

Rapid

Review



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Virtual Primary Care in Northern, Rural and Remote Canada

A Rapid Review Prepared for the
Canadian Foundation for Healthcare Improvement

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Abbreviations and Acronyms

AI	Artificial intelligence
BWW	Big White Wall
cEMR	Community electronic medical record
CHCs	Community health centres
EAPC	Enhanced Access to Primary Care
eHIP	eHealth Infostructure Program
EMR	Electronic medical record
KI	Key Informant
MIS	Mustimuhw Information Solutions
OTN	Ontario Telemedicine Network
PT	Provincial and territorial
RRM	Rural Road Map

Executive Summary

Virtual care is increasingly recognized as a vital component of high-quality healthcare and may hold promise in strengthening access to primary care in northern, rural, and remote areas of Canada. In Canada, as seen around the world, the adoption of virtual care has accelerated as part of health system responses to COVID-19. Though the northern, rural, and remote regions of Canada may benefit from the improved access, satisfaction, and convenience that may come with virtual care, little is known about the key features of virtual care or the specific considerations for its effective implementation that will support enhanced access to primary care in these contexts. This rapid review sheds light on these features and considerations with the aim of supporting the effective and appropriate scale up of promising virtual care practices in the North, and other rural and remote communities across Canada.

Our review of the literature, combined with expert interviews with researchers and practitioners, uncovered several potential and realized benefits of virtual care. These include increased accessibility, continuity of care, cost effectiveness, better health outcomes for patients, greater provider satisfaction, and equity. However, with regard to equity, there were concerns that virtual care could exacerbate inequities in access and outcomes unless sufficient attention is paid to the needs, experiences, and availability of the necessary technologies across all communities. The key considerations for the effective implementation of virtual care to improve access and outcomes are multifaceted:

- **Technology infrastructure, resources, and support** are fundamental to the effectiveness of virtual care in primary care, such as adequate phone and internet broadband access, the capacity to introduce and maintain new technologies, training, and technical support.
- **Change management** can be facilitated through leadership and engagement to incorporate the change process into the clinic or organization's strategic plan. Thoughtful planning also helps manage expectations and workflow.
- **Stakeholder engagement and relationships** support the sustained delivery and scale up of virtual care, along with responsiveness to the needs, preferences, and values of the community. Moreover, the patient-provider relationship is considered the cornerstone to the successful implementation of virtual care.
- **Cultural safety** is critical to effective and appropriate primary care, both in-person and virtual. The leadership of the primary care organization needs to formally embrace the value of cultural safety and provide cultural safety training and ongoing support to all healthcare providers.
- **Privacy and security** are widely recognized as risks with virtual care for which clear guidelines need to be developed and communicated with healthcare providers and patients alike.
- **Financial considerations**, like adequate remuneration and financial support, are needed to cover start-up costs, the routine use of virtual care technologies, and sustainability.

In the context of the COVID-19 pandemic, there is an opportunity to carefully consider maintaining, and where needed, adapting, new virtual care models that have rapidly been introduced. While the initial focus of these new models of virtual care was to alleviate pressures on hospitals and emergency care systems, eventually this will likely shift to addressing the long-term needs of patients and communities in a strengthened primary care system. The results of this review are intended to inform these discussions of where, how, and in what way these new approaches could be used to improve the quality and access to primary care in northern, rural, and remote regions of Canada.

Introduction and Background

Virtual care is increasingly recognized as a vital component of high-quality healthcare. Moreover, virtual care shows particular promise in Canada's northern, rural, and remote areas, where acquiring adequate health services resources is a significant challenge, and where virtual care may allow for responsiveness to the needs and preferences of diverse Indigenous communities (1,2).

Health system innovations in this context include an increased use of virtual care and health planning that is responsive to the diverse needs and priorities of people living in northern, rural, and remote communities. Mustimuhw Information Solutions (MIS) and the Ontario Telemedicine Network (OTN) are examples of virtual care platforms with the potential to improve access to care and better meet the care needs of populations across northern, rural, and remote parts of Canada (3,4).

Despite recent developments in healthcare technology and the increased availability of such resources, adoption of these technologies has been limited, not used to their full capacities, and in some areas remain inaccessible (4). As new technologies and models of practice are introduced, there are many considerations, challenges, and barriers that must be acknowledged in order to facilitate virtual care's successful adoption in the primary care setting (5).

Global healthcare systems are currently undergoing major transformations with the introduction of a wide range of public health and health policy measures to fight the spread of COVID-19. Remote access to healthcare services and the adoption of virtual care models have become critical to enabling primary care providers to continue providing care to their patients while mitigating the risks of spreading the virus. In response to the pandemic, policies and practices have been rapidly adapted to accommodate necessary health system responses. While Canadian provinces and territories have to a greater or lesser extent facilitated the use of virtual technologies in primary healthcare in recent years, this transition has been accelerated by the COVID-19 pandemic. To promote the virtual transition, governments have provided resources, such as videoconference licences, and introduced or expanded billing codes to allow physicians to bill for virtual visits (6–10). The pressures that the COVID-19 pandemic has placed on the healthcare system have catalysed widespread adoption of virtual care into regular patient care across the country and internationally.

For historical and physician supply reasons, the nurse-based model of primary care in northern Canada is very different than the physician-based model in southern Canada. Built on the nursing stations and outposts established by the federal government after the Second World War, the community health centres (CHCs) that serve most of the people living in northern Canada, including the northern provincial regions, are publicly owned and operated by provincial and territorial (PT) governments. The registered nurses employed in the CHCs provide a relatively comprehensive set of basic healthcare and wellness services. Although many of these northern nurses provide care across their full scope of practice, they and their patients depend on extensive medical transportation services, a referral system and transportation services involving primary care doctors, specialist physicians, secondary and tertiary hospital care in larger settlements as well as (often) air-based medical evacuation (11). This contrasts with physician-based primary care in the few more-populated urban centres in northern Canada as well as in most regions throughout southern Canada. In contrast to the nurse-based model, much of the physician-led care in urban centres in southern Canada is provided in private clinics owned and managed by primary care physicians who are independent contractors and who receive remuneration on a fee-for-service basis or

an alternative based on a contractually agreed form based on the number and type of patients being served.

This rapid review aims to describe virtual care and identify the elements that support enhanced access to primary care. While we are particularly interested in the use of virtual care in northern Canada, this review draws on a range of sources covering diverse rural, remote, and northern settings. By “primary care” we are referring to the first point of contact for individuals seeking healthcare and wellness services, normally in community settings, and which often serves as a gatekeeper and link to other parts of the health system. By “access” we refer to the ease with which people can obtain care when and where they need it (12). Improving access requires the reduction of physical, financial, cultural, and other systemic barriers to receiving care. It also requires continuity of care (seamless transitions in care within and between services) and equity (responsiveness to patient needs, and social and cultural determinants of health) (13).

Methods

Literature Review

We performed a rapid scoping review of the literature, using systematic searching and data collation methods, to uncover examples of virtual care implemented in Canada's northern, rural, and remote primary care settings. We followed an established five-step methodological framework for scoping reviews (14,15). Three multi-disciplinary databases were searched (MEDLINE, PsychINFO and CINAHL Plus) using a combination of database-specific syntax (e.g., Medical Subject Headings [MeSH]) and text-words related to the concepts: 1) virtual care, 2) primary care, and 3) northern, rural and/or remote Canada. The search was limited by publication year (2015-2020) and English language. Appendix A provides details on the selection process and search strategy. We also conducted a targeted scan of grey literature, including reports and evaluations, to identify effective characteristics and strategies for virtual primary care in northern, rural, and remote settings.

Key Informant Interviews

Individuals identified as experts or as having experience in virtual care were contacted as key informants (KIs) to complement our literature review findings. KIs were identified by the North American Observatory on Health Systems and Policies (NAO), members of the Canadian Northern and Remote Health Network hosted by the Canadian Foundation for Healthcare Improvement (CFHI), reports and news articles, and snowball sampling from KIs. Invitations to participate were sent by email. We conducted in-person and telephone interviews with 15 KIs between February and April of 2020. Interviews were approximately one hour in duration and interviewers (JL, RA) took detailed notes of the conversation. KIs were asked questions about their professional role and knowledge of virtual care in northern, rural, and remote settings, including with regard to their perspective on the importance of virtual care; facilitators and barriers in the adoption and implementation of virtual care; system factors or other motivators that influence the implementation of virtual care; and recommendations of literature or other KIs. The interview guide is available in Appendix B.

Limitations

The literature search was limited by publication date (2015-2020) and language (English); however, language restrictions are unlikely to modify study conclusions (16). Our KIs included researchers and physicians, and only three nurses, in three provinces and territories and only one from an Indigenous-led primary care setting. Accordingly, they do not represent all healthcare providers, e.g., traditional medicine practitioners, in the circle of care across Canada. Moreover, the literature review may have missed some search terms reflective of the breadth and holistic nature of primary care. In addition, we are unable to disaggregate results from the literature review and KI interviews between the North and other rural and remote parts of Canada, and thus further research and primary data collection would be needed to draw out the areas of convergence and divergence in the effective use of virtual care in these unique settings. This rapid review was conducted during the early phases of the COVID-19 pandemic in Canada. This made it difficult to reach some KIs and also led to rapid changes in the virtual care landscape as the literature search and KI interviews were being conducted. In light of these changes, we pay particular attention to the role of virtual care in the COVID-19 pandemic in a dedicated section.

