



Inequalities in Access and Use of Digital Technologies: A Determinant of Concern for Population Health?

RAPID KNOWLEDGE SYNTHESIS

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Information contained in the document may be cited provided that the source is mentioned.

Notice

This document was written in the health emergency context of COVID-19. It was written in a short time frame and is based on a review and non-exhaustive summary analysis of the scientific literature and on some documents previously produced by the INSPQ. This document presents findings and measures targeting equitable access to digital technologies that may need to be reviewed as the scientific knowledge related to the current pandemic develops. The INSPQ is conducting scientific monitoring on COVID-19 in order to quickly update this document as necessary.

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Summary

Digital technologies have proven essential during the COVID-19 pandemic for jobs and education and to provide access to a range of online activities and services. While the screen time of many Quebecers has increased in this context, inequalities in access and use have been reported. Based on a quick synthesis of the knowledge, the objectives of this publication are to document the digital inequalities faced by populations in economically vulnerable situations, people living in regions that are underserved or poorly served by telecommunications services, senior populations, school-age populations, and populations with low literacy levels. Measures are proposed to mitigate these inequalities with a view to ensuring equitable access to a range of services, information, and services and activities related to a number of determinants of health.

Key messages

The literature consulted reveals the following findings:

- ▶ Income is the factor with the highest impact on access to the Internet. Populations in economically vulnerable situations with limited access to digital technologies have been more negatively impacted by the health measures applied to workplace and educational conditions.
- ▶ The lack of infrastructure providing access to a fast, reliable, and affordable Internet network contributes to digital inequalities. Populations who are underserved or poorly served by telecommunications services risk being denied optimal access to work, education, and healthcare and social services, especially when residing far from healthcare establishments.
- ▶ Digital technologies help break the isolation of populations of seniors who live alone, but their use is often impeded by a lack of access to and familiarity with these technologies. Social support and assistance in the progressive application of new skills may promote the digital inclusion of these populations.
- ▶ The quality of access and beneficial use of digital technologies for children's online education is largely conditional on the material resources, support, and supervision provided in family and

school environments. Parents and teachers do not always have adequate support to face the challenges of online education.

- ▶ There are a number of types of literacy at play within digital inequalities (e.g., traditional literacy, health literacy, science literacy, media literacy). The use of digital technologies by populations with low literacy levels offers fewer benefits, and even involves more risks to their health than that of populations with a higher literacy level.

The documented measures targeting equitable access to digital technologies are:

- ▶ Adopting government policies guaranteeing universal or equitable access to digital technologies.
- ▶ Supporting the digital shift in public institutions (e.g., schools, libraries, municipal buildings and parks, hospital centres and CHSLDs).

The documented measures that aim for equitable digital technology use are:

- ▶ Setting up tech support to help people make proper use of digital technologies in a way that is cost-effective.
- ▶ Providing opportunities for learning and mutual support to help develop general digital skills as well as those specific to health.
- ▶ Creating environments that foster online learning to support schooling from home when necessary.
- ▶ Involving different population groups in developing spaces and digital resources specifically for them in order to customize the services and tools to their needs and inform designers on the adoption of universal design concepts.
- ▶ Ensuring that a range of high-quality offline alternatives and substitutes for online services are available to compensate for digital inequality and to accommodate communication preferences.
- ▶ Encouraging organizations to invest in digital literacy and eHealth with emphasis on equity, including through their online service offering, training, monitoring disparities in access, and evaluating the results.

Despite the many advantages provided by access to and use of digital technologies in a pandemic context, it is important to remember that intensive screen use is not without health risks.

It is important to create conditions conducive to reasonable use of digital technologies that does not harm the development of individuals or health of the population.

Context

In the last year, thousands of individuals facing the COVID-19 pandemic had to adapt to remote work and education without preparation for this rapid shift. Digital technologies have proven indispensable for work and school, as well as to access to a range of online activities and services (e.g., information, delivery services, physical activities, funerals, prenatal classes, mutual support groups). Although online browsing is a significant source of misinformation, it also facilitates access to reliable and varied resources. A survey conducted from March 8 to 17, 2021, of around 6,000 Quebecers 18 years of age and over demonstrates the extent of the population's use of digital technologies.¹ More than half of participants reported increasing their screen time since the start of the pandemic for meetings or e-learning, video calls, or social media.

As a result of the health crisis, which forced many services and activities to transition to digital solutions, experts have proposed considering access to and use of digital technologies as a social determinant of health (1, 2). The concept of digital technologies in this context includes various devices that allow access to websites and applications that can be downloaded online (e.g., computers, smartphones, tablets). Their use is conditional on Internet access, which is therefore another part of the digital inequality issue.

