opportunity to share qualitative feedback through an open-text response, on a voluntary basis, in addition to answering the survey questions.

Results

Medly program data

Over a period of 7 months, 33 patients were enrolled in the Medly program, thereby enhancing the access of specialist cardiology services to remote Indigenous communities in the JHB region. A commitment to providing culturally appropriate and strengths-based care resulted in the project goal of enrolling 25 patients being surpassed. Positive feedback was provided by patients and providers, and the results suggest that the management of HF for enrolled patients had beneficial effects.

The Medly program patients in the JHB region displayed 55% partial adherence to the digital therapeutic program (defined as completing 1 reading [pulse, BP, weight] per day while enrolled in the program), and 52% full adherence (defined as completing 3 readings [pulse, BP, weight] per day while enrolled in the program. These adherence metrics were consistent across the 3 months that data were collected (January, February, and March, 2023). The cumulative adherence rates are > 100%, as partially adherent patients also include those who are fully adherent. The distributions of program alerts shifted over time (Fig. 2); the final proportions were 76% normal alerts, 23% caution alerts, and > 1% critical alerts. Figure 2 shows how the distribution of Medly program alerts developed as the implementation progressed. At the baseline clinical review of the WAHA Medly program patients, 0 were determined to be either receiving titration for or on optimized GDMT. A retrospective chart audit conducted at 3 months post−Medly program onboarding, to assess the titration of GDMT for patients with HF, showed that 93% of eligible patients were either on optimized GDMT or were being titrated for GDMT.

Equipment distribution was tracked at the point of enrollment into the Medly program, and was separated into 3 distinct categories, as follows: (i) ”bring your own everything“ to indicate patients who had all necessary components themselves; (ii) ”bring your own device“ to indicate patients who brought their own smartphone and/or data plan, but required a scale and BP cuff; and (iii) ”full kit” to indicate patients who required that all components (phone, BP cuff, scale) be provided to them. At the conclusion of the project, 40% of patients were in category (i), 46% were in category (ii), and 14% required a full kit.

Survey results

A total of 15 patient responses and 7 provider responses were provided. Surveys were distributed using REDCap. The following bar charts contain key results of both the patient and the provider surveys. Complete survey results can be found in Supplemental Table S1, which contains the results of the patient survey, and Supplemental Table S2, which contains the results of the provider survey. Results are reported as counts and percentages, with missing responses also recorded.

Patient survey results. A total of 15 WAHA patients completed the survey. Key results from the patient survey

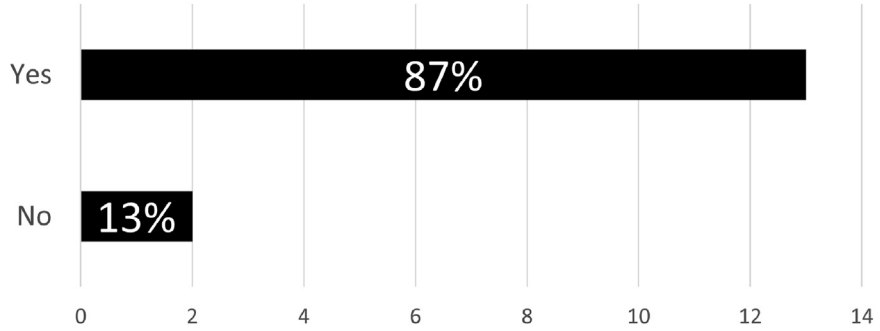

Figure 3. Patient question: Would you recommend the Medly program to others? A total of 87% of respondents indicated they would recommend the Medly program to others. X-axis indicates number of responses.

include the following findings: 86% of respondents would recommend the Medly program to others; 80% felt the program addressed a gap in care in the community; 80% found the program easy to participate in; and 87% felt more confident in managing their condition with the aid of the program. Figures 3-7 show results from the patient survey.

Qualitative responses. Survey respondents also were asked to provide additional comments or suggestions via the following open-ended query: "Please provide any other suggestions or comments regarding your care or the Medly Program." Several respondents expressed their gratitude for the program, as shown by the following response:

> *I wish we had this program earlier in our remote communities. As I have lost loved ones as [sic] sudden cardiac arrest. Hopefully, it will continue as [sic] years to come. For me, I'm confident in my health and continue to feel positive with my lifestyle. Helped me a lot mentally, emotionally and physically.*

Another respondent shared the following, indicating an increase in confidence in condition management through enrollment in the Medly program: "Gave me confidence in my health condition." One respondent had positive interactions with the Medly program, but wondered if an increase in integration with other specialists was possible, especially in sites located out of the region.

