

The Current State and Impact of Digital Literacy and Equity Factors on Newcomers' Healthcare Access

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For any questions or concerns regarding the contents of this report, please write to Courtney Kupka at research@accessalliance.ca.

Executive Summary

Project Context – Access Alliance Multicultural Health and Community Services (Access Alliance) is a community health centre based in Toronto, Ontario, dedicated to supporting newcomers, immigrants, and refugees. The COVID-19 pandemic exposed gaps in infrastructure, revealing the inadequacy of the organization’s digital tools and communication strategies. In particular, issues with phone systems and Ocean, an online booking platform, highlighted barriers faced by uninsured and marginalized clients. The project aims to address and enhance digital literacy, improve service access, and develop strategies to better engage and support our diverse client base. This report presents the impact of digital literacy and technology on these populations, focusing on their experiences with healthcare and community services.

Methodology – A literature review and environmental scan were conducted referencing relevant literature and organizations to understand the digital literacy, access, and impact of technology on newcomers, immigrants, and refugees, particularly concerning their interactions with healthcare and community services.

Key Findings - The report highlights the critical need for improved digital literacy and access among immigrants, refugees, newcomers and service providers to enhance their ability to use digital interventions in healthcare and community service settings.

<p>Current State: Digital Literacy, Equity & Access</p>	<ul style="list-style-type: none"> • Digital literacy includes a broad set of skills as well as the ability to adapt to new technologies. • Language barriers and insufficient digital literacy make it challenging and overwhelming for immigrants and refugees to navigate digital platforms. • High costs and limited availability of technology and internet impact access for lower-income individuals. • Socioeconomic and demographic factors like education and income affect digital access and literacy, resulting in unequal health outcomes. • Older immigrants and those with lower education levels struggle with digital literacy, affecting their technology use. • Our Clients – Most have some access to devices and the internet, but do not necessarily have the basic skills required to use them.
<p>Impact of Digital Interventions on Healthcare Access</p>	<ul style="list-style-type: none"> • Hybrid approaches to digital interventions are more effective. • Digital interventions when designed and integrated appropriately, are useful and can optimize access and efficiencies. • Lack of consideration for preferences, language barriers, limited digital literacy and other accessibility needs reduce the effectiveness of digital interventions (e.g. automated instructions, time limitations, etc.) • Digital interventions and tools may not meet all the diverse needs of immigrants and newcomers. • Older immigrants and those with limited digital skills may struggle with digital platforms, affecting service access. • New immigrants and refugees often face discrimination and barriers due to language and cultural differences. • Inadequate digital skills hinder integration, increasing marginalization.

<p>Strategies to Address Challenges</p>	<ul style="list-style-type: none"> • Hybrid approach to digital interventions: Use hybrid approaches to digital interventions by providing in-person and digital support for better access and to effectively meet the complex needs of clients. • Interdisciplinary and participatory approaches: Include target populations (e.g. clients and staff) in designing and implementing digital interventions to address specific needs. • Equitable resource allocation: Provide, advocate and partner for device and internet access, technology subsidies, and low-cost internet. • Capacity Building and Personalized Support: Provide comprehensive training on basic digital skills and skills for healthcare apps, with help desk support for staff and clients to increase uptake, adoption and use. Offer multilingual support and targeted digital literacy training to improve digital literacy, skills, and use. • Intermediaries: Use dedicated roles such as a Digital Navigator or Community Health Worker to identify or address gaps in digital interventions to optimize the success of a digitalized environment. They can also identify and support the adoption of new digital interventions. • User-friendly and culturally sensitive technology: Inclusive and well-thought-out technology or digital interventions support access, adoption, and utilization by a multitude of stakeholders.
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Recommendations – This report identifies key recommendations for addressing the barriers and challenges clients and staff experience when digital interventions are used.

- **Components for Optimizing Digital Interventions** – Adopting a hybrid service approach, interdisciplinary and participatory developmental approach, user-friendly technology, provision of devices and connectivity, digital literacy training, and staff operational requirements.
- **Digital Intervention Integration at Access Alliance** – Understand clients’ skills, needs and preferences for training and developing appropriate digital interventions; Ocean as a tool: evaluate the platform for usability, staff and client training, and increase awareness; Enhance general and specific digital literacy skills training for clients and staff; and develop the role of intermediaries such as a Digital Navigator to champion digital intervention integration.

Conclusion - The findings of the report highlight the need for enhanced digital literacy to improve access to healthcare services for immigrants and refugees. To address these challenges, several recommendations are proposed. Implementing these recommendations will significantly improve digital access and healthcare outcomes, ensuring that services are equitable and responsive to the needs of clients (newcomers, immigrants, refugees) and staff.

Key Words: Digital literacy, digital equity, digital divide, newcomers, immigrants, technology, digital intervention, digital navigator

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Background

This report investigates the state of digital literacy, access, and the impact of technology on newcomers, immigrants, and refugees, focusing on their interactions with healthcare and community services. It highlights the ongoing digital divide in literacy, equity, and access, its impact on immigrant and newcomer's healthcare access, and explores different strategies to address these gaps and challenges. This report explores primary and grey literature including resources and experiences from Access Alliance and its partners or other organizations. By identifying core issues from the end-users' perspective, we aim to examine strategies that enhance service accessibility and client satisfaction.

Current Organizational Challenges

The COVID-19 pandemic exacerbated existing challenges in service delivery at Access Alliance, particularly in managing the increased demand for health and settlement services. Our existing phone system infrastructure and staffing capacity were not equipped to handle the increased load. This demand exposed gaps in our infrastructure, technology, and the digital skills of clients and staff. During this period, our phone systems, a critical communication tool, were overwhelmed, leading to numerous crashes, complaints and negative reviews. Clients began using alternative channels, like social media and online reviews to seek help. Although the introduction of Ocean, an online booking platform, was intended to alleviate some of these challenges, it did not fully resolve the issues. This highlights broader communication and access issues beyond phone lines and front desk operations.

Multifaceted Client Communication Challenge

Our clients' communication preferences and technology use are diverse and evolving. Language and cultural barriers, coupled with varying levels of digital literacy and access, create significant challenges in ensuring effective communication. Difficulties navigating the website further hinder clients' ability to access information and services efficiently.

Project Objectives

The objective of this project is to conduct a rapid review of existing literature and sector practices through an environmental scan to understand the current state of digital literacy, access, and the impact of technology on newcomers, immigrants, and refugees. This report aims to identify areas affecting clients' ability to interact with Access Alliance and improve service access. Thus, informing strategies to enhance service access and client satisfaction in healthcare and community service settings. Ultimately, this report will contribute to improving service access through a comprehensive digital transformation strategy, addressing infrastructure, technology, and communication challenges. This report addresses the following key questions:

- What is the state of digital literacy and equity for newcomers/immigrants in Toronto?
- In what ways does technology impact experiences of accessing healthcare and community services (facilitators and barriers) for newcomers/immigrants?
- What strategies, best practices, or tools are used to improve access to services in a hybrid format among their clients?