Analytic Overview

We identified 26 literature sources that described virtual primary care applications in the target setting. These include literature reviews (3,17,18), a mixed methods study (19), a pilot study (20), an observational study (4), technical and evaluative reports (21–31), presentations (32–34), case study reports (35–37), and conference proceedings (38,39). Appendix C provides a descriptive overview of the review literature. We also interviewed 15 KIs with experience in research, care delivery, and/or management of primary care. KIs are primarily based in Ontario (n = 9), Northwest Territories (n=2) and British Columbia (n = 3) and include care providers (physicians and nurses) and researchers (some KIs are both). Only one KI is from an Indigenous-led primary care setting. Their experiences with virtual care varied including frontline use, implementation, and/or evaluation. Findings from the literature are integrated with KI experiences of virtual care use and implementation below, to describe how virtual care is being used in primary care in northern, rural, and remote areas of Canada; the outcomes and benefits of virtual care; and some key considerations for implementation.

What is Meant by “Virtual Care”?

The Canadian Virtual Care Task Force defines virtual care as: “any interaction between patients and/or members of their circle of care, occurring remotely, using any forms of communication or information technologies, with the aim of facilitating or maximizing the quality or effectiveness of patient care.” Various definitions are seen in the literature (3,18,24). Although there are some differences in the existing definitions, we have discerned four common elements of virtual care:

- 1) the use of information and/or communications technology;
- 2) the delivery of health services from a distance;
- 3) a description of the stakeholders involved (e.g., patients, providers, family); and
- 4) the intended aim or purpose of the service.

Virtual Care Applications and Delivery

Virtual care encompasses all technology-enabled care such as e-consultations or e-referrals (i.e., virtual access to specialist advice), e-visits or teleconferencing (i.e., secure videoconferencing with providers), and telehomecare (i.e., the use of remote monitoring devices in the home), among others. Thus, a wide variety of technological tools deliver care through synchronous, asynchronous, or combined delivery approaches. Synchronous delivery refers to services that allow stakeholders to interact in real-time (e.g., video consultations), whereas asynchronous delivery, also known as “store and forward”, allows stakeholders to review messages and notes at a separate time (e.g., electronic medical records [EMRs], secure messaging) (40).

Virtual care in the form of video visits may be delivered through the patient’s own devices (e.g., personal computers, cellular devices) or technology that is available within healthcare settings (e.g., high resolution cameras, mobile kiosks equipped with cameras, etc.). Phone calls are also used, especially within rural communities. In many cases, a combination of messaging, audio, and video services were available. Two examples of virtual visits were identified in British Columbia that use an app provided by Babylon, in partnership with Telus Health, (24) and the Medeo system (33). OTN has also developed extensive room-

based videoconferencing for First Nations communities in Ontario (22,26). Where adequate internet is available, communities have access to a secure desktop computer, and videoconferencing devices that enable private and secure eVisits (22,26). In addition, a pilot project called Enhanced Access to Primary Care (EAPC) led by the OTN between 2017 and 2018 in southern Ontario, leveraged asynchronous messaging (communication between patient and provider not occurring in real-time such as, email or text messaging) and synchronous eVisits (two-way, real-time, audiovisual appointment) to provide patients with access to their primary care providers (24,26,30,35–37). The Yukon Telehealth System comprises mobile telehealth units, where each community health centre has at least one unit and a telehealth coordinator who manages the system. Patients travel to one of the community health centres or other sites with telehealth units to participate in scheduled telehealth sessions (29).

MIS is an information management leader for Indigenous Health and Child & Family Services organizations in Canada (41). The Mustimuhw community electronic medical record (cEMR) and their “Citizen Health Portal” exemplify a secure platform for patients to access their health information and contact their primary care provider through an online portal messaging feature (25). Providers can also upload notes and plans so that the local hospital and community health centre share information (25). Secure messaging was found in other examples that enable patients to contact their providers, and also used by providers to connect with one another or to check in and provide coaching to patients from a distance (23,25,26).

Assistive technologies were also reported in the delivery of virtual care for remote monitoring, chronic case management, and diagnostics. Tools like virtual stethoscopes, wearable technologies, robotics, and artificial intelligence (AI) can assist providers with gathering information and monitoring a patient’s health status from a distance, such as their blood sugar and blood pressure (17,27,42). In some cases, a combined approach might be used where patient monitoring assessments are done in-person by a nurse, in the clinic setting. This information would then be inputted to the EMR where the patient and physician can follow-up with a virtual visit. EMR use in conjunction with other virtual care tools to enable patient-provider and provider-provider communication were also reported in the literature (25,38,42). Rosie, a remote presence robot, is an example of robotic technology used to facilitate active patient monitoring in settings where immediate clinical action may be needed while the physician is not physically present (23). In British Columbia, an Artificial Intelligence (AI)-assisted algorithm was marketed to help patients assess their symptoms and determine whether they should seek video consultation or in-person appointments (27).

Some teleconsultation services are provided by primary care, such as the widespread use of PT health lines for people to access nurses (18). Teleconsultations also occur between professionals to discuss patient care and provide information or advice (18). Also, Ornge serves remote Indigenous communities in Ontario with air ambulance and critical care transport, as well as nurses who provide telemedicine consultations to four remote Indigenous communities (39).

Applications outside primary care

Health services that are considered under the umbrella of primary care tend to be more comprehensive in northern, rural, and/or remote communities than in urban settings, and regularly include mental health and maternal services. KIs pointed out that in southern urban settings, the role of the primary care provider regarding these services is mainly to refer the patient to a specialist; yet, in rural, remote, and

northern settings, primary care providers provide these services themselves and consult specialists when needed.

Some examples of the programs designed to connect patients with specialists include “Telehealth Rounds and Consultation” for pediatric patients and “Video Conferencing for Adult Ambulatory Clinics” for adult patients (22). Similarly, MBTTelehealth and MyMCTVideo applications are used in Manitoba by primary care providers requesting specialist consults for services that are unavailable to patients in certain regions, or to communicate with specialists regarding patient care (18). Other examples were described in the literature where virtual technologies were used to improve access to trauma, hospital, and specialty care, but these services were not the focus of this review (21,24,34).

Mental health assessments may also be provided virtually (17,18,21). For example, the Rural and Northern Telehealth Service is a specialized telehealth service providing mental healthcare to First Nations communities in northern Manitoba (18). Big White Wall (BWW) is an example of a self-management virtual care platform that offers 24/7 peer-to-peer support, education, and access to clinically trained mental health professionals free of charge (24).

There are some examples of telehomecare programs to support and care for people at home. In another OTN project, telehomecare provides intensive six-month health coaching and remote monitoring by trained nurses (26,32). Patients receive weekly coaching to help them meet their goals and nurses will explicitly intervene at the sign of a worsening condition (26). Akira MD is an application available for private purchase intended to enable virtual care of homebound older adults (21).

Outcomes and Benefits of Virtual Care

For literature sources that evaluated virtual care applications, outcome measures included accessibility, continuity of care, cost effectiveness, health outcomes, and patient-centredness. Similarly, KIs regarded virtual care as an important tool to enable, support, and facilitate the pillars of effective primary care, and acknowledged the need to consider equity in access to these tools, and, particularly in the North, that these consider cultural appropriateness to ensure these are designed with and for Indigenous communities (discussed below in Implementation Considerations section).

Accessibility

Several studies spoke to the potential for virtual care to improve the accessibility of primary care, (22,24,28–30,35,38). Five of these studies demonstrated some evidence of improved accessibility of both primary and specialist care as measured by the use of these tools and self-reported measures of access (21,24,28,29,38). In one case, enhancing the timeliness and ease-of-access to primary care led to a reduction in hospitalization and emergency visits (26), and virtual technology enabled community members to participate in health-related programs not offered in their local community (29). Likewise, KIs considered virtual care an important tool for increasing access and convenience for patients. However, many cautioned that increased access to primary care does not equal increased access to *quality* care. Some KIs were wary of virtual care being the sole solution to access challenges; rather, virtual care should be part of a larger, holistic strategy to enable access in northern, rural and remote contexts. Virtual care was perceived as more flexible than in-person care by providing patients with the opportunity of choosing a healthcare provider that they feel comfortable with even if they are located further away. Numerous

KIs highlighted that primary care is a patient’s “medical home” and thus, it is critical that providing consistent and continuous care be the fundamental goal. Several KIs spoke to the need for virtual care to be part of, and not independent from, the patient’s medical home, in order to reap the benefits of improved access.

Continuity of care

KIs discussed how virtual care options can be an important tool to enable, support, and facilitate continuous care over the long term, especially for small, fly-in communities. Virtual care may provide more stable and consistent care where patients can have the opportunity to see the same physician or care team, rather than whomever happens to be flying in that month. A study by La and colleagues found that access to virtual care visits promoted continuity of care for patients who avoided seeking care from emergency department or walk-in clinic for issues that could be address by primary care providers (35). Carrier First Nation in British Columbia also reported greater continuity of care as patients can access their own primary care provider at any time by using an EMR and video conferencing (38). Moreover, KIs noted that in nurse-led clinics in remote and northern contexts, nurses often rely on virtual care to provide continuous care for patients, and to communicate with physicians often located in the larger tertiary hospitals.

