Promoting Digital Health Equity Among People with Serious Mental Illness

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Abstract

As digital technology becomes increasingly integrated into daily life, it is essential to consider how its use influences health and well-being, particularly among individuals with limited access to digital technology, such as those with serious mental illness. The purpose of this research was to examine the relationship between digital technology and health and well-being among people with serious mental illness and to identify ways to promote digital health equity.

This dissertation presents a needs assessment based on community-based participatory methods (Wallerstein et al., 2017). We partnered with a community mental health organization that provides services to people with serious mental illness and assembled an advisory committee consisting of staff members and service users to guide the research process. We conducted four semi-structured focus groups to examine how service users with serious mental illness currently use digital technology, how they would like to use it, and how their use relates to their health and well-being. The focus groups also explored barriers to digital technology use experienced by service users and potential solutions. A pragmatic, mixed inductive-deductive approach to qualitative data analysis was employed. To prioritize barriers and solutions, we used a research method called the nominal group technique that involves assembling a group of experts on a topic and conducting rounds of idea generation, discussion, and idea ranking. We conducted two client nominal groups and one staff nominal group. Ranking data from the nominal groups was summarized and presented descriptively.

Participants described several pathways beyond accessing healthcare through which they believe that service users' digital technology use both positively and negatively impacted their health and well-being. Our findings also provided an in-depth overview of the different barriers to digital technology use experienced by service users and identified several high-priority

solutions to explore for intervention development. Existing research largely focuses on digital health equity within the healthcare system. The current research highlights how expanding our conceptualization of digital health equity presents new opportunities to influence health outcomes.

Keywords: serious mental illness, digital divide, health equity, digital health equity, digital determinants of health, participatory research

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Contribution of Authors

Kimberly Turner is the first author for all three studies described in this dissertation. She was responsible for reviewing the literature, study conceptualization and design, participant recruitment, data collection and analysis, and manuscript writing and editing. Undergraduate student Christa Masengesho Ndamage is second author of all three studies. She contributed to data collection by co-facilitating groups. She also transcribed focus group data and made substantial contributions to data analysis. Dr. John Sylvestre is last author. He oversaw the conceptualization of the studies and execution of research activities and provided editing support.

All studies were based on community-based participatory research principles. As such, we assembled a stakeholder committee to advise on the project. Although no single member of this advisory committee meets criteria for authorship, as a whole, the advisory committee made substantial contributions by providing expertise on their lived experience, guiding the focus of the research questions, providing input on which methodological decisions would work best for stakeholder participants, providing feedback on study materials, verifying interpretations of the findings, and dissemination. Their contribution will therefore be acknowledged in publications as "the Digital Health Equity Advisory Committee."

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Chapter 1

General Introduction: Structure and Scope of Dissertation

Statement of the Problem

Digital technology use plays a prominent role in day-to-day activities, including work, education, access to services, and leisure. The COVID-19 pandemic accelerated reliance on digital technology, as public health restrictions led businesses and services, including healthcare and social services, to rapidly transition to virtual service delivery. Despite public health restrictions having been lifted for some time, the pandemic has had a lasting impact on the way that people live and work. Many workplaces and services continue to offer online or hybrid options because of their convenience and their ability to remove barriers for people with mobility impairments or those living in rural areas. This, however, can pose problems for people who have less access to digital technology and internet connectivity. Indeed, in the healthcare sector, concerns have been raised about the influence of increasing virtual care on groups with less access to technology and how, without careful consideration, this could exacerbate existing health inequities (Crawford & Serhal, 2020). Additionally, for many marginalized groups with poor access to digital technology and internet connectivity, the transition to a more virtual society has the potential to impact many aspects of their lives and well-being, beyond access to healthcare. One such group is people with serious mental illness.

Currently, little is known about the impact of an increasingly digital world on the health and well-being of people with serious mental illness. The current scientific literature examining digital health equity among marginalized groups, including people with serious mental illness, is mainly focused on the healthcare system and does not focus on the interaction between digital technology use and social determinants of health. This limits our understanding of the overall

impact of digital technology use on health. Although digital interventions and programs for people with serious mental illness have been developed and implemented, most research on digital health equity among marginalized communities has not involved those communities in the research process. To promote digital health equity, communities themselves need to be the voice of their own needs.

Overview of the Current Research

The goal of this dissertation is to examine the relationship between digital technology use and health and well-being in the lives of people with serious mental illness, with a focus on understanding how to promote digital health equity. This was accomplished through a partnership with a community mental health organization that provides services to people with serious mental illness. By involving service providers and their service users with serious mental illness, we aimed to gain an in-depth understanding of how service users' digital technology use relates to their health and well-being, identify their needs related to digital health equity, prioritize these needs, and identify and prioritize solutions to address these needs.

To achieve this, we conducted a needs assessment based on a community-based participatory research (CBPR) approach. A needs assessment is a process that examines current conditions and desired conditions, and identifies the gaps or "needs" required to move from current to desired conditions (Newcomer et al., 2015; Sleezer, 2014). CBPR is an approach to research that has developed in response to ever-increasing health disparities experienced by low-resource and marginalized communities, and the need to rebuild trust that has been eroded through their previous interactions with the healthcare system and research (Wallerstein et al., 2017). This approach to research is particularly appropriate for our needs assessment, given that one of its key principles is that it "emphasizes public health problems of local relevance and

ecological perspectives that attend to the multiple determinants of health and disease" (Wallerstein et al., 2017, p. 33). The core principles of CBPR are that it is participatory, cooperative (engages community members and researchers in a joint process), it is a co-learning process, it involves systems development and local community capacity building, it is empowering and enables participants to have increased control over their lives, and it achieves a balance between research and action (Wallerstein et al., 2017).

To conduct our community-based participatory needs assessment, we collaborated with a community mental health organization. Our partner is located in a large urban centre in Ontario, Canada, and serves over 8000 active clients. Their focus is on providing evidence-based services to people with serious mental illness with complex needs who are unhoused or vulnerably housed. Their services consist of a variety of psychosocial programs, including outreach, case management, group programs, specialty services, and counselling services.

We adapted the CBPR model to our setting and research goals. Important contextual factors included the marginalization of people with serious mental illness and potential mistrust of health and research professionals. Our research group, however, has maintained a longstanding relationship with our partner organization and its service users that built a foundation of trust. This project was conducted in 2023. At the time of data collection, most COVID-19 pandemic related public health restrictions had been lifted. However, the pandemic had highlighted the importance of the issue of digital access and digital health equity to our partners, and motivation to conduct and participate in research in this area was high.

Several steps were taken to ensure that the project aligned with stakeholder interests and to ensure collaboration and manage power dynamics within the partnership. Initial meetings were held with management of our partner community mental health organization to establish

their goals for the project. We agreed on the overarching goals of the project but also agreed that flexibility was needed to incorporate the perspectives of stakeholders. We also agreed on the resources that would be provided by each member of the partnership. We provided research expertise and labour while the organization agreed to support recruitment and provide access to physical office space.

We then assembled an advisory committee consisting of four service users and three staff members of our partner community mental health organization. From the beginning, we approached the partnership with respect for the knowledge and lived experiences that committee members were bringing to the project and made this clear to members. We also clearly set out expectations regarding contributions. The committee agreed to contribute to the project by providing input on the research questions, giving feedback on the study methods and materials, verifying the interpretation of findings, and supporting the dissemination of findings. We also demonstrated our respect of the committee's knowledge and contributions by taking action on their feedback and by paying service user committee members for their time ($25 for each one-hour meeting attended). The purpose of this advisory committee was to ensure that the people impacted by our research had a voice in the questions we were asking and how we went about answering them. Our advisory committee was diverse in terms of level of experience with digital technology and in their life experiences and identities.

This community-based participatory needs assessment included three studies. The focus of the first study was on understanding how people with serious mental illness are currently using digital technology and mapping out the relationship between their digital technology use and health and well-being. In this study, we examined how service users were currently using digital technology, disparities between how they were using digital technology and how they

would like to use it, and explored the perceived impact of digital technology use on health and well-being. The focus of the second study was on identifying unmet needs and barriers related to digital technology use and possible solutions that could address these needs and barriers. For studies one and two, we conducted focus groups with stakeholders, including service users with serious mental illness at our partner community mental health organization and staff members providing direct client services. The focus groups were designed to answer both our research questions for study one and study two, but separate analyses were conducted on the dataset for each study.

The aim of the third study was to assess which unmet digital technology needs and barriers to digital technology use, and which solutions to address them, were considered highest priority by stakeholders, including service users and frontline staff at our partner community mental health organization. To achieve this, we used a nominal group technique (Delbecq et al., 1975) to prioritize them based on importance, potential impact, and feasibility.

The findings of these studies contribute to the current conceptual understanding of digital health equity and how it interacts with social determinants of health for people with serious mental illness. Additionally, this work has provided a marginalized community with the opportunity to participate in research on a topic that is important to them. Finally, the research has resulted in recommendations for community mental health organizations that are interested in promoting digital health equity among their clients.

Chapter 2

Study Context and Literature Review

The aim of this chapter is to provide background information in order to contextualize the current research. Definitions for important concepts are provided, including exploring different proposed models of health equity and digital health equity. The existing literature on digital technology and health among people with serious mental illness is reviewed, with a focus on understanding the potential benefits of digital technology use for health and well-being and barriers to digital health equity. Finally, gaps within the existing literature that motivated the current research are identified.

Serious Mental Illness

According to the National Institute of Mental Health, serious mental illness is defined as "a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities" (National Institute of Mental Health, 2024, Definitions section). In the field of community mental health, serious mental illness is typically conceptualized based on three domains: duration, disability, and diagnosis. Duration refers to the amount of time the mental illness persists, disability refers to the level of functional impairment, and diagnosis refers to the specific diagnoses included. Definitions of serious mental illness differ in the thresholds they set for each of these domains. Regardless of the specific definition used, there is extensive evidence that people with serious mental illness experience significantly higher morbidity and mortality than the general population (Cunningham et al., 2013; Cunningham & Dixon, 2020; Goldman et al., 2018; Hayes et al., 2017). Additionally, it bears mentioning that people with serious mental illness often

experience poverty and marginalization and live in circumstances that make accessing and using digital technology difficult (Sylvestre et al., 2018).

The Digital Divide

The term "digital divide" has been used to describe gaps in *access* to digital technology in certain groups. However, the term has evolved, and now access is only considered the first level of the digital divide. It is also important to consider the second level, which includes *digital skills and use*, and the third level, which refers to *being able to experience the benefits of digital technology use* (Lythreatis et al., 2022).

In terms of *access*, Firth et al. (2016) conducted a systematic review and meta-analysis of mobile phone ownership and interest in eHealth interventions among people with psychosis, a condition included in almost all definitions of serious mental illness. Overall, they found that the mobile phone ownership rates were 66.4% (Firth et al., 2016). Five of the 12 studies included in this systematic review and meta-analysis collected data on the type of mobile phone owned by participants with psychosis, and these studies found that 35.4% owned a smartphone.

As digital technology becomes more available and affordable, the digital divide may be narrowing. A more recent study examined the use of computers, smartphones, and social media among a convenience sample of 403 people being treated for serious mental illness across four mental health centers in the United States (Brunette et al., 2019). They found that over the prior six months, 88.6% reported using a mobile phone, 65.8% reported using a smartphone, 53.6% reported using the internet on a computer or tablet, and 67.9% reported using social media (Brunette et al., 2019).

A study of mobile phone and smartphone use among people with serious mental illness receiving services across two clinics in the United States found that 86% of participants owned

any mobile phone and 60% owned a smartphone (Young et al., 2020). These ownership rates were lower than those of the general population in the United States, which, at the time of data collection, were 95% for mobile phone ownership and 77% for smartphone ownership (Pew Research Center, 2025). Similar rates of ownership were found in a cross-sectional survey of users of psychiatric inpatient services conducted in Berlin, which found that 84.9% of participants owned any mobile phone and 59.3% owned a smartphone (Marbin et al., 2023). This study found that precarious housing and having a psychotic illness were associated with reduced likelihood of owning a mobile phone (Marbin et al., 2023).

A study on access to digital technology conducted during the early COVID-19 pandemic, a time when much of our lives were restricted to the digital world, found that of the people with serious mental illness who participated, 79.8% owned a smartphone or tablet, and 56.4% owned a laptop or desktop computer. In comparison, 13.4% did not own a device. Additionally, 83.9% of participants reported having internet access at home. Despite the relatively high levels of access to digital technology and the internet found in this study, 39.5% of participants reported being non-users of the internet, and only 37.1% reported being frequent users. This suggests that, even when access was not an issue, many faced additional barriers, including those related to digital literacy, concerns about privacy and security, and attitudes about digital technology (Spanakis et al., 2021).

A subsequent study by Spanakis et al. (2022) looked at digital skills, the second level of the digital divide, among people with serious mental illness using the essential digital skills framework (United Kingdom Department for Education, 2019), which assesses the skills that are needed to fully benefit from digital technology and internet use. In this framework, “foundation skills” are the basic prerequisite skills for digital technology use, such as entering account

information, connecting to Wi-Fi, and using a keyboard and mouse or touchscreen (Spanakis et al., 2022). Of the 249 participants, 42.2% reported deficits in foundation skills. The most common deficits were in managing and updating passwords and changing device settings to improve accessibility and usability (Spanakis et al., 2022).

When it comes to issues beyond access and skills, even less is known about whether people with serious mental illness are experiencing the benefits of digital technology use. Some qualitative studies have explored bridging the first level of the digital divide by providing marginalized groups with access to digital technology. Our research group conducted a study in partnership with a community mental health organization during the COVID-19 pandemic that distributed pre-paid smartphones to clients with serious mental illness who had histories of housing instability (Turner et al., 2023). Our study consisted of qualitative interviews with phone recipients and frontline staff focused on the implementation of telehealth case management services. We found that, even when participants were provided free access to digital technology, they faced additional barriers, including difficulties maintaining access (e.g., loss, theft), digital skills deficits, paranoia, and lack of access to private spaces to participate in telehealth services (Turner et al., 2023).

People with serious mental illness continue to experience the digital divide at all levels, leading to concerns that a more virtual world could negatively impact their health and well-being. With the arrival of the COVID-19 pandemic and the transition to increased use of digital technology to deliver health care, the impact of this transition on groups already affected by health disparities, including those with serious mental illness, is being increasingly discussed and investigated in the academic literature (Clare, 2021; Crawford & Serhal, 2020; Spanakis et al., 2021; Watson et al., 2021).

Digital Technology and Health

The relationship between the digital divide and health was examined prior to the COVID-19 pandemic. A study using data from 2013-2017 American Community Survey looked at associations between computer and broadband internet use and health inequities among over 2 million participants (Singh et al., 2020). Their analysis found that in communities with the lowest levels of internet use, life expectancy was 6.6 years shorter than in communities with the highest use. Additionally, at the individual level, after controlling for other sociodemographic variables, not owning or using a computer was associated with 42% higher odds of disability, including mental disability (43%), self-care disability (51%), and independent living disability (42%) (Singh et al., 2020). Although this evidence is correlational, it does suggest an important relationship between computer and broadband internet access and use and health and well-being.

A qualitative focus group study on access to digital technology among individuals with low socioeconomic status provides a possible explanation for a relationship between digital technology access and health outcomes (Baum et al., 2014). This study examined the ways in which digital technology use interacts with social, economic, and cultural capital. They found evidence of a self-reinforcing cycle in which limited access to digital technology negatively affected factors known to influence health outcomes, including educational opportunity, employment, housing stability, and social networks; these factors, in turn, further limited access to digital technology (Baum et al., 2014). This relationship between digital technology use and the factors that influence health outcomes is important for understanding inequities in health for marginalized groups, including people with serious mental illness.

Defining Health Equity and Digital Health Equity

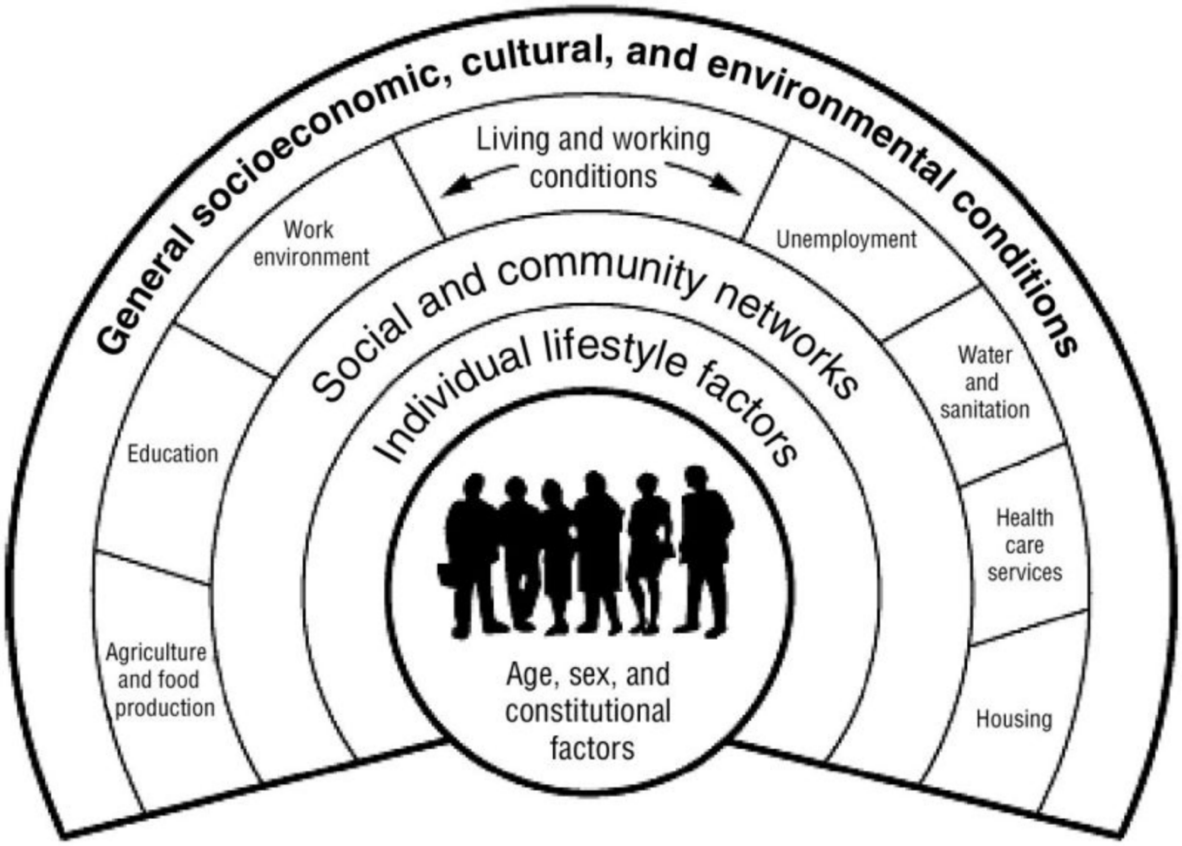
Health Equity

Health equity and *digital health equity* are concepts that are helpful for understanding differences in health and promoting more equitable health outcomes. Before considering digital health equity, it is important to first understand health equity. Health equity is a term that has been variously defined in the literature. Although many frameworks for understanding health equity exist, most definitions and frameworks of health equity either implicitly or explicitly adopt a social justice perspective, focusing on health disparities among groups with different social positions, such as differences in race, gender, and socioeconomic status (Braveman, 2006). One of the most influential and widely used definitions of health equity is "everyone should have a *fair opportunity* to attain their full health potential and, more pragmatically, that none should be disadvantaged from achieving this potential, if it can be avoided." (Whitehead, 1992, p. 433). Whitehead (1992) also notes that it is not differences in health alone that are of concern, but rather health inequalities that are avoidable, unjust, and unfair. The latter type of differences, those resulting from factors that are unjust and avoidable, are often referred to as *health disparities*. Health disparities are influenced by a multitude of factors often referred to as *social determinants of health.*

A straightforward way of thinking about social determinants of health is to group them into categories that fit together in ecological layers. See Figure 1 for a representation of one such model (Dahlgren & Whitehead, 1991). The outer layer consists of the major structural environment, which is the general socioeconomic, cultural, and environmental conditions. Next, there are living and working conditions that include factors such as education, access to food and water, housing, and healthcare services. This is followed by social and community networks,

which include how people and communities come together to provide each other with mutual support to reduce exposure to factors that may negatively impact health (Dahlgren & Whitehead, 1991). In the next level, there are individual lifestyle factors, such as smoking, alcohol consumption, engaging in physical activities, and at the center are biological and constitutional factors (Dahlgren & Whitehead, 1991).

Figure 1. Reproduced from Dahlgren, Göran & Whitehead, M. (1991). Policies and strategies to promote social equity in health.

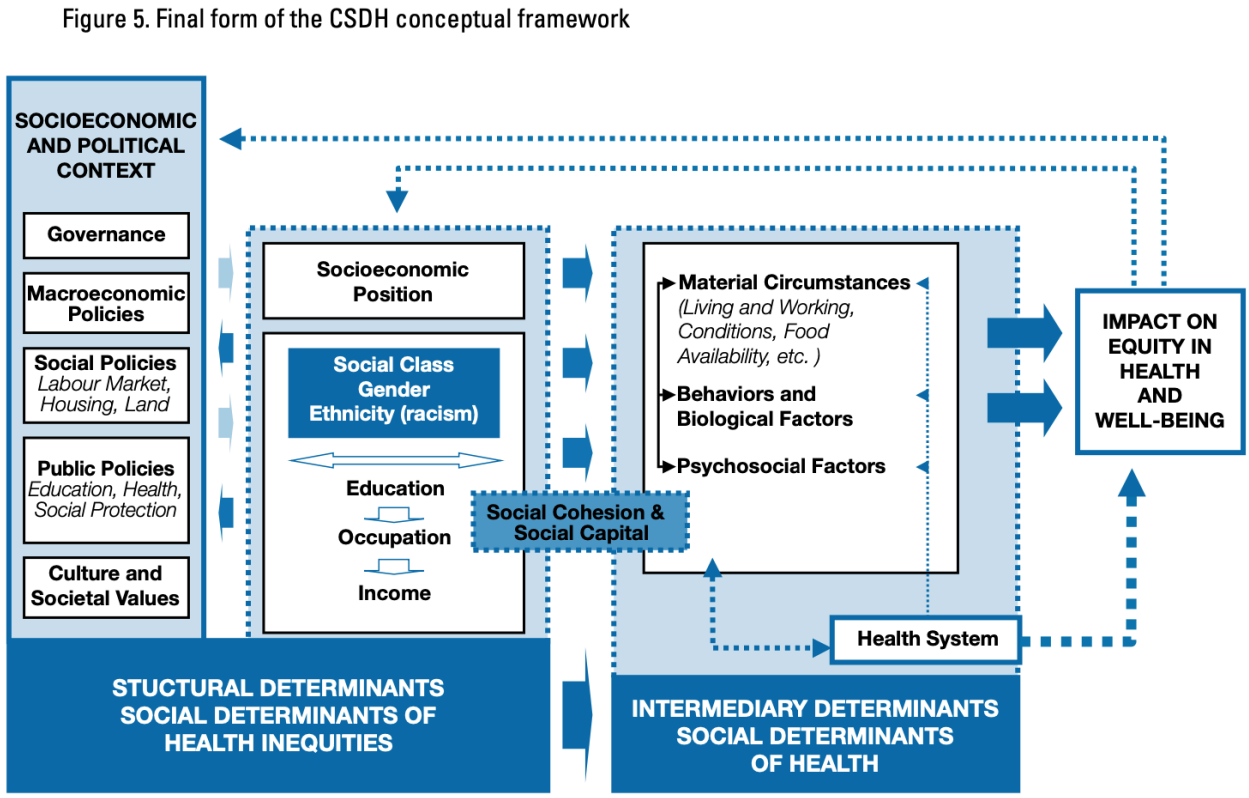


Although straightforward to understand, this framework does not explicitly capture the complexity of social determinants of health and how they interact. A framework that better captures the interconnectedness of social determinants of health and how they influence each

other is the Commission on Social Determinants of Health (CSDH) framework proposed by the World Health Organization (World Health Organization, 2010).

This framework differentiates between *structural determinants* and *intermediary determinants* of health (See Figure 2). Structural determinants reinforce social hierarchies of class, power, prestige, discrimination, and access to resources. The main indicators related to someone's position within the social hierarchy are income, education, occupation, social class, gender, and race/ethnicity. All of these are influenced by the overarching socioeconomic and political context within a society (e.g., governance, economic and social policies, culture and values). The structural determinants influence intermediary determinants of health, including one's material circumstances (e.g., housing quality, working conditions), behavioural and biological factors (e.g., nutrition, exercise, tobacco consumption), and psychosocial factors (e.g., psychological stressors, social support). Thus, differences in social position resulting from structural determinants lead to a stratification of society where people are exposed to different levels of conditions that positively or negatively impact health (intermediary determinants of health), resulting in disproportionately negative consequences for groups with less advantage. Intermediary determinants of health influence health equity directly and are partially moderated through the healthcare system, which can exacerbate or mitigate their effects (World Health Organization, 2010).

Figure 2: Final form of the CSDH conceptual framework. Reproduced from page 46 of the Discussion Paper: A Conceptual Framework for Action on the Social Determinants of Health (WHO, 2010).



Digital Health Equity

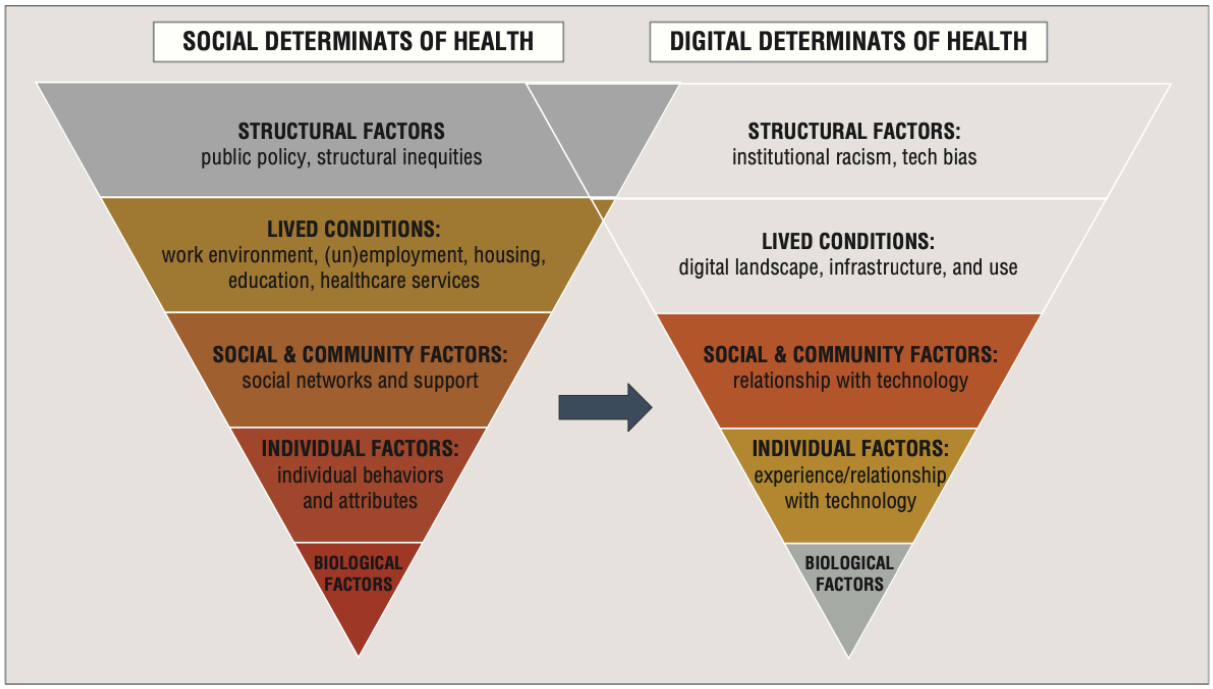
As more aspects of our lives move online, it is increasingly important to consider the role of access to and use of digital technology in health, often referred to as digital health equity. Digital determinants of health are the factors that impact the potential for digital technology to promote health and that influence its contribution to health disparities (Lawrence, 2022). There are many different frameworks that have been proposed for digital health equity and digital determinants of health.

A 2025 scoping review addressed the lack of consistency across definitions and frameworks by reviewing the literature on digital health equity frameworks (Kim & Backonja, 2025). The consolidated definition they propose is: “Digital health equity is a multi-level socio-ecological concept that results from fair and just opportunities for everyone to attain their highest level of health through access to technology-enabled health resources and services” (Kim & Backonja, 2025, p. 940). This scoping review highlights that the majority of digital health equity definitions and frameworks are focused on the healthcare system and digital health interventions. That is, they outline different digital determinants of health but only apply them to people’s interactions with the healthcare system and do not consider how they impact other areas of people’s lives (e.g., social support), which may also influence health outcomes. Similar to the first model of social determinants of health presented, these factors have frequently been conceptualized as relating to different ecological levels (Lawrence, 2022; Lyles et al., 2021; Richardson et al., 2022).

Figure 3, presented below, illustrates one such framework (Lawrence, 2022). Consistent with the framework of social determinants of health presented above (Dahlgren & Whitehead, 1991), this framework organizes digital determinants of health in ecological layers. This is only one example, and other frameworks include additional digital determinants of health, such as access (Lawrence, 2022; Richardson et al., 2022). The authors present ecological layers and provide examples of social and digital determinants of health for each layer. In terms of structural factors, social determinants of health include public policy and structural inequities, whereas digital determinants of health include institutional racism and tech bias (i.e., biases embedded into technology systems such as artificial intelligence that may perpetuate discrimination) (Lawrence, 2022). For lived conditions, social determinants of health refer to

people's work environment, housing, education, and healthcare. Digital determinants of health at this layer refer to the digital landscape and infrastructure (Lawrence, 2022). For social and community factors, social determinants include social networks and supports, whereas digital determinants refer to the broader community's relationship with digital technology such as attitudes and beliefs about digital technology and trust, privacy, security, and surveillance (Lawrence, 2022). For individual factors, social determinants include individual behaviours and attitudes, while digital determinants include individual experience and relationship with digital technology. Biological factors do not differ between social and digital determinants and include genetic traits, age, and race.

Figure 3. Reproduced from the chapter Digital Health Equity. In: Linwood SL, editor. Digital Health [Internet]. Brisbane (AU): Exon Publications; 2022 Apr 29. Chapter 9.

