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Progress towards enhanced access and use of technology during the COVID-19 pandemic: A need to be mindful of the continued digital divide for many rural and northern communities

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Abstract

The COVID-19 pandemic produced unprecedented adoption and deployment of technology in rural and northern areas; however, this expansion widened the digital divide for many. Evidence shows that older adults' use of technology has increased. Coupled with an increasing number of available technologies to enhance healthcare delivery, social engagement, meaningful activities, and support to carers, we are at a crossroads for change. Emerging strategies used by organizations to promote technology and support efforts to bridge and close the digital divide are discussed. In a post-pandemic society, policy-makers can play a critical role to ensure that improvements, efficiency gains, and lessons learned are fully leveraged to reap the benefits of technology use by older adults, care partners, and the healthcare system. Recommendations are given for policy-makers to capitalize on this opportunity to narrow the digital divide for those in rural and northern communities.

Introduction

Since the onset of the COVID-19 pandemic, rural and northern communities across Canada have experienced unprecedented and accelerated adoption of technology (from robotics and virtual reality [VR] to smartphone apps and wearable sensors), with greater investment into broadband infrastructure.[1] There has been an increase in the use of videoconferencing and telemedicine by healthcare professionals and we have seen health program delivery methods pivot to virtual care delivery to reduce or replace in-person interactions.[2,3] Rapid digitalization has led to the expanded use and acceptance of telehealth, virtual care, and wearable devices.[4] For example, virtual triage in emergency departments helped reduce crowded waiting rooms by redirecting patients for treatment to alternative locations resulting in a decrease of 9,300 patient visits per day during the pandemic in Canada.[5] Further, the number of primary care physician visits provided virtually or by telephone increased between 27% and 57% across five Canadian provinces.[5]

A Statistics Canada report highlighted "A shift of almost 869,000 seniors from the 'have not' to the 'have' side of the digital divide" yet, the number of "non-users" remains disproportionately high among older adults (persons aged 65 years and greater).[6] The expanded use of technology by many during the COVID-19 pandemic widened the digital divide between those who can access technologies and those who cannot.[7,8] Among older adults, the proportion of those accessing home broadband rose from 79% in 2018 to 83% in 2020.[9] However, this remains well below the Canadian rate of 94%.[9] Statistics Canada notes the widening of the digital

divide between 2018 and 2020 with evidence suggesting differential rates of increased internet and digital technology use between basic users and intermediate users. Over one quarter of older adults (25.4%) are considered basic users compared to 12.2% of those aged 50-64 and 9.8% of those aged 49 years and younger.[6] During the pandemic, a higher proportion of basic users fell further behind in their use of the internet. Barriers to technology use among older adults include physical and cognitive impairment as well as the lack of financial and social resources.[10] Further, individuals living in rural and northern communities are more likely to have limited access to high-speed internet.[9] Those who are not connected often lack access to technology resources and/or connectivity, have low digital literacy, and lack confidence and/or motivation to use technologies. The inability to easily and reliably access and use digital technologies may worsen their situation and widen inequities to accessing and benefitting from the healthcare system.

In Canada, the use of many technologies among older Canadians increased significantly during the COVID-19

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pandemic.[11] A 2020 AGE-WELL poll ascertained that 72% of Canadians aged 65 and over felt confident using current technology.[11] The stereotype that older adults are technophobes is rapidly being broken. It remains unclear if these numbers reflect the reality in rural and northern areas where significant challenges persist around access to high-speed internet. For those people living in rural areas, broadband access is often slow and can be unstable, unreliable, and expensive.[12] The lack of connectivity affects the ability to access services, make decisions, and benefit from opportunities presented by technology that rely on broadband connectivity. The Canadian Radio-television and Telecommunications Commission (CRTC) notes that all Canadians should have access to an internet connection through a broadband connection with at least 50 Mbps download and 10 Mbps upload speed, have access to unlimited data, and be able to connect using Long-Term Evolution (LTE).[13] Yet, the CRTC reports 87.4% of Canadians have access to broadband and unlimited data as recommended compared to only 45.6% of people in rural communities.[13] Further, the CRTC notes that fewer Canadians in rural communities have access to mobile LTE compared to all Canadians (97.4% vs. 99.5%).[13]

Negative implications resulting from digital exclusion are further amplified by the mistaken assumption that all Canadians can access high-quality connectivity and digital devices if they choose to do so. This misconception commonly leads to stigma, especially toward older adults, and further exacerbates health inequities. A Canadian study examining technology use by older adults during the pandemic showed an increase in smartphone use from 58% in 2019 to 65% in 2020, noting that most older adults who own a smart phone use it daily (83%).[11] Further they noted that the 23% of older adults who reported using video calls to connect to friends and family had doubled from 2019 to 2020. Perhaps most notably, nearly three quarters of older adults in this survey reported feeling confident using current technology.[11] This supports earlier work that emphasized older adults in rural and northern communities were both interested and keen to use technologies and were in fact some of the earliest adopters.[14] Older adults commonly leverage intergenerational connections and existing social networks to enhance their digital literacy and embrace new technology.[14,15] However, older adults continue to face barriers when social and financial resources are limited which inhibit their ability to access and sustain long-term technology use.[14]