Virtual care also has the potential to facilitate care continuity through connections within care teams, integrating primary care providers, allied health professionals (3,17,18,20,21,23–26,28,30,38,39), and other community health representatives or leaders (18,20,23,24,38). As described by one KI, virtual care options enabled clinics to expand their team in order to offer their patients consults and often ongoing follow-up with other health disciplines, including allied health professionals such as social workers, counsellors, addiction medicine specialists, dietitians, and spiritual care providers. It also enabled providers to receive rapid consults from specialists in order to better care for their patients and for resource sharing. For example, if a mental health specialist in a specific community is not available, they can draw on a specialist from another community to fill the need regardless of distance. Allied health professionals’ roles in the delivery of virtual care differed based on the technology type and setting. In some jurisdictions, like Saskatchewan and British Columbia, billing codes are available for allied health providers and specified medical representatives to communicate and manage patients virtually (27).

Cost effectiveness

Five papers cited a cost-related outcome measure of virtual care (17,19,26,28,33). The presence of robotic technology reduced by 60% the cost associated with medical transports of patients out of their home communities (17,26). Evaluative data also indicated cost savings incurred from reduced health system usage and increased efficiencies for both the healthcare system and for patients (e.g., reducing travel and reducing barriers to accessing care) (19,21,28,29,33). Patients perceived a cost savings in the form of saving travel time, while 87% of patients in one study were able to avoid a work absence (33). KIs also noted the potential cost savings and efficiencies to health systems through the adoption of virtual care. Minimizing regular physician air travel to northern, rural, or remote communities saves time, resources, and also positively impacts Canada’s carbon footprint.

Health outcomes and satisfaction

Depending on the nature of the technology, potential health benefits of virtual care include improved health and mental health status, medication adherence, and reduced mortality and complication rates (24,34). Some rural physicians experienced an increase in quality-of-life due to increased confidence, less anxiety and distress, and an expanded skill set when treating rural patients with the virtual support of emergency physicians (28). For example, physician informants described feeling more confident in managing unfamiliar medical cases and less stress related to on-call situations. Several studies indicated high satisfaction among patient users and that most reported finding the virtual visits to be effective, convenient, and that it saved them time and money (25,32,38). KIs also reported that feedback from patients were generally positive. However, it was noted that many older adults, along with Elders from Indigenous communities, prefer in-person care and found technology difficult and confusing to use, and that virtual correspondence with their care provider felt dismissive. A report by MIS referred to several patient-focused benefits of virtual care, such as enabling “patient-centric care”, empowering patients to be full partners, and self-management (25); however, it is unclear how these outcomes are measured.

Equity

While few studies explicitly considered the role of virtual care in promoting more equitable access to primary care, the KIs raised equity as a key consideration in the effective use of virtual care. KIs viewed virtual care as a tool to improve access for underserved communities, such as those who do not have physical access to a primary care provider, those with mobility issues, and those with caregiving responsibilities. They also signaled that despite being a potential solution to enhance equity, scaling up virtual care might also perpetuate inequity since patients do not have equal access to or ability to use the needed technology.

In addition to challenges with inadequate internet access and technological infrastructure, people living in rural, remote, or northern areas may live in crowded spaces with lack of privacy to be able to speak with their provider. Also, older, marginalized populations and those with disabilities may have difficulty using and benefitting from virtual care, as studies find that younger patients are often more likely to have a virtual visit compared to older individuals (19). Smaller clinics, especially those in rural, remote, and northern areas or situated in small communities often lack the funds required to implement and sustain virtual care. In these situations, virtual care is simply not a financially feasible option without increased up-front investment. Without careful and explicit attention to who is able to access the platforms, KIs noted that there is limited potential for virtual care to improve access to care in rural, remote, and northern contexts.

Implementation Considerations

Among the factors identified to facilitate effective delivery of virtual care were technological capacity, change management, stakeholder engagement and relationships, models of care, cultural safety, privacy, and remuneration. In many instances, these were not explicitly discussed as either barriers or facilitators, but rather as factors that were key in determining the success of virtual care delivery.

Technology infrastructure, resources, and supports

Technological infrastructure, support, and the degree to which patients and providers were educated on its use, was of paramount importance to the success of care delivery. In addition to needing adequate supplies of equipment and ability to access virtual care (29), numerous KIs discussed that having adequate infrastructure also meant having basic phone and internet broadband access, and the capacity to introduce new technologies like computers, microphones, software, troubleshooting support, and backup systems. Access to technology may be a particular challenge in the North as they may not be available or reliable due to extreme weather. This lack of capacity significantly limits virtual care options.

Technological challenges are exacerbated by high staff turnover and low retention rates in rural and remote areas, resulting in various levels of necessary training and ability to troubleshoot issues that may arise. In the literature, some authors emphasized the need for adequate training by practitioners and the presence of someone to facilitate virtual encounters in order for virtual options to be successfully adopted (17,28). An example of this type of training in practice is MIS's remote user-group training sessions through videoconferencing and online training tools to facilitate its adoption (41). Reports championed both the patient and end-user experience (19,24,28,30) as well as technology-provider experience (19,24,25,28,30) in their findings, with a key point that the technology had to be accessible and easy to use. There were a variety of methods proposed to achieve this, including education and technological support for all users. Some KIs also indicated the need for virtual care training as part of medical school curriculum and residency programs across the country. Currently, it is incorporated in a select number of programs, but it is critical that all primary care providers are equipped to integrate virtual care into their practice.

In addition to learning to use the technology, additional supports are needed for implementation and management. It was indicated by some KIs that nurses in northern communities often take on the additional role of technical support in order to offer virtual care within their clinics and health centers. This creates an added burden and increased workload in an already understaffed and busy environment. The Yukon Telehealth System, however, includes a telehealth coordinator who manages the system by scheduling and initiating virtual sessions, providing technical support, and overseeing the system. Clinician users of the system attributed the quality of the coordinators' work and commitment to the operation of the platform as the key factors in their satisfaction with the system (29).

Change management

Implementing technological changes will require a change management framework to support users and recipients (23,24,28). For example, the successful implementation of the BWW application in Ontario used a combination of communication plans, partnered with community-based organizations, and aligned with a national mental health campaign, Bell Let's Talk, which led to the provincial scaling of BWW (24). As suggested by Digital Health Canada & OTN (23), a culture change towards such technological advances like virtual care should be fully embedded in an organization's strategic plan, in clinical practice and supported by measuring readiness before implementation. Sustainability also relies on the normalization of these technologies and virtual processes as part of a clinic's model of care (5). Buy-in from local healthcare providers and champions also influence the successful implementation of virtual care in communities, as indicated by KIs and clinician users of the Yukon Telehealth System (29). There may be

reluctance to adopt a new way of practicing and embrace virtual care culture, and behavioural change was cited by KIs as a significant barrier to overcome.

Consistent leadership presenting a clear vision, and a slow, stepwise iterative implementation were all cited as facilitators for change. A process framework or toolkit could improve the overall implementation and sustainability planning. One KI suggested that practices may need to restructure their existing model of care around virtual modalities and find ways to seamlessly incorporate them into daily operations in order to achieve the true benefits of virtual technology; those who are able to adapt and invest in this practice redesign are more successful.

Planning is especially important to manage the expectations and workflow of providers to ensure guidance is clear and minimize potential increased workload. The experiences of workflow among different providers and KIs varied (28,32,36). Most providers (76%) surveyed from the eHealth Centre of Excellence and OTN pilot project believed that the virtual care project improved their ability to see patients during a day (36), and rural family physicians in the Robson Valley (British Columbia) virtual care pilot project found their workflow similarly improved, however the virtual platform demanded more time of emergency physicians (28). KIs noted that nurses' work can be easily disrupted to facilitate the flow of patients in the physician's "virtual waiting room" and they consequently inherit a lot of additional tasks once patient consultation is completed by the physicians themselves (e.g., various components of a patient's physical examination). The improvement of workflow was often discussed in terms of how virtual care delivery mechanisms directly influenced the day-to-day operations of a provider using the program, including its integration with EMRs.

Stakeholder engagement and relationships

Sustained delivery and scale up of virtual care projects will require ongoing engagement from providers, members of primary healthcare teams, patients, and the community (20,28). Strong communication plans and outreach strategies from supporting organizations can help facilitate feedback and stakeholder engagement loops (24). Rural family and emergency physicians in Robson Valley described improved communication and partnerships with other providers through the use of the virtual care service, resulting in better patient consults (28). Quality improvement work is also necessary for the successful and effective deployment of virtual care. KIs also expressed the need for increased measurement and evaluation capacity to assess the impact of virtual care on patient care and health outcomes, and that the outcome variables used in these evaluations need to be chosen to reflect what is valuable and important to both providers and patients.

Strong patient-provider relationships were seen as critical in facilitating longitudinal care where virtual care is used to supplement and augment the patient-provider relationship, rather than replace in person visits. Some KIs noted that having a face-to-face, physical connection with a primary care provider changes the quality of the relationship and although virtual care can fill in the gaps, where wait times are potentially long or in situations where there are provider shortages, it should not be relied on at the expense of in-person care. In remote and northern areas of Canada, and Indigenous communities in particular, there is often a lack of trust in mainstream healthcare organizations. One KI indicated that those from Indigenous communities, in particular Elders, sometimes felt uncomfortable while using virtual care and reported that they were being dismissed by the physician, which exacerbated the existing lack of trust. Such a lack of trust has its roots in colonization and systemic racism that have profound,

inequitable impacts on the health and wellbeing of First Nations, Inuit, and Métis peoples living in Canada. Intergenerational trauma and continued racism in the medical system and other institutions such as schools and child welfare (43) underscore the importance of ensuring that healthcare professionals are provided with widespread training and support in cultural safety, and continue moving toward Indigenous-led models of care. This will in turn, aid in the formation of meaningful and continuous patient-provider relationships and trust, leading to improved quality-of-care through greater acceptability and cultural appropriateness (13).