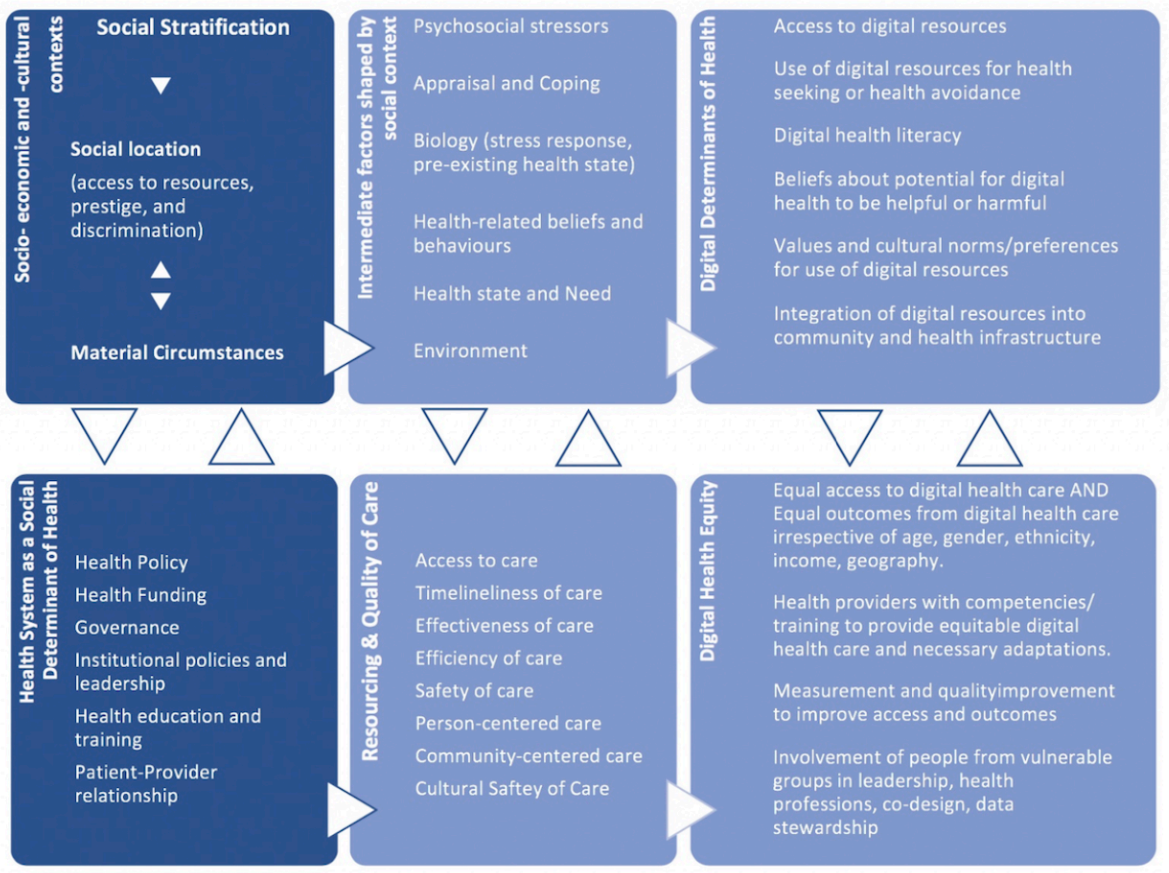


The WHO framework of social determinants of health represents how complex social determinants of health are and how they interact with one another (World Health Organization, 2010). One would expect digital determinants of health to also be complex, interrelated, and interact with social determinants of health. However, this complexity is not captured by these ecological frameworks of digital determinants of health, such as the one presented in Figure 3. In the figure above, on the digital determinants of health side, lived conditions refer to the digital landscape and infrastructure; however, it is easy to see how digital technology use might interact with factors listed on the social determinants of health side, such as employment and living conditions. Because of the impact digital technology use can have on other social determinants of health, some have described access to digital technology and connectivity as a "super" social determinant of health (Sieck et al., 2021). Although referring to it as a super determinant is also an oversimplification, thinking about it in this way highlights the interactions between digital and social determinants of health, which are not captured in most frameworks of digital determinants of health. For example, searching for an apartment or applying for jobs are activities that could affect a person's material circumstances and would be much more challenging without internet connectivity. Nonetheless, in much of the research literature, digital determinants of health are almost exclusively considered within healthcare and health interventions, without considering the impact digital technology can have on health by influencing social determinants of health outside of healthcare.

One framework that does integrate digital determinants of health and social determinants of health is the digital health equity framework (DHEF; Crawford & Serhal, 2020). This framework is derived from the health equity measurement framework (Dover & Belon, 2019) and takes into consideration how the unequal distribution of power and resources results in social

stratification, often related to intersectional factors including gender, race, income, ability, and occupation. The authors of this framework also note the potentially mutually reinforcing nature of digital determinants of health and social determinants of health. See Figure 4.

Figure 4. Digital health equity framework, reproduced from (Crawford & Serhal, 2020).

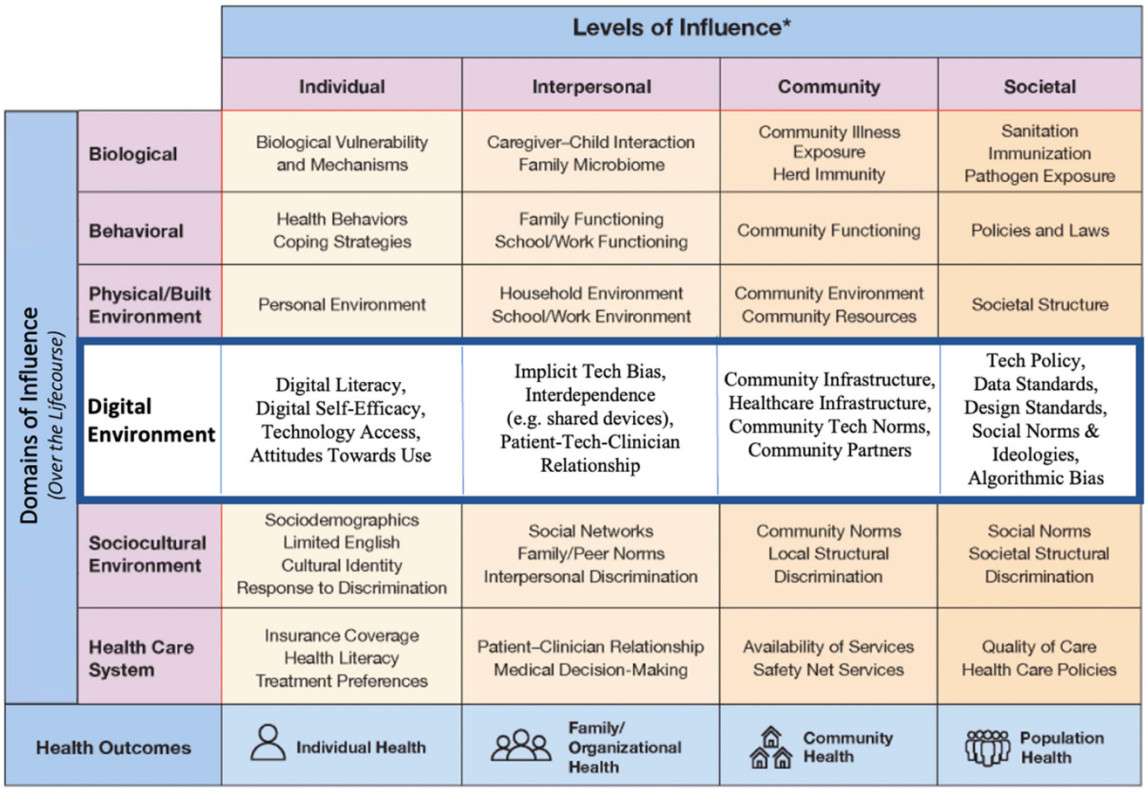


Despite considering the interaction between digital determinants of health and other social determinants, the DHEF's consideration of this interaction is limited to how social determinants of health relate to digital healthcare (Crawford & Serhal, 2020). Thus, their framework considers how digital *health* resources and digital *health* literacy might interact with factors such as poverty, health beliefs, living conditions, and coping styles, to influence digital access and digital *health* behaviours. However, it does not consider how digital resources might impact employment, social support, or other social determinants that influence health outcomes.

Their framework is a step in the right direction, but does not consider the various ways that digital technology use relates to health beyond the healthcare system. The importance of expanding our perspective on digital health equity is supported by empirical evidence that a greater proportion of the explainable variability in health outcomes is attributable to social and economic factors and health behaviours, rather than to clinical or treatment factors (Hood et al., 2016).

Another framework that considers digital determinants of health in the context of social determinants of health is the framework for digital health equity by the National Institute on Minority Health and Health Disparities (NIMHD) (Richardson et al., 2022), which is an adaptation of the NIMHD's more general research framework (Alvidrez et al., 2019). This framework consists of different domains of influence: biological, behavioural, physical, built environment, sociocultural environment, healthcare system, and health outcomes, that can act at different levels of influence: individual, interpersonal, community, and societal (Alvidrez et al., 2019). Richardson et al.'s framework incorporates digital determinants of health by situating the digital environment as a domain of influence. See Figure 5. The authors note how all these determinants can interact with one another (Richardson et al., 2022). However, within this framework, digital health equity is defined as "equitable access to digital healthcare, equitable outcomes from and experience with digital healthcare, and equity in the design of digital health solutions" (Richardson et al., 2022, p. 2). Thus, this framework also considers digital determinants of health mainly in the context of healthcare and does not capture the ways that the digital environment can interact with all the levels of influence of other determinants.

Figure 5. Framework for Digital Health Equity by the National Institute on Minority Health and Disparities Research, reproduced from (Richardson et al., 2022).



In sum, similar to early conceptualizations of social determinants of health, most frameworks describing digital determinants of health place them into ecological layers that do not capture the complexity of how these factors interact with social determinants of health to impact health outcomes or attempt to describe the pathways through which this occurs. Additionally, existing frameworks are focused on how these digital determinants of health relate to healthcare. This way of thinking about digital determinants of health and digital health equity fails to account for the many ways in which we use digital technology that relate to social determinants of health outside of the healthcare system. Additionally, it fails to account for the

interactions between digital and social determinants of health and the pathways through which they may impact health outcomes.

Potential Benefits of Promoting Digital Health Equity Beyond Healthcare

These limitations to existing frameworks of digital health equity are important because there is evidence that digital technology use can positively influence social determinants of health for people with serious mental illness, particularly in terms of social support and relationships. A systematic review of online social networking among people with psychosis included 11 studies and found that people with psychosis use the internet for social networking more frequently than control groups and spend more time playing online video games and in chat rooms (Highton-Williamson et al., 2015). The reasons for online social networking identified in this review were to connect with new contacts, reconnect with existing contacts they had lost touch with, and find or provide peer support (Highton-Williamson et al., 2015). Spinzy et al. (2012) examined how people diagnosed with psychotic disorders reported using the internet to make social connections. They found that participants with psychotic disorders had significantly lower access to the internet compared to participants without psychotic disorders. However, despite lower access, they found that participants with psychotic disorders formed more virtual relationships, and that the number of relationships that led to real-life relationships was roughly equal between the groups (Spinzy et al., 2012).

Townsend et al. (2016) examined the experiences of people with serious and persistent mental illness with digital technology. This study examined their use of cell phones and the internet separately since only two participants of 50 owned a smartphone that provided both phone capabilities and internet access. Most participants had access to phone plans through publicly funded programs that provided limited minutes and texts. The study found that

participants relied on cell phones for maintaining social connections through calling and texting, and allowed them to reach out for support, including medical services, in moments of need. Additionally, phones were used for making appointments, accessing services, and communicating with potential employers (Townsend et al., 2016).

There is also emerging qualitative research that suggests that digital technology use has benefits outside of the healthcare system for people living in permanent supportive housing, a population that overlaps with people with serious mental illness (Henwood et al., 2024). Researchers conducted focus groups with tenants in permanent supportive housing and found that participants used digital technology in a variety of ways (e.g., maps, social media, videoconferencing) and many participants felt that using digital technology could benefit their health and well-being, despite experiencing barriers such as affordability (Henwood et al., 2024).

In line with the evidence that digital technology use can positively influence the health and well-being of people with serious mental illness, there is also evidence of the negative consequences of being digitally excluded. A qualitative study on the impacts of digital exclusion on people with serious mental illness found that it can result in reduced social connectedness, negative self-perception, disempowerment, and negative impacts on employment, benefits, and housing (Middle & Welch, 2022).

Promoting Digital Health Equity Among People with Serious Mental Illness

Some research has been completed on interventions aimed at promoting digital health equity for people with serious mental illness. However, this research is mainly limited to the use of digital technology in healthcare and the implementation of digital health interventions. A systematic review of digital health technologies for patients with serious mental illness included 18 studies and identified three main areas of intended use: monitoring, clinical assessment, and

intervention (Batra et al., 2017). The authors classified the interventions they identified into three categories: self-management, adherence interventions, and psychoeducation/CBT. The types of technologies implemented were mobile/smartphone applications, digital medicine/sensors, an adhesive patch paired with a mobile application to collect physiological data, and an electronic pill container. The most common technology used was smartphone/mobile apps, and the most common use was patient monitoring. The authors of the systematic review concluded that the identified digital health interventions have the potential to be used for supporting symptom monitoring, providing psychotherapy, improving medication adherence, and assessing clinical symptoms. They note that the usability and feasibility of these digital health interventions are high, but additional research and testing are crucial.

A systematic review was conducted on the application and effectiveness of telehealth for supporting the treatment of people with serious mental illness (Lawes-Wickwar et al., 2018). This review summarizes findings of digital intervention effectiveness on cognitive, psychosocial, and behavioural outcomes. The authors found evidence supporting the effectiveness of computer-assisted cognitive rehabilitation interventions for improving cognitive outcomes for people with schizophrenia. They also identified some initial evidence in support of virtual reality interventions for cognitive and vocational rehabilitation. The authors noted that, at the time of their review, there were few studies evaluating web-based interventions for people with serious mental illness. Evidence from the studies they did find indicates that educational websites aimed at improving knowledge about medication, medication adherence, improving self-esteem, and providing insights into serious mental illness are not effective compared to nurse-led education. They did note that websites that incorporated interactive elements, such as peer support and CBT self-management, were associated with improvements in mood, quality of life, and social

adaptation. The authors found evidence supporting the use of telephones for promoting medication adherence and appointment attendance.

Despite evidence that digital technology use can impact health in various ways, very little is known about promoting digital health equity for people with serious mental illness outside of the healthcare system. A clinical review of digital interventions to promote health among people with severe mental disorders used a multi-level framework based on work by Liu et al. (2017) to examine digital interventions to address excess mortality among people with severe mental disorders (Naslund & Aschbrenner, 2019). This framework consists of three levels: individual factors, health systems factors, and social determinants of health (Naslund & Aschbrenner, 2019). The authors found examples of digital interventions targeting individual factors, including smartphone applications for managing mental health symptoms, telehealth programs for psychiatric and medical instability, telephone-based wellness coaching for weight reduction and wellness promotion, wearable activity tracking, web-based smoking cessation, and smartphone-based smoking cessation. They also identified system-level interventions, which included technology-delivered programs to support clinicians in delivering services, an electronic screening tool for recording and monitoring metabolic syndrome, electronic health records, and a web application to support goal setting and shared decision making in clinical encounters. They only identified two types of interventions targeting other social determinants of health: two peer support interventions and a mobile app supporting employment. The review concluded that there is very little research on digital interventions that target broader social determinants of health for people with severe mental disorders (Naslund & Aschbrenner, 2019).

Barriers to Promoting Digital Health Equity

To develop interventions and programs that broadly promote digital health equity, we need to first understand the unmet digital technology needs and barriers that prevent people with serious mental illness from accessing, using, and experiencing health benefits from digital technology. However, the current research literature has focused on barriers faced by marginalized groups more broadly, and the research that is specific to barriers faced by people with serious mental illness does not include the perspectives of people with serious mental illness themselves. It is also focused on barriers to digital health interventions.

A qualitative meta-review summarized the research evidence from reviews on barriers to digital health solutions (eHealth) experienced by people with lower access to digital technology, including seniors, people with a low socioeconomic status, and those with migrant backgrounds (Coetzer et al., 2024). This meta-review included 29 reviews (e.g., systematic, narrative, etc.) and summarized barriers and solutions for eHealth as being individually framed or systematically framed. The three most commonly mentioned individually framed barriers were limited digital skills, trust and privacy concerns, and lack of interest/motivation. Other barriers identified in 10 or more of the included reviews were financial difficulties, low self-efficacy, limited health literacy, a preference for in-person care, lack of social support, and outdated/insufficient technology or technical access issues. The three most commonly identified, systematically framed barriers were: content not tailored to individuals' abilities, contexts, interests, and cultures; connectivity or technical issues/flaws; and insufficient health resources (Coetzer et al., 2024).

This meta-review also extracted solutions to improve eHealth that were proposed by review authors. The most commonly identified individually framed solutions included improving

digital skills/literacy and involving social support networks. The most commonly identified systematically framed solutions included personalized/accessible/user-centered/culturally relevant design; improving technology infrastructure; transdisciplinary, patient-centered collaboration; and improved financing of initiatives. Although there is likely overlap in the barriers to eHealth that people with serious mental illness might experience and those experienced by seniors, people with a low socioeconomic status, and those with migrant backgrounds, none of the included reviews were specific to people with serious mental illness and likely miss barriers unique to this population. Additionally, this meta-review was focused on eHealth, rather than digital health equity more broadly.

A systematic review of qualitative studies synthesized strategies for advancing digital health equity among underserved groups and barriers and facilitators to the adoption of these strategies (Wilson et al., 2024). The three main themes identified among strategies for advancing digital health equity were user-friendly design, supportive infrastructure, and educational support. The main barrier identified was a lack of acceptance of this support, while facilitators included promoting trust by providing evidence supporting health claims in accessible language (Wilson et al., 2024).

Although these reviews provide a good summary of barriers that negatively impact digital health equity for marginalized groups, they may not capture the unique experiences of people with serious mental illness. One study has explored the potential benefits of digital health tools and barriers to their use among people with serious mental illness specifically. This study administered a survey to a panel of experts who were presented with a list of items and asked to indicate how likely they were to be a barrier to digital tool use or cause unintended negative consequences for patients with serious mental illness (Hatch et al., 2018). The items that were

rated as having the highest potential to be a barrier or have negative unintended consequences were: the patient not believing that the intervention is well suited to their needs, finding the digital health tool burdensome to use, not understanding how to use the tool, having concerns about being monitored, finding the tool intrusive, having concerns about privacy, and feeling frustrated and discouraged with the digital tools (Hatch et al., 2018). Even though this study was focused on people with serious mental illness, the experts on the panel who completed the survey were researchers with expertise in technology-assisted interventions in psychiatry, and the study did not include people with serious mental illness themselves.

Promoting digital health equity for people with serious mental illness involves understanding the barriers that they face when it comes to accessing, using, and benefiting from digital technology, both in relation to healthcare and in relation to other social determinants of health. Currently, very little is known about the unmet digital technology-related needs and barriers to digital technology use faced by people with serious mental illness from their perspective. Even less is known about these barriers and their impacts outside of virtual healthcare and digital health interventions.

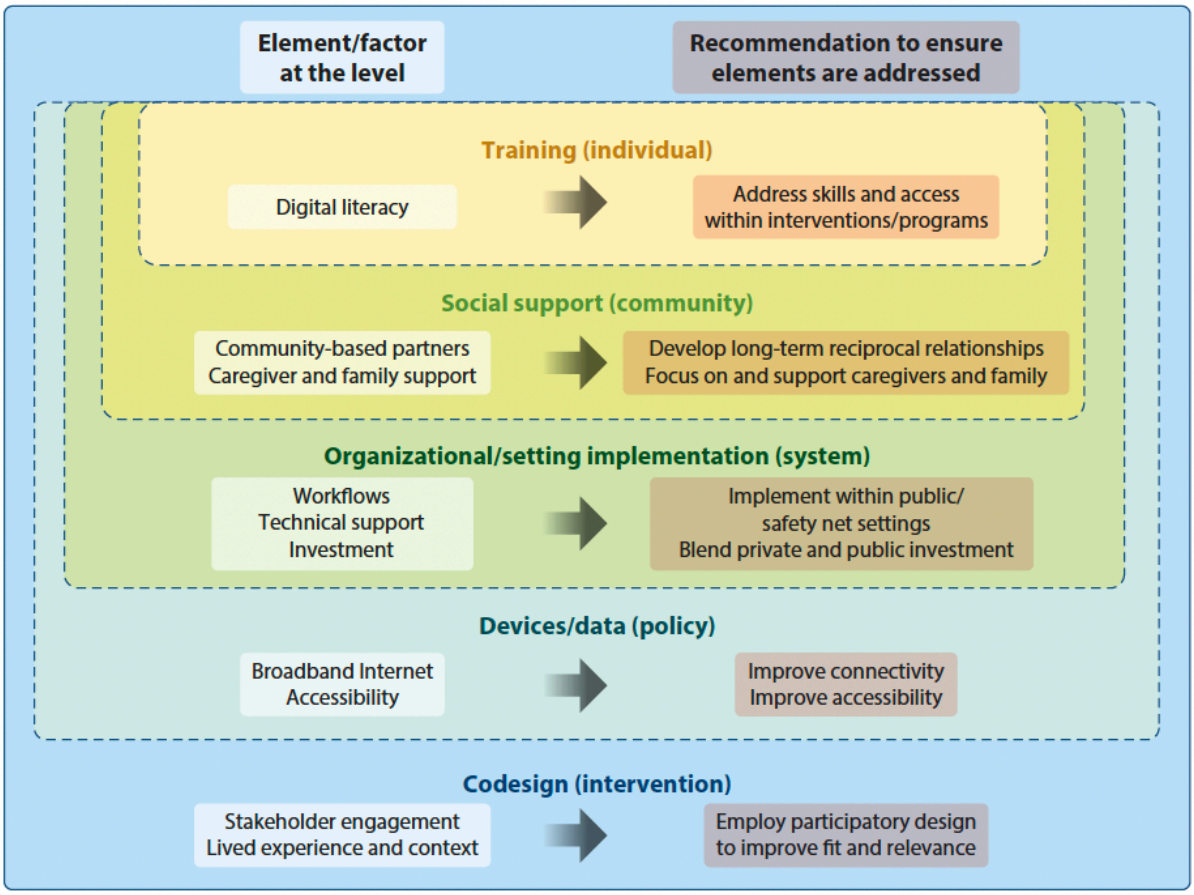
Framework for Promoting Digital Health Equity

A criticism of the current literature on barriers to digital health equity is that recommendations are vague and not actionable (Coetzer et al., 2024). It is therefore important to take a systematic approach to identifying barriers and developing recommendations. A multilevel determinants of digital health equity framework was developed by Lyles et al. as part of a review and synthesis of the literature on digital health disparities (2023). They used this framework to examine the current literature and identify interventions and recommendations that address barriers to digital health equity. This framework identifies five levels of influence on digital

health equity: policy/structural-level determinants, systems-level determinants, community/social-level determinants, digital health intervention-level determinants, and individual-level determinants. The policy and structural-level determinants affect access to digital technology through policies and other structural influences that impact factors such as broadband internet infrastructure and affordability. Systems-level determinants include funding structures (e.g., public versus private) and their influence on digital health innovation, healthcare systems leadership and culture, and implementation of digital health interventions. The community/social-level determinants consider how relationships can influence the uptake and success of digital health interventions, including the importance of awareness, trust, and individual support. The individual-level determinants include abilities and motivational factors that influence someone's ability to use and benefit from digital health interventions. Digital health intervention-level determinants include characteristics of the intervention that influence accessibility and usability.

Based on their review of the peer-reviewed and grey literature on digital health interventions, the authors of this framework identified key elements that affect digital health equity at each level and provided recommendations to address them. A summary of key factors that they identified at each level, along with recommendations to address them, is provided in Figure 6.

Figure 6. Summary of recommendations by level. (Left, white boxes) Element/factor at the level. (Right, pink boxes) Recommendations to ensure elements are addressed. Dotted lines represent porous relationships (e.g., training feeds back into social support, social support feeds back into systems, systems feeds back into policy). Reproduced from Lyles et al. 2023, p. 13.6.



The multilevel digital determinants of health framework proposed by Lyles et al. (2023) is a helpful tool for thinking about how to promote digital health equity. However, like much of the research on digital health equity, this work focuses on the healthcare system. Additionally, only one of the included studies was specific to people with serious mental illness, limiting our ability to generalize their recommendations. The authors also highlight the importance of collaboration with communities in the development of digital health interventions to ensure that they meet real needs and are designed and implemented in user-centered ways.

If this framework were adapted and used in community-based participatory research to collaborate with people with serious mental illness, it could result in a strong understanding of unmet community needs and barriers to digital technology use and help generate relevant,

actionable recommendations to promote digital health equity. A limitation of this framework is its focus on digital health equity within the context of healthcare interventions. However, we think it could be helpful when applied to other social determinants of health. We therefore developed an adapted version of this framework to facilitate its application beyond the healthcare system. In this adapted version, the digital health intervention level has been replaced with a "tools and services level" to include areas outside of the healthcare system that are also impacted by usability, utility, and accessibility issues. For example, digital determinants of health at this level could be applied to apps for personal health management and to online services such as banking and government services that may affect access to benefits or financial resources. We have also incorporated any relevant digital determinants identified in other frameworks at each level (Crawford & Serhal, 2020; Lawrence, 2022; Richardson et al., 2022). Lyles et al.'s (2023) framework discusses issues of access primarily under the policy level, since policy-level factors influence access more than individual-level factors. Some digital determinants of health frameworks, however, consider access to digital technology to be an individual-level factor, since it is experienced by the individual. Our research used participatory and qualitative methods. To facilitate communication with our partner community mental health organization and participants, we included access as an individual-level factor because it is more intuitive for people to speak about their own individual experiences with access. However, we did differentiate between the level at which an intervention is implemented and the level of its impact in our study on solutions to promote digital health equity. Our adapted framework can be found in Table 1.

Table 1

Ecological Framework for Digital Determinants of Health

Individual	**Tools and services**	**Social/community**	**Systems**	**Policy**
Individual Access	Usability	Community norms and attitudes around technology	Health systems investment and funding	Government policy and regulations
Digital literacy	Utility	One-on-one interpersonal interactions	Leadership in promoting health equity	Privacy laws
Personal attitudes	Accessibility	Community-based awareness of and access to digital technology resources Online social participation and communities	Health systems infrastructure	Infrastructure (e.g., broadband internet)

Adapted from Lyles et al., (2023)

Lyles et al. (2023) emphasize the importance of involving stakeholders in the development and implementation of digital health interventions, pointing to some examples of co-design of digital health interventions. The majority of studies on digital health equity, however, do not use this approach. Instead, they adopt an a priori approach in which researchers

determine which digital health interventions should be developed for marginalized communities and then conduct studies on these interventions. People with serious mental illness are experts in their own experience and should have a say in how digital health equity is thought about and promoted in their communities. People with serious mental illness often have many identities that intersect and compound the inequities and disadvantages they face. Thus, including their voices is essential for understanding the complex ways in which digital and social determinants of health impact them.

Chapter 3

Examining Digital Technology Use and Its Perceived Impact on Health and Well-being Among People with Serious Mental Illness: A Qualitative Study

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Introduction

People with serious mental illness, defined as "a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities" (National Institute of Mental Health, 2024, Definitions section), have poorer health outcomes than the general population, including higher morbidity and excess mortality (Cunningham et al., 2023; Cunningham & Dixon, 2020; Goldman et al., 2018; Hayes et al., 2017; Laursen et al., 2013). Differences in health that are unnecessary, unfair, avoidable, or unjust are referred to as *health inequities* (Whitehead, 1992) and are driven by *social determinants of health.* The World Health Organization's (WHO) framework for social determinants of health proposes that structural factors, including the socioeconomic and political context and someone's socioeconomic position, generate stratification that influences intermediary determinants of health, including someone's material circumstances, behavioural and biological factors, and psychosocial factors. These intermediary determinants of health directly affect health inequities, and their impact is also partly moderated through the healthcare system, which can exacerbate or mitigate their effects (World Health Organization, 2010).

The increasing use of digital technology in all spheres of living has created a risk for health inequities to be further exacerbated for groups with low access to digital technology, such as those with serious mental illness (Firth et al., 2016; Marbin et al., 2023; Spanakis et al., 2021). For example, a study of digital exclusion and its impact on the health of people with serious mental illness found that the consequences of digital exclusion included reduced social connectedness, negative self-perception, disempowerment, and negative impacts on employment, benefits, and housing (Middle & Welch, 2022). Although not focused on people with serious mental illness, a qualitative study conducted in Australia found a self-reinforcing cycle where,

for people with low socioeconomic status, limited access to information and communication technologies had negative effects on existing determinants (educational opportunity, employment, housing stability, social networks) which limited their access to digital technology further (Baum et al., 2014). Some researchers have suggested that access to digital technology should be considered a "super" social determinant of health because of its interactions with, and potential impacts on, many other social determinants of health (e.g., employment, education) (Sieck et al., 2021).

Recognition of the potential negative impacts of increasing reliance on digital technology on health has led to the concept of *digital health equity* and research on how to reduce inequities. Digital health equity has been conceptualized in various ways, and there is currently no agreed-upon definition (Kim & Backonja, 2025). The authors of a recent scoping review examining definitions and frameworks of digital health equity proposed a consolidated definition: "Digital health equity is a multi-level socio-ecological concept that results from fair and just opportunities for everyone to attain their highest level of health through access to technology-enabled health resources and services" (Kim & Backonja, 2025, p. 940). This definition highlights that most research on digital health equity focuses on the use of digital technologies within the healthcare system and health interventions. Although this is an important area where digital technology can influence health, it does not consider emerging evidence of the many other ways in which digital technology use relates to health, including impacts on education, employment, social connection and support, self-perception, and housing (Baum et al., 2014; Middle & Welch, 2022; Spinzy et al., 2012; Townsend et al., 2016; Turner et al., 2023).