The transition of essential services and activities to digital solutions has not affected everyone in the same way. Since the start of the pandemic, inequalities in access and use have been reported in Quebec media.² Researchers have noted that these inequalities are ingrained in socioeconomic and cultural contexts present before the pandemic, which suggests that they intersect with the underlying social inequalities while reinforcing them (3, 4). For example, data collected by Statistics Canada suggests that as certain schools adopted e-learning options in fall 2020, pre-existing differences in Internet access and possession of the devices required to go online risked further disadvantaging children from low-income households.³

The premise adopted by this document is that accessibility and appropriate use of digital technologies are assets that facilitate access to a range of services, information, and activities related to many determinants of health (1, 2, 5). Having an Internet connection and device to use online resources are two of the most commonly cited indicators when describing digital inequalities. Yet, beyond possessing technology connected to the Internet, this issue also includes quality of access (e.g., quality of the bandwidth, number and quality of devices). Moreover, behind the rates of connection and possession of digital devices are uses of a varied nature and intensity, which do not necessarily offer the same benefits in terms of access to various areas of interest. For example, occasionally going online to take a course by videoconference or for a telemedicine appointment is not equivalent to having difficulties logging off due to Internet addiction or online gambling issues. Finally, inequalities in access and use have tangible advantages and disadvantages with regard to social inclusion (6).

¹ <https://www.inspq.qc.ca/covid-19/sondages-attitudes-comportements-quebecois/temps-ecran-23-mars-2021> [in French]

² <https://ici.radio-canada.ca/nouvelle/1706030/haute-vitesse-emilise-lessard-therrien-projet-teletravail-etude>
<https://ici.radio-canada.ca/nouvelle/1688855/teletravail-divertissement-reseaux-internet-cellulaire>
<https://ici.radio-canada.ca/nouvelle/1706227/covid-19-pandemie-internet-reseau-connexion-outaouais-investissements-federal>
<https://theconversation.com/il-est-plus-que-temps-de-prendre-au-serieux-les-inegalites-numeriques-et-scolaires-140602> [in French]

³ <https://www150.statcan.gc.ca/n1/pub/11-631-x/2020004/s8-eng.htm>

HEALTH RISKS ASSOCIATED WITH HYPERCONNECTIVITY AND SCREEN USE⁴

Since the start of the health crisis, Internet use has facilitated the continuation of work, provided access to information and services, offered a variety of digital entertainment, and helped maintain family and social ties, all of which are elements that have helped maintain health to a certain extent in a pandemic context. However, these are also probably the same conditions that have contributed to the increased screen time observed during the pandemic in Quebec and around the world (7, 8).

This increase in screen time largely corresponds to professional and academic use, in addition to the shift of interpersonal communications, social relationships, and hobbies to screens (9). Yet, intense screen use (over four hours a day for leisure) comes with health risks (10). Prolonged hours in a seated position while exposed to blue light increases the risks of developing musculoskeletal disorders; vision, sleep, and sedentariness problems; and obesity. (11). The intensive use of certain content or applications on a screen is also associated with dependency issues (e.g., online gaming or gambling, shopping), cyberbullying, anxiety, depression, isolation, etc. (12).

Objectives and methodology

Objectives

This quick knowledge synthesis has three objectives:

- ▶ Identify the populations most vulnerable to digital inequalities
- ▶ Describe the digital inequalities in the identified populations
- ▶ Document the solutions proposed in the scientific literature to mitigate the potential inequalities in access to and use of digital technologies in Quebec

Literature review strategy and analysis

A keyword search was done in electronic reference databases, using the services of a librarian (see *Annexe 1*).⁵ For articles published before the pandemic, the research strategy was restricted to literature reviews, including scoping reviews, and narrative and systematic reviews, with or without meta-analysis, and without date ranges. Given the type of available literature related to the current health crisis (e.g., publications having undergone a shortened publishing process, a higher number of opinion articles published), expert opinions were included in the selection of scientific literature published in 2020 and 2021. Preprint articles were not excluded.

In addition to this main strategy, the professionals who contributed to this document applied complementary methods of literature review, including:

- ▶ Selection of scientific articles and grey literature from scientific monitoring conducted by the INSPQ in the COVID-19 pandemic (monitoring “social inequalities in health”, “screens,” and “psychosocial impacts – children”).
- ▶ Identification of scientific articles and grey literature in pertinent databases including PubMed, Google Scholar, and Google. The keywords used and date ranges were adapted to each topic addressed.
- ▶ Application of the “snowball” method by examining articles cited in the documents consulted.

The descriptive analysis of digital inequalities in the identified populations is based on the literature published before and during the COVID-19 pandemic in societies with comparable technology infrastructure to that in Quebec. Similarly, the proposed measures aiming for equitable access to digital technologies are from the pre-pandemic literature or were issued in a pandemic context and could potentially be applied in the COVID-19 context.

⁴ For data on screen use in the Quebec population, refer to: <https://www.inspq.qc.ca/covid-19/sondages-attitudes-comportements-quebecois/temps-ecran-23-mars-2021> [in French]

⁵ Appendices have not been translated, please refer to the French version at [Inégalités d'accès et d'usage des technologies numériques : un déterminant préoccupant pour la santé de la population? | INSPQ](#)

Assessment of the quality of evidence and other benchmarks of quality

The level of scientific support for the measures proposed in this document was established by examining the number and type of available publications, and the consistency of their results (see the details of the methodology used in *Annexe 2*).

The other benchmarks of methodological quality that apply to the production of a rapid knowledge synthesis in a COVID-19 pandemic context are presented in *Annexe 2* as a checklist.