Language barriers persist and are sometimes exacerbated with virtual care. Providers need to read non-verbal cues that comes with care encounters, which can be missed in the virtual setting. One KI noted that with in-clinic appointments there tends to be more informal conversation to build rapport and learn about the life circumstances that influence each person's health (i.e., stress, finances, etc.). However, this effect can be somewhat mitigated with a strong pre-established relationship as discussed above. Working with translators in a virtual care model can be challenging and platforms need to enable the provision of care in other languages. In Indigenous communities, there are Elders who do not speak English or French, challenging the provision of virtual care.

Cultural safety

Cultural safety refers to providing equitable clinical care in a manner that emphasizes and respects the unique cultural context of Indigenous Peoples and the values of each patient (38). For primary care in Indigenous communities, the importance of cultural safety is of utmost significance (25,38). Two examples from the literature review identify how delivery systems have integrated First Nations culture and values into service delivery (25,38). MIS is fully governed by Cowichan Tribes on Vancouver Island, and is used in seven provinces and supported by 285 First Nations as the software of choice for many Indigenous organizations (41). Developed with community members and Elders, the cEMR and health citizen portal includes traditional healing in their service domains (25). The Carrier Sekani Family Services virtual primary care model is a holistic approach that integrates the philosophies of the Carrier Nations (13,38). In this case, primary care services offer an "in-community presence" by establishing consistent relationships between community members and primary care providers (38). Surveyed patients of the Carrier Sekani Family Services reported the clinic as a safe and respectful environment (90.8%), and 91% reported feeling emotionally or physically safe at the clinic.

In spite of these promising practices, multiple KIs noted that it is important not to view virtual care as the sole solution to persistent problems with access and quality-of-care in Indigenous communities. One KI indicated that it is the organization's values and not virtual care itself that provides culturally safe and competent care. It is up to the organization to train and support their staff to deliver culturally safe care no matter what the platform or modality of care. They indicated that cultural literacy sometimes becomes a problem with non-Indigenous service providers (and some Indigenous providers as well) and that as an organization, they address it by providing more education and training to these individuals. The responsibility in enforcement of culturally safe care lies with the organization. Especially in remote and northern contexts, there is work to build collaborative programs with acute care hospitals to ensure they are providing culturally appropriate care as a fundamental component of meeting the needs of these communities.

Another suggested idea is a “rural road map” (RRM), developed by the Advancing Rural Family Medicine: The Canadian Collaborative Taskforce, to address health disparities among rural and remote communities (44). One component of the RRM targets the needs of Indigenous communities by increasing the number of Indigenous healthcare professionals trained in Canada, improving retention of healthcare providers within rural Indigenous communities, and providing cultural safety training for all healthcare professionals (44). The central focus of the RRM aligns with a commitment to renew relationships with Indigenous people through respect, cooperation, and partnership (44).

Privacy

Privacy and security of patient information are important considerations in the implementation of virtual care. Some of the included studies identified that certain online platforms were capable of adequately protecting patient information, and investigated patient and provider perception of security using such platforms (19,29,32). The cEMR used by many First Nations communities across Canada, places a particular focus upon patient safety and security within their participating communities and found that 81% of patients interviewed felt the system was adequate for protecting their privacy (25). A survey in British Columbia (both rural and urban areas) found that 95% of patient respondents were confident in the security and privacy of their personal information during a virtual visit (19). Providers involved in the OTN eVisit pilot project pointed out that the virtual care platform used represented an improvement in security from the email exchanges that might have otherwise taken place (32).

While there are promising examples of the interoperability of digital health strategies, there remain concerns about maintaining the privacy and security of personal health information in the context of sharing across providers and delivery points (27). Regulatory policies across the country do not adequately support the modernization of virtual care and they vary by jurisdiction (27,45). For example it is not mandatory for physicians in some jurisdictions to have a secure email address (46). Although policy documents and standards of practice by regulatory colleges and governing bodies exist, KIs identified the need for more guidance for healthcare providers about privacy and related liability issues.

Financial considerations

Financial considerations, like remuneration and financial incentives, were widely discussed in the literature and by KIs. There is recognition of the need for remuneration for virtual visits to be equivalent with in-person visits (30). Across jurisdictions, all the interviewed KIs identified financial incentive and remuneration as important factors to enable the adoption of virtual care by primary care providers.

Unlike the salaried payment model for physicians that is used in some parts of Canada, including some northern communities, provincial community health centres, and throughout Northwest Territories, the fee-for-service payment model that is dominant in most provinces may be less conducive to broad adoption of virtual care. For example, KIs in British Columbia noted that most physicians run small practices in a small business environment, which means they do not have the resources or the supports in place to introduce virtual care and be able to use it effectively. Physicians also want to be paid for seeing their patients and a billing code allows them to do so. In the British Columbia context, physicians can get paid more to see a patient virtually than in person, which was identified as both a motivator and a problem. This payment model incentivizes episodic, discontinuous care as physicians see patients in a walk-in clinic model with little follow-up and often no communication back to the patient’s primary care

physician. Also, some KIs discussed the increase in private, for-profit platforms entering the virtual care market. This was perceived as threatening the provision of high-quality, continuous primary care. They also argued that a profit-driven motivation may lead to the use of virtual care when it may not be optimal, leading to the breakdown of high-quality, continuous care.

Financial support for start-up costs was seen as a possible way to increase uptake of virtual care in primary care settings. Making virtual care available but leaving it up to individual providers to determine what to provide will not help with urban-rural disparities. Moreover, the KIs noted that aligned clinical governance and funding structures at a systems level is needed to facilitate and create the capacity for primary care clinicians to be able to provide virtual care. One KI suggested that in Northwest Territories, government support for virtual care was delayed and overall limited. As reported by the Assembly of First Nations, there is need for sustainable investment in virtual care rather than pilot projects alone: “While eHIP [eHealth Infostructure Program] has been met with success where investments have been made, pilot projects tend to advantage communities who already have built-in capacity and risks widening the divide between have and have-not communities”(47).

Virtual Care in Response to COVID-19

The COVID-19 pandemic has forced healthcare systems to pivot dramatically in the way they provide care across all sectors and primary care is no exception (48). The necessity to limit in-person interactions, practice physical distancing, and divert people away from hospitals to preserve acute care resources have propelled services to move to a predominantly virtual care-based model. For example, the BC Interior Health Authority is providing Zoom licences to healthcare professionals and staff for clinical virtual appointments (6,7). Adding to the First Nation Health Authority's telehealth program, "Virtual Doctor of the Day" has now been made available to connect First Nations members and their families in remote communities to a doctor or nurse practitioner through video conferencing (49,50). MIS also partnered with Novari Health to extend their virtual care presence to further support the First Nation Health Centre response to the pandemic. This includes additional cEMR integrations, including a COVID-19 surveillance registry and other reporting items (e.g., client registry for up-to-date contact information, tracking individuals living in particular households for contact tracing), and support for remote work (51), and eVisit offerings (both synchronous and asynchronous). Alberta also launched a new tele-advice portal for physicians to seek specialist advice about caring for presumed and confirmed COVID-19 patients at home (52).

Given that a portion of our KI interviews occurred after the pandemic crisis accelerated, a unique perspective was obtained as the world observed healthcare rapidly transition into a virtual care model. KIs noted that funding, policy, and legislation barriers that physicians fought against for over 30 years disappeared overnight. Fear, necessity, and urgency inadvertently became the major facilitators in the rapid implementation of virtual care across entire healthcare systems. This speaks to the importance of a system-level willingness to change and the key role of motivating factors. When the benefit of implementing virtual care vastly outweighed the costs, and the risks of not doing so could be catastrophic, all levels of a healthcare system are more willing to adapt and change. Prior to COVID-19, KIs noted that physicians made up the majority of providers using virtual care. With the shift to an almost exclusively virtual model of care, more nurses and alternative medicine providers such as traditional healers in Indigenous health centers have started providing care virtually. Privacy concerns that were once a major barrier to the implementation of virtual care and considered a significant risk suddenly became less consequential compared to the risk of not providing access to necessary care. Some KIs did express concern that privacy issues may be overlooked because the switch to virtual happened so quickly. Healthcare providers are using a variety of different platforms, some of which are secure (such as those certified by Canada Health Infoway¹) while others such as FaceTime, Zoom, Skype, or other video conferencing platforms may have increased risk of security breaches. KIs indicated that privacy and security were still important to acknowledge and that the willingness to tolerate lower levels of security in the current pandemic situation will not be acceptable post-COVID-19.

The dramatic shift to an almost exclusively virtual model of care in combination with the closure of many non-essential services also poses increased equity concerns. While virtual care enables many patients to have continued access to their healthcare providers, those without access to technological devices (i.e.,

¹ Infoway oversees a national program to review and certify digital health solutions to ensure privacy, security, and interoperability requirements are met (53).

cellphones, tablets, computers, etc.) or the internet are left without any way to obtain the care they need or would otherwise get in person. It was noted by one informant that the rush to transition to a purely virtual care system did not go smoothly for their community health center as the abrupt cancellation of all in-person appointments and diagnostics left patients upset, confused, and without care if they did not have access to a smartphone with the OTN platform or FaceTime. As a result, there is significant concern that a lack of access to these technologies will exacerbate health inequities. The switch to virtual care has also contributed to staff shortages, including of nurses who have a significant increase in workload as many have taken on numerous tasks once done by the physician.