Through this project, we aim to empower our clients with the digital skills and resources needed to navigate and access essential services, ultimately improving their well-being and integration into the community.

Methodology

This study utilizes a rapid review and environmental scan approach to review the digital literacy, access, and impact of technology on newcomers, immigrants, and refugees, with a particular focus on their experiences with healthcare and community services. The methodology consists of three key components: executing searches in selected databases, identifying relevant literature, and analyzing the results.

Literature Review

To ensure a comprehensive understanding of the topics, we identified three areas of focus:

- Digital Literacy and Equity for Newcomers/Immigrants
- Impact of Digital Interventions on Healthcare Access
- Strategies for Hybrid Service Access

Each focus area includes specific concepts, keywords, synonyms, and search strings to guide the literature search (See Appendix A). Items included in the review cover a range of peer-reviewed articles, reports, and relevant publications that provide foundational insights into these focus areas.

Environmental Scan

Through this structured approach, key stakeholders were engaged across various organizations to gather comprehensive insights into the digital literacy, access, and impact of technology on newcomers, immigrants, and refugees. Resources and documents such as surveys and reports, available online were included in the scan. In addition, consultations with several sector experts, community leaders, and service providers were conducted. These interactions provided valuable information on sector practices and challenges, informing strategies to enhance service delivery and client satisfaction in healthcare and community service settings.

Partners Contacted

To support this work, we connected with twelve organizations located in Ontario. These included various Community Health Centres, Family Health Teams, hospitals and

research institutions, along with sector experts. We received responses from the following.

1. Women's College Hospital – Institute For Health System Solutions And Virtual Care (WHIV) – Onil Bhattacharyya (Director, WCH Institute for Health System Solutions and Virtual Care) & Vanessa Kishimoto - Research Coordinator, WHIV
2. Community Health Centres of Northumberland (CHCN): Taryn Rennicks - Executive Director
3. Rexdale CHC: Dan Grummon, Program Coordinator & Devi Raghunauth
4. Toronto East Quadrant Local Immigration Partnership: Isobel Goddard – TEQ LIP Manager
5. Industry expert in digital spaces and newcomers: Marco Campana
6. Alliance for Healthier Communities: Sara Bhatti (Research and Evaluation Lead)

Key Findings

Through a comprehensive literature review and environmental scan, several key themes emerged regarding digital equity and access among newcomers, immigrants, and refugees. These themes underscore the significant impact of digital literacy on healthcare access, the quality of care, and overall health outcomes for these populations.

Current State: Digital Literacy, Equity & Access

Digital literacy encompasses a broad set of skills necessary for effective and responsible technology use. It involves the ability to effectively solve problems using technology in a safe, legal, and ethical manner (TSLIP 2020; Ontario Ministry of Education 2024). As digitalization and big data continue to grow in importance, digital literacy, therefore, also includes the capacity to engage with new technologies. Digitally literate individuals are aware of the rights, responsibilities, and opportunities that come with living, learning, and working in a connected digital world (TSLIP 2020; Ontario Ministry of Education 2024).

Digital Divide

The term "digital divide" refers to the disparity between individuals who have access to and can effectively use information and communication technologies, such as smartphones, computers, and reliable, affordable internet, and those who do not (Lukawiecki et al., 2022; Vital Focus, 2021). This divide is especially pronounced among immigrants and refugees, who face significant barriers including language difficulties, socioeconomic challenges, and limited digital literacy. For example, in the U.S., only 12% of foreign-born adults who speak a non-English language are highly proficient in digital problem-solving, compared to 36% of native-born English speakers. Moreover, nearly 21% of non-English-speaking immigrants have no computer experience, compared to 5% of English speakers (OECD, 2013). These disparities highlight how language and socioeconomic factors exacerbate the digital divide, preventing these populations from fully accessing digital interventions and digital health services.

According to the 2021 Canadian Survey on Disability, 32% of recent immigrants reported difficulty accessing healthcare services due to digital challenges, highlighting a significant barrier to obtaining necessary care (Statistics Canada, 2021). A recent survey by Wired: Evaluating Settlement Online, found that 70.8% of newcomers surveyed indicated a need for digital literacy training in order to access services offered (YMCA, 2023). Additionally, a 2023 report found that 45% of newcomers felt overwhelmed by the complexity of digital health platforms, affecting their ability to navigate and utilize healthcare services effectively (Shahid et al., 2023).

Socioeconomic and Demographic Factors

Education and income levels have a profound impact on digital access and literacy. Individuals with higher education and income levels are generally more proficient in using digital technologies and have better access to them. Lower education and income levels can limit both the ability to use technology effectively and the resources available to obtain it (Budhwani et al., 2022). This disparity affects immigrants and refugees by creating barriers to accessing digital health services, leading to inequitable health outcomes (Fujioka et al., 2020; Shahid et al., 2023). Furthermore, studies looking at seniors and immigrants, identify key factors contributing to their digital disparities, including socioeconomic status, language proficiency, degree of acculturation, education level, and digital literacy (Chen et al., 2020; Pandey et al., 2022).

Specific challenges based on socioeconomic and demographic factors:

- Lower-income immigrants often face significant financial barriers to accessing digital technologies and internet services. In some areas, even when services are available, they may be limited or oversubscribed, leading to inconsistent access (Chen et al., 2020, Rabet et al., 2024).
- Older immigrants, in particular, often struggle with digital literacy, which is influenced by factors such as education level, degree of acculturation, and prior exposure to technology (Chen et al., 2020; Pandey et al., 2022).
- Research indicates that individuals with higher levels of education and those from more affluent socioeconomic backgrounds are generally more digitally advantaged. They tend to use a greater number of devices to access the internet and have a higher prevalence of smart devices. (Zhang & Livingstone, 2019).

Challenges in Access and Utilization

Canada is renowned for its high per-capita immigration rate, with approximately 500,000 newcomers arriving each year. A substantial portion of these immigrants settle in Ontario. From 2022 to 2023, Ontario welcomed 196,305 new immigrants, accounting for 43.2% of all newcomers to Canada during this period (Ontario, 2024). As Ontario continues to attract a significant number of immigrants, addressing the challenges faced by these new residents becomes increasingly urgent. One key issue is the digital divide,

which impedes immigrants and refugees from fully integrating and accessing essential services. For many, the high cost of technology and internet services is a significant barrier, making these resources inaccessible to lower-income individuals (Pandey et al., 2022). Additionally, availability can be an issue, particularly in underserved areas where reliable internet connections are not readily available or are oversubscribed, leading to limited access (Chen et al., 2020, Rabet et al., 2024).

While there has been some progress in narrowing the gap in internet access, significant disparities in digital skills and knowledge persist. This means that even though more individuals have the means to connect online, many still lack the digital literacy required to use these technologies effectively (Shahid et al., 2023). Researchers emphasize that access alone is not enough; the ability to use these technologies effectively is what truly determines whether individuals can benefit from them and avoid being impacted by the digital divide (Caidi and Allard 2005; Yuan et al., 2019). Immigrants and refugees often face barriers in accessing and utilizing digital services due to varying levels and the interactions of digital literacy and language proficiency (TSLIP, 2020).