The populations most vulnerable to digital inequalities

An investigation of the scientific literature allowed for a preliminary identification of the populations most at risk of experiencing the negative impacts of digital inequalities in the COVID-19 pandemic context (3, 13–15): populations in economically vulnerable situations, populations living in regions that are underserved or poorly served by telecommunications services, seniors, and school-age children. This research has confirmed the pertinence of the initially identified populations and also added a category: the population with low general literacy and health literacy.

The articles consulted generally explain the majority of access inequalities by economic obstacles related to income and by the inaccessibility of telecommunications services in certain regions. The inequalities of use at play vary according to learning opportunities, the use practices of the people around the user, and various aspects of individuals' life paths (e.g., education, job type).

Populations in economically vulnerable situations

The literature consulted indicates that socially and economically vulnerable populations are the hardest hit by digital inequalities (16, 17). On a Canada-wide scale, the factor that most impacts Internet access is income—more than age, location of residence, and education level (18).

In Quebec, 12% of households with an annual income below \$20,000 did not have an Internet connection in 2020, while no households with an income above \$60,000 were in this situation.⁶ Low-income households are also less well equipped with technological devices in both number and quality (19, 20). According to the Canadian Internet Use Survey (CIUS, 2018⁷), low-income households are more likely to have less than one device per member than high-income households. Due to isolation and social distancing measures, members of a single household may have to share digital resources, which as a result become insufficient to meet the obligations of telework and schooling from home (4).

Moreover, the use of outdated equipment or an insufficient bandwidth can cause long wait times or even make it impossible to access online resources. As a result, the experience may be less satisfactory, and use may decrease due to the increased difficulty of developing digital competencies, compared to in households whose income is high enough to afford access to a higher bandwidth (4, 21). In addition, it is more difficult in a pandemic context to make use of the usual support networks, when support from more experienced individuals contributes in many ways to developing digital competencies (22). Basic digital skills are in fact often necessary for seeking out the support required to resolve online technical difficulties (4).

The closure of schools, libraries, cafés, and workplaces that offered Internet access, and in some instances provided access to quality devices, has also contributed to widened access inequalities in the pandemic context (23). These closures are an obstacle, especially for job seekers who do not have a reliable Internet connection and cannot develop the digital skills that they may need

⁶ Data available here: <https://transformation-numerique.ulaval.ca/enquetes-et-mesures/netendances/2020-11-portrait-numerique-des-foyers-quebecois> [in French]

⁷ Data available here: <https://www150.statcan.gc.ca/n1/pub/75f0002m/75f0002m2021003-eng.htm>

to integrate into the job market (18, 24). The situation has also affected access to digital technologies for people living in extreme poverty, such as those experiencing homelessness.

KEY MESSAGE

- Income is the factor with the highest impact on access to the Internet. Populations in economically vulnerable situations with limited access to digital technologies have been more negatively impacted by the health measures applied to workplace and educational conditions.

Populations living in regions underserved or poorly served by telecommunications services

The existence of a digital divide according to place of residence is well established in the scientific literature from countries including the United States, Australia, and Canada (14, 15, 25–29). This divide is mainly characterized by a disparity in access to digital technologies between urban and rural regions, even though some rural regions may be better served than others (5), and some disparities in access can also be observed between wealthy and poor neighbourhoods in cities (30). In Canada, 98.6% of urban households have access to broadband Internet services (50/10 Mbps with unlimited data transfer), while 45.6% of households in rural communities have access to such services⁸. Rural households have access to an LTE mobile network at a rate of 97.4% (31), but this network has the inconvenience that it can only be used from a cellular phone.

For rural communities with some Internet access, these services are often more costly yet slower or less reliable due to a lack of infrastructure or competition between providers (29, 30, 32). Additionally, since people living in these regions use digital technologies less often, they have fewer opportunities to develop their skills at using them. This is the case for all groups that face inequalities in access to digital technologies: their realities are generally overlooked in the design of digital technologies, which ultimately means online services

and applications are potentially less suited to their needs (26, 28).

According to many researchers, rural populations who face limited or even non-existent Internet access are denied a range of benefits (5, 14, 25, 26, 28, 32). It is important to take into consideration that travel time and costs, which are sometimes higher in rural areas (5), can complicate access to health care and social services for communities far from healthcare facilities. In these circumstances, it can be more difficult to receive a timely diagnosis and benefit from appropriate ongoing medical or professional care (32). Online psychological counselling and psychosocial support should be accessible to the members of these communities, which would benefit the entire population (27). An Internet connection could also help break social isolation for people who are often far from their loved ones, especially during health crises like the COVID-19 pandemic (27, 29, 33).

Lastly, limited access to digital technologies in these regions, in addition to its impact on employment, education, and communication (27, 29), may hinder the entrepreneurship and economic competitiveness of rural communities and businesses (33), potentially affecting their vitality (33). Excessive inequalities in the distribution, accessibility, and affordability of goods and services can harm the economy, society as a whole, and the health of populations (34).