> *Would be nice to see all specialists looking after my healthcare in one hospital. As of now I have [specialists] in [southern hospital] and am on a waiting list for a referral to see [an] ophthalmologist for cataracts. Am told wait list here in [southern hospital] is over a year. So am waiting for a referral in [regional hospital], which my optometrist says will be faster. So that will be 3 different hospitals. Hope that they would look into this. I am very happy with my Medly team, which are very caring doctors and nurses. They have called me on [sic] numerous times when my numbers are off and the weight, blood pressure and heart rate are so easy to do. Thank you for this team.*

In general, the open-ended responses were positive, and they corroborate the positive sentiment captured in the survey. Full survey responses can be found in Supplemental Table S1.

Provider survey results. A total of 7 WAHA providers completed the survey on their experience with the Medly program. Key results from the provider survey include the following: 86% of providers found the program easy to participate in; 86% found that the program addressed a gap in available care in the region; and 43% felt that the program was integrated into their workflow and practice. Figures 8-10 show results from the provider survey.

Qualitative responses. Like the patient survey, the provider survey also had 2 free-text boxes for respondents to use to provide comments or recommendations on the program. Like

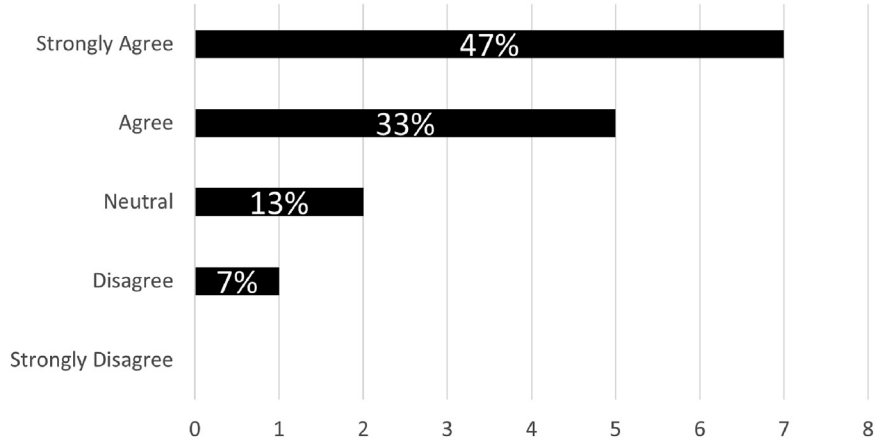

Figure 4. Patient question: I found the program easy to participate in. A total of 80% of respondents agreed or strongly agreed that the Medly program was easy to participate in. X-axis indicates number of responses.

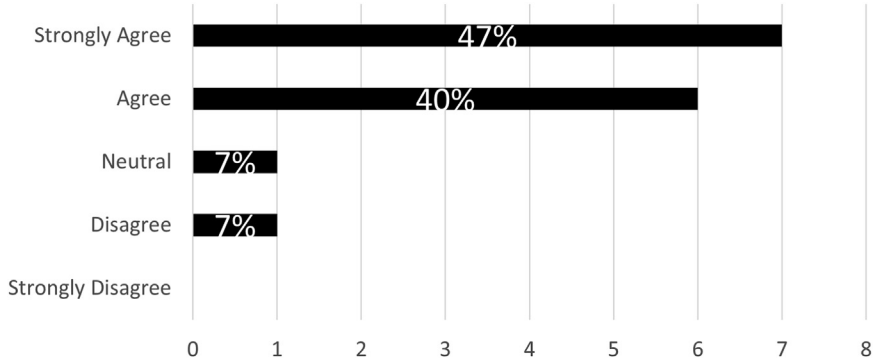

Figure 5. Patient question: I felt more confident in the management of my heart condition on Medly. A total of 87% of respondents felt more confident in the management of their heart failure through enrollment in the Medly program. X-axis indicates number of responses.

patients, providers saw value in the program, as the following response indicates: "Thank you to the UHN team. I know my patients, their families, and my colleagues appreciate and value the program." Some providers expressed concerns about the continuity of care, and communication with other service providers, both in-region and out-of-region, as indicated by the following response:

> *I'm not sure the 'collaborative' aspect has been worked out well yet. It seems more like basing care for some aspects of care to Toronto [sic]. For very complex conditions, this is OK, but when it involves 'garden variety' conditions like hypertension, it actually may move care farther from home, rather than closer.*

In general, provider comments corroborated the positive sentiment captured in the survey and offered avenues for continued improvement. Full survey results can be found in Supplemental Table S2.