The Current Study

The focus of the present study is on understanding how people with serious mental illness are currently using digital technology, gaps in their current use and desired use, and how they believe their digital technology use relates to their health and well-being. This study was the first part of a broader community-based participatory needs assessment that was conducted in partnership with a community mental health provider in a large city in Ontario, Canada. This organization provides services to people with serious mental illness with histories of being unhoused or unstably housed, including outreach, case management, group programs, specialty services, and counselling services. They sought recommendations on how their organization can best support digital health equity for their clients. We assembled an advisory committee consisting of clients (service users) of the community mental health organization with lived experience of serious mental illness and staff members who provide direct, client-facing services to inform the research and ensure that it reflected their interests and produced relevant findings.

Our advisory committee encouraged us to look beyond healthcare to other ways in which digital technology can impact health. In addition to examining how digital technology use relates to healthcare services, our study examined digital technology use in people's lives more generally (e.g., leisure, job searching, accessing social support). Given the current lack of evidence about the experiences and needs of people with serious mental illness with respect to digital health equity, we elected to use an exploratory qualitative approach to gain a more in-depth understanding of their experiences. Not only does this study provide practical information about how people with serious mental illness are currently using digital technology and how they believe it impacts their health and well-being, which will be used to plan digital health equity

promotion efforts at our partner community mental health organization, but it also provides important theoretical data that can help inform frameworks of digital health equity.

Objectives

The aim of this study was to examine current digital technology use by a group of people with serious mental illness receiving services from our community mental health organization partner, with a focus on the relationship between digital technology use and their health and well-being. The present study was designed to answer the following two research questions:

1. How are service users with serious mental illness currently using digital technology and how does this compare to their desired use?
2. How does digital technology use relate to the health and well-being of service users with serious mental illness?

Methods

Data Collection Procedures

Participants were invited to participate in a 60–90-minute focus group. All focus groups were held between August and October 2023. We conducted four focus groups, three with service users and one with staff members of our partner community mental health organization. The staff focus group and two of the service user focus groups were held in-person in a conference room at our partner community mental health organization's offices. One service user focus group was held online over Zoom. The consent forms were reviewed at the beginning of each focus group. The client (service user) consent form is provided in Appendix A, and the staff consent form is provided in Appendix B. In-person participants signed the consent form. Participants of the virtual group were sent a digital copy of the consent form and provided verbal consent to participate. Service user participants received a $50 honorarium for their participation,

and refreshments were provided during the in-person focus groups. Two members of the research team facilitated the focus groups. The primary facilitator led the group in discussion, whereas the secondary facilitator focused on taking notes. In addition to the detailed notes that were taken, all focus groups were audio recorded. The ethical components of all study methods were reviewed and approved by The University of Ottawa's research ethics board.

Participants and Recruitment

Our sample consisted of service users with serious mental illness and staff who were providing direct services to clients. To recruit staff, we presented the study at staff meetings and sent email invitations. Interested staff members contacted researchers directly using the contact information provided in the recruitment materials. We recruited client participants (service users) who were receiving services from our partner community mental health organization and had serious mental illness and a history of homelessness or housing instability. To recruit clients, we used a convenience sampling approach. Our recruitment procedures were designed to produce a diverse sample that would capture a range of perspectives, including the perspectives of more vulnerable service users, those that had more or less experience and comfort with digital technology, and those who had accessed, or not accessed, online services. We consulted our advisory committee regarding how to recruit service users for our focus groups. They suggested that, rather than individually coordinating a time that works for all interested participants, it would be more accessible for most service users if we set a predetermined date, time, and location for the focus group. Case managers and group facilitators presented the study to their clients. If service users provided consent to have their contact information shared with researchers, case managers and group facilitators provided the research team with the contact information (email or phone number) of an interested participant, and researchers contacted them

directly to provide more information about participation. Staff members also informed service users of the focus group's date and location, allowing interested service users to show up on the day of the focus group without needing to communicate with the research team in advance.

Materials and Measures

Semi-structured focus group guides were developed for service users and for staff based on our research questions. We asked participants what they are using digital technology for and what they would like to do more of with digital technology. To learn more about the relationship between digital technology use and social determinants of health, we asked participants which areas of their lives they believed were affected by their use of digital technology. For the staff focus groups, we focused on areas staff were most likely to have knowledge of through their work with clients. The focus group guides were developed using a funnel approach that includes a fixed list of core questions, each accompanied by a variable set of more specific, optional follow-up questions. This ensured that data collection was sufficiently structured to facilitate comparisons across groups while also providing flexibility to address concerns unique to each group and to explore new topics (Morgan, 1996). The advisory committee provided feedback on the focus group guides to ensure they addressed all areas of interest to service users. The focus groups were designed to answer the questions outlined in the present study and additional questions that are presented in study two. The semi-structured focus group guide for service users can be found in Appendix C, and the guide for staff can be found in Appendix D.

Data Analysis

Focus group audio recordings were transcribed verbatim and uploaded to the qualitative data analysis software NVivo 14. The focus group data were coded and analyzed using a pragmatic mixed inductive-deductive approach, adapting steps from Miles et al. (2014). Two researchers independently coded all focus groups. Coding was reviewed after each focus group to ensure consistent application of the coding manual and to make any necessary adjustments. Coding discrepancies were resolved through discussion and consensus. The coding manual can be found in Appendix E.

In our first coding cycle, we coded service users' current use of digital technology, desired use, and perceived impacts of their digital technology use, including perceived positive and negative impacts on health. We also coded any social determinants of health described by participants according to the WHO's framework (behaviours and biological factors, material circumstances, psychosocial factors, social cohesion/capital, socioeconomic context, culture and societal values, government policies, socioeconomic position, healthcare).

In qualitative analysis, second cycle coding is used to refine larger amounts of coded data into a more simplified, meaningful format (Miles et al., 2014). In a second coding cycle, we developed codes for different types of digital technology use (e.g., healthcare access, social support) based on patterns observed in the data. One of our objectives was to better understand how service users' digital technology use relates to their health and well-being. Causation coding is a technique that can be used to examine participants' beliefs about what led to certain outcomes by identifying combinations of antecedent and mediating factors that contribute to an outcome (Miles et al., 2014; Pearse, 2019). A variable is considered a mediator if it accounts for the relationship between the predictor and outcome variables and helps explain how or why that

relationship occurs (Baron & Kenny, 1986). As a qualitative study, this term is being used to describe the perceived relationship between variables, rather than a statistical relationship. As part of the second coding cycle, we employed causation coding to elucidate the relationship between different types of current digital technology use and the perceived impact of that digital technology use. Types of technology use were treated as antecedent variables, and perceived impacts of digital technology use (including perceived positive and negative health impacts) were treated as outcomes. We examined the data for explanations linking the antecedent and outcome variables, which were coded as mediating variables. We then created network models of beliefs about causal explanations described by participants. A network model is a set of nodes connected together through links that represent relationships. They are useful for displaying relationships among variables and for capturing complexity and narratives that can be lost when data are divided into matrices (Miles et al., 2014). Separate network models were generated to represent the positive and negative impacts of digital technology use on health and well-being. Mixed or contradictory findings were noted and are highlighted in the findings.

Trustworthiness

In qualitative research, threats to trustworthiness are considered as opposed to threats to reliability and validity (Korstjens & Moser, 2018; Lincoln & Guba, 1985). Five important aspects of trustworthiness are credibility, transferability, dependability, confirmability, and reflexivity. Credibility is similar to the concept of internal validity used in quantitative research and refers to the confidence that the findings are an accurate interpretation of participants' experiences. Several strategies to promote credibility have been developed, including prolonged engagement, persistent observation, triangulation, and member check (Korstjens & Moser, 2018; Tracy, 2010). To ensure that our findings are credible and reflect participants' experiences, we

designed our research to promote prolonged engagement through our longstanding partnership with the community mental health organization and engagement with our advisory committee. Additionally, we used several triangulation approaches, including the independent coding of data by researchers, gathering data from different stakeholder groups (staff, service users), and gathering data from service users with different levels of experience with digital technology by holding both in-person and virtual focus groups. Dependability refers to consistency of the findings over time (Korstjens & Moser, 2018), while confirmability refers to ensuring that the findings can be confirmed by other researchers (Korstjens & Moser, 2018). These were promoted through the creation of an audit trail, which involves detailed, transparent reporting of all decisions made in the research process, notes, meeting minutes, research materials used, and data management. Reflexivity involves regularly reflecting on one's biases and assumptions (Korstjens & Moser, 2018). Reflexivity was encouraged by completing summaries after each focus group that reflected on researcher impressions.

Findings

The final sample included 21 service users and 4 staff members. All service user participants were adults with serious mental illness receiving services from our partner community mental health organization. This sample was sufficiently large to provide in-depth information and a range of perspectives to inform the next steps in our research. Results are presented by research question. First, we will provide an overview of the ways in which people with serious mental illness are currently using digital technology and how this compares to their desired use. Next, we present how participants believe different types of digital technology use impact health and well-being.

How are Service Users with Serious Mental Illness Currently Using Digital Technology and How Does This Compare to Their Desired Use?

Current Use

We found that service users with serious mental illness use digital technology for a variety of purposes similar to those in the general population. They reported that they use digital technology effectively in various areas of their lives. Several participants reported using digital technology to access essential services, including *healthcare services* and the *court system*. Participants also reported using digital technology for *skills development and education,* including formal education and acquiring new skills through free online resources and tutorials. Some participants reported using digital technology for *employment*. Another category of use reported by participants was *entertainment and leisure,* including video games, YouTube, television, and movies. Service user participants also reported that their current digital technology use included receiving *social support* by staying connected to their in-person network of friends and family (via social media, text messages, email, phone, and video calls), through online communities, and by making connections through online dating. Participants reported using digital technology to promote their health by using *fitness trackers*, through *nutrition management* and finding recipes online, and by using *mental health and meditation apps*. Some service user participants also reported using digital technology for *searching for housing*.

Desired Use

Participants did not identify many ways in which service users would like to use digital technology but were unable to. Instead, they identified several ways that service users wished their digital technology use could be improved. Many participants reported that their hardware was not sufficient for an optimal experience and wished to have access to better-quality

hardware. For example, one participant used her laptop for online courses, but it was slow and the headphone jack was broken, making it more difficult to complete her schoolwork. Similarly, many participants reported a desire for faster, less expensive access to the internet and data. Participants reported that, although most service users had access to the internet and mobile phone plans, this access was not sufficient for using digital technology in the ways that they wanted. For example, some service users reported that limited computer bandwidth and insufficient data in their phone plans interfered with their ability to participate in virtual healthcare groups.

Although some service user participants desired more online services, others desired fewer. Some service users felt that they were online too much and would like to use technology less, with one participant saying, “We're all addicted” and another saying, “Around me, they use it a lot. You know, and just there, like seeing them. Right. I'm like, wow, you guys really rely on this. Like so much.” In line with this, some service users expressed a lack of interest in digital technology and resented being forced to use it for so many things. There was also a participant who reported ambivalence about her digital technology use, saying, “I think that it would be very stressful if we didn't have access to any technology. But at the same time… I would feel relieved if I was not as reliant as I am on it.” Overall, there appeared to be a consensus that service users should have the flexibility to choose whether to access services online or in person, which is not always the case. Participants also expressed a desire for online services that are accessible to service users outside of business hours.

Another area in which service user participants reported that their digital technology use could be improved was privacy. Several service user participants reported that they wished they had access to a Virtual Private Network (VPN) to prevent their online activities from being

tracked. They reported that this would make them feel more comfortable with using digital technology.

Most participants also emphasized the importance of improving digital skills and education. Some service users expressed a lack of confidence in their digital skills and reported that they would be more willing to use digital technology if they could improve their digital skills. A couple of service user participants reported that they do not know enough about digital technology to know what they might want to use it for.

How Does Digital Technology Use Relate to the Health and Well-being of Service Users with Serious Mental Illness?

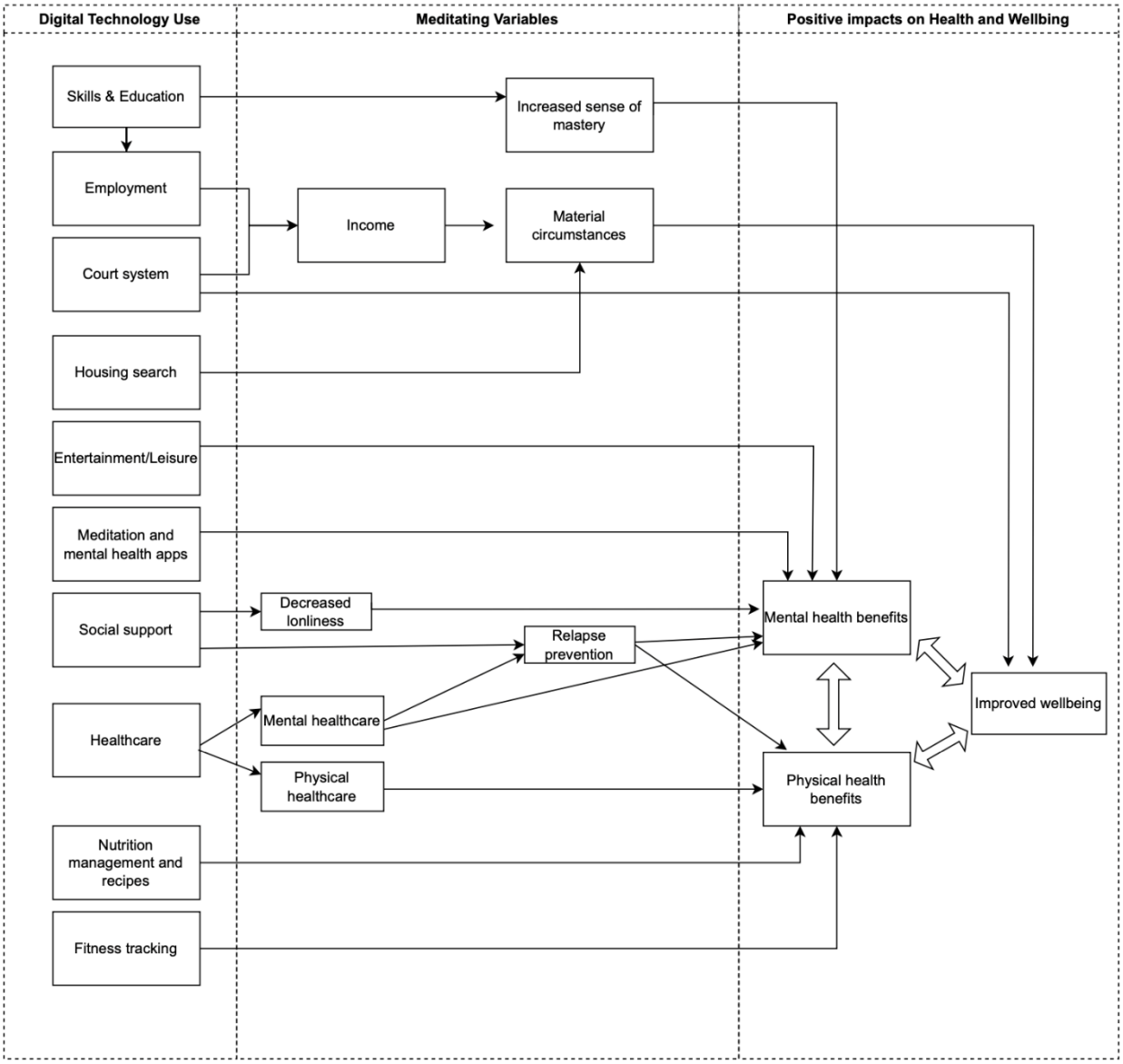
In addition to understanding how people with serious mental illness currently use digital technology, we sought to better understand how participants believe that digital technology use may relate to service users' health and well-being. Participants described both positive and negative impacts of service users' digital technology use on their health and well-being. Positive impacts are presented first, followed by negative impacts. Types of digital technology use were organized into categories, which are italicized.

Positive Impacts on Health and Well-being

A network model outlining the positive impacts of digital technology use on health and well-being outcomes, as described by participants, is presented in Figure 1. In the first column, the boxes represent the different types of digital technology use described by participants. In the second column, each box represents mediating variables described by participants that link digital technology use to outcomes. The third column contains the main categories of outcomes described by participants. The arrows represent the direction of the relationships.

Figure 1

Network Model of Perceived Positive Impacts of Digital Technology Use



Several participants discussed the use of digital technology for *skills and education*. This included several service users who reported using digital technology to access formal education. One participant took her high school equivalency exam online. Another participant was using digital technology to facilitate attending a university in a nursing program, stating, “It's hybrid, so a lot of my classes have been online, and all of my notes and stuff like that are online as well.”

She explained how digital technology use helps her overcome mental health barriers to higher education:

> I've mentioned a couple of times that I'm in school. If I didn't have access to my computer, it would make it a lot harder because, due to my mental health, I oftentimes have a hard time getting to classes, especially ones that are super early in the morning, like my lovely 8:30 AM Monday class [laughter]. So, if I didn't have access to my computer, I probably would have a much harder time accessing the course content.

Another service user who was using digital technology for university described how she would be impacted if she no longer had access to digital technology, saying, "I do all my courses online…If I didn't have that, that would definitely impact me negatively." She was proud of what she has been able to accomplish through being able to access higher education online, saying, "[attending university] is a big thing because I never thought I'd get to where I am." A third participant, who used digital technology to facilitate their higher education, explained that, even when classes are held in person, digital technology remains necessary: "I'm in university…some classes do require laptops, really varying forms of access to technology."

Other service users used free online tutorials and resources to teach themselves skills. For example, one participant said, "I use YouTube to learn new things… if I need to change the car battery or if I want to learn how to knit." Another service user participant said that he was learning audio engineering skills. He reported that he had previously skipped school and had not performed well in a traditional academic environment but had taught himself to use audio engineering software through free online resources. He reported, "I use it mostly for myself, and for my friends, but I can use it to make income as well." Beyond the potential income, he reported that learning these skills helped him to build a sense of mastery and reduced mental

health symptoms saying, “For the days where I am too depressed to leave the house it's something I can enjoy doing.”

In sum, many service user participants used digital technology to acquire skills or to access formal education. Several participants reported that accessing education and learning skills improved their well-being by fostering enjoyment, a sense of mastery, or a sense of accomplishment. Additionally, some service user participants believed that their use of digital technology to learn skills or earn a university degree enhanced their well-being by improving employment opportunities and earning potential.

In addition to enhancing skills and education, creating potential for future employment, digital technology use also directly facilitated paid *employment*. One service user participant held an in-person job but reported that the application process was entirely online, stating, “I applied to the job online…training was all in person, but the application was online.” Another participant reported that he is currently employed part-time in an entirely online position, stating, “I actually work part-time for [organization] too, and it's all online.” Another participant explained that although her work is in person, she holds multiple jobs with variable hours and that, without access to digital technology, it would be difficult to manage her work. She said,

> Because I work a couple of jobs alongside my schooling, it's way easier to do the scheduling and stuff like that with technology when I can just merge a whole bunch of calendars. So, it would probably affect my ability to work the weird shifts that I do if I didn't have that.

One service user participant reported that digital technology increased her income by providing virtual access to the *court system*, enabling her to attend a child support hearing. She reported that she would not have been able to travel to the city where it was being held to attend

in person. Another participant was also able to access family court in a different city as a result of being able to attend virtually, saying: “For the family court, if I wasn't able to go online and do the Zoom and do all that stuff… I would have no chance. It would be impossible.” Unlike the other participant, this participant improved her well-being by resolving a stressful dispute with her ex-partner.

As noted above, the use of digital technology contributed to increased job opportunities and income for some participants, thereby improving their material circumstances. Additionally, participants reported that *searching for housing* online provided them with more options and made it easier to find higher-quality housing. One participant stated, “When I found my apartment, it was easier to go through the steps on the internet." Another participant expressed their frustration about how people without internet access are negatively impacted, saying,

> But then some people don't have access…you're totally up a creek without a paddle if you don't have access to the internet in some ways, trying to find apartments, trying to do all kinds of things that people who are vulnerable have to do every day.

Participants also reported using digital technology for *entertainment and leisure,* such as watching television, listening to music, and watching YouTube. One participant described how using digital technology for entertainment helps her when she is having a mental health episode, saying,

> It's hard when I get in like, really bad episodes of depression…if I can force myself to, you know, at least get out of bed, and get to the couch and watch TV. That's better than lying in bed all day staring at a wall.

Several service user participants also reported using digital technology for m*editation and mental health apps*. They reported that using these apps improved their mental health by

supporting the development of coping skills, including mindfulness skills. One participant described using an app that helped them identify cognitive distortions, saying, “A thought tracker, so it like gave all the different like cognitive distortions and kind of like went through it. It was cool.” Similarly, another participant described her use of meditation apps, saying, “I use it throughout the day if I'm like upset or just not vibing and just need to kind of recenter, calm down.” Another participant reported that she uses an app that provides easy access to her safety plan. Safety plans are written plans for an individual to follow in the event of a mental health crisis (e.g., coping tools, calling a support, nearest emergency room). This participant reported that she would often lose her safety plans in the past. However, she now uses an app for her safety plan, which provides her with easy access to it and has helped mitigate suicidal and self-harm risk.

A major area where participants reported that digital technology had a positive impact on service users’ health and well-being was through *social support*. Many service user participants used digital technology to receive social support from friends and family. One participant said, “Now that I have a really good phone, I use messaging to keep in touch with family.” A couple of participants reported using online dating, with one stating that she met her current partner online: “I used to when I was single- I went on Tinder and that's an online application through my cell phone and that's how I met my current boyfriend.” Another participant found online support groups that provided her with important social support, saying, “I have a daughter who is transitioning, and I was able to find groups online to help support her, so I'm very grateful for that.”

Almost all participants reported that service users used digital technology to access *healthcare services*. Participants accessed healthcare services that included group therapy and

appointments with family physicians, psychiatrists, and case managers. Some participants described a preference for accessing healthcare virtually. Reasons for preferring virtual care included not needing to commute, not needing to come to a neighbourhood they associated with drug use, being able to access services that they cannot access locally, being unable to leave the house, and mental health barriers to leaving their home. One participant described how meaningful it was to be provided with a laptop by our partner community mental health organization during the eight months they were under house arrest, saying, “I continued after that, still continuing to do Zoom meetings and to have access to my mental health stuff… it's definitely been good for me, for my health, for my mental health and my physical health.” Another participant described how virtual healthcare made accessing primary care easier, saying,

> My family doctor is like three hours away… so being able to access that to keep up to date on my prescriptions and have that regular follow-up without having to wait six hours at a walk-in clinic, it has been really nice.

Additionally, being able to access services online meant access to a larger variety of services at various times. One participant noted that there is typically an online Narcotics Anonymous (NA) group occurring at any given moment somewhere in the world. He reported that being able to attend online NA groups from home at all hours helped him to not use, saying, “I can wake up from like a dream where I'm using at 2:00 in the morning, go online and there's always an NA meeting. Like every hour, like doesn't matter what hour.” Another participant reported that, early in her addiction recovery, having the option to attend concurrent disorders groups virtually was beneficial because the location of in-person services was triggering to her and going to that area increased her likelihood of relapse:

> Through my early recovery, this area is a trigger for me. You know like my dealer was right across the street *[laughter]*. So, even like being here, to come to the substance groups was difficult for me because afterwards it's like 'do I go on that bus or do I…?'

Many service users reported that digital technology allowed them to access mental health care by participating in therapy groups online when they would not have been able to attend in person due to parenting responsibilities, work responsibilities, travel time, and mental health issues. For example, one participant reported that attending group therapy online allowed them to better manage voices that they hear, and the ability to participate online removed a significant barrier to accessing healthcare for them, saying,

> I hear voices and so I found during the Zoom meetings things were a lot easier because I could control my voices in my own environment and not have to be around people and have to keep stepping out of the room.

Several service user participants reported that using digital technology for *nutrition management and healthy recipes* positively affected their physical health. For example, one service user participant described using a food tracking app to help her monitor her calorie and carbohydrate intake to manage her type one diabetes and medication-related weight gain. She noted that the tracking app helped her improve her physical health by regulating her blood sugar and maintaining a healthy body weight, saying,

> Because I have a problem with binge eating, as well as I'm type one diabetic, I need to watch my carbs. But I noticed…Since I started medications, I gained 35 pounds, right? I enter my meals or type them in and it tells me the calories and carbs…it helps me develop a plan where I eat this, I eat this, I eat this, and then I go exercise this much and then I know that I'm not surplus on calories.

Other service users described finding healthy recipes online. For example, one participant noted that online recipes helped her to eat better and remain within her budget, saying, “Recipes and things like that too…you still stay healthy under budget.”

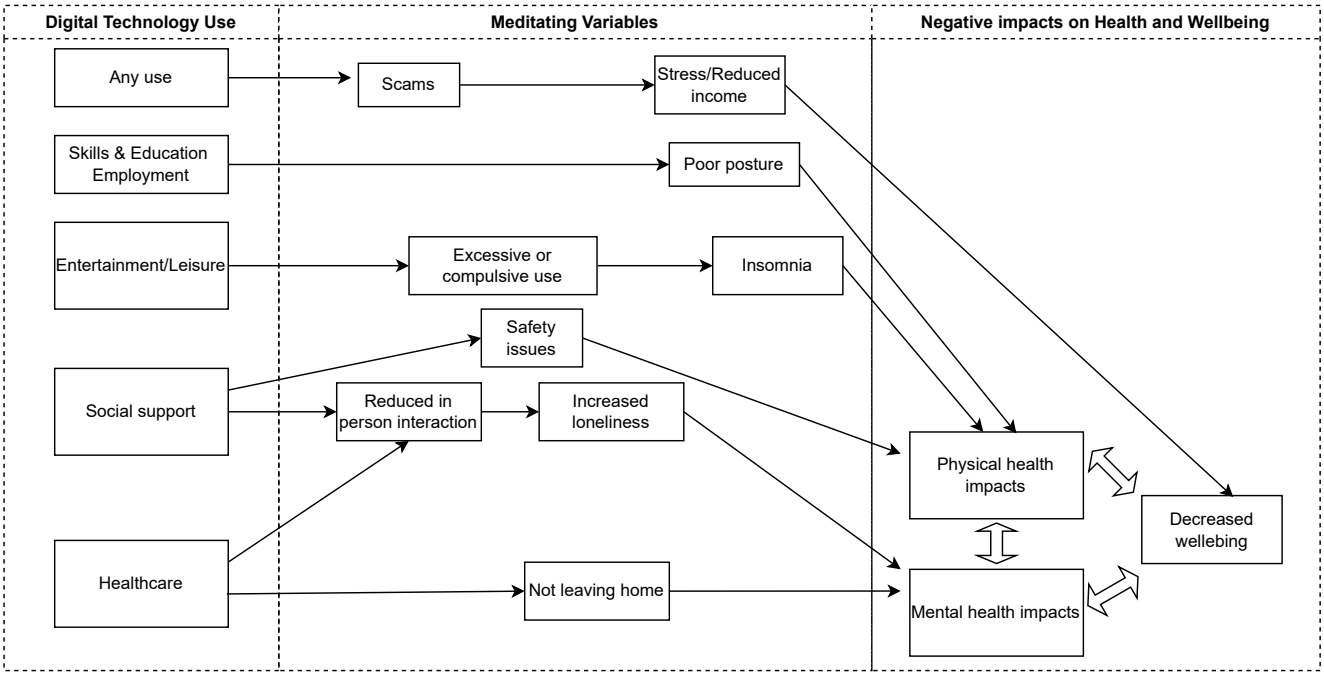
Although uncommon, one participant reported using a *fitness tracker* to track her steps and sleep. She reported that it helped her get the exercise she needs to stay healthy, and she also reported that she shared the sleep data with her doctor, who is treating her for insomnia.

Negative Impacts on Health and Well-being

A network model outlining the negative impacts of digital technology use on the health and well-being of service users, as described by participants, is presented in Figure 2. This model is structured in the same way as the positive impacts model, with the types of digital technology use described by participants in the first column, mediating variables that explain the relationship between usage and outcomes in the second column, and the main categories of negative health and well-being outcomes in the third column. The direction of the arrows indicates the direction of the relationship described by participants.

Figure 2

Network Model of Perceived Negative Impacts of Digital Technology Use



Participants reported that *any use* of digital technology, even minimal use, increased their susceptibility to online scams. For example, one participant who reported minimal digital technology use said,

> I think it's actually pretty hard because I am extremely limited on my use of the internet. I don't open anything, and yet I have a home phone, I still get that call from some [suspected scam] company every couple days or weeks.

Another service user reported a close call with a Facebook ad scam, saying,

> It said that Canadians were gonna be able to invest in some kind of cryptocurrency…and it looked like Elon Musk was actually saying what they were doing. So, I put in my information. I didn't give them my banking information or anything, it kind of seemed a bit too good to be true. And then it was funny because as soon as I punched in my phone

> number and pressed like enter, almost immediately my phone started ringing with numbers from like wherever… So my phone still gets all those calls...and this is like months ago.

One service user participant described an ex-partner using online accounts to steal from her, saying, “He used my debit card information online and used it through an Amazon account that I didn't have access to, so I couldn't undo the purchase.” Another participant reported that she was the victim of a catfishing/romance scam, saying,

> I did have a problem once where like I was trying to meet up with some guy back when I was single and he ended up being a catfish…I wasted lots of money like because I thought they needed it. And I was going to meet the person one day but like it never ended up happening and it wasted like $5000 or something.

Another service user said that, although she has not been the victim of a scam, she has experienced significant stress due to her mother falling victim to online scams. She said,

> I have been lucky enough to never have to deal with a scam that I've like gotten into myself. My mother, on the other hand, Oh my God. The number of phone calls I get from her because Amazon scammed her again and its never actually Amazon. So I spend way too much of my time attempting to deal with that.

Participants reported that online scams negatively affected their health and well-being by causing financial losses and increasing stress.

Service users who relied on digital technology for *skills and education,* and for *employment,* reported concerns about the impact of prolonged use on their physical health, particularly given their lack of access to an ergonomic office setup. One participant said:

> So as far as health goes, like I definitely notice the effects of technology. A big one for me is I find it affects my physical health because I spend all my time sitting there, staring at a screen. So, like, that's just so great for my posture and stuff like that.

Discussing similar concerns, another participant reported: “When I use my laptop for example, I know my posture physically is not great. So, I always wonder what, like the physical disability ramifications are.”