Language barriers further exacerbate the digital divide, particularly for immigrants and newcomers. Many struggle to navigate digital platforms that are predominantly in English or French, leading to difficulties in accessing essential services online (EdTech Center, 2022). This is intensified by a lack of digital literacy, skills and knowledge necessary to use digital tools effectively. These compounding factors make it challenging for many immigrants to navigate digital platforms, leading to exclusion from essential services (IRCC 2023; Pandey et al., 2022). Platforms and tools that do not consider or accommodate these needs lose their effectiveness and usefulness for this client population.

Examples of client challenges (Pandey et al., 2022):

- Not knowing which services are available and uncertainty about how to access services.
- Lack of access to updates about programs and not knowing how to contact staff.
- Language barriers.
- Lack of adequate computer knowledge.
- Insufficient time to learn and use digital tools.
- Difficulties using Zoom to access LINC class.

Examples of challenges and barriers in providing digital support in the settlement sector (TSLIP, 2024):

- Newcomers find websites and portals essential for settlement needs are difficult to use
- Difficulty in applying for funding and funder restrictions (e.g. eligibility criteria)
- Access barriers
- Newcomers express unaffordability of internet limited access to reliable devices and internet access

- Organizations have limited skills, experience or capacity to provide quality and culturally sensitive digital literacy programming
- Technology rapidly advances causing digital literacy needs to change constantly.

The above reveals key insights regarding challenges experienced by immigrants and newcomers. The information aligns greatly with a scoping review by Budhwani et al. (2022) which sought to answer the question of “*What challenges and strategies related to enabling the access to, uptake of, and engagement with virtual care for people from underserved communities have been documented in the literature?*.”. To note its relevance, as part of the inclusion criteria, they considered racial or cultural minority groups and immigrants and refugees as populations of interest. As such, given the similarity of information identified in this rapid review, we can adopt the identified six key themes of challenges for health equity in virtual care here. The themes were: (1) the person’s orientation toward health-related needs, (2) the person’s orientation toward health-related technology, (3) the person’s digital literacy, (4) technology design, (5) health system structure and organization, and (6) social and structural determinants of access to technology-enabled care (Budhwani et al., 2022).

Our Clients – Digital Equity Screening Tool Pilot

While the above information identified in the literature is relevant to include, we must also consider the information currently available regarding the client population of Access Alliance.

As part of this transition to virtual services during the COVID-19 pandemic, an evidence-informed standard guideline was developed to support both healthcare and social/community services within a hybrid framework (Access Alliance, 2022). A key component of this evaluation was the Digital Equity Screening Tool, which assessed clients' access to and proficiency with digital technologies (Access Alliance, 2024). This tool was piloted with a sample of clients from the Senior’s programs and Settlement 1-to-1 services. The pilot not only informed on the use of the tool itself but also several other areas related to client and staff skills in navigating digital tools as well as training needs and interests. This tool provided valuable insights into the digital competencies of our client population. It found:

- While 87.1% of clients had identified some sort of access to the internet and devices, they indicated they do not have the necessary access (e.g. speed and amount) or skills to meet their needs. For example, only 20-30% of clients have high confidence in completing virtual tasks such as sending or responding to an email, booking online appointments or joining meetings, etc.
- Half or more of both client groups self-report that they require training on the basics of using computers and the internet, highlighting a digital divide within the Access Alliance client population.
- Most clients found the tool easy to use but 42% required assistance, primarily due to limitations in their digital literacy.

- While paper-based administration requires time-consuming data entry, digital modes allow for direct data input into the repository, making the process more efficient for staff. The tool's flexibility in the modality of administration supports varied client preferences and helps assess their digital competencies.
- Clients value both in-person and remote services, appreciating the time and cost savings of remote options while valuing the interpersonal connections of in-person interactions.
- Challenges such as digital literacy, skills, and the cost of data and Wi-Fi affect clients' ability to engage fully.

Impact of Digital Interventions on Healthcare Access

Research consistently highlights digital interventions and technology's impacts on healthcare access for immigrants. With digital modes becoming more ingrained in healthcare practice and its access, digital literacy and access is crucial for any individual, especially immigrants and refugees for whom accessing and receiving healthcare is already challenging. A hybrid approach that combines digital tools with in-person support has proven effective. This method ensures that digital interventions are complemented by face-to-face interactions, which helps in building trust and addressing the complex needs of newcomers (IRCC 2023; Pandey et al., 2022). Integrating both modalities can improve service delivery and client satisfaction. While digital platforms are highlighted for their potential to enhance convenience and access to healthcare services, existing barriers such as language difficulties and limited digital literacy among immigrants can hinder their effectiveness. The COVID-19 pandemic has intensified these issues, highlighting the urgent need for comprehensive solutions to bridge the gaps and rectify the challenges experienced (Chen et al., 2020; Pandey et al., 2022).

One salient example of digital interventions in healthcare is the development of Virtual Emergency Departments (ED) in response to the COVID-19 pandemic. Virtual EDs were established in Canada to reduce the need for low-risk patients to seek in-person care, aiming to minimize face-to-face interactions when possible (Hall et al., 2024). Hall et al. (2024) explored access to virtual EDs in equity-deserving populations, including immigrants. Study participants recount that the virtual ED provided a safer space, reducing their stress by avoiding triggering instances they experienced with in-person care (e.g. inequitable care/treatment by administrative workers, perceived discrimination due to lack of OHIP eligibility, etc.). They also spoke to the benefits such as avoiding related costs (e.g. travel) as well as the ease and flexibility in using the online booking system which supported the avoidance of long wait times to see the physician. However, even with these benefits, participants experienced challenges while navigating the booking system. Listing time limits to complete the application, the impact of the type of device used to access the system, the complexity of the Zoom requirement, and language accessibility as impacts on their ability to engage with the intervention. Aside from the fact that participants agree virtual care cannot replace in-person, most of the barriers identified are related to the lack of a user-friendly digital intervention and poor

adaptability to anyone who may require some sort of accommodation. One mediating factor was the administrative staff who supported participants to fill in the application and call ahead of the appointment to ensure the participant had received the Zoom information to attend (Hall et al., 2024). Here, it is clear that although the interventions are useful the effectiveness is generally limited to its usability and adaptability to accommodate different needs.

Similar to other studies on virtual care, participants faced challenges with accessing and navigating technology due to language barriers or disabilities. Qualitative studies also report instances where new immigrants and refugees experience discriminatory behaviour from staff and healthcare providers due to their limited language abilities and cultural or religious backgrounds (Pandey et al., 2022). Such experiences not only interfere with the development of therapeutic relationships but also discourage these individuals from seeking healthcare, leaving them feeling exhausted, fearful, and helpless while interacting with the Canadian healthcare system (Pandey et al., 2022). This significantly impacts the ability of immigrants to effectively utilize digital interventions and digital healthcare services.