Conclusions

This rapid review sought to describe virtual care models and key characteristics that support enhanced access to primary care in northern, rural, and remote areas of Canada. Drawing on published academic and grey literature, along with key informant interviews with practitioners and researchers, this review uncovered several promising virtual care initiatives, as well as some key considerations for effective and appropriate implementation of these technologies. In the context of the COVID-19 pandemic, this review is especially timely, and reveals a real opportunity for careful and sustained adoption of virtual care in Canada's northern, rural, and remote areas.

The availability of virtual care applications varies in these northern, rural, and remote communities, and they have not yet been widely adopted. Virtual care can be seen as a tool to help improve access to care in regions with limited health resources, address poorer outcomes in terms of health indicators, and improve health system performance. However, a consistent finding in this review was that virtual care alone will be insufficient to solve these major access and quality-of-care challenges. Also, there may be some communities who prefer not to engage in virtual care models of care, and the needs and priorities of such communities should be considered in any reforms. Given this context, however, there is a need to bring the level of virtual care (both in quality and scale) up to the level of the best practices seen in Canada, or even beyond. The promising new models of care emerging, such as Mustimuhw (cEMR, citizen health portal, eVisits) and Carrier Sekani Family Services, and the rapid changes fuelled by the COVID-19 pandemic, suggest this may be achievable.

This review uncovered several potential and realized benefits of virtual care. These include increased physical accessibility, greater patient and provider satisfaction, continuity of care, cost effectiveness, better health outcomes for patients, and equity. With regard to continuity of care, there was little evidence that virtual care improved care continuity, and this was recognized as a vital consideration in the development and implementation of future virtual care initiatives, such that it can facilitate communication with patients and care providers not only for episodic consultation but for continuous care that includes all the members of the care team. In terms of equity, there was seen to be potential for virtual care to improve equity in access to care, by overcoming some of the physical, temporal, and geographical barriers to access. However, on the other hand, there were concerns that virtual care could exacerbate inequities given the need for internet connectivity and smart phones for some more advanced technologies that are not widespread in many communities and among socially excluded groups. Moreover, the KIs emphasized the importance of considering access not only from the perspective of being able to see any healthcare provider but rather, access to quality primary care that is patient-centered, culturally safe, and continuous. This review uncovered several key considerations for the effective implementation of virtual care to improve access and outcomes, including:

- **Technology infrastructure, resources, and support** are fundamental components to the effectiveness of virtual care in primary care, such as adequate basic phone and internet broadband access, the capacity to introduce and maintain new technologies, training, and technical support. Integrating virtual care content into medical education curriculum, providing initial training as new technologies are introduced, and ongoing technical support will allow providers to focus on care delivery, rather than create time wasting work troubleshooting technical support issues.

- **Change management** can be facilitated through leadership and engagement to incorporate the change process into the clinic or organization's strategic plan. Thoughtful planning also helps to manage expectations and workflow. Care settings that fully integrate virtual care experience the most success and benefit, and in some cases, enables a clinic to expand their services through the building of interdisciplinary teams. Possible increases in workload and shifts in responsibility are important to take into consideration for sustainable implementation.
- **Stakeholder engagement and relationships** support the sustained delivery and scale up of virtual care, along with responsiveness to the needs, preferences, and values of the community. The patient-provider relationship is considered the cornerstone of successful implementation of virtual care. Provider and patient engagement were also highlighted as critical in ensuring that the tools being implemented align with what the users on both ends find valuable, and is a powerful motivator in enabling change.
- **Cultural safety** is critical to the effective and culturally appropriate use of virtual health services, particularly with regard to northern and Indigenous communities. Moreover, the leadership of the primary care organization needs to formally embrace cultural safety as a value, provide cultural safety training and ongoing support, and make sure that all healthcare providers adopt culturally safe practices. This is vital to building relationships and trust, providing equitable care, and improving access to quality care.
- **Privacy and security** are widely recognized as risks associated with the adoption of virtual care for which clear guidelines need to be developed and communicated with healthcare providers and patients alike.
- **Adequate remuneration and financial support** are needed to cover start-up costs as well as the routine use of virtual care technologies, and major changes to fee-for-service remuneration models may be necessary.

While this review drew on a wide range of literature and heard from experts and practitioners from several jurisdictions, there are several gaps that would be worthwhile topics for future research. There is a paucity of literature, both scholarly and grey, focussed on the use of virtual care in the primary care setting in the North, in spite of the emergence of innovative programs and models being implemented. In addition, while we were able to speak to some scholars and practitioners in the North, we missed perspectives from many regions, as well as from members of the provider team who are not physicians or nurses, along with community leaders and members, who would help to paint a fuller picture of the actual and potential use of virtual care in northern, rural, and remote settings. Future research could also consider whether and how the primary care team may adapt and take on new roles in order to implement virtual care, and the extent to which virtual care improves quality of care, care continuity, and equitable access and outcomes.

Finally, COVID-19 rapidly changed the landscape of virtual care as the entire healthcare system had to pivot in the way care was being provided. Factors that were cited as barriers to implementation were eliminated overnight and virtual care became the predominant, and in some cases, the only modality of providing care. A portion of our KI interviews occurred after the acceleration of the pandemic and thus, we were able to capture the change that occurred along with valuable perceptions of how this has impacted primary care. Close examination of the changes that have been made, and how they have been experienced by care providers, patients, and communities, will help to inform which of these short-term virtual models should remain in the long-term as tools to improve access to quality primary care.

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Appendix A: Detailed Methodology

Literature Review

We performed a rapid scoping review of the literature, using systematic searching and data collation methods, to uncover examples of virtual care implemented in Canada’s northern, rural, and remote primary care settings. We followed an established five-step methodological framework for scoping reviews (14,15). Three multi-disciplinary databases were searched (MEDLINE, PsychINFO and CINAHL Plus) using a combination of database-specific syntax (e.g., Medical Subject Headings [MeSH]) and text-words related to the following concepts: 1) virtual care, 2) primary care, and 3) northern, rural and/or remote Canada. The search was limited by publication year (2015-2020) and English language.

Citations were screened sequentially in two phases: (1) titles and abstracts, and (2) full-text articles. Reviewers (JL, MR, SC, MS, MJ) first tested a random sample of seven articles to screen titles and abstracts to pilot the selection criteria. Selection decisions were compiled and discussed, then remaining citations were divided to complete screening. The titles and abstracts of citations whose eligibility was uncertain (rated “maybe”) were passed directly to full-text review. We applied the same process to full-text screening. After pilot testing the selection criteria, three reviewers screened full-text articles (SC, MS, MJ).

Articles were included if they met the following criteria: (1) Setting was located in rural, remote, or northern areas of Canada; (2) setting included primary care, family, or community medicine; (3) study described a virtual care intervention; (4) source was empirical; (5) outcome included elements of “access” or “quality”, or related to accessing or improving primary care. Articles were excluded based on the following criteria: (1) non-English; (2) conducted outside the settings of interest; and (3) full-text article not accessible. Data extraction was completed by three reviewers (SC, MS, MJ).

We also conducted a targeted scan of grey literature, including reports and evaluations, to identify effective characteristics and strategies for virtual primary care in northern, rural, and remote settings. This consisted of targeted Google and governmental website searches, and materials forwarded by key informants and network members.