Participants reported that using digital technology for *entertainment and leisure* activities negatively impacted their health. Some participants reported that they felt “addicted” to digital technology and one highlighted that there is a lack of supports in place to help people address compulsive use of digital technology. Compulsive use of digital technology, particularly for nighttime entertainment, disrupted sleep patterns, leading to insomnia and reduced well-being during the day. A staff participant described observing disrupted sleep among several of their clients, saying, “and sleep disorders, too, so many people in the middle of [the night] playing the video games or chatting with their people, their friends, because they're in different time zones…being awake all night.” Participants reported that compulsive use of digital technology also led to decreased in-person activities, which contributed to loneliness and reduced well-being.

Although many participants reported using digital technology to access *social support* in ways that benefited their health and well-being, they also reported that such use had negative implications for their health and well-being. Participants reported safety concerns about making connections online through online communities, social media, and online dating that had the potential to put their physical and mental health at risk. One participant reported a negative experience with a date she met through a dating app. She said, “I had a bad experience with the

dating app…so I never did dating apps again." Other participants reported concern about the safety of others. One participant discussed concerns about the safety of social media connections made by her niece saying, "My niece, who lives with us at the moment, she, she's 16 and she uses a Snapchat app and a lot of misleading people and ages and- you know, also people buy a lot of drugs off online." Similarly, another participant reported concern for a friend's 16-year-old daughter who was meeting people online, saying,

> She was going online and trying to meet people, and so she went out with this guy, and then he brought her back at 2:00 in the morning. But he wasn't 18, he was an older man, right? So it's dangerous too, I find for children because they're online, you know? And they're teens thinking, thinking that they're talking to another teen, right. And they're not, they're talking to an adult.

In addition to concerns about the safety of social connections made online, participants reported that over-reliance on online connections risked contributing to a reduction of in-person activities and relationships, which could exacerbate anxiety and other mental health issues. Staff participants reported that service users having exclusively online social connections was a concern, particularly among their younger clients. One staff member said,

> Especially with younger folks…what that social support circle looks like. And in the intake I find a lot of youth will say; 'oh, I have tons of friends'…and then as you get to know them, there's, like, underlying loneliness that's there.

Although many participants appreciated the ability to access *healthcare* through digital technology, others expressed concerns about the potential negative impacts of increased virtual care on their health and well-being. Participants noted that accessing care virtually led to reduced in-person interaction and a sense of isolation and loneliness. One participant said, "I despise

online Zooming and all that stuff. For me, it was very isolating." Another participant reported that decreased in-person care made it harder to feel a sense of connection with her service provider because she felt her worker could not read her facial expressions and body language as well online, saying, "Virtual is hard in the sense of talking about really intense things. My worker can't really see my emotional response as well through Zoom rather than us being in the same room." Several other participants preferred in-person services over online because they enjoyed having something to motivate them to leave the house, with one saying,

> In person for me, there's an additional benefit in the fact that it forces me to leave the house… if I were to do it online, I'm going to wake up do the appointment and I'm going to go back to sleep. But if I'm forced to do them in person, once I'm up and getting to the appointment, I end up feeling better because I'm outside, getting fresh air. And then I might run errands on the way home or whatnot.

Discussion

This study describes how a group of people with serious mental illness receiving services at our partner community mental health organization are currently using digital technology, how that compares to how they would like to be using digital technology, and how they believe their digital technology use relates to their health and well-being. We found that service users with serious mental illness used digital technology in a variety of ways that were similar to how it is used in the general population including accessing essential services such as accessing healthcare services and the court system, learning new skills and formal education, employment, searching for housing, entertainment and leisure, social support, nutrition management, meditation and mental health apps, and fitness tracking. Consistent with previous research, participants reported that their digital technology use positively impacted education, employment, social support, and

housing (Baum et al., 2014; Middle & Welch, 2022; Spinzy et al., 2012; Townsend et al., 2016). Additionally, participants reported that service users' digital technology use positively impacted their health and well-being through access to essential services such as healthcare and the court system, learning new skills, entertainment and leisure, nutrition management, meditation and mental health apps, and fitness tracking. Previous research has mainly focused on the potential benefits of digital technology use for people with serious mental illness. We found that, although participants reported that digital technology positively affected service users' health and well-being in many ways, they also described negative effects and reported that greater digital technology use was not always beneficial. Participants reported that digital technology can negatively affect health and well-being through factors such as susceptibility to scams, social isolation, and excessive use. This mirrors the complex relationship with digital technology experienced by the general population. It also highlights the importance of providing people with serious mental illness the same autonomy as everyone else to decide how they want to use digital technology and benefit from it while also recognizing unique challenges faced by this population, including financial constraints and mental health symptoms.

This study contributes to the body of evidence on how digital technology use may relate to the health and well-being of people with serious mental illness beyond healthcare. Although all service users reported using digital technology to access healthcare, and it was identified as an important way in which participants believed digital technology use affected the health and well-being of service users, they also pointed to several other pathways through which digital technology use impacted health and well-being. Therefore, the focus of digital health equity should be expanded to include interventions and programs that address social determinants of health outside the healthcare system. This includes interventions that promote health and well-

being and those that mitigate the potential negative impacts of increased digital technology use. Limiting the term digital health equity to refer to digital technology's impact on health only within the healthcare system de-emphasizes research in areas that are critically important to many marginalized groups. Consistent with this, a clinical review of digital interventions to promote health among people with severe mental disorders found that there has been little research on health interventions that focus on social determinants of health (Naslund & Aschbrenner, 2019).

Nevertheless, it is not necessarily the case that we need to create a completely new concept or framework. For example, the definition of digital health equity proposed by Kim & Backonja (2025) could be minimally modified to the following: Digital health equity is a multi-level socio-ecological concept that results from fair and just opportunities for everyone to attain their highest level of health through access to technology-enabled ~~health~~ resources and services. This definition captures the same core factors but also allows for application outside healthcare, which is particularly important for marginalized groups affected by health inequities and the digital divide.

Our analysis employed a mixed inductive-deductive approach (Miles et al., 2014). Findings are presented as they were described by participants. However, we did code social determinants of health, and many of the pathways identified by participants in our network models could be categorized within the WHO's social determinants of health framework (2010). For example, descriptions of changes to eating behaviours and exacerbations of problematic behaviour (e.g., compulsive and excessive use) which influence biological health would fall under behavioural and biological factors. Participants also described using digital technology to access social support from friends and family, which would fall under psychosocial factors.

Participants described how their digital technology use influenced income and education, which are structural determinants of health. Participants also described mechanisms by which their use of digital technologies affected their utilization of healthcare services. Our findings support the point made by other researchers that digital inclusion should be viewed as a social determinant of health (Middle & Welch, 2022). Additionally, our study provides evidence for the usefulness of applying existing social determinants of health frameworks to explore the relationship between digital technology and health beyond healthcare.

Strengths and Limitations

A major strength of the present study is the partnership with our community mental health organization and its clients. This research was collaborative and puts the voices of the community at the centre. We had strong buy-in and support from stakeholders, including participants, underscoring the importance of this research topic. A limitation of this study is the lack of demographic information to contextualize findings. Additionally, the convenience sampling approach means that our sample may be biased towards a particular type of service user. Only a small number of service providers participated, therefore the perspectives of staff may not be fully captured by our findings.

Conclusions and Future Directions

Our study provides preliminary evidence of the various ways that digital technology use can both positively and negatively influence health and well-being for people with serious mental illness. It also supports the expansion of conceptualizations of digital health equity beyond healthcare and emphasizes that efforts to improve digital health equity need to extend beyond healthcare use and access. In future research, we plan to expand on these findings by

applying a digital health equity framework to barriers and unmet digital technology needs experienced by service users with serious mental illness both within and outside of healthcare.

Chapter 4

Exploring Unmet Needs and Barriers to Digital Technology Use Among People with Serious Mental Illness and Proposed Solutions to Address Them

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Introduction

Serious mental illness is “a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities” (National Institute of Mental Health, 2024, Definitions section). People with serious mental illness face inequities in health outcomes, including higher morbidity and mortality compared to the general population (Cunningham et al., 2013; Cunningham & Dixon, 2020; Goldman et al., 2018; Hayes et al., 2017). Additionally, people with serious mental illness face barriers to accessing and effectively using digital technology. They have lower rates of device ownership and internet use (Firth et al., 2016; Marbin et al., 2023; Spanakis et al., 2021), and many have deficits in foundational digital skills (Spanakis et al., 2022). As more aspects of daily life involve digital technology, the number of ways it can affect health and well-being is increasing. It is therefore important to make sure that the transition to an increasingly digital society does not further exacerbate health inequities for people with serious mental illness.

The concept of digital health equity has been introduced in response to concerns about the potential negative health implications of increased dependence on digital technology for groups with limited access to it. Authors of a recent scoping review of definitions and frameworks of digital health equity proposed the following consolidated definition: “Digital health equity is a multi-level socio-ecological concept that results from fair and just opportunities for everyone to attain their highest level of health through access to technology-enabled health resources and services” (Kim & Backonja, 2025, p. 940). Whereas this definition focuses on digital technology within the healthcare system and health interventions, there is an increasing body of evidence indicating other ways that digital technology use relates to the health and well-being of people with serious mental illness including impacts on education, employment, social

connection and support, self-perception, and housing (Baum et al., 2014; Middle & Welch, 2022; Spinzy et al., 2012; Townsend et al., 2016; Turner et al., 2023, 2026a). In the current study, we take a broader approach, defining digital health equity as all individuals having fair and just opportunities to use and experience health benefits from digital technologies.

There is currently a lack of understanding of the specific unmet needs and barriers that interfere with accessing, using, and benefiting from digital technology for people with serious mental illness and what could potentially be done to address them. A qualitative meta-review of research on eHealth (digital health solution) use among groups with lower access to digital technology (people with a low socioeconomic position, seniors, and people with a migrant background) included 29 reviews (e.g., scoping, systematic, literature, etc.), which identified individual and system barriers to eHealth. Individual barriers included trust and privacy concerns; lack of interest or motivation; financial difficulties; low self-efficacy; limited health literacy; preferences for in-person care; lack of social support; insufficient technology or technical access; physical or cognitive impairments; and language barriers (Coetzer et al., 2024). System barriers included content not being tailored to user needs; connectivity or technical issues; insufficient health resources; stigma; insufficient commitment from system actors; unsupportive legislation; limited training opportunities; the pace of digitalization; and difficulties in intersectoral collaboration (Coetzer et al., 2024). This meta-review, however, did not include people with serious mental illness and its focus was limited to eHealth.

Hatch et al. (2018) conducted a study on the potential benefits of and barriers to the use of digital health tools for people with serious mental illness. They administered a survey to an expert panel consisting of researchers with expertise in technology-assisted treatment interventions in psychiatry. The expert panel rated the following items as having the potential to

be barriers to or unintended consequences of digital health tools: belief that the intervention is not well suited to needs, burdensome to use, not understanding how to use, concerns about being monitored, finding the tool intrusive, privacy concerns, and feelings of frustration and discouragement with digital technology (Hatch et al., 2018). This research, however, was again focused on health interventions and does not capture the experiences or perspectives of people with serious mental illness. In addition to limited research specific to people with serious mental illness, there is also very little research on barriers to digital technology use outside the context of the healthcare system and individual health interventions.

The Current Study

In order to promote digital health equity among people with serious mental illness, it is important to understand what factors are currently getting in the way of them benefiting from digital technology. It is also important to incorporate the perspectives of those directly affected by this issue. This study describes the second phase of a larger community-based participatory needs assessment. We partnered with a community mental health organization in a large city in Ontario, Canada, that provides services, including outreach, case management, group therapy, and counselling services, to people with serious mental illness who are unhoused, unstably housed, or who have histories of housing instability. Our research was guided by our advisory committee, which consisted of clients and frontline staff from our partner organization.

In a first phase, we conducted a qualitative study with service users of our partner community mental health organization on how people with serious mental illness are using digital technology and how they believe their digital technology use relates to their health and well-being (Turner et al., 2026a). We identified several pathways through which people with serious mental illness believed their digital technology use negatively impacted their health and

well-being including vulnerability to scams, excessive use, isolation, and physical effects of poor posture, and several pathways through which they believed it positively impacted their health and well-being, including education, employment, income, social support, health-behaviours, healthcare access, and leisure (Turner et al., 2026a). This research highlights the importance of removing barriers to digital technology use and providing resources to mitigate negative impacts. It also emphasizes the importance of expanding the scope of digital health equity beyond healthcare.

In the current study, we used qualitative focus groups to gain an in-depth understanding of the experiences of our partner community mental health organization's service users with serious mental illness. Our aim was to learn about the unmet needs and barriers to digital technology use experienced by people with serious mental illness, as well as potential solutions to address them. Based on these findings, we created recommendations for how our partner community mental health organization or other service providers, researchers, and policy makers can support digital health equity for people with serious mental illness.

A criticism of the literature on barriers to digital technology use and proposed solutions is that some recommendations, particularly at the systems level, are vague (e.g., stigma, lack of system actor commitment) (Coetzer et al., 2024). To generate more targeted recommendations, we selected and adapted a multi-level framework that outlines different levels of determinants that influence digital health equity to guide our research, as shown in Table 1.

Table 1

Ecological Framework for Digital Determinants of Health

Individual	**Tools and services**	**Social/community**	**Systems**	**Policy**

Individual Access	Usability	Community norms and attitudes around technology	Health systems investment and funding	Government policy and regulations
Digital literacy	Utility	One-on-one interpersonal interactions	Leadership in promoting health equity	Privacy laws
Personal attitudes	Accessibility	Community-based awareness of and access to digital technology resources Online social participation and communities	Health systems infrastructure	Infrastructure (e.g., Broadband internet)

Adapted from Lyles, et al., (2023)

The framework is based on a multi-level framework proposed by Lyles et al. (2023) and includes the following levels of digital determinants of health: the policy level, which includes government policies and regulations and infrastructure; the systems level which includes health system investment, funding, leadership, and implementation skills; the community/social level, which includes social influences, community priorities, and one-on-one interactions; the individual level, which includes digital skills, motivational factors and acceptance of digital tools; and the digital health intervention level, which includes features of digital interventions that influence accessibility and usability. The authors note that each level provides different

opportunities to promote health equity and should be considered in the development of digital health interventions (Lyles et al., 2023). This framework, however, focuses on the healthcare system and health interventions. We therefore modified it to improve its broader applicability.

The policy-level and systems-level factors in Lyles et al.'s framework remained the same in our adapted framework. At the social/community level, we also considered community-based awareness of access to digital technology resources and participation in online communities. We replaced the digital health interventions level with a tools and services level that considers the same factors (accessibility, usability), but applied to any digital tools or services (e.g., online banking, websites). We also considered utility, that is, whether people felt that the tools and services available were relevant and useful to them, under this level. At the individual level, our framework also includes digital skills, but rather than examining motivational factors and acceptance of digital tools, we considered personal attitudes toward digital technology more broadly. Additionally, across different frameworks, access is sometimes treated as an individual-level factor and sometimes treated as a policy-level factor. This is because, although access is something experienced by the individual, it is more strongly influenced by policy-level factors than by anything the individual has control over. For the purposes of our framework, access was treated as an individual-level factor because it was more intuitive for participants to discuss barriers to access in terms of their individual experiences.

Objectives

Based on the gaps identified, our study was designed to answer the following research questions:

1. What are the unmet needs and barriers to digital health equity for service users at the different levels of digital determinants of health?

2. What actions could be taken to address the identified unmet needs and barriers to digital health equity?

Methods

We designed qualitative focus groups to answer our research questions. The focus groups were also designed to answer separate research questions about how service users are using digital technology and how they believe their digital technology use relates to their health. For clarity, these findings were reported separately in study one (Turner et al., 2026a). Both studies involve primary analysis of the same dataset; therefore, the methods and study materials are the same as those used in our prior study (Turner et al., 2026a). The methods are described in detail again in this study. Some elements of the coding and analysis were only relevant to one set of research questions and were described in the methods section of the relevant study only. The ethical components of all study methods were reviewed and approved by The University of Ottawa's research ethics board.

Data Collection Procedures

We conducted three focus groups with clients with serious mental illness receiving services from our partner mental health organization and one focus group with staff providing direct client services. Each participant was asked to attend one 60–90-minute focus group. Three focus groups were held in person in a conference room at our partner community mental health organization's offices, while one client (service user) focus group was held virtually via Zoom. All focus groups were held between August and October 2023. The consent information was reviewed at the beginning of each focus group, and participants were informed that their participation was voluntary and were given opportunities to ask questions. The service user consent form can be found in Appendix A, and the staff consent form can be found in Appendix

B. Refreshments were served at the in-person groups. Service users who participated were provided with a $50 honorarium for their time. Two members of the research team served as facilitators for each focus group. The primary facilitator moderated the group discussion, while the secondary facilitator provided support with administrative tasks and detailed note-taking. All focus groups were audio-recorded.

Participants and Recruitment

Due to the potential challenges of recruiting participants with serious mental illness, we used a convenience sampling approach. Our recruitment procedures were designed to ensure that our sample would still capture a range of perspectives, including the perspectives of more vulnerable service users and those with more or less experience with digital technology. Staff participants were recruited through email and through a presentation of the study at an all-staff meeting. Researchers' contact information was included in the recruitment materials and interested staff members were invited to contact the research team for more information. Clients with serious mental illness who were receiving services from our partner community mental health organization at the time of the study were eligible to participate. To ensure a range of perspectives, service users who had used online services through our partner community mental health organization and those who had used only in-person services were recruited. Case managers and group facilitators from the concurrent disorders program supported recruitment for the study by presenting recruitment material to service users. Service users who consented to share their contact information with researchers to obtain additional information about participation were contacted directly by the research team. Additionally, to reduce barriers to participation, the date, time, and location of focus groups were determined in advance, and interested service users were invited to attend without prior sign-up or coordination.

Materials and Measures

Semi-structured focus group guides for service users and for staff were developed. The focus group guides were designed to answer two sets of research questions. We examined service users' digital technology use and its relationship with their health and well-being in a previous study. The focus group guides were also designed to answer this study's research questions by exploring unmet needs and barriers to digital health equity, as well as possible solutions or actions that could be taken to address these needs. We structured our focus group guides according to an adapted version of Lyles et al.'s (2003) ecological framework, as detailed in Table 1. We used a funnel approach for our focus group guides, which included a fixed list of core questions for each level of digital determinants of health in our framework and a set of more specific, optional follow-up questions. This allowed data collection to be structured enough to cover all areas of interest while maintaining flexibility (Morgan, 1996). Our advisory committee provided feedback on the focus group guides to ensure they covered all areas of interest to service users and used accessible language. The semi-structured focus group guide for service users can be found in Appendix C, and the guide for staff can be found in Appendix D.

Data Coding and Analysis

The focus group audio recordings were transcribed verbatim. These transcripts were uploaded to the qualitative data analysis software NVivo 14. We used a pragmatic, mixed inductive-deductive approach based on methods outlined by Miles et al. (2014) to analyze the qualitative focus group data.

We coded participant-reported unmet needs and barriers related to digital technology use, as well as actions and solutions to address them. We based our coding of unmet needs, barriers, and solutions on the conceptual framework of digital determinants of health presented in Table 1.

We used a deductive approach in which we coded unmet needs and barriers as well as solutions according to the level of digital determinants of health that they relate to (i.e., if someone did not trust digital technology this would be coded at the individual level, if there was a barrier resulting from how a program was being implemented, this would be coded at the tools and services level). For solutions, there was sometimes a discrepancy between the level of digital determinants of health at which the solution needs to be implemented and the level of digital determinants of health the solution is meant to improve. For example, solutions to provide education that would improve individual-level digital literacy skills would need to be implemented at the policy, systems, or tools and services levels. In these cases, solutions were coded according to the level at which they are implemented (e.g., a community organization program to teach digital skills would be coded at the tools and services level rather than the individual level, even though it addresses an individual-level need). We inductively developed codes for categories observed among the unmet needs and barriers, as well as actions and solutions. An initial list of codes was developed based on the detailed notes taken during the focus groups. The coding manual was then applied independently by two researchers to the first focus group transcript. Researchers then met to discuss any additions or modifications needed to refine the coding manual and to review discrepancies in coding, which were resolved through discussion and consensus. This process was repeated for each of the focus group transcripts. The final coding manual can be found in Appendix E. Mixed or contradictory findings were noted and are highlighted in the findings.

Trustworthiness

This study employed several strategies to ensure that the findings are credible, transferable, dependable, and confirmable. Credibility refers to the level of confidence that the

findings accurately represent participant experience. This was promoted through prolonged engagement with participants in focus groups by asking follow-up questions and for examples. Verification of the findings was built into the research design of our community-based participatory needs assessment by presenting the study's findings to a separate group of participants as part of a follow-up study on priority setting. We also used triangulation strategies, including designing our recruitment strategy and focus groups in a way that would attract clients with different experience levels and perspectives on digital technology (in person and via Zoom) and holding groups with both service users and service providers. Additionally, data coding was performed independently by multiple researchers.

Findings

The final sample for the focus groups included 21 service users and four staff members. A summary of the categories identified for both unmet needs and barriers and solutions can be found in Table 2. This is followed by qualitative descriptions of the categories and participant quotes. These findings are presented by research question. Categories identified in our analysis are italicized.

Table 2

Summary of barriers or unmet needs and solutions

	Barrier or unmet need	**Solutions**
Individual: Related to someone's access to digital technology, how they feel about technology, and their digital skills.		
	High cost: internet and phone plans, hardware and repairs	Family plans to reduce cost
	Unstable housing (Lost/stolen phones, lack of access to charging and internet, lack of access to private spaces to store/use)	Relying on official sources of information Using flip phones
	Insufficient internet access (low data, lack of bandwidth, rural connection)	See Policy-level solutions
	Personal attitudes (mistrust, anxiety, privacy concerns)	
	Paranoia	

	Lack of skills	
	Unmet education and training needs	
Tools and services: Related to **any types of services accessed through digital technology**. This includes healthcare and social services, but also any websites, banking services, apps, social networking, or even GPS and maps. Focus on if they are **<u>available, easy to use, useful, and accessible.</u>**		
	Availability: Limited service hours, preferred modality not available (online or in person)	Flexibility in how people can access tools and services (online or in person)
	Accessibility: language, visual, financial, passwords and dual-factor authentication	Peer technology support programs
		Distribution of reliable information
	Usability	
		Hardware giving or lending programs

		Involvement of stakeholders in the design of tools and services to increase user friendliness
Social/community: Related to **community norms and attitudes** about digital technology, **accessing digital technology through the community**, and participation **in online socializing and communities.**		
	Lack of social contacts with knowledge about digital technology	
	Community tech supports not trustworthy	
Health systems: Related to the **health system more generally,** including things like overall investment in digital technology, leadership in promoting digital health equity.		
	Needs of marginalized groups not considered in the implementation of virtual healthcare	Flexibility for both in-person and online services across healthcare system
	Lack of consistency in virtual care platforms and delivery across the healthcare system	Consultation with stakeholders when developing programs

	Lack of diversity in virtual care	Investment in public sector virtual care
Policy: These are needs or barriers related to government policy on digital technology, the development of broadband internet infrastructure, and policies related to data security and privacy		
	Lack of policy regulating internet cost for low-income individuals	Government investment in telecommunications infrastructure in rural areas
	Excessive regulations or restrictions on government policies and programs	Policy mandating internet access in certain settings (e.g., long term care homes)
		Free Wi-Fi in public spaces
		Government providing free or low-cost internet

	Policy making telecommunications companies provide low-cost phone plan options
	Expansion of existing programs to increase access and affordability

What are the Unmet Needs and Barriers to Digital Health Equity for Service Users at the Different Levels of Digital Determinants of Health?

Participants identified several unmet digital technology needs and barriers to digital technology use. These unmet needs and barriers are presented according to the level of digital determinant of health at which they are experienced.

Individual Level

At the individual level, participants identified several barriers related to accessing digital technology. A major barrier for many service users was *the high cost of hardware and repairs,* and the *high cost of internet and phone plans*. Participants discussed how phones and laptops themselves were difficult to afford. One service user participant described how she could not afford to replace her broken laptop saying, “It's really expensive to get a new laptop, like, I don't have the money to buy a new laptop, so I'm just using my broken laptop to the best of my ability and that's making it difficult to access things.” Another service user participant expressed similar concerns about affordability of phones saying, “Just getting a cell phone itself is also hard because they're so expensive. If my phone breaks, I literally have no technology and no way of talking or communicating.” A different service user expressed how, despite working full-time, she still had difficulties with affording digital technology, saying,

> I work full-time, but I am still paycheck to paycheck and I struggle to- I don't have any money to fix my phone right now. So, I can imagine even more of a barrier it would be for someone who is unable to work.

Even when service users had access to hardware, many participants expressed that the high ongoing costs of mobile and internet plans were a barrier. One participant said,

> I had a cell phone, I didn't have data, like a GB of data. So, I couldn't use my cell phone, so having the laptop was a big help, but if somebody can't afford internet or they don't have internet access that doesn't really do much, to have the laptop.

Another service user described his difficulty affording his phone plan, saying, "I haven't found anything that's cheap. My phone is $55 a month, but that's still expensive when you're low income and you want talk and text."

Participants also described how *unstable housing* created barriers to accessing and using digital technology, including the lack of a private space to store or use devices, the absence of a consistent space to charge them, and an increased risk of device loss or theft. One service user participant said:

> For people who are unhoused, people who don't have consistent access, even if you have a phone and you're in a shelter and they make you leave during the day, you've got to figure out how you're going to keep your phone charged and where you're going to find internet access if you don't have data.

Participants also reported that *insufficient internet access*, including limitations on data plans and internet bandwidth, was a significant barrier. One participant struggled with her internet bandwidth not being enough to support multiple users. She said, "One of the challenges I faced during COVID was as soon as the kids got home, the internet would drop." Another participant reported that living in a rural area was a barrier to accessing the internet, saying, "When I lived in the country, we just did not have the capacity to have reliable internet."

Personal attitudes towards digital technology were also a barrier for many service users. Many participants reported *mistrust, anxiety, and fear* regarding digital technology, as exemplified by the participant who said: "I don't trust technology, no." Another service user

participant said: “Scary. Yeah, it's scary… Intimidating. I don't feel like I'm well versed in it.” Someone else described how Artificial Intelligence (AI) was contributing to their anxiety around digital technology saying, “They can make it look like it's a person speaking. but you can't tell that it's not a person… that's just one of the scary things about AI.”

Participants also reported *concerns about* online privacy and data tracking. A service user participant described how her concerns about data tracking were a barrier to her digital technology use, saying,

> They do that [data tracking] too much. Because if you search something random or somebody else on your phone, you start getting ads for what you search for… This is even one of the reasons why I don't use my phone for shopping or anything else like that.

Additionally, staff participants and service users both reported that *paranoia* was a significant barrier to digital technology use. Participants made a distinction between what they considered to be valid concerns about inadequate privacy protections (e.g., having their data used for marketing) and paranoia about being monitored through digital technology stemming from mental health conditions. One client participant said, “Well, I have a huge paranoia about it. About being recorded.”

Another individual-level barrier was a *lack of digital skills*. One staff participant reported that smartphone technology was too complicated for some of their clients, saying, “And what I did notice with a few of my clients is it was too complicated for them to use. They wanted the old flip phones.” Service users reported difficulties with device use, as well as broader digital literacy challenges, such as finding and using information online. For example, one participant described this challenge saying, “I think that there might be a reasonable amount of information that you could find for free, but it also depends on if you know where to go to find that

information, or if that information is understandable to you." Participants also reported that, although many were motivated to improve their digital skills, there was a lack of services to support learning, resulting in *unmet educational and training needs*. One client participant said,

> I feel like there's not enough services to explain how to use the internet and how to use Zoom and all this stuff because… I struggle with just learning about new technology and there's not enough really free resources out there for people to be able to learn the technology.

Tools and Services Level

At the tools and services level, participants reported barriers related to *availability, accessibility, usability, and utility*. In terms of *utility,* the majority of participants reported regularly accessing several relevant and useful tools and services, including mental health care, physical health care, online banking, GPS and maps, educational resources, entertainment, and wellness apps. However, several participants reported that *limited service hours* were a barrier to the *availability* of some of these tools and services. They reported that some services that they accessed through digital technology were only available during regular business hours or were not available enough. One participant reported the following about trying to use her phone to access a crisis line "I'd call the crisis line or help line, and I'd get a messaging machine. You know, you wait 10 minutes and then you get the messaging machine. Then you leave a message and they never call." Staff participants echoed this when discussing digital technology supports, saying, "For a lot of our clients, the only safe support they have is with professional supports… Their supports are limited to business hours."

Additionally, participants reported that their *preferred modality for accessing services (online versus in person) was not always available*. This was a particular concern when it came

to accessing healthcare. Most service users expressed a desire for more online options. However, they also reported feeling compelled to complete some tasks online that they would prefer to do in person (e.g., intake processes, scheduling doctors' appointments). One participant said the following about the increasingly virtual intake processes for addictions care

> I think that for addiction treatment and access, the online thing is a huge issue. There really needs to be in-person walk-in services because it's really confusing. This system they have right now where it's like you have to go through [program 1] and then they redirect you to [program 2] and then you have to book your virtual call. Like it's really confusing.

A staff participant described how some services were not appropriate for online delivery, noting that a clinic that provides rapid access to medical services for alcohol withdrawal had not returned to in-person services after COVID-19 restrictions were removed, saying,

> And so now that is virtual and they haven't gone back in person, I find it just complete bonkers to be like, 'you're withdrawing, so let's just go online here' versus [before] they had eight to four hours before they would just show up, and they would see someone, they would get some medication help with withdrawals. Like, it was just so easy then.

Participants also raised *accessibility* concerns about tools and services. Several participants raised concerns about the use of *inaccessible language* in online explanations of how to use digital technology, particularly for individuals with learning disabilities. One participant said: "I find a lot of the time information online explaining what you need to do in a situation where your technology is not working properly is often worded in a way that I find very confusing and not necessarily straightforward enough."

Additionally, several participants expressed concerns about *visual accessibility*, specifically that screens were too small, making it difficult to see and use digital technology. The

requirement to use a credit card to sign up for or access certain apps or services was another factor that some participants felt created *financial accessibility* issues, as it excluded participants who did not have a credit card due to financial difficulties resulting from their disability. One staff participant said

> For me, it's the need of a credit card to be able to do certain things… they need a credit card and then if they don't have a credit card then they have to find another company. But then sometimes that company is too expensive.

Participants also reported that, although they understood the importance of keeping accounts secure, *password requirements and dual-factor authentication* brought up accessibility barriers for individuals who have difficulties with memory and those who frequently change devices and phone numbers. Service user participants reported frequently losing access to their accounts. Similarly, staff participants reported that clients forgetting passwords and dual-factor authentication were common issues in their work with clients. A staff participant said

> Our clients never remember their passwords… they have that barrier there. So there are places to use them, but because a lot of times we're often the resource to remember how to get access. They're unable to do it independently.