Despite the convenience digital platforms offer for scheduling appointments and accessing health information, significant barriers remain. Language barriers, digital literacy gaps, and cultural preferences critically impact the effective use of technology for healthcare access (Hall, et al., 2024; Lukawiecki et al., 2022). For example, while many newcomers appreciate the convenience of digital platforms, older immigrants or those with limited digital literacy face difficulties with online booking systems and other digital tools. While generally, many struggle to book appointments that require following automated instructions, and in some cases, these barriers can lead to worse health outcomes (Pandey et al., 2022). This emphasizes the need for targeted training and education for improving service access and provision (IRCC 2023; Pandey et al., 2022; Balyasnikova & Ahn, 2024).

In sum, the impact on healthcare access includes or is affected by the following.

- Digital scheduling systems and telehealth options reduce appointment wait times and availability issues, particularly benefiting those with transportation or childcare challenges (Wisniewski et al., 2020; Pandey et al., 2022).
- Digital systems enhance coordination between primary care providers and specialists, potentially minimizing delays in accessing specialist and diagnostic care for immigrants (Pandey et al., 2022).
- Multilingual digital platforms with real-time translation improve communication between immigrants and healthcare providers. However, this support may not cover all languages or cultural nuances, limiting the effectiveness of digital tools for some immigrant groups.

- Integrating digital solutions creates a more client-centered healthcare experience, reducing delays and improving overall satisfaction with the healthcare experience (Pandey et al., 2022).
- Digital tools offer real-time updates on healthcare services, availability, and appointment status, thereby, addressing concerns about healthcare adequacy (Lukawiecki et al., 2022).
- Digital tools can provide information and guidance on the Canadian healthcare system, helping newcomers understand how to access services, manage their health, and advocate for themselves within the system.
- Immigrants lacking reliable internet or digital devices may struggle with digital tools, worsening existing disparities.
- Those with low digital literacy might find it difficult to use these tools effectively, requiring additional support and training.
- Protecting the security and confidentiality of personal health information is crucial; any breaches can undermine trust in digital interventions.
- Digital tools must integrate seamlessly with traditional healthcare services. Poor integration can create confusion and fragmented care, especially for immigrants adjusting to a new healthcare system.

The digital literacy skills clients gain, such as scheduling online appointments and conducting searches, are essential for daily tasks. However, it moves beyond just impacting healthcare access, also affecting their ability to self-navigate and activities of daily living. These skills enable them to independently access services like online banking, job searches, and education. By mastering these tools, clients can manage their responsibilities more effectively, enhancing self-sufficiency and integration into society, thereby reducing the risk of marginalization and promoting social inclusion. Caidi and Allard (2005) argue that the inability to effectively use information and communication technologies is a form of marginalization, which can hinder newcomers' integration into society. Digital literacy has become essential for success in living, learning, and working in a highly digitalized world (Yuan et al., 2019). Without the necessary skills, newcomers and immigrants risk further marginalization, as they cannot take full advantage of the opportunities that digital technologies offer. Effective use of the internet and technology can empower individuals, providing them with an autonomous way to obtain information and navigate different environments beyond a healthcare setting.

Strategies to Address Challenges

Addressing digital literacy, equity and access needs requires a comprehensive approach that includes educational interventions, user-friendly technology, continuous support, and public initiatives (Budhwani et al., 2022, IRCC 2023; Pandey et al., 2022). By implementing various strategies, healthcare and community services can enhance access and improve the experiences of immigrants and refugees in a digitalized society. We pose the following strategies below as relevant to the work of Access Alliance and this review's focus on the access component of digital service provision.

Hybrid Approach to Digital Interventions

While digital platforms enhance convenience and access to healthcare services, barriers such as language difficulties and limited digital literacy among immigrants can hinder their effectiveness (Pandey et al., 2022; Lukawiecki et al., 2022; Wisniewski et al., 2020). Real-time examples of using a hybrid approach to digital interventions have proven effective. In Hall et al. (2024) the use of administrative staff to support accessibility of the digital intervention was helpful to the participants. The administrative staff would call participants over the phone to ensure they had the Zoom information and were ready to attend the appointment. Similarly, Flemingdon Health Centre (FHC) used a dedicated volunteer to support the implementation of a self-check kiosk to enhance patient engagement and streamline health equity data collection (FHC, 2023). They report this dedicated role was 'pivotal' in the implementation of this digital data collection (FHC, 2023). These are prime examples of digital interventions supported by in-person or phone resources for improving accessibility but also easing the transition to adopting new interventions or technologies. Face-to-face interactions complement digital tools, addressing barriers and significantly improving engagement and outcomes for immigrant populations (Pandey et al., 2022; Stark et al., 2022).

Interdisciplinary and Participatory Approaches

Effective utilization of digital tools requires addressing barriers experienced by the target population. However, we must first understand what their unique needs are. With this, interdisciplinary research and participatory approaches in developing digital interventions are required. By involving target populations in the design process, we can create more effective solutions that address their unique challenges while also ensuring continuous support and resources to help them navigate these digital tools and platforms (Chen et al., 2020; IGC 2020). They can help tailor and guide both the digital tool development and its implementation. It is also clear that increased engagement and consultation throughout the development and implementation process supports the adoption and use of digital (health) interventions (Radu et al., 2023). This participatory approach can lead to more effective and inclusive digital interventions.

Organizations and the frontline staff engaging with clients play a key role in bridging the digital divide, providing essential assistance to help clients to effectively use technology and access healthcare services. Intermediaries like Digital Navigators and Community Health Workers (CHWs), discussed in more detail below, are pivotal in promoting clinical care and technology integration into practice. With their day-to-day interactions with clients, they have a unique view of the capacities and needs for effective implementation and use of digital tools. They have a role in ensuring that digital interventions are accessible, user-friendly, and culturally sensitive, ultimately improving healthcare access and outcomes for immigrant and newcomer populations (Pandey et al., 2022; Lukawiecki et al., 2022; Wisniewski et al., 2020).

Equitable Resource Allocation

Equitable resource allocation aims to guarantee that every individual, regardless of their background or needs, has fair access to essential resources. This approach addresses disparities by providing targeted assistance to those facing financial, linguistic, or cultural obstacles. Here's how equitable resource allocation can be leveraged to support immigrants and refugees in the digital age:

- **Provision of Devices:** Ensuring that immigrants and refugees have access to necessary devices such as smartphones, tablets, or computers. This can be through device loan programs or subsidies that allow individuals to purchase affordable technology.
- **Affordable Internet Access:** Partnering with internet service providers to offer low-cost or free internet plans to immigrants and refugees who might not be able to afford standard rates, ensuring they can stay connected and access online services (Centre for Digital Health Evaluation, 2021).
- **Tailored Support Services:** Allocating resources to provide personalized support, such as digital navigators or community liaisons who can assist immigrants in understanding and using digital tools effectively (Pandey et al., 2022; Lukawiecki et al., 2022).
- **Language and Cultural Support:** Investing in translation services and culturally appropriate materials to ensure that digital tools and resources are accessible and understandable to people from diverse linguistic and cultural backgrounds.