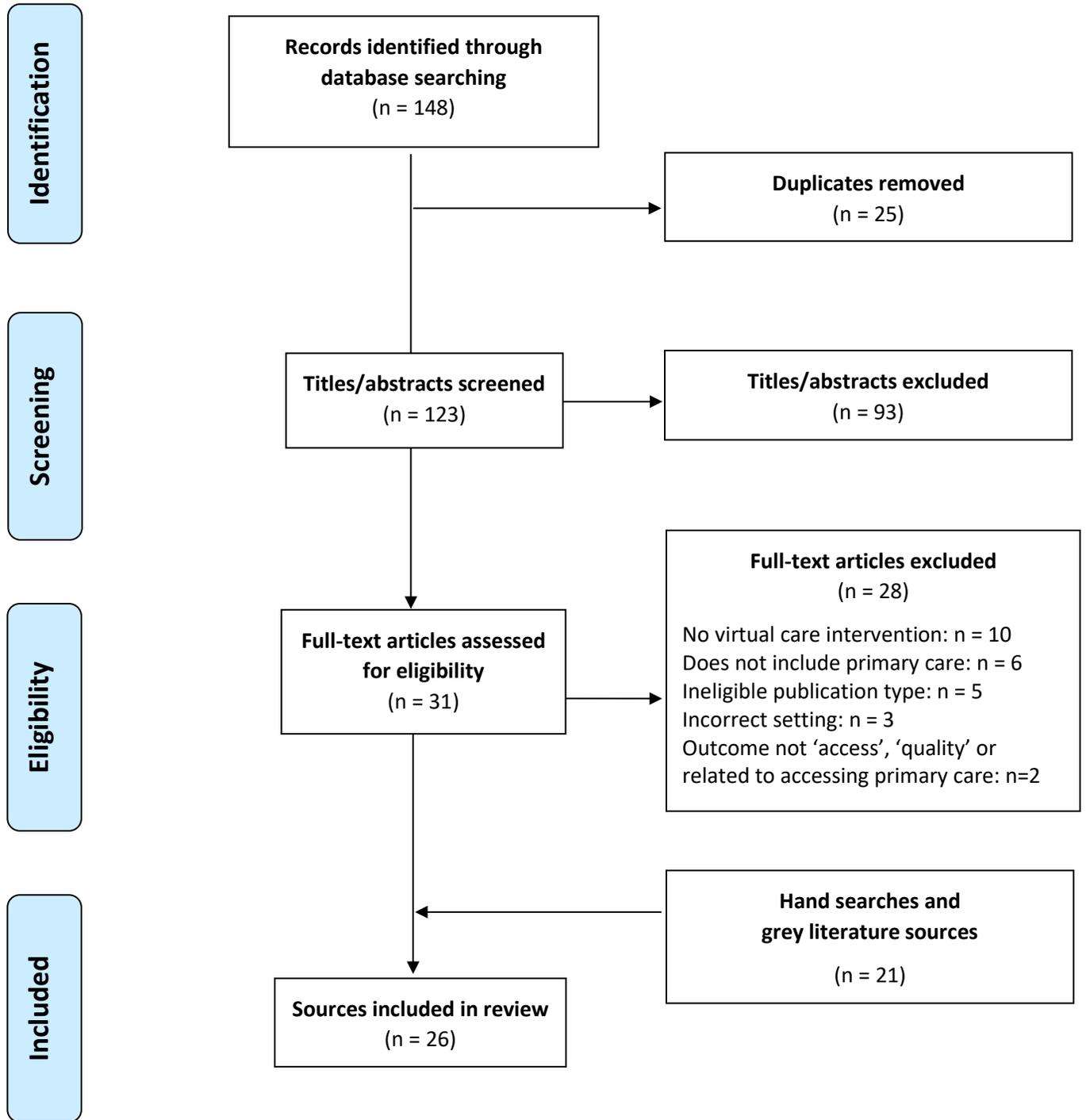
Electronic Database Search Strategy

Electronic database search strategy: MEDLINE Ovid (February 18, 2020)

	SYNTAX	RESULTS
1	rural.mp. or exp Rural Health/ or exp Hospitals, Rural/ or exp Rural Population/ or exp Rural Health Services/	162374
2	exp Health Services Accessibility/	108208
3	medically underserved area/	6912
4	(rural* or remote or isolated or underserved).tw,kf.	1153312
5	canada.mp. or exp Canada/	191213
6	(Ontario or British Columbia or Alberta or Manitoba or Saskatchewan or Quebec or New Brunswick or Newfoundland or Prince Edward Island or Northwest Territories or Nunavut or Yukon).tw,kw.	63838
7	1 or 2 or 3 or 4	1277145
8	5 or 6	208645

9	primary health care/ or community mental health services/ or comprehensive health care/ or general practice/ or family practice/ or community health services/	193835
10	family medicine.mp. or exp Physicians, Family/	25821
11	(family physician or family doctor or family practice or general practice or primary care physician or primary care doctor).tw,kf.	57966
12	((primary adj2 care) or general practitioner*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	199594
13	9 or 10 or 11 or 12	319374
14	telemedicine.mp. or exp Telecommunications/ or exp Telemedicine/	92709
15	wearable electronic devices/	1894
16	patient portals/	325
17	electronic health records/	18486
18	medical records systems, computerized/	19009
19	medical informatics/	11686
20	artificial intelligence/	22642
21	virtual reality/	1524
22	smartphone/	3863
23	speech recognition software/	704
24	precision medicine/	16720
25	biomedical technology/	6345
26	(medical informatics or artificial intelligence or virtual reality or smartphone or speech recognition software or precision medicine or biomedical technology).tw,kf.	37250
27	(telehealth or telemedicine or telecommunication* or teleconferenc*).tw,kf.	19512
28	((health or medical or digital) adj3 (technolog* or device* or informatic*)).tw,kf.	51115
29	((electronic or digital) adj3 (record* or health or medical)).tw,kf.	51115
30	(ehealth or mhealth).tw,kf.	7311
31	(remote adj2 (monitor* or device*)).tw,kf.	3084
32	((wearable or portal* or wireless or infomatic* or application*) adj3 technolog*).tw,kf.	15291
33	(app or apps or application or applications).tw,kf.	1180941
34	((virtual or digital) adj3 (health or medicine or care or services or support* or assistant*)).tw,kf.	5460
35	assistive device*.tw,kf.	2451
36	or/14-35	1429224
37	7 and 8 and 13 and 36	160
38	limit 37 to yr="2015 -Current"	76
39	limit 38 to english language	76
40	remove duplicates from 39	75

PRISMA Flowchart



Adapted from: Moher, D., Liberati, A., Tetzlaff, J., & Altman, D.G., The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Medicine* 6(7): e1000097. doi:10.1371/journal.pmed1000097

Appendix B: Interview Questions

1. What is your role in terms of studying, developing, or implementing virtual care, and in particular virtual care in primary care (as opposed to specialist care)?
2. Why is virtual care important?
 - *How do you see it as a potential solution to issues of access to primary care in northern, rural, and remote areas of Canada.*
3. Have you ever implemented/were part of a virtual care initiative that aims at improving access to primary care in northern, remote, and Indigenous populations?
4. What are the facilitators that can help implement such initiatives?
5. What are the challenges?
6. Are you aware of any policies (intraorganizational, interorganizational, or system level) that motivated primary care providers to invest or use virtual care?
7. What other motives or factors do you think can enhance the adoption or impact of virtual care in primary care settings? *Funding, Privacy policies, training, vendors... etc.*
8. Are you aware of any virtual care models that work well, that can be built upon/improved?
9. Is there anything else that you want to share with me today? Is there anyone else you think I should speak to?

Appendix C: Summary of the Review Literature

Descriptive Overview of the Review Literature

We identified seven studies of virtual primary care applications in the target settings, describing different virtual care applications in Ontario (3,4), British Columbia (3,19), Alberta (20), Saskatchewan (17), and Newfoundland and Labrador (17). Three of the papers included a study design of mixed methods (19), observational (4), pilot study (20), and literature reviews about telehealth services in Canada (3,17). Data collection methods in these studies include health administrative data sets, including electronic medical records (4,19,20) and evaluative surveys (19,20). Intervention recipients who participated in receiving the virtual care application included patients from Ontario divided according to geographic areas (i.e., “rural north”) (4), First Nations patients (20), and primary care patients in British Columbia (19). The healthcare providers delivering the cited virtual care applications included fee-for-service physicians (4) and primary care providers (i.e., physicians, nurse practitioners) (3,19,20).

A search of the grey literature produced 19 unique documents that each described one or several different virtual care interventions in Canada. The documents are categorized as a combination of technical and evaluative reports (21–27,30,54), presentation slides (32–34), case study reports (35–37), conference proceedings (38,39), and a rapid synthesis (18). The grey literature documents focus on virtual care in British Columbia (24,25,27,28,33,38), Alberta (18,21,25), Saskatchewan (25), Manitoba (18,25), Ontario (21,23–25,27,30,32,35–37,39), Quebec (18), Prince Edward Island (24,34), and Newfoundland and Labrador (21,23). Study designs include clinical trial (24), literature review (18,21), pilot study (21,22,28,32), mixed methods (30), and case study (35–37), through use of surveys (24,28,30,33), interviews (24,28,30), synthesis of research evidence (18,21) and vendor generated data (30). The recipients of the virtual care intervention include the following patient groups: First Nations community (22,25,26,38,39), patients admitted to hospital (24,34), primary care patients (18,24,26,27,30,32,33,35–37), rural patients (28), patients with complex care needs (i.e., pediatric cancer patients, critical care patients, patients with chronic lung disease or congestive heart failure, and people living with HIV/AIDS) (21,23,24,26). Healthcare providers supporting the delivery of the virtual care platform have been described as being physicians (i.e., primary care, specialist, hospital-based) (18,21–28,30,32–38), nurses (18,25,26,28,34,38,39), paramedics (39), and mental health professionals (24).