Tools and services that were *not user-friendly* were considered a major barrier to the usability of digital technology services. Participants described tools and services having user interfaces that are not straightforward. One participant referred to user friendliness as an issue for the healthcare videoconferencing apps compared with FaceTime:

> Things not being user friendly. An example is like some of the healthcare video conferencing apps, you know that meet the privacy standards, are overly complicated

versus just like FaceTiming is straightforward, but some of the on-call and stuff like that are a little bit more difficult.

The Canada Revenue Agency's (CRA) online system was frequently described as not user-friendly, and many participants had difficulty accessing the documentation they needed from CRA to access programs and supports.

Social/Community Level

At the social/community level, most participants reported having a *social network with limited knowledge of digital technology.* One participant said: "Because as it is right now, I don't know anybody. I mean, when my husband was alive, he knew everything about computers, but I am the opposite." A staff participant highlighted that even when service users have contacts who claim to be knowledgeable about digital technology, *they may not always be trustworthy*. A staff participant provided an example of how this could unfold from the perspective of one of his clients:

> [A service user tells me] 'I'm going to drop it off to this guy and he's going to help me jailbreak it because I forgot my password' or something. But then the trust piece might not necessarily be there because that phone then might get stolen or lost while someone else is supposedly helping you.

Health Systems Level

At the health systems level, participants reported that a major barrier is that the healthcare system is *not sufficiently considering the needs of marginalized groups* in the implementation of virtual care systems. For example, they reported that the needs of people with lower access to digital technology are not being sufficiently considered. One staff participant said, "The health system discourages clients from calling and wants them to plan or book appointments online,

which is impossible if you don't have that ability. And sometimes it's the only way to book appointments." Additionally, participants reported that the needs of people with addictions are not being considered. A client participant described how the way that the healthcare system is set up for addictions does not consider the needs of users, saying, "It's really easy to get lost in the system. Like the entire setup for like getting addiction support in the city is not accessible with the technology that's used."

Another client participant described barriers to accessing addictions care saying,

> I find it really confusing and even my worker was like; 'Yeah it's really confusing to do'. Especially someone living on the streets, they obviously don't have access to that [digital technology]. But for the general thing it's just too many steps to go through, and again with the virtual intake I'm not comfortable going online.

Another concern discussed by several participants was the *lack of consistency in virtual care platforms and delivery* across the healthcare system. A service user participant described how this contributed to difficulties with accessing care saying,

> The fact that everyone uses different programs. I've got probably five or six different like video chat programs on my computer. Some people use Teams, some people use Zoom, there's Skype, there's like all kinds of different ones. And I have a bunch of them because everybody seems to like to use a different one. And half of them don't work half the time.

Another service user participant described similar challenges, saying, "There is a lot of different programs that are out there like Teams is one for one doctor. There's another, Madeo, that's for another doctor. This is for video conference. So it's hard to just keep everything separated."

Service user participants also expressed concerns that virtual care is not addressing the *lack of diversity* within the healthcare system. One participant said the following about their experience with the mental healthcare system:

> One thing I've noticed about the care I get, it's usually from predominantly white caregivers. And a lot of my friends…most of my friends are Jamaican, Asian, Sudanese, right? And mental health in their families is different, is handled differently and when someone from their background goes to get help, and they're met by just a bunch of white social workers, I feel that they could feel uncomfortable…I think just diversifying the teams, the professional teams giving care. Making sure that there is a very mixed diverse professional team, so that for ethnicities who come in will feel more comfortable talking to someone from their ethnicity.

Although this was not described as a barrier to accessing virtual care, it could be a barrier to benefiting from virtual care if not addressed.

Policy Level

Participants identified several policy-level barriers that contributed to individual-level barriers to access. Participants noted that *the government is not doing enough to regulate the prices of phone and internet plans for low-income individuals*. Several participants were able to access low-cost internet through a program offered by a large Canadian telecommunications company. A staff participant discussed how we should not have to rely on the goodwill of private companies for something so important, saying, “With the internet, it is a little silly in my mind that we have to rely on a for-profit company [telecom provider] and rely on their goodwill of having this.”

Several participants brought up that there are often *excessive regulations or restrictions on government policies and programs* that could promote digital health equity, particularly regarding eligibility and how funds can be used. For example, one staff participant described how the province of Ontario provides startup funding through a program called Home for Good that can be used to help clients get established in their housing, but that restrictions prevent it from being used for a laptop or phone, saying,

> For some reason they've identified you can use it for a smart TV, but you cannot use it for a laptop. They're very clear on this. We've brought this up so many times, that a laptop would be so much more useful.

Another participant described how, even for those who are eligible for certain programs, the requirements to prove eligibility can make it difficult to access. One service user participant said:

> And the other thing is that you're supposed to prove you're on disability or OW [Ontario Works] or on long-term disability or something- anything like low income… and that can be really hard sometimes when you can't get proof from your worker.

What Actions Could be Taken to Address the Identified Unmet Needs and Barriers to Digital Health Equity?

To promote digital health equity, in addition to outlining the needs and barriers associated with digital technology use, we must identify actions and solutions to address them. Participants provided several solutions that could be used to help better meet their digital technology needs and address the barriers they face. These solutions are presented according to the level of digital determinant of health at which they could be implemented.

Individual Level

At the individual level, participants suggested some helpful things that individuals facing barriers to digital technology use could do themselves. These included using *family phone plans* to reduce monthly costs, using *flip phones* rather than smartphones to avoid being targeted for theft, and *relying on official online sources of information*. However, the vast majority of solutions to improve individuals' access to digital technology and overcome barriers related to digital skills and mental health are implemented at other levels.

Tools and Services Level

At the tools and services level, participants suggested greater *flexibility in how people can access tools and services*. They also recommended that services, tools, and applications be designed to be more user-friendly, with one participant suggesting that stakeholders should be involved in their development. There were also suggestions specific to our partner community mental health organization, including a *peer support program* for digital technology and the *distribution of reliable information about digital technology*. Another common suggestion was to expand and create *programs to increase access to hardware*, either by providing it free of cost or by lending it.

Social/Community Level

Participants did not provide many solutions that could be implemented at the social/community level. However, some of the solutions proposed for implementation at the tools and services level were aimed at shifting community perceptions of digital technology, such as distributing reliable information related to digital technology, and suggestions for peer support programs.

Health Systems Level

At the health systems level, participants recommended having *flexibility for both in-person and online services* as a priority across the healthcare system as a whole. They also recommended additional *investment in public sector virtual care*. Finally, they recommended that the needs of people with lower access to digital technology be considered in the implementation of virtual healthcare through *consultation with stakeholders*.

Policy Level

Policy-level recommendations included *government investment in telecommunications infrastructure in rural areas* and the provision of *free Wi-Fi in public spaces*. Participants also suggested creating policies that *mandate the provision of internet access in certain settings*, such as long-term care homes, shelters, and group homes. Some participants went as far as to say that the government should be *providing free internet access for all* citizens, with one participant saying,

> Having free internet, it makes sense. It feels very possible because there's internet signals everywhere you go… Infrastructure is there, I'm sure it could be done, where they just make a unified network in a secure way, which obviously there would be work education done on that. But I think that's very possible and I think that could be a good stepping stone for Canada.

Other participants did not think that was realistic, but acknowledged that the government could do more to regulate the cost of internet for people who have low incomes, saying,

> Even though it’s a necessity, food is also a necessity. I think it's really important to have low-income options for people who need it and maybe we need more low-income options and there should be some regulations on how expensive they can make the internet. But I mean, I

> don't think it's realistic to say that we can just give everyone free internet. It's just not possible. Just like food is a necessity, but we still pay for it.

Participants suggested that the government could help regulate the cost of internet and phone plans by creating policies that require all Canadian telecommunication companies to offer low-cost mobile and internet plans to people who meet low-income criteria. A couple of participants noted that the government currently has programs that provide access to low-cost internet for certain groups, such as the Connecting Families initiative, and that it also provides funding for digital technology for certain groups. One staff participant described how funding for technology was expanded for people with intellectual disabilities during COVID-19:

> One good thing with people dual-diagnosis, they qualify usually for something called passport funding. Which is supposed to be used to help and develop programming and structure, and skills. But one thing during the pandemic was they allowed some of those funds to be used to pay for technology and they've kept this now. So that's been so helpful for some of our folks, that it can pay for up to 3000$ a year. So for a laptop, or to pay the phone bills.

However, participants noted that these programs are limited and that many are ineligible. Many participants suggested that *existing programs that increase access to and affordability of digital technology should be expanded* to include more people or be made less restrictive.

Discussion

This study qualitatively examined unmet digital technology needs and barriers to digital technology use among people with serious mental illness and potential solutions to address them. Regarding unmet needs and barriers to digital technology use, many of our findings were consistent with evidence from studies on barriers to eHealth among groups with low access to

digital technology (Coetzer et al., 2024). These included high cost; insufficient internet and data access; personal attitudes about digital technology, including mistrust, fear, and privacy concerns; insufficient digital skills; limited social network with knowledge of digital technology; unmet education and training needs, stakeholder needs not considered in the development of interventions, and legislation and public policy barriers. We also identified several additional barriers that may relate to the unique experiences of participants with serious mental illness, including paranoia, unstable housing, lack of trustworthy social contacts with knowledge of technology, issues with passwords and dual-factor authentication, and a lack of consistency in virtual care platforms across the healthcare system.

Our findings indicate that service users with serious mental illness and staff providing them with services identified many of the same barriers that were identified by researchers with expertise in technology-assisted treatment interventions in psychiatry in a study on barriers to digital health tools for people with serious mental illness (Hatch et al., 2018). These included the suitability of interventions, lack of understanding of how to use them, concerns about being tracked, and privacy concerns. Our findings indicate that these barriers also extend beyond digital health tools. Additionally, compared to researchers, our study participants emphasized affordability and access issues that are prerequisites to using digital health tools. They also emphasized a lack of opportunities to learn digital skills, accessibility issues, and inconsistent platforms used for healthcare delivery.

We identified several solutions across the different levels of digital determinants of health. Proposed solutions that individuals could implement included using family mobile plans to reduce costs, relying on official sources of information, and using flip phones to reduce the risk of theft. Solutions that could be implemented by providers of tools and services included

developing peer technology support programs, distributing reliable information about digital technology, expanding access to hardware, and involving stakeholders in the design and development of tools and services. Stakeholder involvement was also proposed as a solution at the health systems level to ensure that broader health systems take into account stakeholders' needs. Solutions that could be implemented at the policy level included the provision of free or low-cost internet, investment in infrastructure improvements for rural areas, mandating the provision of internet in certain settings (e.g., long-term care homes), policies requiring telecommunications companies to provide low-cost options for internet and mobile plans, and providing free government-funded Wi-Fi in public spaces. No solutions were identified at the social/community level.

For this study, we applied a digital determinants of health framework that was broadened to apply beyond the healthcare system. We did this because evidence indicates that digital technology use relates to health and well-being outside of accessing healthcare (Turner et al., 2026a), making it important to consider barriers across all areas of use. Applying this ecological framework across domains of digital technology was useful for several reasons. It allowed for a more precise discussion about specific digital technology barriers and solutions and ensured that we covered all areas in which service users' well-being and health could be impacted by these barriers. Additionally, it showed that these frameworks can be applied outside of healthcare.

Recommendations

One of the goals of this study was to come up with recommendations for promoting digital health equity for people with serious mental illness. We do not have any specific recommendations at the social/community level. At the individual level, we recommend using low-cost programs, enrolling in family plans to save money, and selecting low-tech devices that

are less likely to be targeted by theft. Another recommendation is to use a password manager or passphrases, which are passwords composed of four or more random words that are long and secure yet still fairly easy to remember.

At the tools and services level, we recommend that community mental health organizations and social service providers consider implementing programs to improve access to digital technology. Our partner community mental health organization has already created several initial programs, including one that lent laptops to clients to enable participation in online group programming and another that provided smartphones with prepaid plans to clients who lacked access during the COVID-19 pandemic. However, these programs had to be scaled back or discontinued due to resource constraints. Our findings suggest that these programs are highly valued by service users, and we recommend advocating for digital health equity grants and partnering with other organizations to enable the resumption or expansion of these programs. For example, our partner community mental health organization could pursue a partnership with an organization that refurbishes digital technology that could be used in a lending program. We also recommend developing and implementing programs that provide technical support, including peer support, drop-in technical support, and digital literacy courses. The Digital Outreach for Obtaining Resources and Skills (DOORS) is an existing digital literacy training program that has developed training materials and can partner with community organizations who would like to implement their program. It is difficult to make specific recommendations for the developers of digital tools and services outside social service providers; however, our findings highlight that everyone should consider the needs of marginalized groups and prioritize accessibility.

At the health systems level, it is clear that the needs of groups with limited access to digital technology are not adequately considered in the implementation of virtual services within

the healthcare system. Further consultation with these groups and a better understanding of the barriers they face are essential. Based on the findings of this study, we strongly recommend that when virtual care options are implemented, in-person services should always remain an accessible option. Although we recognize it would be difficult to implement, we also recommend a unified approach to videoconferencing software across the healthcare system.

At the policy level, we recommend more investment in broadband internet infrastructure. We also strongly recommend that the Canadian government create regulations that require all major telecommunications companies in Canada to provide low-cost internet and mobile phone plans for low-income people, similar to the Connected for Success program that Rogers (a large Canadian telecommunications service provider) offers in Ontario. At the provincial level, we recommend that the province of Ontario remove restrictions on its Home for Good startup funding that prevent it from being used for digital technology.

Strengths and Limitations

A strength of this study is the use of a multi-level digital health equity framework to guide our data collection and analysis. This helped us to cover all areas important to stakeholders and identify more specific barriers and solutions. Another strength of this study is its focus on stakeholder involvement, including our advisory committee and participant involvement. A limitation is that the convenience sampling approach may have biased the type of service user and service provider who participated. Only a small number of service providers participated, therefore the findings may not fully reflect the range of staff perspectives. Additionally, there is a lack of demographic information, which limits our ability to contextualize the findings.

Conclusions and Future Directions

This study provides an overview of unmet digital technology needs, barriers to using and benefiting from digital technology, and proposed solutions to address these barriers from the perspectives of service users with serious mental illness and staff who provide them with services. We recognize that all our recommendations require resources, and it will not be possible to implement them all. It will be important to continue to involve stakeholders in selecting and developing programs and interventions. We designed a follow-up study to work with stakeholders to prioritize barriers to be addressed and solutions based on what they feel would be most impactful and feasible.

Chapter 5

Prioritizing Unmet Needs and Barriers to Digital Technology Use Among People with Serious Mental Illness and Proposed Solutions to Address Them

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Introduction

When people with serious mental illness lack access to digital technology and the skills to use it effectively, they are at greater risk of becoming further marginalized in a society where this technology is increasingly integrated into daily life. The gap in access to digital technology, digital skills, and the ability to experience the benefits of digital technology among citizens is referred to as the "digital divide." People with serious mental illness, defined as "a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities" (National Institute of Mental Health, 2024, Definitions section), are particularly vulnerable to this gap. Rates of device ownership and internet use remain lower for people with serious mental illness than the general population (Spanakis et al., 2021; Firth et al., 2016). There is also evidence of digital skills deficits among people with serious mental illness, with a recent study finding that 42% of participants with serious mental illness lacked foundational digital technology skills (Spanakis et al., 2022). This gap is a problem because previous research has shown that digital technology use has the potential to positively and negatively impact health and well-being outcomes for people with serious mental illness in diverse ways (Turner et al., 2026a). If it is not addressed, there is potential for increased reliance on digital technology to further widen the health gap for a group that already experiences poorer health outcomes than the general population (Cunningham et al., 2023; Cunningham & Dixon, 2020; Goldman et al., 2018; Hayes et al., 2017).

Given the potential impacts of an increasingly digital world on health, the concept of digital health equity has emerged in the research literature to describe the relationship between digital technology and health. Digital health equity lacks a consistent, universally accepted definition, and numerous frameworks and definitions have been proposed (Kim & Backonja,

2025). Many definitions of digital health equity focus only on digital technologies within the healthcare system and digital health interventions. However, recent research shows that digital technology relates to health beyond the healthcare system, including through social connection, education, employment, behavioural change, and leisure (Henwood et al., 2024; Naslund & Aschbrenner, 2019; Turner et al., 2026a). We therefore define digital health equity as all individuals having fair and equal opportunities to use and experience health benefits from digital technologies. Our definition is broad and encompasses the impact of digital technology on health, including, but not limited to, its use within the healthcare system and for specific digital health interventions.

The literature on promoting digital health equity has largely focused on telehealth and healthcare interventions. Less is currently known about how to go about promoting digital health equity for people with serious mental illness outside of healthcare. This makes it hard for community mental health organizations, researchers, and others who are interested in supporting people with serious mental illness in achieving better health outcomes to know where to start. As an initial step, we need to understand what is getting in the way of people with serious mental illness benefiting from digital technologies. In a previous study, we found that people with serious mental illness face barriers to using and benefiting from digital technology, including affordability, issues with user friendliness, and availability of relevant services (Turner et al., 2026b). Creating interventions and solutions that address these barriers provides a starting point for promoting digital health equity; however, we live in a world of limited resources and need ways of selecting solutions to prioritize for development into programs or interventions to be implemented and evaluated.

Despite the emphasis in the current scientific literature on the importance of involving communities in research, priority setting, and co-creation of interventions to improve digital health equity (Fortuna et al., 2019; Lyles et al., 2023; Robinson et al., 2024) a major gap that exists in the current literature related to digital health equity and serious mental illness is the lack of research on what people with serious mental illness consider their most important unmet digital technology needs and solutions. A priority-setting partnership project was completed on research priorities related to digital mental health in general (Hollis et al., 2018). Participants included people with personal experience of mental health problems, family members/caregivers, and health and social professionals. The research question that was considered the highest priority by participants was about the benefits and risks of virtual delivery of mental health care compared to face-to-face care. Questions about the efficacy and safety of digital versus face-to-face interventions, and about how to optimize digital interventions in combination with human support, were also considered high-priority research questions (Hollis et al., 2018). This research, however, may not reflect the unique experience of people with serious mental illness. To our knowledge, no research has been conducted focusing on setting digital health equity priorities by people with serious mental illness**.** Therefore, the present study sought to use prioritization research methods to provide people with serious mental illness the opportunity to express their priorities for digital health equity.

The Current Study

The current study builds on our prior work. It is the third phase of a larger community-based participatory needs assessment. The overarching goal of this project is to better understand and promote digital health equity among people with serious mental illness. To achieve this, we have worked in close collaboration with a local community mental health organization in a large

urban centre in Ontario, Canada. This organization provides a range of services, including outreach, case management, group therapy, and counselling services to complex clients with serious mental illness who are homeless or vulnerably housed. Our partnership has included consultation with their management, the creation of an advisory committee consisting of staff members and clients, and practical support, including assistance with recruitment and providing access to office space.

In the first phase, we conducted focus groups to examine how a community of people with serious mental illness and histories of housing instability are currently using digital technology, how this use compares to their desired use, and how they believe their digital technology use relates to their health and well-being. This first study examined the intersection of digital and social determinants of health. It found that there are many pathways through which people with serious mental illness believed their digital technology use impacted their health, both positively and negatively (Turner et al., 2026a).

In the second phase, we used focus groups to develop an in-depth understanding of unmet digital technology needs, barriers to digital technology use, and potential solutions from the perspectives of people with serious mental illness and staff members providing direct services. We found significant barriers to digital technology use, including barriers to access; digital skills deficits; personal attitudes towards digital technology; availability, accessibility, usability, and utility concerns; lack of tech savvy social connections; lack of consistency in platforms across the healthcare system; and concerns about privacy policies. Proposed solutions included programs to improve access to hardware through lending devices or providing low-cost or free devices, increased flexibility for in-person and online healthcare services, and changes to government policies (Turner et al., 2026b).

After conducting our focus groups, we presented the initial findings to our advisory committee and consulted with them regarding their objectives for the next stage. We determined that the goal of the third study would be to identify which unmet needs and which solutions were considered highest priority by service users and staff at our partner community mental health organization. Resources are limited, and certain solutions need to be selected for implementation and future research. To select the most promising approaches to address digital health equity gaps, we need to identify which unmet needs and corresponding solutions are viewed as highest priority by people with serious mental illness.

The nominal group technique is a structured approach to generating priorities. It involves a group of experts responding to a "nominal question" through a series of rounds of idea generation, discussion, and ranking (Delbecq et al., 1975). It is a mixed-methods approach that provides qualitative information through idea generation and discussion, and quantitative information through idea ranking. Modified versions of this technique have been used for priority setting in healthcare research (Rankin et al., 2016). The nominal group technique is particularly useful when there is a lack of empirical evidence, a need to identify problems, identify solutions, or prioritize (Harvey & Holmes, 2012), all of which apply to the study of the digital health equity needs of people with serious mental illness. Some of the strengths of using a nominal group technique are that it encourages the generation of a large number of ideas, makes it difficult for a minority of participants to dominate, encourages minority opinions to be voiced and discussed, and minimizes conformity pressures (Cantrill et al., 1996).

The traditional nominal group technique consists of introducing the process and nominal question, silent idea generation by participants, round robin sharing of ideas, group discussion, ranking of items, and presentation of the ranking and final discussion. Although our goal was not

to achieve complete consensus, we did incorporate a common variation of the nominal group technique known as a re-ranking round (McMillan et al., 2016). This involves presenting the results from the initial vote to participants, discussing them, and then re-ranking in a subsequent round of voting. This was done in order to generate additional discourse about top-rated items and to allow participants to reflect on and change their responses. Another common modification to the nominal group technique is to use a literature review or exploratory methods to generate ideas for ranking rather than silent idea generation (McMillan et al., 2016). In the present study, we used a focus group to generate an initial list of ideas for ranking, and combined this with silent idea generation, in which participants could add any additional items not identified in the focus group research. The steps of the traditional nominal group technique and our modified nominal group technique are presented in Table 1.

Table 1

Traditional nominal group technique steps compared to modified version used in this study

Traditional nominal group technique	**Modified nominal group technique used**
Step 1: introduction to the process of the nominal group	Step 1: introduction to the process of the nominal group. During this phase, we presented the list of ideas generated in previous stages of the research process to participants.
Step 2: Silent idea generation. Participants are provided with the nominal question and asked to silently think and write down ideas on a piece of paper	Step 2: Silent idea generation. Participants are provided with the nominal question and asked to silently think and write down ideas on a piece of paper.

Step 3: Sharing ideas in a round robin format until there are no new ideas.	Step 3: Sharing ideas in a round robin format. Participants were asked to share any additional items they generated not already included in the list; if they did not have any new items to add they could skip or highlight an item from the existing list that was relevant to them.
Step 4: Group discussion and clarification	Step 4: Group discussion and clarification
Step 5: Voting (ranking)	Step 5: Voting (ranking) of top 5
Step 6: Discussion of the results	Step 6: Discussion of the results of the first round of ranking including any reactions, discussion of items participants were surprised to see or not see as highly ranked.
	Step 7: Re-ranking (top 5)

The validity of results from consensus research methods depends heavily on the expert panel selected to participate (Hasson et al., 2000). In consensus and priority-setting research, experts are individuals with extensive knowledge of the topic being studied (McMillan et al., 2016). Depending on the context, this might include experienced clinicians and policymakers, or people with direct lived experience relevant to the research question (McMillan et al., 2016). For our study, the term “expert” can be defined as someone who has first-hand experience with serious mental illness and receiving services from our partner organization, or someone who has first-hand experience providing services to people with serious mental illness at our partner organization.

Objectives

This study was designed to answer the following research questions:

1. Which unmet needs and barriers to digital health equity are considered highest priority by staff and service users at our partner community mental health organization?
2. Which actions to address unmet needs and barriers to digital health equity are considered highest priority by staff and service users at our partner community mental health organization?

Methods

Data Collection Procedures

We held three 120-minute nominal groups. All groups were held in person in a conference room at our partner community mental health organization's offices and took place between November and December 2023. The consent form was reviewed with participants and signed at the beginning of each nominal group. The service user consent form can be found in Appendix F, and the staff consent form can be found in Appendix G. To reduce the cognitive demand on participants, we provided a 10-minute break halfway through the nominal groups. Researchers checked in with participants regularly to ensure everyone was doing well, to offer additional breaks, and to inform participants that they are free to leave at any time. The nominal groups included two members of the research team as facilitators. The primary facilitator led the group in discussion, whereas the secondary facilitator focused on taking notes and scoring the voting results. In addition to the detailed notes that were taken, all nominal groups were audio recorded.

Participants and Recruitment

A set of guidelines on the use of consensus methodology recommends that, for the nominal group technique, the expert panel should consist of between five and 10 participants (Waggoner et al., 2016). Fewer experts would not result in a sufficient variety of ideas, and more than 10 panellists would become difficult to manage. We aimed to recruit between five and 10 participants for each of our groups.

We recruited three expert panels for our nominal groups: two consisting of service users and one consisting of staff members. We used a convenience sampling approach to facilitate recruitment and ensure sufficient participation. The recruitment strategy was designed in collaboration with our advisory committee to ensure that our sample would still capture a range of perspectives, including service users with varying levels of digital technology experience and more vulnerable service users. Staff participants were recruited by presenting the study at a staff meeting and by emailing study information to staff members. Interested staff were invited to contact the research team for more information. Staff members assisted in recruitment by presenting information about the study to their clients (service users). If the service user consented, the case manager would share the service user's contact information with researchers. Due to strong service user interest in participating, we were required to cap each group at 10 participants, and service users had to register in advance. Participation was on a first-come, first-served basis, and a waitlist was also created. To facilitate the participation of service users who did not have access to an email account or phone, case managers could also sign up on behalf of clients who were unable to communicate with the research team directly. Additionally, to remove barriers to participation, the research team offered to pay for the cost of any taxis (Uber) organized by case managers to help their clients arrive at the right time and place. Given the

longer duration of the nominal groups, service user participants received a $75 cash honorarium for their participation. The ethical components of all study methods were reviewed and approved by The University of Ottawa's research ethics board.

Materials and Measures

Before starting the nominal group procedure, client participants were asked to complete a brief questionnaire that included demographic information and a question about their level of comfort with digital technology. This questionnaire can be found in Appendix H. All groups followed a multi-step nominal group procedure (Delbecq et al., 1975; McMillan et al., 2016; Potter et al., 2004). A nominal group guide was developed based on these procedures. In a previous study, we used focus groups to identify barriers to digital health equity and proposed solutions from the perspectives of people with serious mental illness and frontline staff at our community mental health partner organization (Turner et al., 2026b). We used the data from this study to develop an initial list of unmet digital technology needs or barriers, along with solutions to address them. Participants were provided with a paper copy of this example list to reference throughout the group. This list can be found in Appendix I.

At the beginning of the nominal group, the facilitator explained the procedure and group guidelines to participants and provided an opportunity to ask any questions. The nominal group was carried out according to the guide in Appendix J. First, participants were asked to independently think about which needs and barriers on the list they had experienced and brainstorm any additional needs or barriers that they think are important. Second, participants were asked to share what they wrote down, one idea at a time, in a round robin. The ideas were then added to a master list by the facilitator. Third, there was a group discussion in which items were clarified and similar items were merged. Fourth, from the final list of items, participants

were asked to independently write down the five that they considered the highest priority and rank them according to priority level (highest to lowest). When ranking items related to unmet needs and barriers, participants were asked to consider which items, if addressed, would have the most benefit for the most people. Following this, the facilitators calculated the results and reviewed them with participants, discussing any discrepancies across items and giving participants the opportunity to explain their rationale for or against items. After this discussion, participants were asked to complete their final ranking by independently listing the five items they consider highest priority and ranking them by priority level. The final results were then presented, and an opportunity for final comments was provided. This procedure was then repeated for actions and solutions that could be taken by either our partner community mental health organization or other actors. When ranking actions and solutions, participants were asked to consider how feasible or realistic each solution is, how much impact it would have, and the importance of the unmet need or barrier it addresses. Our aim was to use the nominal group technique to prioritize by ranking rather than to reach consensus; therefore, we did not set a predetermined level of consensus that needed to be met. We included two rounds of ranking to elicit additional discussion while ensuring sufficient time to cover all topics.

Data Analysis

Qualitative data from the nominal groups were used to provide descriptions of the items discussed in the findings and provide relevant context including rationales for or against the importance of items that may explain any differences or changes observed in the voting data. When discrepancies in the data were observed, the transcript was examined for potential explanations. Ranking data were summarized and presented descriptively. To calculate the most important items, we assigned a value corresponding to their rank order (five points for being

ranked first, four points for second, three points for third, two points for fourth, and one point for fifth). We then calculated the total points value based on the frequency with which each item was voted for and its rank order. We calculated and compared the five highest-ranked items across service user groups and the staff group. Additionally, we calculated rankings and compared them across all groups and voting rounds.

Trustworthiness

Several measures were taken to promote trustworthiness in this study. Credibility was promoted through triangulation (independent coding of data by multiple researchers, data collected from staff and service users, data collected through focus groups and reviewed and verified by nominal group participants). Reflexivity was promoted by completing summaries after each group, which encouraged researchers to reflect on their impressions and biases. Confirmability and dependability were promoted through the creation of an audit trail documenting thought processes, decisions, and interpretations throughout the research and analysis process.

Findings

A total of 20 service users and 4 staff members who provide direct client services at our partner community mental health organization participated in the nominal groups. Demographic information on age, gender, program participation, and comfort with technology was collected from service user participants and is presented in Table 2.

Table 2

Demographic information for service user participants

Service user characteristics	Number of participants (N = 20)
Gender	
Male	N = 12
Female	N = 7
Non-binary	N = 1
Age	
Range	21-61
Mean	42.6
Standard deviation	12.9
Program participation*	
Peer support	N = 5
Case management	N = 13
Therapy groups	N = 6
Tobacco cessation	N = 1
Housing program	N = 2
Concurrent disorders program	N = 2
Individual therapy	N = 1
Unknown/not specified	N = 3
Comfort with technology (1-10)	
Range	1-10

Mean	7.55
Standard deviation	2.5

*Note: Most participants reported participation in multiple programs

Which Unmet Needs and Barriers to Digital Health Equity are Considered Highest Priority by Staff and Service Users at Our Partner Community Mental Health Organization?