Capacity Building and Personalized Support

Capacity building initiatives support not only clients but staff as well with the skills and abilities to use digital interventions such as tools and technology. Training individuals on digital literacy and different technologies not only builds their ability to use those particular items but these skills become transferrable and adaptable to other tools and technology. These programs should cover a broad spectrum of skills, from basic and general digital navigation to the use of specific healthcare-related applications, such as online appointment booking, accessing electronic health records, and using telehealth platforms. By building these competencies, newcomers can better navigate digital health platforms, access services, and communicate with healthcare providers reducing the digital divide (Lukawiecki et al., 2022).

It is evident that digital literacy training programs are essential for bridging gaps among immigrants (Stark et al., 2022). Even minimal digital literacy training can significantly improve newcomers' access to hybrid services. Research has shown that such training can help newcomers navigate and utilize online services effectively (YMCA, N.D). The YMCA (N.D) implemented a training with newcomers focused on web searching, sending emails with attachments, joining Zoom meetings, and filling and signing PDFs. They found their

simple but targeted intervention dramatically enhanced digital access for newcomers who were able to implement the skills and learnings after the intervention (YMCA, N.D).

- **Capacity building for immigrants and refugees:**
 - Implementing targeted training programs is beneficial for improving healthcare access among immigrants and refugees (Balyasnikova & Ahn, 2024, YMCA, N.D).
 - **Training Programs:** Programs should teach basic digital skills and specific healthcare applications. Specific training sessions could include basic digital literacy workshops covering essential skills such as using smartphones, navigating the internet, and managing emails, as well as Healthcare Application Training.
 - **Healthcare Application Training:** Programs should include hands-on sessions for online appointment scheduling, managing appointments, accessing and interpreting Electronic Health Records, using telehealth platforms, and setting up video calls and virtual waiting rooms.
 - **Language-Specific Digital Training:** Providing training sessions in multiple languages to ensure non-English speakers can effectively use digital tools and healthcare applications.

While there is a focus on the client capacity building needs, we must also consider the training needs of the staff and organization. This training and capacity building focuses on individual skills that staff require to work in the digitalized environment but also the ability to support clients in this environment.

- **Capacity building for staff:**
 - Staff training and tailored digital resources are essential for effective service delivery. Pandey et al. (2022) emphasize that training programs equip staff with the skills needed to utilize digital tools efficiently, ensuring seamless integration into service workflows (Pandey et al., 2022)
 - Training should include components on cultural competency to help staff understand and respect diverse cultural, religious, and linguistic backgrounds. Fostering empathetic and effective interactions with all (Pandey et al., 2022).
 - Healthcare providers require training to support and engage with immigrant populations effectively. Training programs for service providers ensure they can assist clients in navigating digital platforms and address communication and technical challenges (Lukawiecki et al., 2022).
 - The current state of staff skills can also be assessed to understand areas where more training is required.
 - To keep staff updated on the latest tools and best practices, continuous professional development opportunities such as workshops and online

courses should be provided. This ensures that staff remain proficient and adaptable in a rapidly evolving digital landscape.

It is important to recognize that personalized and tailored support from trained individuals, including training programs and one-on-one assistance, is critical for helping both staff and immigrants and refugees navigate digital platforms and access or provide services. These programs should be adaptable to different learning paces and be available in various formats (e.g., in-person, virtual, self-paced online modules) to accommodate the diverse needs of learners. Individualized approaches accommodating different needs can significantly enhance digital literacy and confidence among users. Additionally, providing ongoing support through help desks can help users/clients feel more confident and supported while using these technologies. (Lukawiecki et al., 2022; Stark et al., 2022).

Intermediaries for Supporting Implementation of Digital Interventions

The accelerated adoption of telehealth and digital tools during the COVID-19 pandemic highlighted a need for understanding and building capacity for new and refreshed tools. The need for specialized support roles to ensure these tools and technologies are accessible, user-friendly, and culturally sensitive became apparent. As such, organizations have introduced the use of intermediaries such as Digital Navigators and Community Health Workers (CHWs) to address the specific and critical gaps in healthcare access related to digital literacy, for both staff and clients. These roles receive specific training and continuously explore technologies to support the integration and effective utilization of digital interventions and health technologies adopted by organizations.

Role of Intermediaries in Organizations:

- This role is part of a comprehensive approach, typically including intermediaries, user-friendly technology, and a hybrid model of service delivery. It has become essential in addressing the unique challenges faced by newcomers in accessing digital healthcare and community services (NDIA, 2024; Pandey et al., 2022; Lukawiecki et al., 2022; Wisniewski et al., 2020).
- This role can take part in ensuring equitable access to digital resources, enhancing digital literacy, and supporting clients and staff in navigating technology to meet their personal and professional goals (NDIA, 2024).
- Intermediaries play a vital role in enhancing healthcare access for immigrants and newcomers by providing culturally sensitive support and ensuring the technology is accessible and easy to use (Pandey et al., 2022; Lukawiecki et al., 2022; Wisniewski et al., 2020).
- They help overcome barriers such as language difficulties and digital literacy gaps and support cultural preferences thus improving overall access and engagement with digital interventions such as digital health tools.

Digital Navigators:

- What is a Digital Navigator?:
 - Digital Navigators are new essential roles in organizations, providing personalized support to clients and staff for digital inclusion.
 - Digital Navigators were introduced to bridge the gap between complex digital health technologies and the needs of newcomers, who often struggle with digital literacy and accessing online services. This role was also created to support healthcare staff in effectively implementing and using these technologies, ensuring seamless integration into clinical workflows (Wisniewski et al., 2020; YMCA, N.D; Shahid et al., 2022).
- How are they trained?
 - Digital Navigators undergo a 10-hour training curriculum, including core smartphone skills, basic technology troubleshooting, app evaluation, clinical terminology, and engagement techniques. This training equips them to assist both clients and staff in overcoming digital barriers (Wisniewski et al., 2020).
- What does a Digital Navigator do?
 - They serve as digital champions, identifying new technologies, methods, or tools, leading the adoption and implementation as well as training for clients and staff
 - They help secure internet access, low-cost devices, and offer digital skills training and technical support (NDIA, 2024).
 - They help newcomers with digital literacy orientation and training; and act as advocates and supporters, educating and onboarding newcomers to make informed choices regarding technology use (YMCA, N.D).
 - While Digital Navigators are primarily client-facing, assisting with digital literacy orientation, training, and troubleshooting, they also play a crucial role in supporting healthcare staff. Providing frontline technical assistance and integrating clinical, technical, workflow, and administrative factors help staff navigate and manage digital platforms more efficiently (Pandey et al., 2022; Lukawiecki et al., 2022).
 - Assistance can be provided in person, via phone, email, text messages, video chats, and other communication methods that best suit the newcomer's needs. They aid in the enrollment for digital literacy classes, workshops, and skill development opportunities (YMCA, N.D).
 - They enhance access by facilitating communication through preferred digital channels and improving understanding of available resources. This ensures that digital interventions and health tools are integrated seamlessly into healthcare services, providing a practical solution to enhance healthcare access through technology, addressing both facilitators and barriers experienced by immigrants and newcomers (Pandey et al., 2022; Lukawiecki et al., 2022; Wisniewski et al., 2020).