Discussion

A total of 33 patients were enrolled and managed in the Medly program over a 7-month time period, with resultant high levels of patient and provider satisfaction, and 93% of patients receiving GDMT for their HF. The implementation of the Medly program in the JHB region of Northern Ontario was well received by both patients and providers. In all, 87% of Medly program patients said they would recommend the program to others. Further, 80% of patients, and 86% of providers, thought that the Medly program addressed a gap in available care in the region. Programmatic data, collected from the Medly program dashboard, as well as the Epic and PS Suite EMRs, suggest that the program helped patients better manage their HF. Medly program alert data trended positively throughout the project, concluding at the level of 76% normal alerts, 24% caution alerts, and $<$ 1% critical alerts (similar to trends reported in other deployments). Further, the 55% full adherence and 52% partial adherence levels to taking Medly program measurements are similar to trends found in other deployments. An important point to note is that access to required Medly program equipment enabled program participation, and only 14% of JHB Medly program patients required a full kit (a BP cuff, a scale, a mobile device). Connectivity in the region also is sufficient, with several communities having access to satellite Internet, facilitating communication between patients and the Medly program clinical coordinator. However, when patients were without access to the Internet, the Medly program's in-app algorithm provided instructions and stored data for later, uploading when connectivity was restored.

The integration of the Medly program into the WAHA's services has been shown to be of benefit in sustaining the continuity of care afforded to JHB patients. Management of new or unstable HF is a high-touch process, with titration toward the 4 pillars of GDMT requiring prompt and

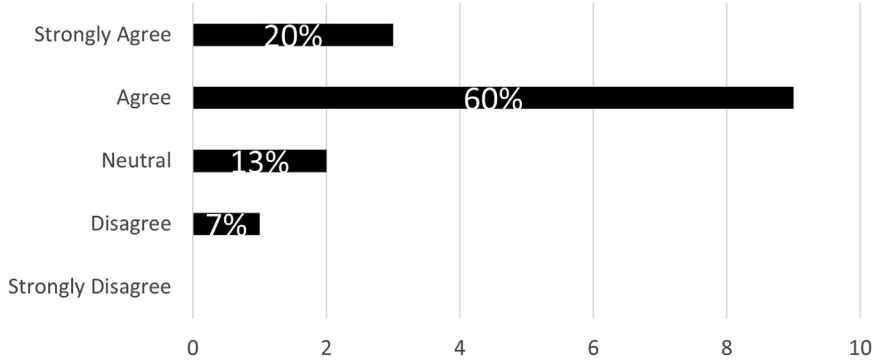

Figure 6. Patient question: Medly addresses a gap in available care within my community. A total of 80% of respondents agreed or strongly agreed that Medly addresses a gap in available care within the James and Hudson Bays region. X-axis indicates number of responses.

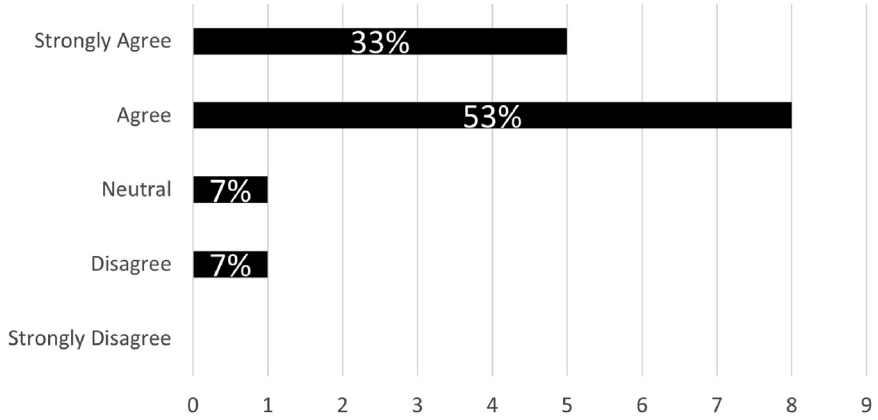

Figure 7. Patient question: The Medly program allows me to access care close to home. A total of 86% of respondents agreed or strongly agreed that the Medly program allowed them to access care close to home, a key objective of the Weeneebayko Area Health Authority. X-axis indicates number of responses.