To address the immediate need to implement community specific solutions to mitigate the digital divide in rural and northern communities, the Centre for Technology Adoption for Ageing in the North (CTAAN) was created in northern British Columbia, Canada (www.ctaan.ca).[16] CTAAN supports ageing in northern and rural communities by making technologies more available to older adults, caregivers, and the healthcare systems that support them. It is built on a unique partnership between the Northern Health Authority, AGE-WELL—Canada's Technology and Ageing Network, and the University of Northern British Columbia. Together with older adults living in northern communities, researchers, and companies, CTAAN has established a process to support testing, piloting, implementing, and promoting of new and emerging technologies to reduce the barriers to the adoption of technologies that help older adults in rural and northern communities.

Opportunities for technology to enhance the health and well-being of older adults in rural and northern areas range greatly. For example, the evolution of smartphones has led to the design, development, and utilization of apps, easily downloaded from the Apple or Google Play stores, and many are freely accessible. Apps targeting the older adult demographic cover many aspects including health, well-being, and fitness. A common feature is to use gamification elements to maintain user motivation, provide positive feedback, and rewards, which are designed and integrated into the app to support older adults' motivation to age well and to "age in place."[17,18] Older adults use of apps can challenge existing myths and stereotypes. For example, preliminary findings from the "COVID-19: Dating apps, social connections, loneliness, and mental health in a pandemic" project found older adults used dating apps to enhance social connections, friendships, and intimacy.[19]

A growing number of older adults are embracing the use of apps for smartphones or tablets. However, new users, who may be less digitally literate, lack an understanding of what apps are. This was highlighted by older people involved in the Adjust Tech, Accessible Technology (ATAT) project who noted the continued need to simplify smartphone interfaces and improve ease of functionality to enhance use and confidence among older adults with limited digital literacy.[20,21] The co-design approach of engaging older adults provides needed opportunities to identify and refine base functionalities and to inform learning modules embedded in the app to enhance usability among older adults. It is becoming commonplace for researchers and technology developers to include older adult users in the research and development of technology and this trend should be encouraged and expanded, as demonstrated by AGE-WELL.[22]

Digital technologies to support persons ageing in community settings, including those requiring care and support from the healthcare system continued to increase and adapt during the COVID-19 pandemic. For example, a virtual approach to offering Adult Day Programming (ADP) has emerged as a promising mode of engaging older adults and delivering services. Virtual ADPs, using videoconferencing technology, can be useful tools to foster group activities, enabling persons to be connected, and to prevent isolation. Through one-on-one and group interactive programming, it can enable a new vector to engage participants and support active engagement in physical and cognitive activities. It also provides respite for care partners to reduce burden and distress. Virtual ADPs can be useful tools to help keep people connected and to prevent isolation. For example, Baycrest@Home offers a suite of virtual services for activities such as music, art, fitness, education, social recreation, therapy, and other live and recorded programming developed for use in an urban environment and shows great potential to be adapted for use in rural and northern communities.[23]

Connecting with family and friends was a significant issue in long-term care settings during the COVID-19 pandemic. Social distancing restrictions and the loss of activities had a profound impact on well-being of residents, family, and formal carers.[24] To help overcome the barriers to social connections resulting from the pandemic, researchers at Swansea University developed technology to make the walls of care homes "disappear." This technology enabled older adults, their family members, and an artist to engage together in an activity to help connect older people to family and friends, despite being in geographically dispersed locations.[25] Such technology has the potential for wider applications in long-term care settings.

Video games and wearable technologies are a significant and growing market. Video game use by older adults has been shown to promote physical and cognitive fitness, enhance opportunity for social engagement, and can be adapted for inclusivity.[26,27] Wearable devices, such as smartwatches, allow people to track their levels of fitness, sleep, and water intake.[17,18] Wearables also have significant potential for monitoring health such as heart palpitations and arrhythmia.[28]

The above description offered examples of technologies to enhance social engagement, meaningful activities, and support care partners. There is an increasing number of so-called AgeTech products and many more companies are developing products for the growing longevity economy. Canada's AgeTech Startup Map by AGE-WELL shows the diversity of technologies spanning AGE-WELL's 8 Challenge Areas.[29,30] The diversity of technologies is also reflected in Karen Etkin's AgeTech Market Map for a global perspective.[31] Addressing the digital divide will unleash the full potential of technology to support older adults, care partners, and the healthcare system.