Community Health Workers:

- CHWs can incorporate similar activities to the Digital Navigator into their day-to-day activities and interactions.
- CHWs leverage their understanding of cultural contexts to provide personalized support, ensuring that technology is not only accessible but also user-friendly for immigrant communities.
- CHWs provide culturally sensitive support, making technology more accessible and relevant to immigrant communities. Their role emerged from the need to build trust and engagement, often hindered by cultural and language barriers (Pandey et al., 2022; Lukawiecki et al., 2022).
- CHWs assist with navigation, troubleshooting, and providing personalized guidance. They help ensure that both clients and healthcare staff are equipped to use digital tools effectively, thereby enhancing overall service delivery (Pandey et al., 2022; Lukawiecki et al., 2022).

One example of this role in practice is FHC's use of a trained and dedicated volunteer serving as an intermediary for the implementation of health equity data collection by tablets (FHC, 2023). As mentioned in the previous section, this role was key for implementation and transition support to digital data collection. In essence, the establishment of these roles highlights a broader strategy to bridge the digital divide by addressing both client-facing challenges and organizational needs. By supporting clients and staff alike, Digital Navigators and CHWs play a vital role in improving healthcare access and outcomes for immigrant and newcomer populations. Combining digital tools with personalized support ensures that digital interventions are effectively utilized and meet diverse needs.

User-Friendly and Culturally Sensitive Technology

Though there are a multitude of tools available to support individuals and increase their access to health care and other services, ensuring these are user-friendly and culturally sensitive is imperative. Specifically, there is a need for technology designs that consider the unique challenges faced by immigrant and newcomer populations to enhance their integration and well-being (Ekoh et al., 2023). Developing user-friendly technology while leveraging continuous support can effectively bridge digital literacy gaps (Lukawiecki et al., 2022; Stark et al., 2022).

A key consideration for digital tools when considering immigrant and newcomer clients is language. Clients may possess skills required to interact with digital tools, however, their English language skills may be limiting their ability to engage with these tools. As identified above, many digital platforms are predominantly in English or French causing an inherent barrier to access (EdTech Center, 2022). Understandably, many immigrants require multilingual and culturally sensitive digital resources to efficiently and independently navigate healthcare systems. Multilingual support is essential for making

digital tools accessible to non-native English or French speakers. Providing services, including digital tools, in multiple languages ensures inclusivity and effectiveness, enabling a broader reach and better engagement with diverse populations (Pandey et al., 2022; Chen et al., 2020; Wisniewski et al., 2020).

To achieve this, several key strategies can be implemented.

- **Intuitive Platforms:** Developing intuitive platforms, user-friendly technology, including online booking systems and digital education resources, helps immigrants navigate healthcare systems more effectively (Lukawiecki et al., 2022). Examples include applications with intuitive interfaces, simple navigation, clear and not overcrowded pages, and features like image recognition to assist users who may struggle with text.
- **Accessibility for Older Adults:** Older adult immigrants can have compounding issues which greatly affect their ability to interact with digital tools. Interventions and platforms should be designed with user-friendly interfaces that cater to older adults who may have lower levels of digital literacy and require multilingual support (IGC, 2020). This includes larger text, straightforward navigation, and tutorials that explain features in simple terms.
- **Multilingual and Culturally Sensitive Resources:** Platforms with multilingual and culturally informed interfaces enhance accessibility and usability. This goes beyond simple translation; it involves using culturally appropriate terms, symbols, and imagery that resonate with the target community. Culturally sensitive resources include materials that reflect the values, beliefs, and practices of diverse cultural groups, such as translated information and visual aids. For instance, providing educational materials in multiple languages or incorporating cultural references can help ensure information is accessible and relatable (Shahid et al., 2023). By integrating these culturally sensitive elements, digital tools can become more inclusive and effective, ensuring that immigrants and refugees can fully engage with and benefit from digital interventions.
 - Moreover, Digital Navigators and CHWs help customize technology used to fit diverse communication and interaction preferences, which is particularly beneficial for immigrants and newcomers (Pandey et al., 2022; Lukawiecki et al., 2022; Wisniewski et al., 2020).
- Examples of digital tools designed specifically for immigrants and newcomers:
 - New Zealand's InfoNow and Belgium's Welcome to Antwerp app provide information on local services and organizations.
 - Canada's Service Delivery Improvement Fund supports projects like occupation-specific language training platforms and job-matching technologies to aid newcomers in finding employment (IGC Intergovernmental Consultations on Migration, Asylum and Refugees, 2020).

Partners/Organizations Strategies

Various organizations have implemented initiatives to address digital equity and inclusion issues to enhance service access for their clients. Based on the information found and shared by partners, they are implementing the following at their organizations.

- **Providing Devices:** Many organizations have launched initiatives to provide phones, tablets, and other devices to individuals in need. These devices enable participation in virtual services, access to appointments, and communication with healthcare providers.
- **Digital Health Education:** Education sessions on how to use smartphones and tablets for health-related purposes are offered. These sessions equip clients with the necessary skills to navigate digital health platforms and access healthcare information online.
- **Senior-Friendly Technology:** Some initiatives include designing tablets and other devices to be senior-friendly, addressing the specific needs of older adults and ensuring they can benefit from digital interventions and digital health services.
- **Training (e.g. videos, courses, and personalized support):** Producing training videos that feature clients demonstrating how digital technology can enhance processes (e.g. seniors teaching seniors) has proven impactful. Organizations have also implemented training programs or resources like one-to-one sessions and 'digital literacy libraries'. At some organizations, staff take on a specific role in supporting clients with digital needs.
- **Staff Training:** Staff are trained to support clients accessing and using different tools (e.g., over the phone or online).
- **Communication and Support:** Constantly communicating with clients through various platforms, such as phone, mail, and email, and providing 'how to use' videos for different technology platforms help clients stay informed and connected.

Recommendations

Components for Optimizing Digital Interventions

Given the findings of this report, the following are key components identified for optimizing digital interventions.

- **Adopting a Hybrid Approach:** Hybrid approaches include in-person and digital/virtual service access and delivery. However, the digital service access and delivery should be accompanied by in-person or additional support to enhance the effectiveness and adoption of these interventions.
 - The hybrid approach involves integrating digital platforms with personalized support. It is important to tailor the level and type of in-person support based on the specific needs of the immigrant community being served.
- **Interdisciplinary and Participatory Developmental Approach:** Incorporate diverse methodologies and actively involve clients to enhance the development of

digital interventions. Specifically, interdisciplinary research combines insights from fields such as technology, healthcare, and social sciences while participatory research includes the perspectives of target populations and communities throughout the research and development process.