Table C1. Summary of the academic review articles

Author/Yr	Study Objective	Method/ Outcome measure(s)	Intervention Description	Key Findings
Agarwal et al., 2020	To contrast how Brazil's and Canada's different jurisdictional and judicial realities have led to different types of telemedicine and how further scale and improvement can be made.	Method: Literature review and reflective experiences Outcome measures: N/A	<i>Champlain BASE</i> : web-based portal connecting PCPs and specialists (ON). <i>OTN</i> : e-visits between PCPs and patients and e-care to monitor patients and coach them to manage their conditions at home through apps and other devices (ON). <i>Interior Health Authority of BC</i> : video teleconferencing platform that allows residents of remote areas to access specialist expertise at their local health centres (BC). <i>Carrier Sekani Family Services (CSFS)</i> : videoconferencing health and coordination services to allow Indigenous community members ongoing access to primary care (BC). <i>RACE</i> : enables PCPs access to specialty services for real-time phone advice (BC and YT).	There are a variety of contextual factors that influence the delivery of telemedical interventions in both countries, and each could benefit from improvements in regulatory systems. A specific barrier in the Canadian context is the lack of homogeneity between provider reimbursement mechanisms.
Holyk et al., 2017	To evaluate the effectiveness of the CSFS primary care model.	Method: Patient survey (n=210) Outcome measures: Medical trust, satisfaction, usability, effectiveness, convenience, and access.	CSFS built a health-grade broadband network that connects community health centres with a corporate network, which connects to the Northern Health Authority, and other relevant public health systems. CSFS was given access to an electronic medical record system and videoconferencing technology.	Continuity of care: patient respondents reported being able to see their doctor more regularly, attend more appointments, reduced the need for long-distance travel to see a doctor, and reduced the number of visits to the ER for health services. Medical trust: Using telehealth at a CSFS clinic rather than seeing a physician face-to-face did not negatively impact patient's level of medical trust. Satisfaction, usability, effectiveness, and convenience: Patients who accessed telehealth via their primary care clinic were more likely to be satisfied, rate highly the usability and effective of the service, and find

Author/Yr	Study Objective	Method/ Outcome measure(s)	Intervention Description	Key Findings
				<p>the service convenient than patients who used the clinic as a walk-in.</p> <p>Patients also reported better management of chronic conditions through access to telehealth.</p>
Jong et al., 2018	To describe the services provided through telehealth in some northern regions of Canada.	Method: Literature review Outcome measures: N/A	Various virtual care uses in northern, rural, and remote communities, including: robotic technology to triage paediatric acute care transports; tele-robotic ultrasonography, videoconference visits for delivering rheumatology services to rural/northern communities, mental health assessments and tele-psychiatry, oversight for advanced life support via videoconferencing, and a list of additional specialist services provided by telehealth in rural Canada.	<p>Telehealth offers potential benefits for health outcomes by increased access to healthcare and reducing expenditures.</p> <p>Authors report that for telehealth to be successfully adopted, training is best provided while the HCP is still in training and more amenable to learning. As well, telehealth equipment should be easily accessible in the practice setting. New technologies such as remote presence robotics and the development of sensor technology will facilitate the implementation of telehealth solutions to remote northern communities.</p>
McGrail et al., 2017	To assess users and providers of virtual visits, including the reasons patients give for use; and to assess empirically the influence of virtual visits on overall primary care use and visits in BC.	Method: Mixed methods (patient survey and administrative health data) Outcome measures: Usage (total primary care visits), cost, quality, and other user perspectives (patient survey).	<p>Technology that enables virtual visits between patients and providers.</p> <p>Two comparison groups included (1) all other BC residents, and (2) a group matched (3:1) on 5-year age group, sex, health service delivery area (HSDA) of residence and the number of major aggregated diagnosis groups (ADGs).</p>	<p>Virtual visit use was highest (in percentage of population terms) in the Northern Health Authority. Young patients and physicians were more likely to use and provide virtual visits, with no differences by sex. Older and sicker patients were more likely to see a known provider, whereas the lowest socioeconomic group were the least likely. Most patient users reported to like their virtual visits, were of high quality, and were helpful to resolve their health issue.</p> <p>Analyses comparing virtual versus traditional visits suggests that virtual visits may have potential to decrease primary care costs by approximately \$4 per quarter, though the</p>

Author/Yr	Study Objective	Method/ Outcome measure(s)	Intervention Description	Key Findings
				<p>benefit was most associated with seeing a known provider.</p> <p>Authors conclude that virtual visits may contribute to a more patient-centred health care, but its integration requires careful consideration.</p>
O’Gorman et al., 2015	To determine how usage of the OTN differed geographically across the province.	<p>Method: Observational (medical service billing data)</p> <p>Outcome measures: number and type of clinical telemedicine utilization.</p>	Technology via OTN that connects patients and providers throughout Ontario.	<p>Median annual utilization rates per 1,000 people were higher in rural settings for both northern and southern areas in comparison to urban areas. OHIP data suggest that only 0.2% of visits are dropped due to technical difficulties.</p> <p>Family and general medicine use was highest in urban areas, and proportionally, rural Northern Ontario had more surgical, oncology, and internal medicine use than the other geographical areas. Findings suggest that telemedicine is being used to enhance access to medical services, especially in sparsely populated regions.</p>
Ross et al., 2016	To determine the feasibility and sustainability of a telemedicine pilot project to deliver primary healthcare in two remote northern Alberta communities.	<p>Method: Pilot study (demographic information, questionnaire, EMR data)</p> <p>Outcome measures: visit volume, telehealth service accessed, satisfaction, sustainability, access, and other stakeholder perspectives.</p>	<p>A partnership between two First Nations communities, AHS, and FNIHB led to the development of a telehealth primary care project. Elements to the project included a private consultation space to keep the telehealth equipment, the sending of telehealth cart and the support staff to assist with assessments. The SLFCC provided a private consultation space, the primary care provider, and the receiving of telehealth equipment. FNIHB and AHS provided technical support for the project.</p>	<p>The pilot demonstrated that a primary care telehealth program for these communities is feasible and sustainable. Participants indicated that telehealth technology improved access and decreased travel, though a longer trial duration is warranted.</p> <p>Stakeholders also commented on weaknesses of the project, including needing more time to engage with the project, technical challenges (power outages and down lines), and scheduling issues.</p>
Seto et al., 2019	To explore the current use, challenges, and	Method: mixed-methods evaluation (usage logs, questionnaires, focus	<i>The Yukon Telehealth System</i> : comprises mobile telehealth units that are mainly used for clinical care and desktop telehealth software that is used for	The telehealth system serves three major purposes being clinical care, clinician education, and administration.

Author/Yr	Study Objective	Method/ Outcome measure(s)	Intervention Description	Key Findings
	opportunities of the Yukon Telehealth System.	groups, and semi-structured interviews) Outcome measures: usage, satisfaction, perceived challenges and opportunities, user experience.	educational and administrative purposes. Each of the 14 community health centres has a single telehealth unit, and additional telehealth units are located in major centres such as Whitehorse. The system is managed by a single telehealth coordinator. Patients travel to one of the community health centres or other sites with telehealth units to participate in the scheduled telehealth sessions.	Clinicians' and patients' experiences with telehealth were generally positive. There was a consensus that telehealth services were underutilized, and the authors suggest that the plateau in telehealth usage may be due to limitations at the system level. Four overarching factors and recommendations for the expansion, including: (1) patient and clinician buy-in; (2) workflow; (3) access to telehealth technology; and (4) infrastructure.

List of acronyms: *Alberta Health Services (AHS); BC (British Columbia); EMR (Electronic Medical Record); First Nations and Inuit Health Branch (FNIHB); HCP (Healthcare Provider); OHIP (Ontario Health Insurance Plan); ON (Ontario); OTN (Ontario Telemedicine Network); PCP (Primary Care Provider); RACE (Rapid Access Consultative Expertise); Slave Lake Family Care Clinic (SLFCC)*

Table C2. Summary of the grey literature articles

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
Bhattacharyya, 2020	To review current projects to deliver virtual health interventions in Ontario, explore the evidence, and learn about patient perspectives.	Report type: Technical and evaluative Outcome measures: Patient and provider experience, use of eVisits by providers and patients, usage by clinical specialty and volume of visits.	<i>OTN eVisit pilot project</i> : technology allowed patients to message, have audio, or video communication with their providers, who had up to 2 days to respond; includes eConsult visits and remote monitoring, wearable technology, and other apps. This is described as a "home video visits" pilot project within Ontario, lasting from 2017-2019.	High satisfaction among patient users. The vast majority of patients also reported that the visit had saved them time and money. The study found that patients did not overuse eVisits, with less than 25% of participating patients having 2 or more visits over the course of the pilot. Most visits took the form of text message conversations, and the visits generally were able to resolve the patient's issue, with 81% requiring no follow-up. Providers found there was a minimal impact on their workload, and described several benefits including: increased revenue by increasing the number of billable visits, improved security compared to email, and increased quality of care due to more time to think about and develop an in-depth response, and lower waiting times. 600 physician specialists enrolled in the "home video visits" pilot project between 2017 and 2019, with yearly visits growing from 43,000 in 2017/18 to almost 200,000 in 2019/20. Generally, these visits were either described as being for mental health or some other specialty purpose aside from primary care, oncology, mental health, etc. The eConsult program describes specialty referrals that make use of a variety of clinical specialties.
Canada Health Infoway, 2015	To describe the experiences of patients who had a virtual visit with surveys, including information on the reason for their visit, timing of their visit, health services used subsequent to their visit, and general attitudes; and	Report type: Evaluative Outcome measures: Attitudes on virtual visit experience; outcomes of most recent virtual visit; impact of most recent virtual visit; what patients would have done if they had not been able to see a doctor online; patient perceived value;	<i>Medeo</i> : Patient participants answered questions relating to their use of the Medeo system that allows them to see a physician online.	57% of patient respondents reported that the virtual health intervention allowed them to avoid an in-person visit with their doctor or their regular place of care. 98% of patient respondents said the intervention saved them time, with 49% reporting time savings of between 30 minutes to 2+ hours. 87% reported avoiding a work absence, and 39% reported saving caregiving arrangements. Physician interviews yielded three themes: (1) that virtual visits are complementary to in-person visits, but cannot replace in-person visits as being the foundation of a physician-patient relationship; (2) that virtual visits take roughly the same time as in-person visits, though