KEY MESSAGE

- The lack of infrastructure providing access to a fast, reliable, and affordable Internet network contributes to digital inequalities. Populations who are underserved or poorly served by telecommunications services risk being denied optimal access to work, education, and healthcare and social services, especially when residing far from healthcare establishments.

⁸ For more data, refer to the Communications Monitoring Report from the Canadian Radio-television and Telecommunications Commission (2020): <https://crtc.gc.ca/eng/publications/reports/policymonitoring/2020/cmr4.htm>

Senior populations

Age is a significant factor in variation in having the ability to benefit from digital technologies (14, 35). Although digital technologies are increasingly well integrated into the lives of most seniors, they are one of the more disadvantaged groups in this regard (36, 37). Many seniors do not have access to a functional device, an adequate Internet connection, or technology with the right features for their needs (38, 39). Use of digital resources by this part of the population is also more limited. For example, few seniors use their devices to access specialized public services online (40). Furthermore, people living in long-term care facilities use digital technologies less often than those who live at home (41).

In addition to the normal benefits in terms of information and communication, digital resources offer seniors other possible advantages. For example, some apps detect falls using an alert system (1, 14) or help reduce loneliness and social isolation (43, 44). A study conducted on some 1,700 people between the ages of 80 and 103 demonstrated that the use of digital technologies was associated with subjective well-being in this age group in terms of lower levels of loneliness and anomie and higher levels of autonomy (37). Other researchers have revealed similar findings (45, 46).

Despite the potential benefits, seniors face obstacles to accessing and using digital technologies, the most documented of which are lack of effective technical support to use them (26, 47) and the fact that

accessibility features are not always designed for the physical capacities of vulnerable populations (e.g., increased font size) (47, 48). Family members, friends, and peer groups are an important source of encouragement and inspiration for becoming acquainted with digital technologies and their support can be a major determinant of their use (43).

Compared to younger people, older adults are often less familiar with digital technologies. This can translate to partial knowledge of the potential benefits of their use (14) and feeling easily exasperated or demotivated when learning how to use them (37). The perception of their complexity may hold older adults back from using these technologies or cause them to disengage from a learning process. The rapid evolution of digital technologies requires frequent skill upgrades that can result in the progressive exclusion of some social groups who are less digitally active. Furthermore, the perception of the social stereotype that age affects digital technology abilities can hinder their adoption in late adulthood, thus leading to continued inequalities between younger and older generations (35).

KEY MESSAGE

- Digital technologies help break the isolation of senior populations who live alone, but their use is often impeded by a lack of access to and familiarity with these technologies. Social support and assistance in the progressive application of new skills may promote the digital inclusion of these populations.

POPULATIONS MORE VULNERABLE TO THE RISKS OF INTERNET AND SOCIAL MEDIA USE

Despite its convenience and various health benefits, using the Internet can also present a risk of victimization (e.g., identity theft, fraud and extortion, cyberbullying, cyberstalking), increased use potentially leading to dependence on certain content or activities available online, and exposure to misleading information that may be detrimental to health. Some population groups like seniors or those who are economically disadvantaged are sometimes more vulnerable to some of these risks or are more affected by their consequences. Gambling and compulsive online shopping, for example, can have major financial consequences on the budgets of families or people who are already in a vulnerable position, such as retirees who can no longer rely on new income to repay their debts (49).

While the cyberbullying of seniors is still little documented, it is nonetheless present and should be monitored given the increased rates of home Internet connections for people over 65 due to the pandemic (+11 percentage points from April to October, 2020, an increase from 80% to 91%).⁹ Increased Internet use and risky practices on social media, lack of knowledge on cyber security, and a history of victimization are both risk and vulnerability factors for cyberbullying (50).

Moreover, social media, a major source of communication and information, can also be a source for the spread of rumours or misinformation. The COVID-19 crisis has repeatedly been declared a pandemic and “infodemic” by the WHO (51). Given the wide distribution social media offers, this misinformation can have a major impact on attitudes and adherence to health measures in a pandemic context. Studies have shown that certain population groups subscribe more easily to some conspiracy theories or are at risk of being influenced by misinformation related to COVID-19; among them are users over 65 years of age and less educated individuals (52).¹⁰ Limited familiarity with resources for fact-checking, lack of awareness about existing misinformation on the Internet, and the “echo chamber” phenomenon¹¹ enabled by social media may explain these vulnerabilities (52).

School-age children

Young children’s access to and use of digital technologies are never entirely independent of those of their family and school environment (53). More specifically, it has been observed that the frequency and extent of the parents’ usage are correlated with those of their children, and that parents who have limited skills using the Internet are more restrictive of their children’s online activities (53). Children living in a household with a single means of Internet access also appear less inclined to use the Internet for educational activities like researching information, educational games, or communicating with a teacher (53). Moreover, concerns and general mistrust related to the harmful effects of digital technologies on youth can result in this age group’s low digital participation (54).

For their education, school-age children are highly dependent on the material and human resources at their household and at school. Well before the 2020–2021 pandemic context, inequalities in digital access were already observed in relation to academic progress. The term “homework gap” coined in the United States refers to the difficulty some students face meeting their educational requirements, namely because they are unable to do homework at home due to a lack of adequate Internet access or the digital resources required (55). In addition to this obstacle, school-age children also need the support and supervision of their parents or guardians.