consistent follow-up care.[17] Avoiding the need for patients living in rural and remote parts of Canada to have to travel several hours for specialist visits is a key goal of digital health approaches.[18,19] This pilot implementation has shown that, in tandem with in-person clinics, remotely managed digital therapeutics can deliver high-quality, culturally appropriate care to Indigenous populations. The patient and provider reception of the program, as well as pilot-project results, continue to inform the collaboration, and sustaining this success is a priority. The refinement and improvement of continuity of care, documentation, and communication are key areas of focus—whether internally, across the WAHA sites, or with the regional and southern centres.

The WAHA–UHN partnership has been in development since 2017—nearly 5 years before this pilot project was initiated. Relationship-building and time invested to come together—and to stay committed, despite distance, Covid-19, and community closures—contributed greatly to the success of the pilot project to provide equitable access to quality HF care in the JHB region.

Implementation challenges and mitigation strategies

Challenges associated with program implementation were handled collaboratively, as they arose, between the WAHA and UHN teams. One challenge was the unfamiliarity and hesitancy of older patients with using technology. This challenge is consistent with those in several other digital health programs[20,21] and must be addressed, as use of any digital therapeutic, including the Medly program, requires a baseline level of patient digital literacy.[22] The provision of education and support to patients and caregivers though the learning curve of using a digital tool was an important aspect of the implementation. The WAHA Medly program clinical coordinator was integral to the troubleshooting of both technological and clinical issues as they arose. The Medly program was received well by patients and providers within the

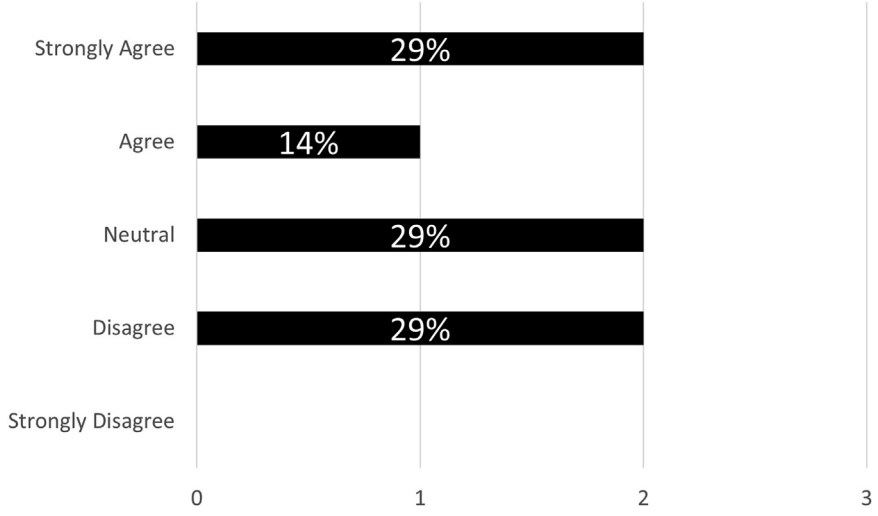

Figure 8. Provider question: This program enhanced my ability to coordinate the continuity of care. A total of 58% of respondents were neutral in their sentiment or disagreed that the Medly program enhanced their ability to coordinate continuity of care. X-axis indicates number of responses.