What does all this mean for technology in the rural and northern context?

With the increasingly hybrid approach to healthcare delivery, it will be important for policy-makers to ensure equity in the ability for all persons, including those living in rural and northern communities, to be able to access, and benefit from this growing transition to virtual healthcare service delivery. Policy-makers must be conscious that the increased offerings of telehealth services meant to enhance accessibility to healthcare do not fully replace in-person care. Policy-makers should consider protecting Canadians' choice to access the same level and quality of healthcare services, whether on-line or off-line, as is their preference and to be able to equally benefit from the same level and quality of care. If this is not protected, the goals of enhanced accessibility through virtual care delivery may instead lead to further inequity and marginalization of vulnerable persons, especially those who experience conditions which are more prevalent with advanced age such as hearing, vision, and cognitive impairment.

Technology-mediated communication is often posited as a tool that can be used by geographically dispersed persons to connect to older adults in rural areas.[32] However, while technology such as telephone calls, texts, and e-mails to family members may have positive influences on social isolation, there is no evidence of an impact on loneliness.[32] This is consistent with a 2018 review of reviews and a recent meta-analysis neither of which found any evidence to indicate that those technological interventions, either individual or community based alleviated loneliness.[33,34] Indeed, it was noted that there was a risk that technological interventions could reinforce social isolation if an individual lacked the physical or cognitive capacity to use the technology.[33-35]

At the individual level, support networks which focus on digital inclusion are critical to mitigate the growing digital divide from the effects of COVID-19. Policy-makers may consider technology subsidies such as tax breaks for costs associated with internet connectivity, subsidized or free national digital literacy education programs, or a national approach to supporting access to virtual health platforms to ensure equity in all citizens' abilities to access digital health technologies.[36,37] It is critical that in the shift to virtual and hybrid delivery of healthcare services and supports that the vulnerable populations including persons in rural and northern communities are not left behind and that the required funding and support is invested to achieve the CRTC's goals that all Canadians be able to access acceptable broadband speeds and experience universal access to internet and mobile LTE networks.

Moving forward

Moving forward into a post-pandemic era, policy-makers will play an instrumental role to ensure the improvements, efficiencies, and lessons learned during this era are sustained including fostering a hybrid approach for service provision leveraging technology across the health and well-being sector. This hybrid approach to care delivery should enhance equally citizens' abilities to access the care service whether physically in-person or virtually, without one being easier/more accessible/providing higher quality than the other. This should be recommended, and in some instances, mandated in the sector. Currently, many individuals face inequity when accessing services such as information and application processes that are predominantly available on-line. This inequity is mainly experienced by those facing inequalities, and especially cross-sectional inequality. Implementing a co-creation and co-design approach like that of the ATAT project affords all parties the opportunity to invest from the beginning, in developing solutions with evaluation in place. Instilling these approaches at the initial phase will encourage greater investment and adoption while also ensuring that the voices of the end-users are heard throughout the different stages of technology development, implementation, and evaluation.

Geographic characteristics used to delineate environments within the digital society should consider geographical variation as a spectrum as opposed to a dichotomous conceptualization of traditional urban and rural environments. Statistics contrasting urban and rural areas may miss variations within groups. Digitally, even those in urban areas can face digital exclusion, can be isolated, and access may be fragmented which in turn can impact on health and well-being as well as social and civic participation. When

considering social participation, family and friends are often dispersed geographically. This "fragmentation" can have biopsychosocial consequences. Digital inclusion for social participation can be key in these instances and must be consciously considered with the pros and cons balanced.

A future roadmap should consider the need for accessible educational programs, the importance of accessible, dual modes of healthcare delivery, and greater rollout of high-speed internet services in rural and northern communities, taking into consideration factors outlined in this paper (eg, cost and access). Reducing and closing the digital divide, and the inequities this can exacerbate, must be paramount for respective communities, with the assistance of scholars and technology companies. Furthermore, as technology advances at pace, consideration should be given to strategies which will minimize digital exclusion in future generations of older adults.

Key considerations for policy-makers

- Be aware of how population classifications (eg, rural, northern, and urban) may mask variation particularly when discussing the digital divide and in relation to social participation.
- Continuously reflect on and evaluate the accessibility and use of digital services across different user groups to ensure equity in the ability for the service to meet the needs of everyone, and support even the most digitally excluded if they remain.
- Government programs that support people to purchase technology and internet are imperative. Greater priority and attention are paramount to address the affordability of technology and high-speed internet.
- The digital divide will persist and may continue to grow if long-term services and support programs are not in place. Government can play a key role in incentivizing and supporting community groups and organizations to develop locally tailored and relevant services and supports to meet the needs of the communities they serve.

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