⁹ For details: <https://transformation-numerique.ulaval.ca/wp-content/uploads/2021/01/netendances-2020-aines-connectes-au-quebec.pdf> [in French]

¹⁰ For more on this topic: <https://www.inspq.qc.ca/covid-19/sondages-attitudes-comportements-quebecois/20-avril-2021> [in French]

¹¹ The echo chamber phenomenon on social media refers to the amplification and reinforcement of information, ideas, and beliefs through repeated communication. Generally speaking, the sources are not questioned and opposing points of view are underrepresented, discredited, or censored (source: Wikipedia).

Recent evidence indicates that the transition to remote learning imposed by the pandemic has created numerous challenges for children, youth, and families, including lack of equipment and supervision difficulties (56). To be effective, online education requires good digital literacy skills of the students, teachers, and parents that have to supervise young children's education (55, 57). The transition to remote learning was not experienced the same way by everyone since children and youth from families of a lower socioeconomic status do not always have the required equipment (55). Some students do not have all the technology skills they require and their parents do not necessarily have adequate digital literacy (57). For example, a recent report estimates that in the United States, lack of Internet access or devices to go online affect around nine million students from the preschool to secondary school levels. For 40% of these students, low literacy or difficulties with the language of use for these digital technologies prevent from using them (58). Additionally, in a pandemic context, parents living in poverty must often face additional stressors (e.g., financial difficulties, job loss) that prevent them from dedicating time or resources to their children's education (56, 59). Experts have hypothesized that these situations lead to academic delays (55) that are potentially more pronounced in children and youth from low socioeconomic backgrounds.

Key message

- The quality of access to and beneficial usage of digital technologies for children's online education are largely conditional on the material resources, support, and supervision provided in family and school environments. Parents and teachers do not always receive adequate support to face the challenges of online education.

CHILDREN AND ADOLESCENTS: MORE VULNERABLE TO RISKS OF INTERNET USE AND SCREENS¹²

Exposed to screens at an increasingly young age, children and adolescents are more vulnerable to the risks associated with their use. The effects of intensive use on their health and development vary (60). In those who are five to 19 years old, intensive Internet use (more than four hours a day of leisure time) is associated with online risk-taking (e.g., meeting strangers, sharing personal information), conduct disorders, anxiety related to body image, and eating disorders (61). As they do not yet have the knowledge and skills needed to protect themselves, children and adolescents may consequently be exposed to inappropriate content and be more vulnerable to sexual exploitation. Adolescents' intensive social media use is also related to increased cyberbullying suffered and committed.¹³ Conduct disorders, hyperactivity, problems with schoolmates, and emotional disorders have been demonstrated in adolescents who spend more than 50% of their free time online gaming (61).

Like it is for adults, intensive screen use is also associated with decreased length and quality of sleep, which may harm learning, memory, concentration, mood, and behaviour. Furthermore, multitasking, as in using multiple apps or devices with a screen at a time, is a common practice among adolescents and may harm learning and academic performance (e.g., reading, problem solving). Furthermore, increased screen time may reduce opportunities to learn, play, and interact with family members, which can erode family relationships (61).

For these various reasons and to minimize the risks, a number of organizations have developed guidelines for screen use. The Canadian Society for Exercise Physiology (CSEP) recommends a maximum of two hours of recreational screen time per day for children aged five to 17 in order to reduce issues associated with sedentariness.¹⁴ Furthermore, to promote healthy use of technologies and digital media, the Canadian Paediatric Society's recommendations include families discouraging excessive online activities, especially during homework time or before bedtime, and encourage daily screen-free time for the whole family (61).

Populations with a low level of literacy, health literacy, or digital literacy

The OECD defines literacy as the “ability to understand, evaluate, use and engage with written texts to participate in society, achieve one’s goals, and develop one’s knowledge and potential”¹⁵ (62). Health literacy refers to when this concept is applied to the ability to find, understand, assess, and use the information to maintain or improve one’s health (63, 64). More broadly speaking, the concept of eHealth (65) includes skills based on six types of literacy, namely traditional, health, information, scientific, media, and digital literacy. These skills enable, among others, the user to use a search engine, identify reliable sources of information, and fill out online forms (66).

Although income, place of residence, and age are factors recognized as having a significant impact on access to and use of digital technologies, the impact of literacy levels remains less explored (67–69). However, researchers who have studied this topic recognize that a low literacy level affects access to and use of digital technologies for a portion of the population (67, 69–71). People with low literacy and health literacy levels may find the need to use digital technologies in the pandemic context particularly difficult.