The results of the final voting (round two) for needs and barriers are presented below. Results are summarized across all three groups, and the top five items are listed in order, except in the case of ties, where the number of items presented may exceed five (e.g., if three items are tied for fourth, six items will be included in the final list). All ties are indicated. Findings are then discussed in detail, including any significant differences observed between groups or across voting rounds.

The following items were identified as the highest-priority service user needs and barriers across all three groups. The last three items were rated as the same priority and are listed in no particular order:

1. Cost of internet and phone plans
2. Lacking digital skills
3. Unmet education and training needs
4. Paranoia (tied for fourth)
5. Privacy Concerns (tied for fourth)
6. Lack of service options (tied for fourth)

A comparison of the highest-ranked items between service-user and staff participants is presented in Table 3.

Table 3.

Comparison of five highest priority unmet needs and barriers between service users and staff

Service users (N = 20)	Staff (N = 4)
1. Cost of internet and phone plans	1. Cost of hardware, internet and phone plans (tied for first)
2. Unmet education or training needs (tied for second)	2. Lacking digital skills (tied for first)
3. Privacy Concerns (tied for second)	3. Phone being stolen or lost
4. Lack of service options	4. Program eligibility issues
5. Paranoia	5. Unmet education or training needs

The cost of internet and phone plans was rated as having the highest priority across all groups. The priority level of this item was stable with virtually no changes between rounds of voting (only changing by one point in one of the groups between votes). However, it should be noted that, although clients considered the cost of hardware and the cost of internet and phone plans separately, staff considered "high cost" to be a single item. For the purposes of calculating priorities across all three groups, the staff item was separated into two items, dividing points evenly between the new items. Although staff did not distinguish between hardware costs and internet and phone plan costs, it was clear that clients considered the latter a more significant barrier. The cost of mobile phone and data plans were generally a bigger concern for clients than internet plans. Many service user participants noted that they had low-cost internet through a

private internet provider's low-income access program. Although this provider also has a similar program for mobile phone plans, it was launched very shortly before the nominal groups took place and not all participants were aware of the program. Additionally, the phone plan costs more than double the amount of the basic internet plan ($9.99/month versus $25.00/month). Despite the existence of the lower-cost programs, the cost of internet and phone plans is still a large burden to service user participants.

Lacking digital skills was rated as the second-highest priority item overall. Lacking digital skills refers to whether individual participants felt that they had the technological skills necessary to use digital technology in the ways they wanted. This item was considered a higher priority to staff participants than it was to service user participants. This may be due to the role that staff described playing in providing support/guiding clients through processes such as getting information from Canada Revenue Agency (CRA), making appointments, and looking for housing that require certain digital skills. In service user group one, lacking digital skills was rated as the highest priority in the first round, but moved down to the fifth highest in the second round of voting. This may have been due to a participant emphasizing the lack of education and opportunities to learn skills, rather than the lack of skills themselves, during the discussion of the first-round voting results.

Unmet education and training needs refer to the needs of participants who lack digital skills and who want to acquire them but lack access to sufficient educational and training opportunities. Although this item was ranked third in the overall priorities, voting between and within groups was variable. This item was rated highly by the first service user group. However, in the other two groups, it received a moderate number of votes but did not make the top five priorities. This item was not highly rated in the first vote for group one, but was highly rated in

the second vote. As noted above, this may have been due to a participant emphasizing a lack of educational opportunities during the discussion of vote one results. Unmet educational and training needs, however, are closely linked to participants' perceptions that they lack digital skills, and they can be considered together in terms of solutions.

Paranoia, privacy concerns, and a lack of service options were ranked at the same priority level. Paranoia refers to concerns about being monitored and tracked that service users considered to be related to mental health issues. In contrast, privacy concerns were concerns about online privacy and how personal data is being used that service users considered genuine concerns rather than paranoia. Lack of service options refers to clients having a lack of options for services in their preferred modality, particularly in the context of health and social services. For the most part, participants reported that their desired services were not available virtually but also described some cases where in-person options were not available, such as appointments with primary care providers and intakes for mental health services. Paranoia was rated as a minor priority in the staff group and service user group two, and as a moderate priority by service user group one.

Privacy concerns were rated highly by the service user groups but received no votes in the staff group. These results highlight that privacy concerns are a barrier that service users have been facing that staff may not be sufficiently aware of. The rankings of privacy concerns were consistent between rounds of voting, with no major changes observed. Lack of service options was also rated highly by the service user groups but received a very low ranking from the staff group. These results highlight that this may be another service user barrier that staff are not sufficiently aware of.

In contrast, there were some items that were rated highly by the staff group that were considered low priority by the service user participants. These included phones being stolen or lost and program eligibility issues, which received very few service user votes. Staff members explained that clients who lived in less stable circumstances, including those using shelters, tended to have their phones stolen or lose their phones most frequently. Although we did our best to reduce barriers to participation by holding the groups in person, allowing staff members to sign up participants who did not have access to a phone or email address, and by paying for the cost of Ubers organized by staff, it is possible that the types of service users who participated were in more stable circumstances than the service users served by staff participants and did not experience these barriers. Although program eligibility issues were discussed by some service user participants, this item did not receive any votes in the service user groups. It was unclear from the discussion why this was the case, but it is possible that service users are less aware of specific program eligibility issues than staff members or that, from the service users' perspectives, other barriers simply impacted them more.

Which Actions to Address Unmet Needs and Barriers to Digital Health Equity are Considered Highest Priority by Staff and Service Users at Our Partner Community Mental Health Organization?

We asked participants to generate and vote on actions or solutions that could be taken by our partner community mental health organization and by other actors (e.g., researchers, community organizations, healthcare providers, policy makers). Although these were voted on together by participants, for clarity, they were analyzed and are presented separately. For each, we first list the top five highest priority items across all groups. The number of items presented may exceed five in the case of ties (e.g., multiple items tied for fifth). All ties are indicated.

Following this, we included a table comparing the top five items between staff and service users. The findings are then discussed in detail including a discussion of notable differences between groups or changes across voting rounds.

Actions That Could be Taken by Actors Other Than Our Partner Community Mental Health Organization

The following actions that could be taken by actors other than our partner community mental health organization were ranked as the top five priorities across all groups:

1. Government regulation of the cost of internet and phone plans (for low income)
2. Internet access as a government-funded public service
3. Increased government investment in publicly funded virtual health care
4. Additional government funding for digital technology (e.g., through Ontario Disability Support Program (ODSP), expanding passport funding for dual diagnosis)
5. Government investment in internet infrastructure (in public spaces, rural areas)

A comparison of the top five priorities between service user and staff participants can be found in Table 4.

Table 4.

Comparison of five highest priority actions that could be taken by "others" between service user groups and the staff group

Service users (N = 20)	Staff (N = 4)
1. Government regulation of the cost of internet and phone plans (for low income)	1. Including "low tech" options (e.g., flip phones, landlines) in telecom provider's low cost access program

2. Internet access as a government-funded public service	2. Government regulation of the cost of internet and phone plans (for low income)
3. Increased government investment in publicly funded virtual health care	3. Additional government funding for digital technology (e.g., through ODSP, expanding passport funding for developmental disability)
4. Additional government funding for digital technology (e.g., through Ontario Disability Support Program (ODSP), expanding passport funding for dual diagnosis) (tied for fourth)	4. Telecom provider offering debt forgiveness within their low-income access program
5. Government investment in internet infrastructure (in public spaces, rural areas) (tied for fourth)	5. Telecom provider to expand eligibility for access program

All the top solutions for actors other than our partner community mental health organization were actions to be taken by government policy makers. The highest priority solution across all groups was government regulation of the cost of internet and phone plans. Participants

were aware that Canadians pay some of the highest prices for telecommunications services and believed that the government could be doing more to regulate the cost of both internet and phone plans, particularly for people who are low-income. This was rated more highly by service user participants than by staff participants, which is consistent with service user participants considering the high cost of internet and phone plans as a higher priority barrier than staff participants did.

The second highest priority solution was that the government should be treating internet access as a publicly funded service that everyone is entitled to. This solution was rated highly by one of the client groups, but it received few votes in the other client group, and it did not receive any votes from staff participants. All participants were asked to consider feasibility as part of their prioritization for solutions. The differences between groups for this item likely stemmed from different perceptions of its feasibility.

The third highest priority solution was for the government to invest more in publicly funded virtual health care. Participants expressed that many virtual healthcare services are emerging in the private sector and that the public sector needs to ensure that it is investing in the promotion of digital health equity within the public healthcare system.

The fourth highest priority solution was for additional funding for digital technology to be provided through current government support programs, such as ODSP. Participants also described how changes had been made to an Ontario program that provides funding for people with developmental disabilities to pay for supports so that they can fully participate in their communities to allow some of the funds to be spent on access to digital technology. They noted that this could be used as a model for other programs.

The fifth highest priority item was for the government to invest in internet infrastructure to improve access in public spaces and rural areas. Suggestions from participants included building infrastructure for free Wi-Fi networks in public spaces such as parks or even in all public spaces across cities. Participants emphasized that the current infrastructure for internet in rural areas needs additional investment and many rural areas have very limited or slow internet.

A key difference between service user and staff priorities was that, in addition to actions that could be taken by government actors, staff participants also prioritized solutions that could be implemented by a private Canadian telecommunications service provider. This telecommunications provider has a program called Connected for Success that offers low-cost internet and phone plans to Canadians who are on income support programs. Staff participants suggested expanding the eligibility criteria for the Connected for Success program. They also explained that a major barrier to accessing the program for many of their clients is having debts with the company from being sold plans they could not afford, which prevents them from participating. Staff members suggested offering debt forgiveness as part of the Connected for Success program as a solution.

Actions That Could be Taken by Our Partner Community Mental Health Organization

The following actions that could be taken by our partner community mental health organization were rated as the top five priorities across all groups:

1. Technology support services (drop in, scheduled; peer, non-peer)
2. Provide clients with access to hardware (lending or giving)
3. Provide education in digital technology (e.g., individual teaching, courses)
4. More care options/flexibility (virtual, in person, hybrid)

5. Dissemination of reliable technology information (e.g., about scams, where to access charging and Wi-Fi, low-cost options, resources)

A comparison of the top five priorities between service user and staff participants can be found in Table 5.

Table 5.

Comparison of five highest priority actions that could be taken by our partner community mental health organization between service user groups and the staff group

Service users (N = 20)	Staff (N = 4)
1. Provide education in digital technology (e.g., individual teaching, courses)	1. Technology support services (drop in, scheduled; peer, non-peer)
2. Technology support services (drop in, scheduled; peer, non-peer)	2. In home/community one-on-one technology support (not peer)
3. More care options/flexibility (virtual, in person, hybrid)	3. Provide clients with access to hardware (lending or giving)
4. Provide clients with access to hardware (lending or giving)	4. Accessible technology tutorials and manuals for staff and clients

5. Dissemination of reliable technology information (e.g., about scams, where to access charging and Wi-Fi, low-cost options, resources)	5. Provide education in digital technology (e.g., individual teaching, courses)

The highest priority item across groups was our partner community mental health organization providing technology support services. These were described as on-site, one-on-one information technology (IT) support services that could be provided on a drop in in basis or by appointment and delivered by a peer or non-peer. One staff participant described the benefits of a peer providing IT support:

> Sometimes it would be great to have the IT peer support worker because then the peer would say like no and then they would be able to explain it, but coming from a peer and not a worker, sometimes they would accept it better than me trying to say, hey, this is how it works.

However, other staff members argued that a consequence of having IT services delivered by a peer was that the client's case worker would need to be present with the client, which posed a challenge. Staff participants included a separate item for having IT support that could be delivered in the community (e.g., at clients' homes); however, this was not brought up by client groups.

The second highest priority across groups was for our partner community mental health organization to provide their clients with access to hardware, either by purchasing it for them or through a lending program. Several participants brought up how they benefited from our partner community mental health organization's program that distributed phones with pre-paid plans to

clients at no charge during the COVID-19 pandemic. However, due to funding and human resource restrictions the program came to an end. Other service user participants talked about how they benefited from a program our partner community mental health organization has for lending out laptops to clients so that they can participate in virtual groups. Service users expressed that they would like to see this program expanded to all clients who are in need of hardware. In the staff focus group discussion, one staff member emphasized the importance of access to hardware when it comes to health equity saying,

> And that's why when we're looking at digital health equity, it's kind of like OK, providing access to this hardware, you don't always see the link, but that's the client's goals and what's going to make them feel good about themselves and like progress in their lives. Like that's very much part of like their health and health team.

Providing education in digital technology (e.g., individual teaching, courses) was the third highest priority. This item refers to our partner community mental health organization offering classroom-based learning support on predetermined topics such as how to set up and use certain applications, how to avoid scams, how to identify trustworthy information, and basic computer skills such as typing. Participants mostly discussed group learning sessions, but some also mentioned that having individual teaching available would be helpful as well.

More flexible care options (virtual, in person, hybrid) was considered the fourth highest priority action/solution. This item was only ranked in the top five by service user participants and was not considered high priority by staff. This is consistent with the findings for needs and barriers, where service users considered a lack of service options to be a high priority need, while staff members did not. Service user participants reported that, although our partner community mental health organization has a good amount of flexibility in their programming already,

participants wanted all programming to be offered in online, in-person, and hybrid formats. Participants discussed the benefits of both in-person and virtual services and emphasized the importance of being able to flexibly move between service modalities depending on specific needs and circumstances that may change from day to day.

The fifth highest priority was for our partner community mental health organization to disseminate reliable information about technology. This information could be provided through information handouts, email, or posted in our partner community mental health organization's offices. Participants discussed how having straightforward information about what resources are available and how to access them would be a priority. For example, an information handout that lists the main locations nearby where participants can access things like charging, free Wi-Fi, computer use, or other digital technology resources. Participants said that it could also be helpful to share information about how to protect your privacy online, how to avoid online scams, and how to create secure, easy to remember passwords.

Two items that were in the top five priorities for staff members were not included in the overall five highest priority items: In home/community one-on-one technology support and accessible technology tutorials and manuals for staff and clients. Staff participants proposed that, although having in-house information technology support would be helpful, having technology support with the ability to meet with service users out in the community and in their homes would provide additional benefits. Many of their clients experienced difficulties setting up technology in their homes, where in-person assistance with troubleshooting would be beneficial. Staff also proposed that our partner community mental health organization create accessible technology tutorials and manuals for both staff and service users. This item was similar to the dissemination of reliable information about digital technology. However, it focused on specific

tutorials and explanations of software and processes used by staff and clients in delivering and receiving services at our partner community mental health organization, rather than on more general information about digital technology.

Comparison of Needs and Barriers Versus Actions and Solutions

Comparing needs and barriers to actions and solutions is important to identify whether there are important needs that are more difficult to address that we may not have identified solutions for. Table 6 presents the top five needs and barriers across all three groups compared to the top five actions and solutions that could be taken by our partner community mental health organization and the top five actions and solutions that could be taken by actors other than our partner community mental health organization.

Table 6.

Comparison of needs and barriers with actions and solutions across all groups (N = 24)

Needs and barriers	**Actions and solutions (partner community mental health organization)**	**Actions and solutions (other actors)**
Cost of internet and phone plans	Technology support services (drop in, scheduled; peer, non-peer)	Government regulation of the cost of internet and phone plans (for low income)
Lacking digital skills	Provide clients with access to hardware (lending or giving)	Internet access as a government-funded public service

Unmet education and training needs	Provide education in digital technology (e.g., individual teaching, courses)	Increased government investment in publicly funded virtual health care
Paranoia (tied for fourth)	More care options/flexibility (virtual, in person, hybrid)	Additional government funding for digital technology (e.g., through ODSP, expanding passport funding for dual diagnosis)
Privacy concerns (tied for fourth)	Dissemination of reliable technology information (e.g., about scams, where to access charging and Wi-Fi, low-cost options, resources)	Government investment in internet infrastructure (in public spaces, rural areas)
Lack of service options (tied for fourth)		

Unsurprisingly, there was a high degree of consistency between the needs and barriers that were considered highest priority, with participants prioritizing actions and solutions that would address high-priority needs. However, paranoia and privacy concerns were considered high priority, while corresponding actions and solutions were not ranked as high priority. In terms of privacy concerns, participants suggested stricter privacy legislation and using virtual

private networks (VPNs). Some participants suggested that any hardware access programs should provide devices with encryption and VPN software pre-installed. It is possible that these solutions were considered less feasible, or that addressing other needs and barriers first would have a greater impact. In terms of paranoia, there were very few solutions proposed by participants to address this barrier. This barrier may benefit from further consultation with experts in the field and a review of relevant literature to identify potential solutions.

Discussion

The aim of this study was to spotlight the views of people with serious mental illness and those providing them with services in setting priorities for improving digital health equity. This study took a broad perspective on the promotion of digital health equity. We did not limit the scope of our study to digital technology use in the healthcare system or digital health interventions. Our previous research indicates that digital technology relates to health and well-being and needs to be considered in the context of all social determinants of health (Turner et al., 2026a). Consistent with these findings, in the current study, even when asked about ways in which our partner community mental health organization could promote digital health equity, participants did not limit their suggestions to direct healthcare service delivery, and many discussed ways that the community mental health organization could promote broader access to digital technology and digital skills.

In terms of unmet needs and barriers, the highest priorities across all groups were the high cost of internet and phone plans, lack of digital skills, unmet education and training needs, paranoia, privacy concerns, and lack of service options in their preferred modality (in person or virtual). Priorities were similar across client and staff groups, with high costs at the top of the list for both staff and client participants. Digital skills were another high-ranking barrier, although

service user participants emphasized the lack of education and supports to develop skills, rather than just a lack of skills.

Participants were also asked to prioritize actions that could be taken by our partner community mental health organization and by other actors. For actors other than our partner community mental health organization, the highest priority actions or solutions were aimed at the government. They included: government regulation of the cost of internet and phone plans, internet access as a government-funded public service, increased government investment in publicly funded virtual health care, additional government funding for digital technology, and government investment in internet infrastructure (in public spaces, rural areas). A key difference between client and staff participants is that the staff members also prioritized solutions that could be implemented by a major Canadian telecommunications company that offers affordable internet and phone plans to eligible Canadians. This included expanding their eligibility criteria and offering debt forgiveness. For our partner community mental health organization, the highest priority actions or solutions were technology support services, providing access to hardware free of charge or through lending programs, providing digital technology education, more flexible care/service modality options (in person, virtual, hybrid), and dissemination of reliable information about digital technology.

Some of the prioritized solutions did not directly correspond to a prioritized barrier. Similarly, some of the high priority barriers had many solutions to address them that were also considered high priority, while others had solutions that were discussed but not rated highly, or no solutions at all. For example, although privacy concerns were considered a high priority barrier, solutions to this were not considered high priority by participants. Paranoia was also considered a high priority barrier, but no solutions were generated to address this barrier. When

prioritizing solutions, participants were asked to consider how feasible or realistic the solution is, how much impact the solution would have, and the importance of the unmet need or barrier it addresses. The relative weight given to each of these criteria by participants, as well as perceived feasibility, may explain the discrepancy between which needs were considered high priority and which solutions were prioritized.

Our study findings differ from previous priority setting research on digital technology in mental health care, which identified research on the risks and benefits, safety and efficacy, and optimization of virtual delivery of mental health care as being high priority (Hollis et al., 2018). This may be because our study asked participants about their priorities more generally and did not frame things in terms of research questions or focus on healthcare interventions specifically. Additionally, our findings likely reflect the different challenges and experiences of people with serious mental illness, who need to prioritize digital technology access and skills before they can consider the relative efficacy of healthcare delivery methods.

Limitations

Limitations of this study include the convenience sampling approach. Therefore, the priorities set here may be biased towards the priorities of service users and service providers who were interested in and able to participate in the study. Additionally, only a small number of service providers participated, therefore the perspectives of staff may not be fully captured. Limited amounts of demographic information were collected, which make it difficult to contextualize the findings. This study was conducted in partnership with a community mental health organization located in Ontario, Canada, and many of the systems and policy related barriers and solutions are specific to that context. Additionally, the participants and researchers do not have an in-depth knowledge of local, provincial, and federal legislation and policies

surrounding digital technologies, the internet, and digital health. Therefore, the solutions offered related to these tended to be vague and some are already in place to some degree. However, this study provided important evidence on where community priorities align with existing policies and which initiatives are falling short in terms of impact.

Conclusions and Future Directions

Overall, our findings suggest that the programs that have been implemented by our partner community mental health organization, including providing drop-in technology support, a technology peer-support worker, and a hardware loan and smartphone handout program, are very much in alignment with service user and staff priorities. All prioritized solutions would require varying levels of investment, and one of the main obstacles to developing, sustaining, or expanding digital health equity programs is limited resources and funding. Our hope is that these research findings will be used to channel limited resources into solutions prioritized by affected groups and to support advocacy for funding the development and study of the proposed solutions. To develop specific recommendations about next steps, it will be important to review the literature for any existing examples of prioritized solutions that have been implemented that may further inform feasibility and identify barriers.

Chapter 6

General Discussion

This research has made both empirical and conceptual contributions to the literature on digital health equity among people with serious mental illness. In this section, we will first summarize the main findings of the three studies. We will then explore how these findings contribute to our conceptual understanding of digital health equity. Following this, we will explore the implications of our findings for the next steps to be taken to promote digital health equity for people with serious mental illness.

Summary of Findings

Study One: An Examination of the Perceived Impacts of Digital Technology Use on Health and Well-being

In study one, we conducted focus groups with service users with serious mental illness and staff members providing frontline services in order to understand how service users are currently using digital technology, how this compares to how they would like to be using digital technology, and how they perceive their digital technology use to relate to their health and well-being. People with serious mental illness were using digital technology for a variety of reasons, including accessing healthcare services, the court system, formal education, employment opportunities, social support, learning new skills, entertainment and leisure, and for health promotion (e.g., nutrition management, fitness trackers, and mental health and meditation apps). When it comes to desired usage, participants pointed to several ways in which digital technology use for service users could be improved. These included more affordable internet and data and access to higher quality hardware. Participants also expressed some ambivalence about digital technology use, with some service users noting that they did not like feeling so dependent on it.

There was a consensus among service users that virtual care options were appreciated, but there should be flexibility with both virtual and in-person options available.

This study also resulted in a network model of how participants believe digital technology relates to the health and well-being of service users with serious mental illness. The study found several ways in which participants believed that digital technology use positively affected the health and well-being of service users. These included positive impacts on service users' mental health and well-being resulting from social support and reduced loneliness; access to mental health care; enjoyment and a sense of mastery from learning new skills and accessing formal education; employment opportunities; and increased income. Participants reported positive impacts on service users' physical health and well-being resulting from using digital technology for nutrition management and healthy recipes, fitness tracking, and access to healthcare for physical health conditions. Social support and access to mental healthcare also prevented substance use relapses for some participants, which had both mental and physical health benefits.

Participants also reported that digital technology negatively affected the health and well-being of service users. Notably, the use of digital technology opened service users up to the possibility of falling for scams and fraud, resulting in stress and anxiety, and for some service users, led to significant financial losses. Service users also noted that a lack of ergonomic equipment led to poor posture and caused pain and concerns about long-term impacts on physical health, particularly for those who needed to use digital technology for long periods due to employment or educational obligations. Although participants felt that using digital technology for entertainment and leisure had positive effects, they also reported that it sometimes led to excessive use, which, for some service users, contributed to insomnia and impacted physical

health. Similarly, although online social support helped reduce loneliness and increase well-being, digital technology use also sometimes led to decreased in-person interaction and more loneliness, which reduced well-being. Using digital technology for social support increased the possibility of connecting with individuals online who were unsafe and negatively impacted physical safety. Some service users reported that accessing healthcare virtually instead of in person would mean that they did not have a reason to leave the house and get ready and contributed to a sense of isolation that negatively impacted their mental health.

This study outlined the complex relationship between digital technology use and its influences on health and well-being. It also emphasized the importance of considering the development of programs and interventions aimed at improving the health and well-being of people with serious mental illness outside of direct healthcare delivery.

Study Two: An Exploration of Barriers and Solutions

In study two, we used focus groups to gain an in-depth understanding of the different unmet digital technology needs or barriers to digital technology use that service users with serious mental illness experienced. We also examined proposed solutions. We applied a framework of digital determinants of health to ensure that we were identifying unmet needs and solutions that were specific and covered a broad range of factors that influence digital health equity. Individual-level unmet digital technology needs and barriers included issues of affordability, unstable housing, insufficient internet access, mistrust, anxiety, privacy concerns, paranoia, a lack of digital skills, and unmet education and training needs. Solutions that could be implemented at the individual level included the use of family plans to reduce costs, relying on official sources of information online, and using flip phones. At the tools and services level, unmet needs and barriers identified included issues with availability (e.g., limited service hours

and services not being offered in the preferred modality); accessibility issues (e.g., language, visual, financial); and non-user-friendly designs. Solutions that could be implemented at the tools and services level included the development of peer technology support programs, the distribution of reliable information about technology, and programs that lend hardware. At the social/community level, unmet digital technology needs and barriers included a lack of social contacts who are knowledgeable about digital technology or a lack of trustworthy contacts with knowledge of digital technology. No solutions were identified at this level. Unmet digital technology needs and barriers identified at the health systems level included insufficient consideration of the needs of marginalized groups, inconsistent virtual care platforms across the healthcare system, and a lack of diversity in virtual care. Solutions included consultation with stakeholders and more investment in public sector virtual care. At the policy level, participants identified a lack of regulation of the cost of internet for low-income individuals and excessive restrictions on government programs that are intended to improve access to digital technology as important barriers. Policy-level solutions included the government providing free or low-cost internet access for everyone, infrastructure improvements in rural areas, policies mandating internet access in certain settings (e.g., long-term care homes), and policies requiring telecommunications companies to offer low-cost plans for people with low incomes.

This study provided an overview of barriers to using and benefiting from digital technology at different levels of digital determinants of health from the perspective of service users with serious mental illness and service providers. It also identified ideas for solutions that could be implemented to address these barriers.

Study Three: Priority Setting

Participants discussed a wide range of barriers and proposed solutions in study two. In an ideal world, all of these solutions would be explored for implementation. However, funding and resources are limited and are affected by many factors outside the control of organizations and their clients. Therefore, there needs to be a way of prioritizing solutions to further examine for implementation. Little was known about the priorities of people with serious mental illness when it comes to promoting their digital health equity. In study three, we used a nominal group technique to support service users and service providers in prioritizing unmet digital technology needs and solutions to address them. The unmet needs or barriers to digital technology use that participants rated as being the highest priority included high costs, a lack of digital skills, unmet education and training needs, paranoia, privacy concerns, and a lack of service options in their preferred modality (in person or virtual). Participants were asked to generate solutions specific to our partner community mental health organization, where they were receiving or providing services, and for other actors (e.g., researchers, policymakers, other service providers). The most highly prioritized solutions for other actors included recommendations for the Canadian government to take more action to improve affordability and access to internet and phone plans. For our partner community mental health organization, the highest priority solutions were to address digital skills by providing more information technology support and education, providing more flexible service options, and supporting access through providing free or loaned hardware. We found that there are still significant barriers at levels one and two of the digital divide, and participants tended to prioritize solutions that addressed these.

Conceptual Contributions of the Dissertation

The current research literature is focused on the healthcare system and health interventions. Our findings highlight the central role that digital technology plays in the lives of people with serious mental illness and its potential to impact a multitude of areas that are tied to health and well-being outcomes outside of access to healthcare, including education, employment, and social support. Our findings emphasize the critical importance of digital technology access and support the idea that interventions to promote digital technology access can be seen as a form of healthcare. By limiting thinking about digital health equity to the healthcare system, we risk de-emphasizing important potential interventions that could impact health and well-being. This perspective is supported by the fact that there is a lack of research on digital interventions that target social determinants of health for people with serious mental illness (Naslund & Aschbrenner, 2019). Our hope is that broadening the perspective of digital health equity will open up a wider range of interventions to reduce morbidity and mortality for people with serious mental illness. This is important because evidence indicates that a greater proportion of the variability in health outcomes is explained by social, economic, and health behaviour factors rather than by clinical treatment factors (Hood et al., 2016). Our research also highlights the importance of involving stakeholder communities in the research process and emphasizing their perspectives. Our initial research focus was on the use of digital technology for healthcare delivery. However, the involvement of service users with serious mental illness and being guided by their experiences and priorities is what led us to this broader conceptualization of digital health equity.

Implications and Conclusions

Our research was conducted after the COVID-19 pandemic, a period during which in person contact was limited through public health restrictions and the vast majority of interactions were shifted online. Services at our partner community mental health organization were impacted by these restrictions, which made in person services difficult or impossible. This was particularly difficult for case management and outreach services because many of those clients did not have access to digital technology. Although public health restrictions had been lifted at the time of data collection, this experience may have impacted participants' perspectives. This experience not only transitioned many essential services online and made service users and providers acutely aware of the vulnerability associated with not having access to digit technology, but it also led to a permanent shift in how services are offered, with many continuing to provide virtual options. This experience likely impacted the types and amount of digital technology use described by participants and may have also affected preferences.

Although our research was focused on people with serious mental illness, poverty was a significant factor that impacted our service user participants. Therefore, some of the findings from this research have implications that extend beyond people with serious mental illness to those affected by poverty. A more general poverty focused approach to addressing digital health equity would address many of the barriers experienced by people with serious mental illness. In particular, issues related to cost were rated as high priority by those with serious mental illness, and having basic access is needed as a first step. However, not all the barriers described by participants are related to the experience of poverty. Participants emphasized difficulties with paranoia and digital technology potentially enabling avoidance and exacerbating mental health conditions such as anxiety. Participants were also affected by unsafe social networks, impacting

their ability to get digital technology supports. They also described a vulnerability to scams that is linked to their financial vulnerability but may have been exacerbated by mental health factors. There were also barriers related to the intersection between serious mental illness, poverty, and unstable housing including not having access to a secure space to store devices, or a private space to use for accessing virtual healthcare. A poverty focused approach to digital health equity would greatly benefit people with serious mental illness, but their specific needs also need to be considered in any solutions.