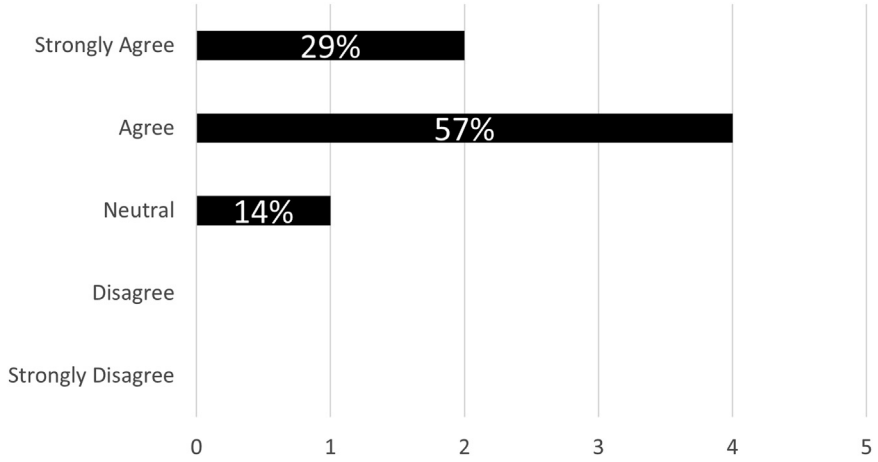

Figure 9. Provider question: Offering the Medly program to the Weeneebayko Area Health Authority communities addresses a gap in available care in the James and Hudson Bays region. A total of 86% of providers felt that the Medly program addressed a gap in available care in the James and Hudson Bays region. X-axis indicates number of responses.

WAHA, but further refinement is still required to ensure that the program is accessible for broad patient populations, including those whose first language is not English and those who have varying levels of digital literacy.[23]

Several patients were unfamiliar with self-management of their health, including the monitoring of their weight and/or BP and/or symptoms. They required coaching and reassurance from the WAHA and the UHN Medly program coordinators, who ensured that patients felt comfortable completing these daily tasks, explained the importance and relevance of the tasks to their well-being, and remained available for questions. This patient-centred approach to addressing patients' concerns contributed to both the program's surpassing of our target enrollment and enhanced adherence rates. Another challenge was the adaption of the Medly program material to reflect the JHB context. Although the Medly program is the standard-of-care at UHN, this implementation was the first in an Indigenous community. Program material was translated into Cree, both written and oral, posted to the WAHA website, and provided upon request.

The WAHA leaders were pivotal in organizing and promoting the Medly program to WAHA providers, and communicating the importance of the program. Extensive collaboration with WAHA clinicians helped in introducing the program to WAHA workflows and facilitating its uptake (eg, presentation at medical rounds, the uploading of the referral form into the WAHA EMR). Ongoing communication between the team and regional cardiology centres that provide service to the JHB helps to ensure that work is not duplicated in caring for JHB patients. Considerable attention was paid to the pathways of referral into the Medly program, as well as the flow of information among institutions, their EMRs, and associated providers. Regardless, a point that must be recognized is that patient encounters were tracked across the following 3 separate systems: the UHN EMR (Epic), the WAHA EMR (PS Suite), and the Medly program patient dashboard. Connecting Ontario, which is Ontario's secure Web-based portal, provides real-time access to digital health records across institutions, and it allowed for cross-institution information-sharing but was imperfect.[24]

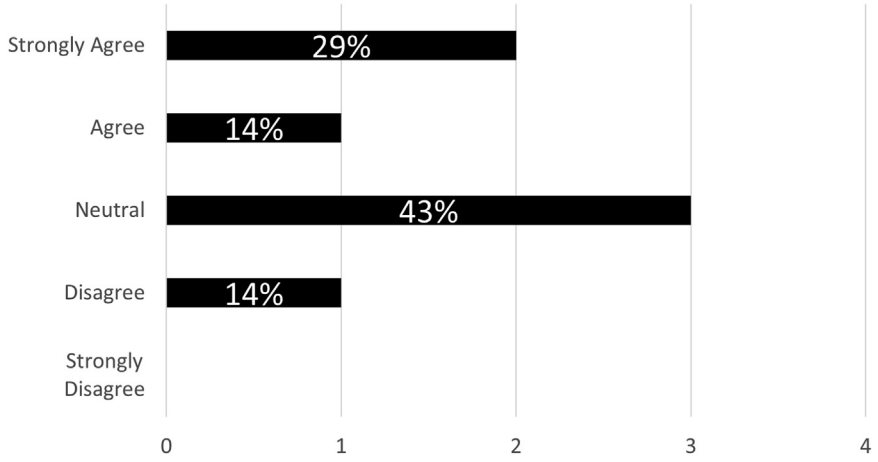

Figure 10. Provider question: The program is integrated into my workflow and practice. A total of 43% of providers agreed or strongly agreed that the Medly program was integrated into their workflow and practice. X-axis indicates number of responses.