Populations with higher literacy and health literacy levels are more likely to use digital technologies for health purposes, whether to find information, receive training, or make appointments online (70). In contrast, those with low levels of literacy and health literacy adhere less to clinical guidelines and appear more likely

¹² To consult a document specifically on this subject, refer to: <https://www.inspq.qc.ca/publications/3015-utilisation-ecrans-pistes-encadrement-covid19> [in French]

¹³ For more details on related risks and recommendations, read: <https://www.inspq.qc.ca/publications/3012-exposition-jeunes-violence-jeux-video-media-sociaux-covid19> [in French]

¹⁴ The 24-Hour Movement Guidelines from the Canadian Society for Exercise Physiology are available here: <https://csepguidelines.ca/>

¹⁵ Source : (OCED, 2013, p. 61) <https://www.oecd-ilibrary.org/docserver/5jm0v427jl9p-en.pdf?expires=1645468236&id=id&acname=guest&checksum=89DEE1D991E2253A904AA6723409FD62> quoted in : https://www.oecd-ilibrary.org/social-issues-migration-health/la-litteratie-a-l-ere-de-l-information_9789264281769-fr

to be in poor health (72), to report that they are in poor health, and to feel less able to make life decisions (63, 64, 66).

The Consortium Health Literacy Project – European supports that health literacy should not only be considered a personal skill, but also an interaction between the individual skills of understanding and using health information and the requirements of the surrounding healthcare system (73). It is therefore imperative, in a context of the widespread shift to digital for activities related to healthcare services, to consider their access and use through a literacy lens. A literacy approach in public health falls in line with the healthcare system's similar approach in its efforts toward health communication, promotion, and education (68, 73).

It is necessary to have skills, and even a certain level of autonomy, to be able to benefit from information and services provided online. The available information may be presented in many written or verbal forms in texts, brochures, videos, or webinars, some being more accessible than others (e.g., videos in different languages with subtitles offered in different languages). Using the Internet does not always include ways of asking questions, sharing concerns, or maintaining a meaningful relationship with the organization or professional providing the online information or service (74, 75). Individuals with a low level of literacy or health literacy could benefit from support to properly absorb this information (73–75). In the case of prenatal education, for example, it is recommended for parents to discuss the information they find online with the professional following the pregnancy (76).

Finally, the literature consulted reveals that individuals with a low level of eHealth literacy feel less effective at taking care of their own health and making decisions based on the information that they find online (65). For example, a study of parents of children with special needs demonstrates that 21% of these parents report being unable to distinguish between good and poor quality information online, and that 25% are not confident making decisions related to their child's health using this information (77). Risks of self-diagnosis and self-medication that could pose potential health dangers may also be related to low digital health literacy.

KEY MESSAGE

- ▶ There are a number of types of literacy at play within digital inequalities (e.g., traditional literacy, health literacy, science literacy, media literacy). The use of digital technologies by populations with low literacy levels offers fewer benefits, and even involves more risks to their health than that of populations with a higher literacy level.

Measures targeting equitable access to and use of digital technologies

Digital inequalities are conditional on numerous individual and population determinants and characteristics. Their combination and interaction can exacerbate digital inequalities (78). Some of them can be changed to promote digital equality.

After the lockdown and physical distancing measures were issued in response to the COVID-19 pandemic in 2020, a number of measures were progressively implemented in Quebec to ensure that more people could benefit from digital technologies. It cannot be fully predicted how the pandemic situation will evolve in the future. The use of these technologies may become less necessary in certain spheres like work, recreation, and culture. The end of the state of emergency should leave room to set desirable directions while weighing the issues, such as children's education (79–81).

Furthermore, in preparation for potential future lockdown periods, effective mechanisms to move essential activities online should be in place. It is also essential to plan alternatives to digital solutions, such as those offered by telephone, mail, or television, for a flexible response to the needs and preferences of certain groups (48, 82). These alternatives must also be as beneficial as the services offered online, especially in terms of accessibility and wait times. In all cases, the context in which the digital technology is used must be assessed to promote the inclusion of all (e.g., security, confidentiality, literacy, Internet addiction) (32, 63).

The measures documented below are taken from documents consulted based on their potential to promote equity in the access to and use of digital technologies. These measures can be developed on a case to case basis on a municipal, regional, or national level.

CAUTIONARY REMARK REGARDING WIDESPREAD USE OF DIGITAL TECHNOLOGY

It is important to remember that the proposed measures do not aim to encourage “tout à l’écran” [all on screen],¹⁶ but rather to reduce the inequalities in access to and use of digital technologies. Moreover, these measures should include a framework for the technologies and use of online resources to prevent known health risks.¹⁷