This research provided an overview of the unmet digital technology needs and barriers to using and benefiting from digital technology for people with serious mental illness. It also identified the priorities of people with serious mental illness in relation to how their health and well-being can be improved through digital technology. These barriers and solutions were considered within an ecological model of digital determinants of health. This allowed us to ensure that all potential pathways for improving digital health equity were considered, and it also allowed us to examine the level at which barriers are experienced compared to the level at which solutions need to be implemented. Using this framework helped us to identify the important role that private telecommunications companies in Canada in influencing cost. Additionally, our findings showed that larger policy and systems levels factors heavily influence individual-level barriers and that individuals are quite limited in terms of solutions that they can implement themselves, which creates additional barriers to implementing solutions. It was therefore important to consider this context and what has already been implemented to make recommendations that are actionable for our partner mental health organization and people with serious mental illness.

Our participants suggested several solutions that could be implemented by the Canadian government to increase accessibility and affordability of digital technology. To determine next steps, these solutions need to be considered within the existing digital technology landscape in Canada and its implications for how to best move forward.

The idea that access to broadband internet should be considered a public utility and a matter of public health has been promoted by many researchers, policy makers, and lawyers (Crock Bauerly et al., 2019; Lemieux, 2023). In Canada, broadband internet and other telecommunications services, including wireless mobile and data plans, are considered a utility and are regulated by the Canadian Radio-television and Telecommunications Commission (CRTC) under the Telecommunications Act. However, it is not a publicly funded service and is provided through a limited number of telecommunications companies. Despite regulation under the Telecommunications Act, Canadians pay among the highest prices for telecommunications services (Innovation, Science and Economic Development Canada, 2024). Although it is unlikely that federal or provincial governments in Canada would publicly fund internet services, there is clearly a need to modify the Telecommunications Act to improve affordability and access.

Our participants recommended that the government implement regulations requiring telecommunications providers to offer low-cost plans to individuals receiving social assistance or earning below a certain income threshold. Presently, the Government of Canada has the Connecting Families Initiative, which is a program designed to provide low-cost access to the internet for Canadians who qualify. This program is offered in partnership with participating private internet service providers. Unfortunately, the eligibility criteria are narrow and currently only families that receive the maximum amount of Canada Child Benefit and seniors who are either receiving the maximum amount of the Guaranteed Income Supplement or who have an

annual income under the Old Age Security (OAS) program of less than $4,000 for singles and $8,000 for couples. These eligibility criteria exclude many low-income Canadians, including the majority of our participants.

Although not obligated to do so under the Telecommunications Act, some Canadian service providers offer programs that provide lower-cost internet and mobile plans to low-income Canadians outside of those eligible under the Connecting Families Initiative. Rogers, a major Canadian telecommunications company, offers a program called Connected for Success that expands eligibility for low-cost plans to include individuals on income support (Ontario Works or Ontario Disability Support Program) and tenants of non-profit housing partners. Our findings suggest that this program has been highly successful in increasing access to both affordable internet and mobile devices and plans for service users with serious mental illness. Telus, another major Canadian telecommunications company, also expanded its eligibility criteria for low-cost internet beyond the low-income families and seniors covered by the Connecting Families Initiative to include people with disabilities and youth aging out of care. It is unclear whether Bell, another major telecommunications service provider, participates in the Connecting Families Initiative, but it is not mentioned on their website. It is also important to note that service availability and program eligibility criteria vary across provinces. Overall, many people in need are being left out of current programs.

Our research suggests that important next steps that would improve digital technology access for people with serious mental illness include government investment in internet infrastructure and the CRTC requiring private telecommunications providers to participate in the Connecting Families Initiative and expanding eligibility for low-cost plans to include people on social assistance and/or those below a certain income threshold. For the average person and

community mental health organization, these are quite abstract and overwhelming solutions that are difficult to act on. Now that these priorities have been identified, however, individuals and service providers can partner with existing organizations that have more experience in these areas. For example, the Association of Community Organizations for Reform Now (ACORN) Canada is a multi-issue community union organization of low- and moderate-income people fighting for social and economic justice. ACORN has an Internet for All campaign. They have extensive experience with advocating for affordable internet access and were the ones who won the Connecting Families program and were instrumental in the creation of the affordable programs offered by Rogers and Telus. Community organizations can lend their voices to support ACORN's advocacy efforts and contribute letters of support for its initiatives.

Another approach could be to advocate to private telecommunications companies directly. For example, Bell has a campaign called Let's Talk that is dedicated to raising awareness, reducing stigma, and expanding access to mental health care. The findings of this research suggest that offering low-cost internet plans for low-income Canadians is very much in line with their stated Let's Talk priorities.

Our research also identified several high-priority solutions that could be implemented directly by our partner community mental health organization or other similar organizations. Participants prioritized solutions that addressed digital skills deficits, solutions to increase access through lending programs, and more flexibility in service delivery. These solutions must be considered within the community mental health context to determine next steps.

To address digital skills, participants suggested a classroom-style learning. A major barrier to implementing this solution is the resources required to develop a digital skills program. Fortunately, there are existing programs that have been developed and tested that could be

adopted. For example, the Digital Outreach for Obtaining Resources and Skills (DOORS) program is a digital literacy teaching program that is interactive, with hands-on activities and instruction that was designed to address the second level of the digital divide (skills) for people with serious mental illness (Hoffman et al., 2020). Since its initial development, the DOORS program has been refined and expanded (Alon et al., 2023). Currently, it includes curricula on smartphones as well as personal computer versions consisting of nine modules (fundamentals, accessibility, navigating the internet, communicating via messages, communicating via video call, staying organized, expanding your knowledge via YouTube, well-being and fun, using artificial intelligence safely). From our perspective, a major strength of this program is that it is not limited to digital healthcare and health information and provides skills that help participants benefit from digital technology in ways that enhance health and well-being across many areas. Additionally, the researchers who developed it regularly partner with community organizations.

Dissemination of reliable information about technology and technology resources (e.g., about scams, where to access charging and Wi-Fi, low-cost options, resources) is a solution that would require fewer resources than many of the other suggestions and may be more feasible for community mental health organizations to implement. Despite this, there are limited examples of research on the topic. Simple infographics could be developed at a relatively low cost on different topics. For example, an infographic outlining methods for creating secure yet memorable passwords using the passphrase method. A document with questions to ask yourself to help identify scams could be developed. Participants also expressed not knowing what programs and services were available to support them with digital technology use. A document could be developed and shared between service providers that contains all this information in one place. Low cost does not mean no cost and barriers include having someone with the relevant

knowledge to create these materials and keep them up to date. Additionally, they may have lower rates of engagement than more hands-on teaching.

Other suggested solutions for our partner community mental health organization were to provide one-on-one digital technology support services and offering programs that increase access to digital technology hardware (phones, laptops, tablets) by providing them at no cost or through loan programs. Our partner community mental health organization has offered both of these programs. Service users who participated in them appreciated them and hoped for them to be restarted or expanded. The major obstacle to maintaining the programs, however, is resource constraints. In the early days of COVID-19, funding organizations prioritized projects focused on digital equity. Although the acute crisis created by COVID-19 has passed, our research highlights that this continues to be an important issue and that it should remain a funding priority.

Overall, the biggest obstacles to implementing the solutions identified by our research will be resources and funding, which are not entirely within the control of individual community mental health organizations. Our hope is that this research can help guide community mental health organizations in considering where to allocate their limited resources. Additionally, our hope is that this work can highlight the important relationship between digital technology and health and reframe programs that improve digital equity as also potentially contributing to health and well-being benefits.

Limitations and Future Research

Limitations of this research include that it used a convenience sampling approach that may have biased the selection of participants. It was also conducted in a Canadian context, some of the recommendations generated are specific to that context. Additionally, this research was qualitative and exploratory in nature and therefore does not provide causal evidence. Further

research is needed to explore the pathways through which digital technology use may positively and negatively impact health and well-being. Another important next step for research would be continued partnerships with community mental health organizations that are interested in promoting digital health equity and using an implementation science framework to assess the feasibility of the prioritized solutions within their organizational context. In particular, we recommend examining interventions aimed at improving access to hardware, such as lending programs or programs that distribute refurbished hardware free of charge, and programs to improve digital skills, such as the DOORS program or peer technology support programs. We recommend starting with addressing issues of access and skills because these are pre-requisites for other digital technology-based interventions and our research indicates that significant needs continue to exist in these areas. The co-development of interventions with people with serious mental illness is another important area for further research. Following this, program evaluation projects could be initiated to assess the outcomes of these interventions.

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Appendix A
Focus Group Client Consent Form

Promoting Digital Health Equity Among People with Serious Mental Illness

Introduction

You are being asked to participate in a study examining digital technology use among Canadian Mental Health Association Ottawa Branch (CMHA Ottawa) clients. Before agreeing to participate in this study, it is important that you read and understand this consent form. It includes details that we think you need to know in order to decide if you wish to participate. If you have any questions you can ask any member of the research team.

Research Team

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Study Funding

Faculty of Social Sciences' Research Support Program, University of Ottawa

What is the Study about?

The goal of our study goal is to better understand current use of digital technology among CMHA Ottawa clients and to identify barriers and facilitators to digital technology use, particularly as it relates to access to services. The study findings will help CMHA Ottawa understand how digital technology is impacting their clients and identify areas where additional support may be needed.

We invite you to participate in this study because you are receiving services from CMHA Ottawa.

WHAT IS MY ROLE IN THIS STUDY?

With your consent, you will participate in a focus group with 4-6 other CMHA Ottawa clients. During the focus group we will be asking questions about your experience with digital technology use, including using CMHA services.

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The focus group will be recorded and transcribed. Any identifiable information from the audio-recordings will be removed during transcription. If you choose not to consent to the audio recording, you will not be able to participate in the focus group. The focus group will last a maximum of 90 minutes.

Participating in the focus group is voluntary and you have the right to decide that you do not want to take part at any time without giving a reason. The study is independent of CMHA Ottawa and your decision to take part or not take part in the study will not affect any services you may be receiving. If you withdraw from the study, we will not collect any additional information from you, but we will use the data collected before your withdrawal

Why Should I Participate?

Your opinions are very important. Your participation in this study will help us to better understand people's experiences with online services, and how to improve access to them. The results of this study will provide a better understanding of how to improve access to digital technology for CMHA clients.

We do not believe that you will experience any significant risks by participating in the focus group. It is possible that you may experience some discomfort in discussing personal information, such as frustration around barriers faced. You may refuse to answer any question if you become uncomfortable or for any reason. Additionally, you can let the focus group facilitator know if you would like to take a break or withdraw from the focus group at any time.

The following resources may be helpful if you would like to speak with someone outside of CMHA Ottawa for support following the focus group:

- **ConnexOntario** (www.connexontario.ca or 1-866-531-2600);
- **The Ottawa Distress Centre** (613-238-3311); or,
- Your local **Community Health and Resource Centre** (www.coalitionottawa.ca).

Focus groups will be held in person or over Zoom, In person activities inherently pose a risk of catching an illness such as COVID-19. Participants may be asked to wear masks and are asked not to attend if they are sick.

Privacy and Confidentiality.

Your answers will be kept private and confidential by the researchers. However, there are some limits to confidentiality. Because you are being asked to participate in a focus group, your responses may not be kept private from the other participants in the focus group. However, we ask all participants to not talk about what is discussed in the focus group after it is completed in order to protect participants' privacy and confidentiality.

Only the research team will have access to information collected from you during this focus group. Consent forms and other identifying information you give us will be kept in a locked filing cabinet. The audio-recording from the focus group, transcripts of the audio-recording, and notes taken during the focus group, will be stored on an encrypted and password protected computer and on the University of Ottawa's secure servers.

Your name will not be linked to anything you say during the focus group and your responses to the questions will be kept confidential and private by the researchers. You are encouraged not to reveal any information that could identify yourself. Should you reveal any identifiable information during the discussion, the information will not be transcribed but rather paraphrased to capture the idea expressed. Any names mentioned in the recordings will not be transcribed. Should you consent to the use of quotes from the focus group, they may be used in write-ups and presentations on this study. However, the quotes will not contain any information that allows you to be identified.

At the end of the study, data and records containing personal information, will be stored in research offices at the University of Ottawa, in locked filing cabinets and on the University of Ottawa's secure

servers. Whether in electronic or paper format, data and personal records will be destroyed five years after the completion of the study.

Confidentiality will be respected and no information that discloses your identity will be released or published without consent, with the exception of disclosing abuse or acute risk of harm to yourself or others. If there is perceived risk, privacy will be breached (i.e. the risk of harm will be shared with the appropriate authority, such as the police). All members of the focus group are asked to maintain confidentiality of other participants.

Compensation

You will receive $50 for participating in the focus group. If you choose to withdraw from the study before completing the focus group, you will still receive full compensation.

Data Use and Storage

Data from this study will be used for research purposes. It will be used for a doctoral thesis project and may be published in scientific journals and presented in scientific conferences. In the event that the results of this study are published or presented, no individual information or information that could identify you will be released. As well, the data collected in the project can be used for other analyses related to the project and to develop future research projects.

Questions and Request for Information

Any questions about your rights as a research participant may be addressed to the Office for Ethics in Research, 550 Cumberland Street, Room 154, (613) 562-5387 or ethics@uottawa.ca

If you have questions at any time about the study or the procedures, you may contact the Student Researcher, Kimberly Turner, or Study Investigator, Dr. John Sylvestre. They can be reached by phone or e-mail at the coordinates listed above.

Informed Consent

I acknowledge that the research study described above has been explained to me and that any questions that I have asked have been answered to my satisfaction. I have been informed of my right to choose to not participate in the study. As well, the potential risks, harms and discomforts have been explained to me and I also understand the benefits of participating in the research study. I understand that I have not waived my legal rights nor released the investigators, sponsors, or involved institutions from their legal and professional duties. I know that I may ask now or in the future any questions I have about the study or the research procedures. I have been assured that information relating to me will be kept confidential and that no information will be released or printed that would disclose my personal identity without my permission. I have been given sufficient time to read and understand the above information.

By signing this consent, I agree to participate in this study. I may provide verbal consent that is audio-recorded, as long as the researcher shares the same information with me that is presented in this written consent form. I will be given a hard copy of the consent form for my records.

I agree to participate in a focus group for this study.

Yes □ No □

I agree to have the focus group audio-recorded and field notes recorded.

Yes □ No □

I understand and agree that my anonymized quotes may appear in published reports.

Yes □ No □

X_____ _____ _____
Participant's Signature Name, Printed Date (dd/mm/yy)

X_____ _____ _____
Focus grouper's Signature Name, Printed Date (dd/mm/yy)

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Appendix B
Focus Group Staff Consent Form

Promoting Digital Health Equity Among People with Serious Mental Illness

Introduction
You are being asked to participate in a study examining digital technology use among Canadian Mental Health Association Ottawa Branch (CMHA Ottawa) clients. Before agreeing to participate in this study, it is important that you read and understand this consent form. It includes details that we think you need to know in order to decide if you wish to participate. If you have any questions you can direct them to any member of the research team.

Research Team

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Study Funding
Faculty of Social Sciences' Research Support Program, University of Ottawa

Purpose of the Study
The goal of our study goal is to better understand current use of digital technology among CMHA Ottawa clients and to identify barriers and facilitators to digital technology use, particularly as it relates to access to services. The study findings will help CMHA Ottawa understand how digital technology is impacting their clients and identify areas where additional support may be needed.

We invite you to participate in this study because you are providing direct client services at CMHA Ottawa.

Research Procedure
With your consent, you will participate in a focus group with 3-5 other CMHA Ottawa staff members. During the focus group we will be asking questions and facilitating a discussion about you and your clients' experiences with digital technology use, including barriers and facilitators.

The focus group will be audio-recorded and transcribed. Any identifiable information from the audio-recordings will be removed during transcription. If you choose not to

consent to the audio recording, you will not be able to participate in the focus group. The focus group will last a maximum of 90 minutes.

Participating in the focus group is voluntary and you have the right to decide that you do not want to take part at any time without giving a reason. The study is independent of CMHA Ottawa and your decision to take part or not take part in the study will not affect your employment. If you withdraw from the study, we will not collect any additional information from you, but we will use the data collected before your withdrawal.

Potential Benefits and Inconveniences

You will not receive any personal benefit from your participation in this study. However, the results of this study will provide a better understanding of how to improve access to digital technology for CMHA clients.

We do not believe that you will experience any significant risks to your well-being by participating in the focus group. It is possible that you may experience some level of discomfort in discussing personal information, such as frustration around barriers faced by your clients. You may refuse to answer any question if you become uncomfortable or for any reason. Additionally, you can let the focus group facilitator know if you would like to take a break or withdraw from the focus group at any time.

The following resources may be helpful if you would like to speak with someone outside of CMHA Ottawa for support following the focus group:

- **ConnexOntario** (www.connexontario.ca or 1-866-531-2600);
- **The Ottawa Distress Centre** (613-238-3311); or,
- Your local **Community Health and Resource Centre** (www.coalitionottawa.ca).

Focus groups will be held in person or over Zoom, In person activities inherently pose a risk of catching an illness such as COVID-19. Participants may be asked to wear masks and are asked not to attend if they are sick.

Anonymity and Confidentiality

Your answers will be kept private and confidential by the researchers. However, there are some limits to confidentiality. Because you are being asked to participate in a focus group, your responses may not be kept private from the other participants in the focus group. However, we ask all participants to not talk about what is discussed in the focus group after it is completed in order to protect participants' privacy and confidentiality.

Only the principal investigator and research assistants will have access to information collected from you during this focus group. Consent forms and other identifying information you give us will be kept in a locked filing cabinet. The audio-recording from the focus group, transcripts of the audio-recording, and notes taken during the focus group, will be stored on an encrypted and password protected computer and on the University of Ottawa's secure servers.

Your name will not be associated with anything you say during the focus group and your responses to the questions will be kept strictly confidential and private by the researchers. You are encouraged not to reveal any information that could identify yourself. Should you reveal any identifiable information during the discussion, the information will not be transcribed but rather paraphrased to capture the idea expressed. Any names mentioned in the recordings will not be transcribed. Should you consent to the use of quotes from the focus group, they may be used in write-ups and presentations on this study. However, the quotes will not contain any information that allows you to be identified.

At the end of the study, data and records containing personal information, will be stored in a research office at the University of Ottawa, in locked filing cabinets and on the University of Ottawa's secure

servers. Whether in electronic or paper format, data and personal records will be destroyed five years after the completion of the study.

Confidentiality will be respected and no information that discloses your identity will be released or published without consent, with the exception of disclosing abuse or acute risk of harm to yourself or others. If there is perceived risk, privacy will be breached (i.e. the risk of harm will be shared with the appropriate authority, such as the police). All members of the focus group are asked to maintain confidentiality of other participants.

Data Use and Storage

Data from this study will be used for research purposes. It will be used for a doctoral thesis project and may be published in scientific journals and presented in scientific conferences. In the event that the results of this study are published or presented, no individual information or information that could identify you will be released. As well, the data collected in the project can be used for other analyses related to the project and to develop future research projects.

Questions and Request for Information

Any questions about your rights as a research participant may be addressed to the Office for Ethics in Research, 550 Cumberland Street, Room 154, (613) 562-5387 or ethics@uottawa.ca

If you have questions at any time about the study or the procedures, you may contact the Student Researcher, Kimberly Turner, or Study Investigator, Dr. John Sylvestre. They can be reached by phone or e-mail at the coordinates listed above.

Informed Consent

I acknowledge that the research study described above has been explained to me and that any questions that I have asked have been answered to my satisfaction. I have been informed of my right to choose to not participate in the study. As well, the potential risks, harms and discomforts have been explained to me and I also understand the benefits of participating in the research study. I understand that I have not waived my legal rights nor released the investigators, sponsors, or involved institutions from their legal and professional duties. I know that I may ask now or in the future any questions I have about the study or the research procedures. I have been assured that information relating to me will be kept confidential and that no information will be released or printed that would disclose my personal identity without my permission. I have been given sufficient time to read and understand the above information.

By signing this consent, I agree to participate in this study. I may provide verbal consent that is audio-recorded, as long as the researcher shares the same information with me that is presented in this written consent form. I will be given a hard copy of the consent form for my records.

I agree to participate in a focus group for this study.

Yes □ No □

I agree to have the focus group audio-recorded and field notes recorded.

Yes □ No □

I understand and agree that my anonymized quotes may appear in published reports.

Yes □ No □

X_____ _____ _____
Participant's Signature Name, Printed Date (dd/mm/yy)

X_____ _____ _____
Focus grouper's Signature Name, Printed Date (dd/mm/yy)

Appendix C

Client Focus Group Guide

Welcome:

- Introduction to facilitator
- Review consent form, answer any questions, sign consent forms
    - Once consent has been provided by all participants, begin audio recording.
- Go around and have everyone introduce themselves (have name cards ready)

Saying that we're students and here to learn, introduction self, welcoming people

Overview:

- We are here to discuss your experiences with digital technology. I would like to hear about what your current use looks like. I would also like to hear about your experiences with accessing services virtually. Finally, I want to learn about the kinds of challenges you have faced to accessing and using digital technology.
- When I say "Digital technology" I mean things like smartphones, tablets, laptops, and doing things on the Internet.
- Our goal with this project is to identify ways to promote digital health equity for CMHA Ottawa clients. Digital health equity means the ways that digital technology use can positively or negatively impact people's health. That might be directly, through accessing healthcare services online, or indirectly by impacting social relationships and support which then influence health
- For today's focus groups, I want to know how you currently use digital technology and how that compares to how you would ideally use it. We want to understand the barriers and needs related to digital health equity for you.
- We will be making recommendations to CMHA Ottawa and others, who are very interested in what you have to say.
- We will be discussing for 30-40 minutes and then have a 5-10 minute break, and afterwards discuss for another 30-40 minutes
- I will start off by providing a brief description of an area of digital health equity, and then I will ask some questions about your experience with it. We will talk about five different areas today.

Guidelines:

- There are a few ground rules that I'd like to go over before we begin.
- First, I know we're talking about digital technology today, but if anyone has a phone or anything on them I would ask that you put it on silent for the duration of the focus group.
- Second, please keep the information shared in this focus group confidential. That means not sharing any information you learned about others after the focus group.

- There are no right or wrong answers to these questions, please respect the opinions of others even if you don't agree with them
- Please speak to each other, my role is to guide and moderate the conversation
- Try not to speak over others
- I may interrupt and redirect the conversation at times to make sure that we cover everything

Individual-level digital determinants of health	
Core questions	**Probing questions**
First I want to talk about access to digital technology or the Internet. By access I mean whether or not you have or can use certain technologies on a regular basis (using it when you want to and need to use it). Do you think you have the access you need to do what you want online.	- Do you wish you had more/better access? - What are the barrier to access you've experienced? - What would be needed to improve access for you? - What areas of your lives are impacted by access to digital technology?
Now I want to ask about digital skills. By skills I mean, whether you feel like you have the knowledge and abilities you need to do what you would like to with digital technology. Do you feel like you have the skills you need to do everything you want to do with digital technology??	- Are there types of technology you wish you could use but don't know how? Like what? - Do you wish you were better at using digital technology? - What are the barriers you experience to improving digital skills? - What do you need to help improve your digital skills? - Do you have difficulty with passwords/accessing accounts? If yes, explain. - What areas of your lives are impacted by your level of digital skill?
Now I want to ask about your attitudes about digital technology. By attitude I mean your thoughts and feelings about digital technology. How do you feel about digital technology?	- Do you like or dislike it? Do you trust it? Why or why not? Do you think it is useful? Why or why not? - Do you wish you felt differently about digital technology? - Are you feelings about digital technology a barrier to using it? - What is needed to overcome this barrier? - What areas of your lives are impacted by these barriers? - Do you have any concerns about privacy? What are they?

	- Do have any concerns about scams or misinformation? What are they? - How do these concerns impact your life?
Digital tools and services-level	
What do you use digital technology for? What are the top 3 things you would like to do when using digital technology? For example, I'm thinking of doing social things, getting information, or getting things you need.	- Are you able to do them? - What are the barriers? - What do you need to overcome these barriers? - What areas of your lives are impacted by these barriers?
Now I want to ask about services. By services I mean, services at CMHA Ottawa, but also other healthcare services, services in the community, but also things like banking services, online taxes, and any other apps or websites you might use. Do you use digital technology to access services? .	- Which ones? - What do you think about them? - Do you face any barriers to accessing digital services? - What is needed to overcome these barriers? - What areas of your lives are impacted by these barriers?
Social/Community-level	
Now I would like to ask about how your social relationships and community might impact your digital technology use. Are there any ways in which those around you affect how you use digital technology? This can be friends, family, or even people who provide you with support. Do you have anyone you can rely on if you need help with digital technology?	- Do you have access to digital technology in community spaces? - Does your community and social circle get in the way of using digital technology the way you would like to? - What is needed to overcome this barrier? - What areas of your lives are impacted by these barriers?
Health systems-level	
We just talked about accessing services using digital technology.	- When you have used online health services, what has your experience with them been like? - The way they are currently offered, are online health services discriminatory? Why or why not?

Now I want to ask more in-depth questions about accessing healthcare services: Do you think that more healthcare services should have online options? Which ones? Why?	
Policy-level	
Now I want to ask some more general questions about digital technology Do you think everyone should have to pay for Internet/ Is it ok for people to have to pay for Internet?	- Do you think all buildings should have Internet included (that the Internet should be considered as a utility)? - Do you think that more should be done to bring down the cost of mobile and data plans? - How would not having to pay for Internet impact your life?

Appendix D

Staff Focus Group Guide

Welcome:

- Introduction to facilitator
- Review consent form, answer any questions, sign consent forms
    - Once consent has been provided by all participants, begin audio recording.
- Go around and have everyone introduce themselves (have name cards ready)

Overview:

- We are here to discuss your clients' experiences with digital technology, what their current use looks like, what kinds of challenges they have faced to accessing and using digital technology, and what their experiences with accessing services through digital technology are.
- Digital technology is a broad term, but I am primarily referring to things like smartphones, tablets, and laptops, and doing things on the Internet.
- Our goal with this project is to identify ways to promote digital health equity for CMHA Ottawa clients. Digital health equity means the ways that digital technology use can positively or negatively impact people's health. That might be directly, through accessing healthcare services online, or indirectly by impacting social relationships and support which then influence health.
- For the focus groups we're doing, the goal is to map out how current experiences with digital technology compare to what would be ideal and what the barriers and needs related to digital health equity for CMHA clients are.
- We will be making recommendations to CMHA Ottawa and others, who are very interested in what you have to say.
- We will be discussing for 30-40 minutes and then have a 5-10 minute break, and afterwards discuss for another 30-40 minutes
- I will start off by providing a brief description of an area of digital health equity, and then I will ask some questions about your experience with it. We will talk about three different areas today.

Guidelines:

- There are a few ground rules that I'd like to go over before we begin.
- First, I know we're talking about digital technology today, but if anyone has a phone or anything on them I would ask that you put it on silent for the duration of the focus group.
- Second, please keep the information shared in this focus group confidential. That means not sharing any information you learned about others after the focus group.
- There are no right or wrong answers to these questions, please respect the opinions of others even if you don't agree with them
- Please speak to each other, my role is to guide and moderate the conversation

- Try not to speak over others
- I may interrupt and redirect the conversation at times to make sure that we cover everything

Individual-level digital determinants of health	
Core questions	**Probing questions**
First, I want to talk about your clients' access to digital technology and the internet. By access I mean whether or not your clients have or can use certain technologies on a regular basis. Do your clients have access to digital technology?	- How do they have access? - Do you think they need more/better access? - What are the barrier to improved access? - What would be needed to improve access? - What areas of your clients' lives are impacted by access?
Now I want to ask about digital skills. By skills I mean, whether someone feels like they have the knowledge and abilities they need to do what they would like to with digital technology. Do you think your clients have they skills they need to do everything you want to do with digital technology??	- Are there things that you would like to do with your clients using digital technology that they are unable to do? - Do you have the digital skills necessary to support your clients' digital skills? - What are the barriers your clients experience to improving digital skills? - What do you think is needed for clients to be able to improve their digital skills? Do you need anything to better support their digital skills? - What areas of your clients' lives are impacted by their level of digital skills?
Now I want to ask about attitudes about digital technology. By attitude I mean thoughts and feelings about digital technology. What type of attitudes have clients expressed to you about digital technology?	- Have these attitudes interfered with your clients' abilities to do things with digital technology? - Are client attitudes a barrier to digital technology use? - What is needed to overcome this barrier? - What areas of your clients' lives are impacted by their level of digital skills? - Have clients expressed any concerns about privacy? What are they? - Have clients expressed any concerns about scams or misinformation? What are they? - How do these concerns impact their lives? -
Digital tools and services-level	
Now I want to ask about services. By services I mean, services at CMHA Ottawa, but also other	- Have you helped your clients access online services at CMHA? Any other online services?

healthcare services, services in the community, but also things like banking services, online taxes, and any other apps or websites you might use. Do your clients use any digital tools or services? .	- Do you use online services or tools in your work with clients? - In your work with clients, have they faced barriers in using digital tools and services? What are they? - What is needed to address these barriers? - What areas of your clients' lives are impacted by these barriers?
Social/Community-level	-
Now I would like to ask about how social relationships and community might impact digital technology use. What are the community norms and attitudes around digital technology use among your clients?	- Do your clients have social relationships they can rely on if they need support with digital technology? - Do clients have enough access to community spaces where they can use digital technology? - Are the community norms and attitudes towards digital technology a barrier to using it? - What is needed to overcome this barrier? - What areas of your clients' lives are impacted by these barriers?
Health Systems-level	
Now I would like to ask you about whether you think enough is being done to promote digital health equity within the healthcare system as a whole.	- Do you think there is sufficient investment in digital health within the healthcare system? - Is the leadership in the healthcare system doing enough to promote digital health equity? - What areas of your lives have been impacted by how digital technology is being used within the healthcare system?
Policy-level	
Now I would like to ask you about your opinions about possible changes in government policy related to digital technology.	- Do you think everyone should have to pay for Internet/ Is it ok for people to have to pay for Internet? - Do you think all buildings should have Internet included (that the Internet should be considered as a utility)? - Do you think that more should be done to bring down the cost of mobile and data plans? - How would not having to pay for Internet impact your clients' lives?