The WAHA and UHN EMRs are not interoperable. An ideal future state of the Medly program would feature integration of digital therapeutics with EMRs and/or greater interoperability across EMRs. Better integration of the Medly program workflows into existing systems, in addition to interoperability between systems, is needed. Consultation notes, letters, and the Connecting Ontario site addressed documentation challenges, with moderate success. Also, sustained dissemination and awareness efforts relating to the program must be made to facilitate the WAHA clinician's effective referral of patients to the Medly program and UHN. Throughout the project, challenges were met with transparent communication and collaborative development of solutions. They were approached in true partnership, with support from both the WAHA and UHN teams, as appropriate, building on the mutual respect and track record of the partnership.

One year after the pilot was conducted (June 2024), the WAHA−UHN partnership has grown considerably, with more than 230 WAHA patients being followed by the WAHA−UHN cardiology program, and 70 onboarded into the Medly program. The WAHA−UHN team continues to refine referral pathways, improve the communication among and the awareness of the WAHA and UHN clinicians, and respond to community cardiology needs.

This paper has shown that digital therapeutics for HF, utilized in tandem with culturally safe and respectful in-person clinics, can effectively help rural and remote Indigenous patients manage their HF, and bring care closer to their homes. Respectful relationship-building and partnership between Indigenous health authorities and non-Indigenous institutions are also critical. As the WAHA−UHN partnership matures, new digital innovations, such as artificial intelligence−assisted echocardiography, are being considered actively. The pilot results included in this descriptive study are important, as limited research has been completed regarding the culturally appropriate and relevant integration of digital therapeutics within rural and remote Indigenous populations in Canada.

Conclusion

The implementation of the Medly program digital therapeutic for HF, in tandem with in-person cardiology clinics, provided equitable access to quality HF care in the JHB region. Management of patients with HF via the Medly program showed promising levels of attainment of GDMT and improvement in their care coordination. The program was well received by both patients and providers, with both groups acknowledging that the Medly program addresses a gap in care in the region. Sustaining the Medly program has been identified as a priority by both project teams (UHN and WAHA) and has received support from funders. Future Medly program efforts should focus on spreading and scaling the program to meet the needs of all WAHA communities, improving communication and care coordination among different cardiology centres, and improving intra-team communication between WAHA-based and UHN-based clinical personnel. Also, the potential exists to further engage with WAHA primary care to achieve a greater focus on early detection and prevention of HF.

Providing culturally safe care is important in helping improve Indigenous population health outcomes. Digital health (including virtual care, digital therapeutics, and other devices) can help improve specialist access for rural and remote Indigenous patients. Conducting implementation in a culturally safe manner that is respectful of local context and experience is paramount. Building on the success of this project, the WAHA and UHN are identifying ways to augment the Medly program, incorporating additional cardiovascular services, such as portable echocardiograms that can be delivered in the community. Meeting the needs of the patients in the JHB region, strengthening capacity there, and bringing care close to home for JHB residents will continue to guide the WAHA−UHN partnership.

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Ethics Statement

This work was reviewed and approved by the University Health Network Quality Improvement Committee (UHN QI ID: 22-0514).

Patient Consent

Medly programmatic data were collected anonymously and are presented in aggregate format. Collection of survey data required patients' and providers' consent and followed standardized University Health Network quality improvement procedures.

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Disclosures

H.R. is cofounder of the Medly program and oversees its deployment at University Health Network (UHN). The Medly program currently is owned by UHN, although a separate corporation—Medly Therapeutics (MTx)—is in development. H.R. has submitted her declarations of conflicts of interest to UHN's Office of Commercialization, through the mandated processes. At present, HR receives no financial benefit from Medly or MTx, but she may do so in the future, given her role as cofounder.

References

1. Garner R, Carrière G, Sanmartin CA. and the Longitudinal Health and Administrative Data Research Team. The health of First Nations living off-reserve, Inuit, and Métis adults in Canada: the impact of socio-economic status on inequalities in health. Available at: https://www.nunivaat.org/doc/publication/Socio-economic-impacts-on-health.pdf. Accessed June 10, 2023.

2. Anand SS, Abonyi S, Arbour L, et al. Explaining the variability in cardiovascular risk factors among First Nations communities in Canada: a population-based study. Lancet Planet Health 2019;3:e511-20.

3. Vervoort D, Kimmaliardjuk DM, Ross HJ, et al. Access to cardiovascular care for Indigenous peoples in Canada: a rapid review. CJC Open 2022;4:782-91.