Measures aiming for equitable access to and use of digital technologies

Measures and level of scientific support	Examples
Apply government policies guaranteeing universal or equitable access to digital technologies. Moderate (2, 4, 15, 18, 27, 33, 83)	<ul style="list-style-type: none"> ▶ Adequately fund digital infrastructure for high-speed Internet access in regions underserved or poorly served by telecommunications services. ▶ Regulate the rates charged by Internet service providers. ▶ Implement programs that provide lower-cost access to Internet coverage and the equipment needed to use it.
Support the digital shift in public institutions (e.g., schools, libraries, municipal buildings and parks, hospital centres and CHSLDs). Moderate (27, 29, 37, 74, 84–86)	<ul style="list-style-type: none"> ▶ Support CHSLD residents who wish to communicate with friends and family using digital media. ▶ Distribute electronic tablets with pre-loaded content to parents who want to benefit from prenatal training but do not have their own device. ▶ When required, distribute the equipment students require for remote education in a timely manner.
Encourage device donation and recycling programs. Low (87)	<ul style="list-style-type: none"> ▶ Promote the donation of used devices to charities that can redistribute them to people in need. ▶ Offer financial incentives to companies that donate devices to charities.
Design services that can be accessed using the LTE mobile network. Low (28, 31)	
Ensure that telehealth services remain as reimbursable by insurance as they are for in-person consultations. Low (5, 30)	
Set up technical assistance and support services to promote proper use of digital technologies in a way that is cost-effective. Moderate (4, 18, 26, 65, 67, 88–90)	<ul style="list-style-type: none"> ▶ Provide resources to respond to the technical support needs of individuals using online services or acquiring technology tools.
Provide opportunities for learning and mutual support to help develop general digital competencies as well as those specific to health. Moderate (4, 15, 23, 65, 67, 69, 70, 91–94)	<ul style="list-style-type: none"> ▶ Offer workplace training programs or workshops. ▶ Support the establishment of learning, assistance, and support networks by peers in various spheres of life (e.g., schools, communities). ▶ Promote learning through trial and error and gradual successes.

¹⁶ The “all on screen” is a trend of modern societies to move all human activities online making the use of screens unavoidable and necessary.

¹⁷ For more detail, readers can refer to the following document [in French]: Lemétayer, F. and Papineau, É. (2021) *L'utilisation des écrans et la santé des jeunes: pistes d'action pour une approche préventive*. Brief presented as part of the consultation with the Ministère de la Santé et des Services sociaux du Québec. INSPQ.

Measures aiming for equitable access to and use of digital technologies (cont'd)

<p>Create environments that foster online learning to support schooling from home when necessary.</p> <p>Moderate (53, 55–57, 59, 65, 95)</p>	<ul style="list-style-type: none"> ▶ Establish a feeling of normality and safety with remote learning while teaching adaptive behaviours and ensuring that instructors follow up with students or parents. ▶ Use communication modules that allow teachers to speak directly to their students. ▶ Ensure that students and parents are knowledgeable about and proficient in the technology tools. ▶ Foster the development of parents' feelings of self-efficacy supporting their children.
<p>Involve different population groups in developing spaces and digital resources specifically for them in order to adapt the services and tools to their needs and inform digital designers on the adoption of universal design concepts.</p> <p>Moderate (18, 28, 37, 53, 55–57, 65, 69, 70, 95, 96)</p>	<ul style="list-style-type: none"> ▶ Involve communities in identifying their digital technology needs. ▶ Adopt inclusive, user-centred design processes. ▶ Involve youth and their parents in transforming digital spaces, especially those related to online education. ▶ Reduce the complexity of navigating public organizations' websites to make them more accessible. ▶ Provide adaptive technologies for people with physical limitations (e.g., impaired vision or fine motor difficulties) and language needs, taking into account their language of communication and literacy level.
<p>Ensure that a range of high-quality offline alternatives and substitutes for online services are available to compensate for digital inequality and to accommodate communication preferences.</p> <p>Moderate (18, 56, 70, 74, 82, 97, 98)</p>	<ul style="list-style-type: none"> ▶ Ensure that digital services and assistance are also made via various alternative modes of communication (in person, by telephone, on the radio, on DVD, etc.). ▶ For schooling from home, offer teaching materials in different forms, including mailed hard copy documents. ▶ For health consultations, offer appointments by telephone to people who are not comfortable with video, and offer the choice of virtual or in-person appointments so that people without access to technology can receive care.
<p>Encourage organizations to invest in digital literacy and eHealth with emphasis on equity, including through their online service offering, training, monitoring disparities in access, and evaluating the results.</p> <p>Moderate (63, 65, 67, 70, 71, 74, 75, 83, 99-101)</p>	<ul style="list-style-type: none"> ▶ On organizations' websites, provide interactive spaces (e.g., a chat window) where users can ask questions and receive guidance to understand and use the information being communicated to them. ▶ Develop stakeholders' capacity to direct users to credible sources of information. ▶ Inform healthcare system leaders of the obstacles to accessing online services in relation to equity. ▶ Identify and document the disparities in access to online services. ▶ Improve quality of access to services while taking into account the outcomes of the documented disparities.

Additional measures for a digital framework, ethics, health equity, and social justice

Despite its advantages, the use of digital technologies involves risks to public health. In particular, increased screen time during the pandemic highlights an urgent need to develop a national awareness campaign on rational and sensible use of digital technologies. This type of campaign should communicate the risks associated with prolonged screen time, the main recommendations per age group, and suggested alternative activities to using screens. It should address

children, adolescents, parents, and adults in general. Risk prevention programs related to screen use should also be developed, targeting living environments of children, adolescents, and adults (e.g., schools, workplaces, public spaces, digital environments). Public policies promoting, for example, the right to disconnect, or that aim to regulate the industry (e.g., video game content ratings) would make it possible to change lifestyle habits more effectively while promoting healthy environments.