- This approach ensures that digital interventions are designed with a deep understanding of the communities' needs and challenges.
- Involving clients in the development and evaluation of digital interventions can lead to more relevant and user-friendly interventions.
- By integrating these methods, researchers and organizations can create more effective and inclusive digital interventions and health services that better address the unique barriers faced by immigrant and refugee populations.
- **User-Friendly Technology:** Create tools that are multilingual, culturally sensitive, and intuitive to use.
 - Digital tools provide convenience and accessibility to healthcare services, but language barriers and limited digital literacy can limit their effectiveness.
 - Include features such as real-time translation, language-specific help sections, and culturally relevant imagery to enhance usability for all clients served by Access Alliance.
 - Implement user-centred design principles to ensure that digital tools used at Access Alliance are easy to navigate and use, even for those with limited digital literacy.
- **Provision of Devices and Connectivity:**
 - Make tablets, computers, and Wi-Fi hubs available on-site through a device lending system or designated space to serve as a hub for device access. This approach supports equitable access for clients to utilize these resources for their personal needs but can also be made available for digital literacy training.
 - Ensure devices are preloaded with essential apps such as language learning tools and digital skills training resources.
 - Provide ongoing technical support and partner with local organizations to offer subsidized or donated devices to clients facing financial constraints, enhancing integration and support for immigrant communities (Switchboard, 2024).
- **Digital Literacy Training:** Implement comprehensive training programs and workshops focused on general digital skills and those specific to healthcare tools or applications.
 - Engage immigrants and refugees in the development and delivery of these training programs to address unique barriers they face in accessing digital interventions for healthcare services.
 - Provide comprehensive digital skills training programs tailored to different proficiency levels, focusing on practical skills needed for effective use of digital health tools.

- Provide clients with 'How to Use' videos for various technology platforms, and maintain regular communication through multiple channels, including phone, mail, and email (Lukawiecki et al., 2022). Ensure that the instructional videos are easily accessible, cover a range of relevant topics, and are designed to address clients' specific needs.
- Explore and identify other available resources to further support clients' digital needs and bridge the digital divide (Lukawiecki et al., 2022; Chen et al., 2020; Pandey et al., 2022).
- **Staff Operational Requirements:**
 - Organizations should ensure that staff have the appropriate skills and resources for using digital interventions.
 - Equip frontline staff with the necessary skills to support clients through alternative formats, such as over the phone or online. The training ensures that staff are well-prepared to assist clients in various digital and non-digital environments (Lukawiecki et al., 2022).
 - Implement Digital Navigators and CHWs to become champions for digital interventions to support the development and implementation of tools.

Recommendations for Digital Intervention Integration at Access Alliance

Current State vs. Desired State

- **Current State:** Typically, appointments and interactions with the organization are by phone or in-person. This has overwhelmed the phone and secretarial resources, resulting in access issues for clients. Access Alliance has made strides in offering digital literacy programs and utilizing tools like Ocean for online appointment bookings to alleviate some of the issues, but challenges persist. The organization is interested in optimizing its digital interventions to improve efficiencies and access for its clients.
- **Desired State:** A more inclusive and accessible digital service access model that ensures all clients can easily navigate and benefit while reducing the burden of service navigation and overwhelmed phone lines.

Recommendations:

- Understand the current and ongoing context of clients' skills, preferences and needs:
 - Gather detailed insights into clients' digital literacy, skills, and accessibility levels as well as preferences for in-person, phone and online booking platforms.
 - Gather detailed insights into linguistic and communication challenges and barriers of clients accessing booking modes such as phone and online platforms (e.g. automated instructions).

- Enhance digital literacy training for clients:
 - Expand the scope of digital literacy training to include more tailored sessions that address the specific needs of different client groups. These sessions should focus on general digital skills and specific skills related to digital interventions in healthcare settings.
 - Ensure training and resources are culturally and linguistically accessible.
 - Identify and utilize resources and trainings that are already available and focused on newcomer and immigrant populations to optimize efficiency and resources.
 - Implement ongoing sessions to support the continued development of skills and abilities.
 - Implement feedback mechanisms to continually assess and respond to clients' challenges with digital tools for ongoing quality improvement purposes.
 - Regularly update training materials to reflect changes in technology and client feedback.
- Provide staff with training:
 - Understand staff's digital skills and those required to engage in their daily work activities to determine areas where additional training is required.
 - Develop specific training for their utilization of digital interventions and provide ongoing support through resources or by the Digital Navigator.
 - Develop role-specific training programs that equip frontline staff with the knowledge and skills to assist clients across various digital platforms. This may include guiding clients through the Ocean platform and addressing any language or technical issues. Offer ongoing workshops or training sessions to update staff on new features and best practices for assisting clients at with digital interventions.
- Strengthen the Role of Intermediaries:
 - Strengthen or implement intermediaries specifically for digital interventions and implementation such as Digital Navigators and Community Health Workers into Access Alliance's workforce. This role can be a stand-alone individual or an existing staff member who incorporates this into their work as a key part of their portfolio.
 - Curate these roles as champions of digital interventions for identifying new interventions or technologies, supporting the development and implementation of interventions or technologies and providing training to other staff such as sharing best practices and insights on digital intervention and client engagement.
 - Provide these roles with ongoing training to better support both staff and clients in navigating digital platforms, ensuring their services are culturally sensitive and accessible.

- Ocean as a tool:
 - Evaluate the user-friendliness of Ocean:
 - Identify and address specific challenges by conducting a usability study to assess how well clients can navigate the platform, focusing on criteria such as ease of use, clarity of instructions, and cultural and language accessibility.
 - Establish a feedback loop with clients to monitor usability issues and make iterative improvements based on their input.
 - Provide training and skill development for usability:
 - Develop easy to understand and clear, multilingual fact sheets or step-by-step guides explaining how to use online services like Ocean, including when and how to use them (e.g. appointment booking).
 - Develop accessible training videos with step-by-step instructions or adapt those currently available such as 'A Patient's Guide to Ocean'.
 - Make a Digital Navigator or staff available for troubleshooting issues.
 - Host regular workshops or webinars, both in-person and online, to train clients on using Ocean, while distributing updated guides and videos through Access Alliance's communication channels.
 - Using the knowledge of clients' digital literacy, skills, accessibility levels, and preferences to develop informed change management strategies for adopting Ocean as a digital intervention.
 - Increase Awareness:
 - Promote online appointment booking options through visible and accessible channels, such as automated phone line, posters, and direct client communication.
 - Ensure consistent communication about digital interventions across all contact points. Update voicemail scripts, email templates, and physical materials to prominently feature information about online booking options and how to use them.
 - Launch a marketing campaign using social media, newsletters, and community events to raise awareness of online booking options and ensure to include the links or connections to the user training resources.

Limitations

One limitation of this review is the methodology, a rapid review and environmental scan. Given the timeline of the project, a thorough systematic review and environmental scan were not feasible. However, this methodology is conducive to the interests of the project, by which it can be used as a starting point. Additionally, many of the findings speak to using customized and tailored approaches to digital interventions. This requires the organization to implement studies which assess their stakeholders' needs and use this in combination with the literature presented here to address those needs.