Appendix E

Coding Manual

Name	Description
DDoH	Digital Determinants of Health: factors that impact the potential for digital technology to promote health and that influence its contribution to health disparities. Can occur at different levels (see subsides)
Health system (DDoH)	Related to the health system more generally, including things like overall investment in digital technology, leadership in promoting digital health equity.
1-HS Barrier-Challenge	
2-HS Solutions-Recommendations	Note: apply at the level of implementation
Lack of investment in promoting digital health equity	The healthcare system has not sufficiently considered and invested in improving accessibility of virtual care for those with lower access
Needs not considered	The needs of people with lower access to digital technology have not been sufficiently considered within the healthcare system
Virtual Care Issues	
Inconsistent platforms	Different platforms are used across different healthcare services (e.g., videoconferencing software, different websites and processes)
Unclear intake procedures	
Individual	Related to someone's access to digital technology, how they feel about technology, and their digital skills.
1-In Barrier-Challenge	

Name	Description
2-In Solutions-Recommendations	Note: apply at the level of implementation
Access	
Cost Related	
Non-cost Related	Includes private space related
Digital Skills	
Lack learning opportunities	Lack of opportunity to learn digital skills
Lack skills	
Personal Attitudes	e.g., Paranoia, not liking it If someone is expressing a general attitude or belief that digital technology lacks privacy or is unsafe code here. BUT if the main concern is about a lack of legislation or rules about privacy, or about lack of skills to manage online safety or privacy would be coded under policy and digital skills respectively.
Threat-Safety	
Policy	These are needs or barriers related to government policy on digital technology, the development of broadband Internet infrastructure, and policies related to data security and privacy.
1-P Barrier-Challenge	
2-P Solutions-Recommendations	Note: apply at the level of implementation
Cost-related policies	
Cost regulation	Policies related to regulating cost of digital technology plans for people who are lower income

Name	Description
Public wifi	
Wifi requirement for certain settings	Long term care, group homes, shelters
Geographical access issues	
Privacy	Legislation aimed at protecting online privacy
Program Restrictions	Restrictions preventing funds from government programs being spent on digital technology
Social-Community	Related to community norms and attitudes about digital technology, accessing digital technology through the community, and participation in online socializing and communities.
1-SC Barrier-Challenge	
2-SC Solutions-Recommendations	Note: apply at the level of implementation
Community Accesss	Lack of information about how to access digital technology through the community (e.g., charging, wifi)
Lack Social Contacts - digital expertise	Lack of social contacts who are competent in digital technology skills
Lack Trustworthy Contacts	Community contacts with knowledge about digital technology who are trustworthy
Online Communities	Lack of information about online communities, supports
Online only social supports	

Name	Description
Tools + services	Related to any types of services accessed through digital technology. This includes healthcare and social services, but also any websites, banking services, apps, social networking, or even GPS and maps. Focus on if they are useful, easy to use, and accessible. Not limited to healthcare tools and services.
1-TS Barrier-Challenge	
2-TS Solutions-Recommendations	Note: apply at the level of implementation
4-Availability	
Lack of awareness	Don't know what tools and services are available
Only in person	Only in person options available (can also code this if the person is saying that there are not enough virtual options)
Only virtual	Only virtual options are available (can also code this if the person is saying there is too much virtual and not enough in person)
5-Accessibility	
Audio-Visual concerns	Concerns about font or screen size being too small, things not being loud enough
Credit card needed	
Language concerns	Concerns about any tools or services not being available in some languages, or translations not being good
6-User friendliness	
Lack tech support	
Login issues	Password or 2 factor authentication
Tech issues (General)	Any general difficulties with technology (aspects of it slow or not working)

Name	Description
7-Utility	
Not useful	Available tools are services are NOT relevant and useful to clients
Useful	Available tools are services are relevant and useful to clients
CMHA (policies)	
Slow (wait times)	
SDoH	Social Determinants of Health: These are factors from the WHO's SDoH framework. They represent factors that interact and influence health outcomes and health equity.
Health outcomes	Any description of effects of digital technology on health outcomes including mental health (e.g., lower or higher mood, makes mental health symptoms better or worse) and physical health (impact on sleep, getting more or less exercise).
Negative	Negative health outcomes
Positive	Positive health outcomes
Healthcare (SDoH)	Use this code when someone's interaction with the healthcare system is being discussed (e.g., discussing access to, use of, quality of healthcare services). We want to capture how healthcare use might link other factors with health outcomes. This may overlap with other codes if someone is discussing how digital technology impacts their use of the healthcare system.
Intermediary	Intermediary Determinants of Health: Factors that are impacted by structural determinants including material circumstances (e.g., housing quality, working conditions), behavioural and biological factors (e.g., nutrition, exercise, tobacco consumption), and psychosocial factors (e.g., psychological stressors, social support). Their impacts are mediated through the healthcare system.
Behaviours + biological factors	e.g., genetic predisposition, lifestyle factors (e.g., smoking, exercise, nutrition, substance use)
Material Circumstances	Related to living and/or working conditions, e.g., housing quality, food security, exposure to hazards

Name	Description
Pyschosocial factors	e.g., psychological stressors, social support, community
Social Cohesion-Capital	Social networks, social norms, social resources e.g., having a connection through a social network that gives you access to social support or can be useful in terms of connecting you to a job or another individual e.g., Community characteristics such as values, lifestyle norms
Structural	Structural Determinants of Health: reinforce social hierarchies of class, power, prestige, discrimination, and access to resources. The main indicators related to someone's position within the social hierarchy are income, education, occupation, social class, gender, race/ethnicity. All of these are influenced by the overarching socioeconomic and political context within a society (e.g., governance, economic and social policies, culture and values).
SocioEcon - Context	Socioeconomic and political context: Governance, economic and social policies AND culture and values (see subsides)
Culture + Societal Values	
Govt Policies	
SocioEcon - Position	Things like: Social Class, Gender, Ethnicity, Education, Occupation, Income
Usage	
Current usage	How someone is currently using digital technology
Desired usage	Activity someone would like to be doing through digital technology

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Appendix F

Nominal Group Client Consent Form

Promoting Digital Health Equity Among People with Serious Mental Illness

Introduction
You are being asked to participate in a study examining digital technology use among Canadian Mental Health Association Ottawa Branch (CMHA Ottawa) clients. Before agreeing to participate in this study, it is important that you read and understand this consent form. It includes details that we think you need to know in order to decide if you wish to participate. If you have any questions you can ask any member of the research team.

Research Team

Study Investigator
Kimberly Turner
School of Psychology (CRECS)
University of Ottawa, Vanier Hall
ON K1N 6N5
562-5800 ext. 2292
[student email]

Study Investigator
John Sylvestre, PhD
School of Psychology
Centre for Research on Educational and Community Services (CRECS) University of Ottawa, Vanier Hall, 5002C
Ottawa, ON K1N 6N5
(613) 562-5800 ext. 4307
John.sylvestre@uottawa.ca

Study Funding
Faculty of Social Sciences' Research Support Program, University of Ottawa

What is the Study about?
The goal of our study goal is to better understand current use of digital technology among CMHA Ottawa clients and to identify barriers and facilitators to digital technology use, particularly as it relates to access to services. The study findings will help CMHA Ottawa understand how digital technology is impacting their clients and identify areas where additional support may be needed.

We invite you to participate in this study because you are receiving services from CMHA Ottawa.

WHAT IS MY ROLE IN THIS STUDY?
With your consent, you will participate in one focus group with 6-8 other CMHA Ottawa clients. During the focus groups we will be asking questions about your experience with digital technology use, including using CMHA services. Our focus will be on learning more about the community's digital technology needs and actions that can be taken to better meet these needs.

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The focus group will be recorded and transcribed. Any identifiable information from the audio-recordings will be removed during transcription. If you choose not to consent to the audio recording, you will not be able to participate in the focus groups. The focus group will last a maximum of 2 hours.

Participating in the focus group is voluntary and you have the right to decide that you do not want to take part at any time without giving a reason. The study is independent of CMHA Ottawa and your decision to take part or not take part in the study will not affect any services you may be receiving. If you withdraw from the study, we will not collect any additional information from you, but we will use the data collected before your withdrawal

For this study, the research team will also ask you a few basic questions about yourself (age, gender identity, CMHA programs you are participating in, level of comfort using digital technology).

Why Should I Participate?

Your opinions are very important. Your participation in this study will help us to better understand people's experiences with online services, and how to improve access to them. The results of this study will provide a better understanding of how to improve access to digital technology for CMHA clients.

We do not believe that you will experience any significant risks by participating in the focus group. It is possible that you may experience some discomfort in discussing personal information, such as frustration around barriers faced. You may refuse to answer any question if you become uncomfortable or for any reason. Additionally, you can let the focus group facilitator know if you would like to take a break or withdraw from the focus group at any time.

The following resources may be helpful if you would like to speak with someone outside of CMHA Ottawa for support following the focus group:

- **ConnexOntario** (www.connexontario.ca or 1-866-531-2600);
- **The Ottawa Distress Centre** (613-238-3311); or,
- Your local **Community Health and Resource Centre** (www.coalitionottawa.ca).

Focus groups will be held in person or over Zoom, In person activities inherently pose a risk of catching an illness such as COVID-19. Participants may be asked to wear masks and are asked not to attend if they are sick.

Privacy and Confidentiality.

Your answers will be kept private and confidential by the researchers. However, there are some limits to confidentiality. Because you are being asked to participate in a focus group, your responses may not be kept private from the other participants in the focus group. However, we ask all participants to not talk about what is discussed in the focus group after it is completed in order to protect participants' privacy and confidentiality.

Only the research team will have access to information collected from you during this focus group. Consent forms and other identifying information you give us will be kept in a locked filing cabinet. The audio-recording from the focus group, transcripts of the audio-recording, and notes taken during the focus group, will be stored on an encrypted and password protected computer and on the University of Ottawa's secure servers.

Your name will not be linked to anything you say during the focus group and your responses to the questions will be kept confidential and private by the researchers. You are encouraged not to reveal any information that could identify yourself. Should you reveal any identifiable information during the discussion, the information will not be transcribed but rather paraphrased to capture the idea expressed. Any names mentioned in the recordings will not be transcribed. Should you consent to the use of quotes from the focus group, they may be used in write-ups and presentations on this study. However, the quotes will not contain any information that allows you to be identified.

At the end of the study, data and records containing personal information, will be stored in research offices at the University of Ottawa, in locked filing cabinets and on the University of Ottawa's secure servers. Whether in electronic or paper format, data and personal records will be destroyed five years after the completion of the study.

Confidentiality will be respected and no information that discloses your identity will be released or published without consent, with the exception of disclosing abuse or acute risk of harm to yourself or others. If there is perceived risk, privacy will be breached (i.e. the risk of harm will be shared with the appropriate authority, such as the police). All members of the focus group are asked to maintain confidentiality of other participants.

Compensation

You will receive $75 for participating in the focus group. If you choose to withdraw from the study before the end of a focus group, you will still receive full compensation for that focus group.

Data Use and Storage

Data from this study will be used for research purposes. It will be used for a doctoral thesis project and may be published in scientific journals and presented in scientific conferences. In the event that the results of this study are published or presented, no individual information or information that could identify you will be released. As well, the data collected in the project can be used for other analyses related to the project and to develop future research projects.

Questions and Request for Information

Any questions about your rights as a research participant may be addressed to the Office for Ethics in Research, 550 Cumberland Street, Room 154, (613) 562-5387 or ethics@uottawa.ca

If you have questions at any time about the study or the procedures, you may contact the Student Researcher, Kimberly Turner, or Study Investigator, Dr. John Sylvestre. They can be reached by phone or e-mail at the coordinates listed above.

Informed Consent

I acknowledge that the research study described above has been explained to me and that any questions that I have asked have been answered to my satisfaction. I have been informed of my right to choose to not participate in the study. As well, the potential risks, harms and discomforts have been explained to me and I also understand the benefits of participating in the research study. I understand that I have not waived my legal rights nor released the investigators, sponsors, or involved institutions from their legal and professional duties. I know that I may ask now or in the future any questions I have about the study or the research procedures. I have been assured that information relating to me will be kept confidential and that no information will be released or printed that would disclose my personal identity without my permission. I have been given sufficient time to read and understand the above information.

By signing this consent, I agree to participate in this study. I may provide verbal consent that is audio-recorded, as long as the researcher shares the same information with me that is presented in this written consent form. I will be given a hard copy of the consent form for my records.

I agree to participate in a focus group for this study.

Yes □ No □

I agree to have the focus group audio-recorded and field notes recorded.

Yes □ No □

I understand and agree that my anonymized quotes may appear in published reports.

Yes □ No □

X_____ _____ _____

Participant's Signature Name, Printed Date (dd/mm/yy)

X_____ _____ _____

Focus grouper's Signature Name, Printed Date (dd/mm/yy)

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Appendix G

Nominal Group Staff Consent Form

Promoting Digital Health Equity Among People with Serious Mental Illness

Introduction

You are being asked to participate in a study examining digital technology use among Canadian Mental Health Association Ottawa Branch (CMHA Ottawa) clients. Before agreeing to participate in this study, it is important that you read and understand this consent form. It includes details that we think you need to know in order to decide if you wish to participate. If you have any questions you can direct them to any member of the research team.

Research Team

Study Investigator
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Study Funding

Faculty of Social Sciences' Research Support Program, University of Ottawa

Purpose of the Study

The goal of our study goal is to better understand current use of digital technology among CMHA Ottawa clients and to identify barriers and facilitators to digital technology use, particularly as it relates to access to services. This study is focused on CMHA Ottawa client needs and barriers, and actions that can be taken to address them. The study findings will help CMHA Ottawa understand how digital technology is impacting their clients and identify areas where additional support may be needed.

We invite you to participate in this study because you are providing direct client services at CMHA Ottawa.

Research Procedure

With your consent, you will participate in one focus group with 6-8 other CMHA Ottawa staff members. During the focus group we will be asking questions and facilitating a discussion about you and your clients' experiences with digital technology use, including barriers and facilitators. Our focus will be on learning more about the community's digital technology needs and actions that can be taken to better meet these needs.

The focus group will be audio-recorded and transcribed. Any identifiable information from the audio-recordings will be removed during transcription. If you choose not to consent to the audio recording, you will not be able to participate in the focus group. The focus groups will last a maximum of 2 hours.

Participating in the focus group is voluntary and you have the right to decide that you do not want to take part at any time without giving a reason. The study is independent of CMHA Ottawa and your decision to take part or not take part in the study will not affect your employment. If you withdraw from the study, we will not collect any additional information from you, but we will use the data collected before your withdrawal.

Potential Benefits and Inconveniences

You will not receive any personal benefit from your participation in this study. However, the results of this study will provide a better understanding of how to improve access to digital technology for CMHA clients.

We do not believe that you will experience any significant risks to your well-being by participating in the focus group. It is possible that you may experience some level of discomfort in discussing personal information, such as frustration around barriers faced by your clients. You may refuse to answer any question if you become uncomfortable or for any reason. Additionally, you can let the focus group facilitator know if you would like to take a break or withdraw from the focus group at any time.

The following resources may be helpful if you would like to speak with someone outside of CMHA Ottawa for support following the focus group:

- **ConnexOntario** (www.connexontario.ca or 1-866-531-2600);
- **The Ottawa Distress Centre** (613-238-3311); or,
- Your local **Community Health and Resource Centre** (www.coalitionottawa.ca).

Focus groups will be held in person or over Zoom, In person activities inherently pose a risk of catching an illness such as COVID-19. Participants may be asked to wear masks and are asked not to attend if they are sick.

Anonymity and Confidentiality

Your answers will be kept private and confidential by the researchers. However, there are some limits to confidentiality. Because you are being asked to participate in a focus group, your responses may not be kept private from the other participants in the focus group. However, we ask all participants to not talk about what is discussed in the focus group after it is completed in order to protect participants' privacy and confidentiality.

Only the principal investigator and research assistants will have access to information collected from you during this focus group. Consent forms and other identifying information you give us will be kept in a locked filing cabinet. The audio-recording from the focus group, transcripts of the audio-recording, and notes taken during the focus group, will be stored on an encrypted and password protected computer and on the University of Ottawa's secure servers.

Your name will not be associated with anything you say during the focus group and your responses to the questions will be kept strictly confidential and private by the researchers. You are encouraged not to reveal any information that could identify yourself. Should you reveal any identifiable information during the discussion, the information will not be transcribed but rather paraphrased to capture the idea expressed. Any names mentioned in the recordings will not be transcribed. Should you consent to the use of quotes from the focus group, they may be used in write-ups and presentations on this study. However, the quotes will not contain any information that allows you to be identified.

At the end of the study, data and records containing personal information, will be stored in a research office at the University of Ottawa, in locked filing cabinets and on the University of Ottawa's secure

servers. Whether in electronic or paper format, data and personal records will be destroyed five years after the completion of the study.

Confidentiality will be respected and no information that discloses your identity will be released or published without consent, with the exception of disclosing abuse or acute risk of harm to yourself or others. If there is perceived risk, privacy will be breached (i.e. the risk of harm will be shared with the appropriate authority, such as the police). All members of the focus group are asked to maintain confidentiality of other participants.

Data Use and Storage

Data from this study will be used for research purposes. It will be used for a doctoral thesis project and may be published in scientific journals and presented in scientific conferences. In the event that the results of this study are published or presented, no individual information or information that could identify you will be released. As well, the data collected in the project can be used for other analyses related to the project and to develop future research projects.

Questions and Request for Information

Any questions about your rights as a research participant may be addressed to the Office for Ethics in Research, 550 Cumberland Street, Room 154, (613) 562-5387 or ethics@uottawa.ca

If you have questions at any time about the study or the procedures, you may contact the Student Researcher, Kimberly Turner, or Study Investigator, Dr. John Sylvestre. They can be reached by phone or e-mail at the coordinates listed above.

Informed Consent

I acknowledge that the research study described above has been explained to me and that any questions that I have asked have been answered to my satisfaction. I have been informed of my right to choose to not participate in the study. As well, the potential risks, harms and discomforts have been explained to me and I also understand the benefits of participating in the research study. I understand that I have not waived my legal rights nor released the investigators, sponsors, or involved institutions from their legal and professional duties. I know that I may ask now or in the future any questions I have about the study or the research procedures. I have been assured that information relating to me will be kept confidential and that no information will be released or printed that would disclose my personal identity without my permission. I have been given sufficient time to read and understand the above information.

By signing this consent, I agree to participate in this study. I may provide verbal consent that is audio-recorded, as long as the researcher shares the same information with me that is presented in this written consent form. I will be given a hard copy of the consent form for my records.

I agree to participate in a focus group for this study.

Yes □ No □

I agree to have the focus group audio-recorded and field notes recorded.

Yes □ No □

I understand and agree that my anonymized quotes may appear in published reports.

Yes □ No □

X_____ _____ _____

Participant's Signature Name, Printed Date (dd/mm/yy)

X_____ _____ _____

Focus grouper's Signature Name, Printed Date (dd/mm/yy)

Appendix H

Client Questionnaire for Nominal Group Study

1. How old are you?

2. What is your gender identity?

3. What programs are you using at CMHA Ottawa?

4. What is your level of comfort with digital technology on a scale from 1 (not at all comfortable) to 10 (completely comfortable. Please circle your answer.

1 2 3 4 5 6 7 8 9 10

Appendix I

List of Barriers and Solutions for Nominal Group

Unmet needs and barriers	
Individual: Related to someone's access to digital technology, how they feel about technology, and their digital skills.	
	Cost and Access
	High cost of internet and phone plans
	High cost of hardware, repairs
	Needing to sell technology to meet basic needs
	CMHA's programs to provide access to laptops were limited, some required participating in virtual group
	Ineligible for connect for success with Rogers (due to previous unpaid rogers bill)
	Phones being lost or stolen (especially without stable housing)
	Lack of internet access: Not enough bandwidth
	Lack of internet access: not enough data on plan
	Lack of internet access: Poor internet in rural areas
	Lack of access to charging
	Lack of access to ergonomic furniture, standing desk
	Lack of access to a private space
	Lack of access to a private device
	Digital skills
	Smartphones too complicated
	Not knowing how to use technology
	Lack of skills to identify scams and fraud

	The way online information explaining how to use technology is presented or worded can be confusing
	Not knowing how to look for information online
	Limited typing experience
	Personal Attitudes
	Mistrust of digital technology
	Paranoia about digital technology
	Don't feel like learning
	Privacy concerns
	Dislike virtual healthcare (find it impersonal, prefer to go in person)
	Dislike being so reliant on technology
	Anxiety about using computers
Tools and services: Related to any types of services accessed through digital technology. This includes healthcare and social services, but also any websites, banking services, apps, social networking, or even GPS and maps. Focus on if they are useful, easy to use, and accessible.	
	Don't know what tools and services are available
	Not user friendly
	Accessibility (e.g., Small screen, hard to see)
	Lack of virtual options for tools or services
	Sometimes only having a virtual options (e.g., needing to have an app to pay for something, needing to complete a course only offered online)
	Need to choose between virtual and in person
	Paid/apps or tools, Need a credit card to sign up an app
	Password issues (can't remember password, using same password)
	Two factor authentication problems (e.g., if your number changes)

	Hard to participate in virtual groups from a smartphone
	Not enough being done to address scams and phishing on apps, websites (e.g., romance scams, fraudulent ads, crypto ads, fraudulent calls and texts)
	Requirements to leave your camera on (e.g., in virtual groups)
	Bills all online, harder to access proof of income, address etc. (especially from only a phone)
	Not being allowed to use email for some things (because of privacy rules)
	Hard to sign documents and forms
	Hard to get help with online systems
	General tech issues/things not working
	Some apps only work with some operating systems (e.g., will work on an iPhone but not android)
	Password manager does not work
Social/community: Related to community norms and attitudes about digital technology, accessing digital technology through the community, and participation in online socializing and communities.	
	Lack of information about community spaces with Wi-Fi, or charging
	Lack of social contacts with knowledge about digital technology
	Lack of knowledge about online communities and peer support
	Community tech supports not trustworthy
	Online only social supports (lack of in person relationships)/Enables avoidance of in person activities
Health systems: Related to the health system more generally, including things like overall investment in digital technology, leadership in promoting digital health equity.	
	Inconsistent virtual care platforms across the healthcare system
	Transition to only using online/virtual applications and intakes for some things

	Needs of groups with lower access to digital technology not always considered
	Poor implementation of virtual referrals (referrals getting lost in system)
	Online screening systems discriminate based on diagnosis Health system set up to discourage calling (push people to do things online, e.g., family doctors online booking systems, not possible to get through on the phone)
	Not enough money/resources to maintain digital equity programs and supports
Policy: These are needs or barriers related to government policy on digital technology, the development of broadband Internet infrastructure, and policies related to data security and privacy.	
	Lack of policy regulating Internet cost for low income
	Lack of political will
	Being forced to accept cookies, privacy policies or be excluded (lack of legislation to protect online privacy)
	Restrictions on city of Ottawa "home for good start-up" money (e.g., can use on TV, but cannot use on laptop)

Solutions	
Individual: Related to someone's access to digital technology, how they feel about technology, and their digital skills.	
	Cost and Access
	Programs that lend hardware (laptops, phones)
	Providing low-cost options (for internet, phone and data plans)
	Teaching technology skills (class, skills groups, technology assistant)
	Relying on official sources of information
	Family plans for phone
	Flip phones instead of smartphones (simpler, less likely to be stolen)

	Providing pre-paid phone plan cards
	Providing a list of charging stations/free wifi access
Tools and services: Related to any types of services accessed through digital technology. This includes healthcare and social services, but also any websites, banking services, apps, social networking, or even GPS and maps. Focus on if they are useful, easy to use, and accessible.	
	Design apps to be more user friendly (consult with stakeholders)
	Use worker's phone for two factor authentication
	Having a link to access videoconference that doesn't require a password or login (e.g., OnCall link)
Social/community: Related to community norms and attitudes about digital technology, accessing digital technology through the community, and participation in online socializing and communities.	
	Peer technology support programs (tech buddies)
	Peer support app
	Sharing/promoting knowledge about technology (apps, resources for internet access, low-cost options etc.)
	Sharing/promoting knowledge about online communities
	Tech support drop in centre
Health systems: Related to the health system more generally, including things like overall investment in digital technology, leadership in promoting digital health equity.	
	Providing in person service options
	Access to walk in services
	Hybrid care models
	More investment in digital healthcare
Policy: These are needs or barriers related to government policy on digital technology, the development of broadband Internet infrastructure, and policies related to data security and privacy.	

	Government providing free or low-cost internet
	Better infrastructure in rural areas
	Policy to provide internet in long term care homes
	Passport funding for people with dual diagnosis expanded to allow using the money for digital technology (continue this)
	Policy making telecommunications companies provide low cost phone plan options
	Free wifi in public spaces

Appendix J

Nominal Group Guide

Introduction:

- Name? Preferred pronouns?
- How long have you been at/been receiving services from CMHA?
- What is your position at CMHA/What services do you use at CMHA?

We have done focus groups to understand CMHA Ottawa client use of digital technology and what barriers and needs are experienced by the community in different areas. Today I would like to identify any additional needs or barriers, discuss which needs are most important, what actions can be taken to address these needs, and which of these actions are the most important.

Needs and barriers

I have given everyone a sheet of paper with examples of unmet digital technology needs and barriers to digital technology use. They are divided into 5 areas where barriers can occur, each area has a list of several examples that were identified in a previous study.

Please take the next 5 minutes to review the list and think about and generate any additional barriers or community needs that you can think of for each category. If you can't come up with any for some of the categories that's ok too. After that, we will go around in a circle and list the needs and barriers one at a time until we've gone through all of them. After that we will have a brief discussion about them as a group to clarify any that are unclear and combine similar items. Then we will vote on which are the highest priority for the community.

[Approximately 5 minutes]

Now I would like to go around the group to share what you've written. We will have time for elaboration and discussion after. Right now, I would just like you to list the needs and I will compile a list. Each person will state one of the needs they wrote down, I will record it on this main list, and we will keeping going around in a circle until all needs have been recorded on the main list. If it comes to you and you have no new needs, you can pass or note one of the needs on the existing list that you identify with. You are free to participate next time it comes around if any additional ideas come to you, though.

[Approximately 10 minutes]

Now I would like to briefly discuss the needs and barriers. To make sure we have enough time to cover all needs we will be limiting this discussion to 5-10 minutes total so I may need to interrupt or redirect at times. Is there anything that anyone would like clarified or would like to clarify for [go through list of needs]. Are there any needs we should merge together? Are there any that need to be in a different category?

[Approximately 5-10 minutes]

Now that we have discussed needs at all the needs and barriers, I would like to prioritize which are most important. By most important, I mean what are the needs that, if they were addressed, would have the most benefit for the most people? We will do an initial round of voting, then we will discuss the results and have a second, final round of voting. You can select your items from the needs we generated today on the whiteboard along any of the ones on the list. Please take the next 5 minutes to think about this and write down the 5 needs you think are highest priority (across all categories) in order of priority (1 being the highest and 5 being the lowest) on this piece of paper and hand it back to me when you are done.

[Approximately 5 minutes]

Ok, give me a moment to quickly calculate the results [Enter rankings into premade excel template] and then I will present them to you, and we can have a brief discussion about them. Especially if there are any items with a lot of disagreement.
Present and discuss discrepancies [Approximately 5 minutes]

Now it's time for the final vote. I would like you once again to write down the 5 needs you think are highest priority in order of priority (The first being more important 5 being least). It can be the same as how you ranked them before or different. Please hand your paper to me when you are done.

[Approximately 5 minutes]

Thanks so much everyone. Now let's take a 10 minute break before we start talking about actions.

Actions

Welcome back! Now that we have spent some time thinking about the most important needs and barriers, I want to generate some solutions or actions that could be taken to address these needs and barriers. I would like to think about actions that CMHA Ottawa could consider taking, specifically, and actions that could be taken by others (e.g., policy makers, other community organizations, advocacy groups, researchers, society as a whole, the healthcare system, etc.).

Please take the next 5 minutes to think about and generate any actions you can think of that correspond with any of the needs we have identified and write them down on this second sheet of paper. I've included a section for CMHA actions and a section for others (with the other possible actors to consider listed). Please review the solutions in the list provided and note down any additional solutions that could be taken by CMHA or by others). When you're done, please turn over your sheet of paper. Then we will go around in a circle and list the actions one at a time until we've gone through all of them. After that we will have a brief discussion about them as a group to clarify any that are unclear and combine similar items. Then we will vote on which are the highest priority for the community. You don't need to come up with actions to address every need, and it's ok if you can't think of actions for all the actors.

[Approximately 5 minutes]

Now I would like to go around the group to share what you've written. We will have time for discussion after, right now I would just like you to list the action and the need it's meant to address and I will make a list on the whiteboard. Each person will state one of the needs they wrote down, I will record it on this main list, and we will keeping going around in a circle until all actions have been recorded on the main list. We will do this for actions that could be taken by CMHA and then actions that could be taken by others. If it comes to you and you have no new actions you can pass or note one of the actions on the existing list that you identify with. You are free to participate next time it comes around if any additional ideas come to you, though. Let's start with actions that could be taken for by CMHA. Ok, now let's do action that could be taken by other actors.

[Approximately 10 minutes]

Now I would like to briefly discuss the actions. To make sure we have enough time to cover all actions we will be limiting this discussion to 5-10 minutes total so I may need to interrupt or redirect at times. Is there anything that anyone would like clarified or would like to clarify for [go through list of actions]. Are there any actions we should merge together?

[Approximately 5-10 minutes]

Now that we have discussed all the actions, I would like to prioritize which are most important. We will do an initial round of voting, then we will discuss the results and have a second, final round of voting. You can include items from the actions we generated today on the whiteboard and/or any of the ones on the list you were provided.

For the actions there are a few things I would like you to think about when prioritizing:

- How feasible the action would be to put in place: So think about the resources that would
- be involved and how realistic a solution it is.
- The potential impact of the action: so how much of an effect would the action have.
- Would it help the community a lot or just a bit?
- Priority level of need: How important do you think the need that the action addresses is?

Think about the balance between all of these. For example, an action that requires a lot of resources but addresses a very important need and would have a huge impact could still be a good priority, and similarly an action that has a smaller impact but would be very easy to do and not require a lot of resources could also be a good solution.

Please take the next 5 minutes to think about this and write down the 5 actions you think are highest priority in order of priority (1 being the highest and 5 being the lowest) on this piece of paper and hand it back to me when you are done.

[Approximately 5 min]

Ok, give me a moment to quickly calculate the results [Enter rankings into premade excel template] and then I will present them to you, and we can have a brief discussion about them. Especially if there are any items with a lot of disagreement.
Present and discuss discrepancies [Approximately 5 mins]

Now it's time for the final vote. I would like you once again to write down the 5 actions you think are highest priority in order of priority (The first being more important 5 being least). It can be the same as how you ranked them before or different. Please hand your paper to me when you are done.

[Approximately 5 min]

That's it for the group! Thank you so much for your participation!