Furthermore, researchers have proposed to estimate the short- and long-term implications of digital technology use on ethics, health equity, social justice (102). They suggest examining how and where these technologies support (or hinder) public health missions and objectives. The distribution of their benefits and disadvantages across all sociodemographic groups should be assessed. The issues surrounding infringement on human rights and invasion of privacy should also be weighed. In doing so, it is important to be on the lookout for new forms of social stratification and surveillance likely to be created by digital technologies, such as the misappropriation of data for businesses, political gain, surveillance, or undue social control, for example (102).

Conclusion

The fast pace of the digital shift imposed by the COVID-19 pandemic appears to be a double-edged sword in terms of social inclusion. The identified scientific data and expert opinions converge in demonstrating that access to and use of digital technologies are far from being equally distributed across the population. Were physical and economic access to digital technologies to become universal, the benefits of their use would remain determined by individuals' varying skills in protecting themselves from the risks these technologies pose and using them in a way that promotes learning, social participation, and health.

Considering that most public services are shifting toward digital formats, it is important to create environments that promote their appropriate use in an evidence-based way and that encourage effective, efficient, inclusive, equitable, and secure services and activities designed for the populations concerned (103). The strengthening of digital skills and access to broadband Internet services and quality devices to go online are becoming increasingly important as digital technologies gain ground and become an integral part of the way services, work, and education are conducted. The new post-pandemic reality will make promotional and preventative efforts on these different fronts all the more necessary for the public health actors leading them.

There is no one single solution to reducing digital inequalities from a public health perspective. Like for any action targeting social determinants of health and the reduction of vulnerabilities, multiple complementary measures must be taken, especially through intersectoral collaboration (34). Without losing sight of the importance of preventing the harmful effects of screens on population health, the public health network can work in collaboration and contribute positively to developing solutions that will reduce inequalities in access to and use of digital technologies.

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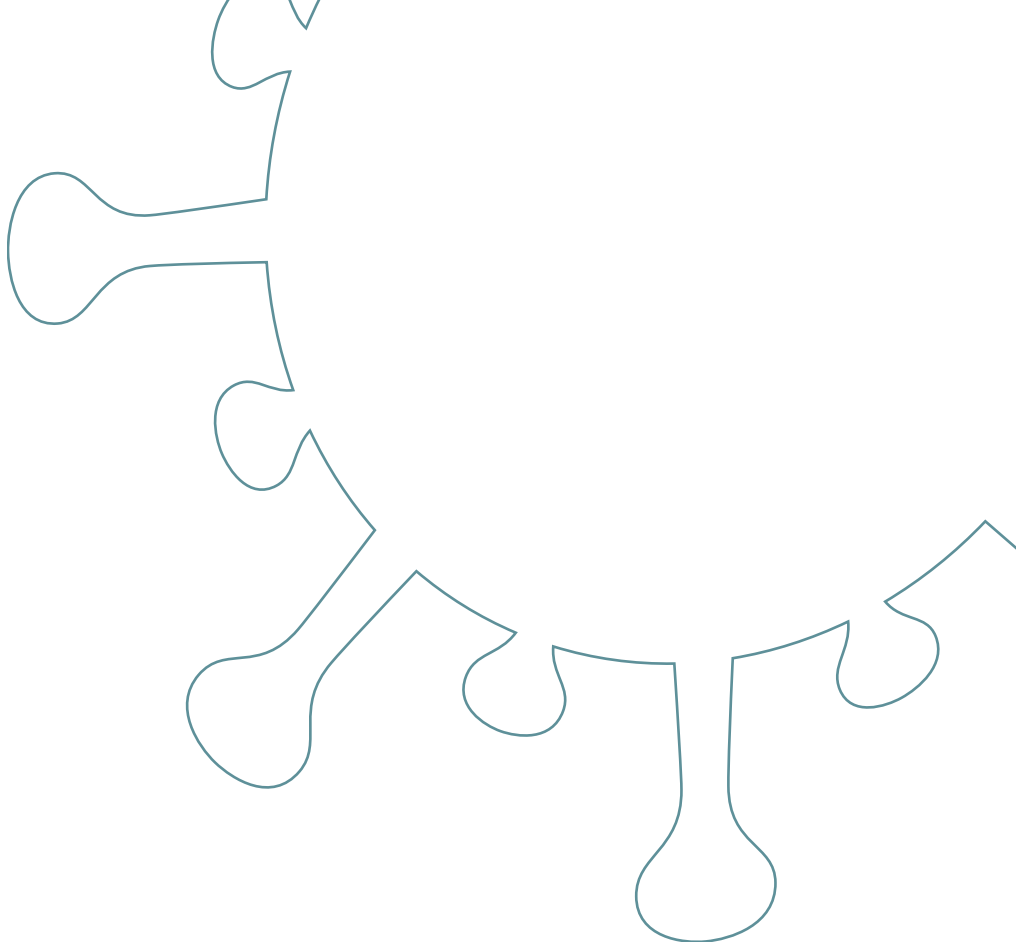
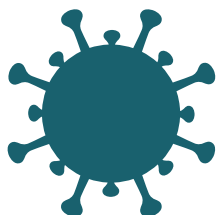
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