Conclusion

This report highlights the critical need for enhancing digital literacy and addressing barriers to accessing and receiving healthcare services through digital means among immigrants and refugees. Effective digital literacy training is essential, focusing on general technology skills and specific healthcare applications to bridge the digital divide exacerbated by language difficulties, socioeconomic status, and limited digital literacy. A tailored comprehensive approach will significantly improve digital interventions for access and healthcare outcomes for immigrants, newcomers and refugees, ensuring equitable and effective service delivery.

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Appendix A – Search String Methodology

Topic	Keywords	Search String
Digital Literacy and Equity for Newcomers / Immigrants	"digital literacy" - "digital skills" - "digital divide" - newcomers - immigrants - refugees - Toronto - "urban areas" - "large cities"	("digital literacy" OR "digital skills" OR "digital divide") AND (newcomers OR immigrants OR refugees) AND (Toronto OR "urban areas" OR "large cities")
Impact of Technology on Healthcare Access	"technology impact" - "digital health" - "e-health" - "healthcare access" - "community services" - "newcomers" - "immigrants" - "refugees" - "facilitators" - "barriers"	("technology impact" OR "digital health" OR "e-health") AND ("healthcare access" OR "community services") AND ("newcomers" OR "immigrants" OR "refugees") AND ("facilitators" OR "barriers") AND ("emigra" OR "foreigner" OR "immigra") AND ("migrant" OR "migration") AND ("minorities" OR "minority group" OR "minority health")
Strategies for Hybrid Service Access	- "hybrid service access" - "online and in-person services" - "blended services" - strategies - "best practices" - tools - newcomers - immigrants - refugees - "community health workers" - "service providers" - "digital navigators"	"hybrid service access" OR "online and in-person services" OR "blended services") AND (strategies OR "best practices" OR tools) AND (newcomers OR immigrants OR refugees) AND ("community health workers" OR "service providers")

Digital Literacy and Equity for Newcomers/Immigrants

- Concepts and Keywords: Digital literacy, digital skills, digital divide, digital competence, digital inclusion, newcomers, immigrants, refugees, new Canadians, migrants, Toronto, large cities, urban settings, metropolitan areas.
- Search String: ("digital literacy" OR "digital skills" OR "digital divide") AND (newcomers OR immigrants OR refugees) AND (Toronto OR "urban areas" OR "large cities")

Concept	Keywords/Synonyms	Notes
Digital Literacy	"digital skills", "digital divide", "digital competence", "digital inclusion"	Adjacency: "digital adj3 literacy"
Newcomers/Immigrants	"immigrants", "refugees", "new Canadians", "migrants"	Adjacency: "newcomers adj3 immigrants"
Urban Areas	"Toronto", "large cities", "urban settings", "metropolitan areas"	Adjacency: "urban adj3 areas"

Impact of Digital Interventions on Healthcare Access

- Concepts and Keywords: Technology impact, digital health, e-health, telemedicine, health technology, healthcare access, community services, healthcare availability, health services access, newcomers, immigrants, refugees, new Canadians, migrants, facilitators, barriers, challenges, obstacles, enablers, support systems.
- Search String: ("technology impact" OR "digital health" OR "e-health") AND ("healthcare access" OR "community services") AND (newcomers OR immigrants OR refugees) AND (facilitators OR barriers)

Concept	Keywords/Synonyms	Notes
Technology Impact	"digital health", "e-health", "telemedicine", "health technology"	Adjacency: "technology adj3 impact"
Healthcare Access	"community services", "healthcare availability", "health services access"	Adjacency: "healthcare adj3 access"
Newcomers/Immigrants	"immigrants", "refugees", "new Canadians", "migrants"	Adjacency: "newcomers adj3 immigrants"
Facilitators/Barriers	"challenges", "obstacles", "enablers", "support systems"	Adjacency: "facilitators adj3 barriers"

Strategies for Hybrid Service Access

- Concepts and Keywords: Hybrid service access, online and in-person services, blended services, hybrid model, integrated services, strategies, best practices, approaches, methods, interventions, newcomers, immigrants, refugees, new Canadians, migrants, service providers, community health workers, social workers, healthcare providers, service workers.
- Search String: ("hybrid service access" OR "online and in-person services" OR "blended services") AND (strategies OR "best practices" OR tools) AND (newcomers OR immigrants OR refugees) AND ("community health workers" OR "service providers")

Concept	Keywords/Synonyms	Notes
Hybrid Service Access	"online and in-person services", "blended services", "hybrid model", "integrated services"	Adjacency: "hybrid adj3 service access"
Strategies	"best practices", "approaches", "methods", "interventions"	Adjacency: "strategies adj3 best practices"
Newcomers/Immigrants	"immigrants", "refugees", "new Canadians", "migrants"	Adjacency: "newcomers adj3 immigrants"
Service Providers	"community health workers", "social workers", "healthcare providers", "service workers"	Adjacency: "service adj3 providers"

Identifying Databases

The selected databases for conducting the literature search include:

- PubMed
- OMNI
- Scopus
- ERIC
- Sociological Abstracts
- Google Scholar

These databases were chosen for their comprehensive coverage of sociological and educational research, which are pertinent to understanding the digital literacy and healthcare access issues faced by newcomers, immigrants, and refugees.

Appendix B – Resources Provided by Partners

<i>Organization</i>	<i>Resources</i>	<i>Link to Resources</i>
Alliance for Healthier Communities	Grand Bend Area CHC Virtual Care Report	Grand Bend Area CHC Virtual Care Report Aug2020.pdf (allianceon.org)
	Virtual Care during COVID-19 and Implications for Future Care Delivery	Microsoft PowerPoint - Trillium 2020 conference presentation (allianceon.org)
	Clinician Change Virtual Care Toolkit	Clinician Change Virtual Care Toolkit (infoway-inforoute.ca)
Marco Campana: Industry expert in digital spaces and settlement	This article discusses innovative ways that newcomers are utilizing technology, highlighting examples such as language learning apps, virtual support groups, and digital skills training to aid integration and support among immigrant communities.	Innovative Ways Newcomers Are Using Technology
	This article highlights how Digital Navigators play essential roles in organizations, providing personalized support to community members for digital inclusion.	Digital Navigators - a vital emerging role in your organization?
Rexdale CHC	Shared resources such as surveys (e.g., survey feedback from clients regarding their experience using online booking resources)	Client Survey 2023-2024 Client Survey 2022-2023 Client Survey 2021-2022
Toronto East Quadrant Local Immigration Partnership	A report conducted by the Toronto InterLIP on Access to Technology Service Providers and Newcomers during COVID-19.	Access to Technology Service Providers and Newcomers during COVID-19
Women’s College Hospital – Institute For Health System Solutions And Virtual Care (WHIV)	These studies focus on understanding health equity-related challenges and issues in virtual care through literature reviews and investigations with various stakeholder representatives. The information is targeted at organizations and health systems.	Challenges and strategies for promoting health equity in virtual care: findings and policy directions from a scoping review Health equity-related challenges and experiences during the rapid implementation of virtual care during COVID-19: a multiple case study Virtual Care In The Covid-19 Era: Evaluation Final Report Equitable Virtualization of Primary Care