4. Weeneebayko Area Health Authority. Report: learning from our ancestors — mortality experience of communities served by Weeneebayko Area Health Authority. Available at: https://www.waha.ca/2021/07/19/report-learning-from-our-ancestors-mortality-experience-of-communities-served-by-weeneebayko-area-health-authority/. Accessed June 10, 2023.

5. McDonald M, Virani S, Chan M, et al. CCS/CHFS Heart Failure Guidelines update: defining a new pharmacologic standard of care for heart failure with reduced ejection fraction. Can J Cardiol 2021;37:531-46.

6. Dang A, Arora D, Rane P. Role of digital therapeutics and the changing future of healthcare. J Fam Med Prim Care 2020;9:2207-13.

7. Graham AK, Weissman RS, Mohr DC. Resolving key barriers to advancing mental health equity in rural communities using digital mental health interventions. JAMA Health Forum 2021;2:e211149.

8. Cuinn WÓ. UHN's Medly is revolutionizing heart failure care. Available at: https://uhnfoundation.ca/stories/uhns-medly-is-revolutionizing-heart-failure-care/. Accessed June 26, 2024.

9. Ware P, Ross HJ, Cafazzo JA, et al. Outcomes of a heart failure telemonitoring program implemented as the standard of care in an outpatient heart function clinic: pretest-posttest pragmatic study. J Med Internet Res 2020;22:e16538.

10. Ontario Ministry of Public and Business Service Delivery. The James Bay Treaty—Treaty No. 9. Available at: https://www.archives.gov.on.ca/en/explore/online/jamesbaytreaty/index.aspx. Accessed June 10, 2023.

11. Seto E, Leonard KJ, Cafazzo JA, et al. Mobile phone-based telemonitoring for heart failure management: a randomized controlled trial. J Med Internet Res 2012;14:e31.

12. Brahmbhatt DH, Ross HJ, O 'Sullivan M, et al. The effect of using a remote patient management platform in optimizing guideline-directed medical therapy in heart failure patients. JACC Heart Fail 2024;12:678-90.

13. UHN. New digital tool helping heart failure patients manage symptoms from home. Available at: https://www.uhn.ca/corporate/News/Pages/New_digital_tool_helping_heart_failure_patients_manage_symptoms_from_home.aspx. Accessed July 15, 2024.

14. Dolgin M. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Boston: Little Brown, 1994.

15. First Nations Information Governance Centre. The First Nations Principles of OCAP. Available at: https://fnigc.ca/ocap-training/. Accessed June 10, 2023.

16. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap) — A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009;42:377-81.

17. Greene SJ, Fonarow GC, DeVore AD, et al. Titration of medical therapy for heart failure with reduced ejection fraction. J Am Coll Cardiol 2019;73:2365-83.

18. Beard M, Orlando JF, Kumar S. Overcoming the tyranny of distance: an audit of process and outcomes from a pilot telehealth spinal assessment clinic. J Telemed Telecare 2017;23:733-9.

19. Jong M, Mendez I, Jong R. Enhancing access to care in northern rural communities via telehealth. Int J Circumpolar Health 2019;78:1554174.

20. Nicosia J, Aschenbrenner AJ, Adams SL, et al. Bridging the technological divide: stigmas and challenges with technology in digital brain health studies of older adults. Available at: https://www.frontiersin.org/articles/10.3389/fdgth.2022.880055. Accessed July 16, 2024.

21. Peek STM, Luijkx KG, Rijnaard MD, et al. Older adults' reasons for using technology while aging in place. Gerontology 2016;62:226-38.

22. Smith B, Magnani JW. New technologies, new disparities: the intersection of electronic health and digital health literacy. Int J Cardiol 2019;292:280-2.

23. Mein E, Fuentes B, Soto Más F, Muro A. Incorporating digital health literacy into adult ESL education on the US-Mexico border. Rhetor Prof Commun Glob 2012;3:162-74.

24. eHealth Ontario. ConnectingOntario ClinicalViewer. Available at: https://ehealthontario.on.ca/en/health-care-professionals/connectingontario. Accessed July 16, 2024.

Supplementary Material

To access the supplementary material accompanying this article, visit *CJC Open* at https://www.cjcopen.ca/ and at https://doi.org/10.1016/j.cjco.2024.08.011.