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
	to describe survey responses from physicians about the motivation behind establishing a virtual practice, facilitators of delivering virtual care, and benefits of providing virtual care.	physician perceived experienced.		there are some limitations with assessment during virtual visits; and (3) that e-visits will grow in the future.
Canadian Partnership Against Cancer (2019)	To summarize pilot projects through an environmental scan.	Report type: Technical Outcome measures: Quality of care, access to care (mental health services and specialist care), patient experience and adoption, usage/ volume.	<i>Telehealth Rounds and Consultation:</i> designed to connect paediatric patients to specialists at larger hospitals. <i>Video Conferencing for Adult Ambulatory Clinics:</i> connect patients to clinics with videoconferencing with specialists. <i>Akira MD:</i> for geriatric-homebound patients. An alternative for virtual care, intervention that involves the use of secure desktop computers in First Nations' communities in Ontario.	N/A
Canadian Partnership Against Cancer – Appendix B (2019)	To evaluate findings from grey and academic sources about private and public delivery of virtual care in Canada.	Report type: Environmental scan Outcome measures: Broad goals mentioned include: to improve the quality and safety of care for patients in rural and remote areas (telehealth rounds and consultations); to improve patient experience, access to specialist care, and	Delivery of virtual care broken down into primary care, specialist care, and critical care. Types of virtual care delivery included: public telemedicine networks, virtual care platforms (such as Maple), and private virtual clinics; The telehealth software Maple was used by Western hospital in NLD to improve telerounding.	Most virtual care in Canada is delivered through public telemedicine networks where people go to an equipped site to remotely interact with a clinician, though there has been a growth in software-based technology in private and public settings. Demand for these services is growing and far exceeds current supply. There have been several successful pilots in virtual care delivery, and virtual care has the capacity to improve patient care. Re: Maple technology, the hospital was able to avoid closing with the help of this software. Prior to the pilot the hospital had been at risk of closure because of strained physician resources, and a reliance upon locums from outside their

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
		reduce cancellations and no-shows (video conferencing for adult ambulatory clinics).		coverage area. Patient feedback was positive, and the pilot has been extended.
COACH, 2015		Report type: Evaluation Method: Surveys Outcome measures: Availability, accreditation, type of telehealth service, qualitative responses from stakeholders.	The 2015 evaluation includes various telehealth services across Canada. Surveys were completed by stakeholders across Canada during the 2013/14 fiscal and 2014 calendar years.	Telehealth has been growing in Canada as the total number of clinical telehealth services grew in the study year. This increases equity of access for persons in remote areas and “disrupts” traditional service delivery models.
Digital Health Canada, 2019	To showcase the virtual care innovation landscape across Canada by highlighting six virtual care implementation success stories.	Report type: Technical Outcome measures: Satisfaction, health outcomes.	<i>Maple</i> software that allows physicians to see, hear, and assess patients for daily rounding through a mobile kiosk. <i>Big White Wall</i> , platform that allows mental health support. <i>WelTel</i> , evidence-based digital health outreach tool improving outpatient care and self-management. <i>e-Visit Primary Care (OTN)</i> , which has third-party platforms that provide access to care via asynchronous messaging, video and audio. <i>Virtual ICU</i> using existing mobile video carts connecting trauma rooms with remote specialists. <i>Babylon</i> app that has patients connecting with physicians in their location of choice for one-on-one consultations.	These interventions have demonstrated positive trends in satisfaction from providers and patients, improved health and mental health outcomes, and skill enhancement. Key mechanisms to successful implementation and adoption across these examples of innovation: (1) Train users and actively management change; (2) build the technology for the user; (3) find champions; and (4) communication is key.
Digital Health Canada/OTN, n.d.	To outline the approaches, actions, roles, skills, and	Report type: Technical Outcome measures: Satisfaction,	Rosie is a remote-presence robot that is controlled wirelessly through a laptop computer. Rosie is FDA-approved to	High degree of satisfaction among users, including comfort using the technology, and users indicated that the capabilities

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
	knowledge used by contributors to implement virtual care.	acceptability, medical transports.	facilitate active patient monitoring in situations where immediate clinical action may be required but the physician is not physically present. One application has been in critical care.	of the robot were superior to conventional videoconference-based telehealth. Medical evacuations were reduced by 60%.
Holyk et al., 2017	To describe the Carrier Sekani Family Services efforts to develop a sustainable, high quality, and community-based model of primary care.	Report type: Conference proceedings Outcome measures: Continuity of care, access to care, cultural safety.	Physicians provide services two days per week via telehealth. CSFS built a broadband network that connects community health centres with its corporate network. PCPs can access the network remotely to retrieve information on patients and facilitate their in-person or telehealth visits.	Enables continuity of care by allowing patients to access their physicians at any time and CSFS physicians to access patient charts from wherever they are.
La et al., 2019	To assess the patient experience of a virtual care intervention launched by the eHealth Centre of Excellence and OTN.	Report type: Evaluative Outcome measures: Patient satisfaction, access to care.	Virtual care intervention involved both synchronous and asynchronous communication between patients and primary care providers. Patients or providers could initiate a visit at any time, with 24/7 audio/video/messaging availability. Providers could respond at their convenience.	Patient experience survey findings (n=470) illustrated that if a virtual visit had not been available: 4% would have visited the ER, 10% would have gone to a walk-in clinic, and 3% would have done nothing. 93% of patient respondents reported virtual visits saved time, 92% said they were convenient access to care, and 82% reported easy to use. 91% were satisfied with the care received through a virtual care visit.
La et al., 2019	To assess the primary care provider experience of a virtual care intervention launched by the eHealth Centre of Excellence and OTN.	Report type: Evaluative Outcome measures: Perceived benefits, experience, satisfaction.	As above.	67 providers and a total of 11,100 virtual visits completed during pilot phase. The provider experience survey results (n=21) indicated the following benefits of conducting virtual visits: efficient way to see patient remotely (86%), supports seeing patients in a timely manner (86%), enhances the quality of care provided (81%), and enhances capacity to see more patients within a day (76%). For visits appropriate to virtual care, providers rate virtual visits as: better than an in-person visit (28.6%), same as in-person visit (47.6%), and undecided (23.8%).

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
				<p>91% indicated that the solution was easy to use and 81% would recommend the solution to their colleagues.</p> <p>Generally, thoughts towards virtual visits were positive. When asked to compare virtual visits to in-person visits, 47.6% of providers said they were of similar quality to in-person visits, 28.6% felt they were superior to an in-person visit, while 23.8% were undecided.</p>
La et al., 2019	To assess the primary care provider perceived benefits of provider-initiated virtual visits.	<p>Report type: Evaluative</p> <p>Outcome measures: Reason for appointment, provider experience.</p>	As above.	<p>Reason for provider-initiated visits (2,761 visits): follow-up on test results (56.6%), existing condition follow-up (13.0%), previous appointment follow-up (12.4%), discuss medication (3.8%), post discharge follow-up (0.3%), and other (13.9%).</p> <p>90% of providers positively rate the value of virtual visits supporting the provision of high-quality care to their patients.</p> <p>86% of providers report that virtual visits facilitate an efficient way to see patients who do not need an in-person visit.</p>
Waddel et al., 2018	To understand when and how is virtual care deemed appropriate to use to provide primary-care services in Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and New Brunswick.	<p>Report type: Rapid jurisdictional synthesis</p> <p>Outcome measures: N/A</p>	<p><i>Teletriage service, Health Link:</i> that has trained nurses providing health information and working with the Primary Care Networks to connect patients to HCPs.</p> <p><i>MBTTelehealth and MyMBTVideo:</i> Specialist consults requested by PCPs.</p> <p><i>Rural and Northern Telehealth Service:</i> providing specialized telehealth service for mental healthcare to First Nations and consults by specialists by virtual care through telemedicine networks.</p>	The rapid jurisdictional review outlined a range of services provided in select provinces.
Mustimuhw Information Systems, 2017	Describes an innovative community electronic medical record (cEMR) model that is being used in First Nations	<p>Report type: Presentation</p> <p>Outcome measures: Functionality, patient empowerment, self-management, continuity</p>	This cEMR offers a secure platform for patients to access their information and contact their care providers through a messaging feature. Through the portal, both physicians and community nurses can upload notes and plans so that the hospital and community are connected.	High satisfaction among patients with both the e-view (93%) and e-visit (75%) features of the tool. Patients felt the system was easy to use (93%), efficient (93%), and adequate for protecting their privacy (81%). To a lesser extent, patients felt that the quality of the information supported their ability to self-manage (68%) and manage the care of dependents (43.5%). Providers were relatively satisfied with the portal (60%) and most would recommend it to other clinics (70%).

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
	communities across Canada.	of care, patient-centered care, user satisfaction.		Providers felt that the system was easy to use (80%), accessible (90%), reliable (60%), had features that supported their work (90%), and adequate for supporting privacy (100%). Providers were unsure of the information quality on the portal.
OTN, n.d.	To describe the various OTN-led innovative technologies.	Report type: Technical Outcome measures: Usage of technology, hospitalization, and ER visits.	<i>eVisits</i> : connecting HCPs with patients by secure videoconferencing using OTN interface. <i>eConsults</i> : provides online access to specialist.	Volume of visits reported, including a 60-80% reduction in hospitalization and emergency visits for patients in the program.
The Virtual Care Task Force, 2020	To outline the actions requires promoting excellence in virtual care in Canada and set the stage for broader discussions and more detailed efforts.	Report type: Technical Outcome measures: N/A	(1) Babylon; a digital health company launched with Telus Health in BC to provide virtual health services in Canada; (2) Champlain BASE- e-consult giving PCPs access to specialty care for their patients.	Babylon is widely marketed in BC and uses AI-assisted technology to facilitate decision making processes; Champlain BASE has been scaled across Ontario and has supported continuity of care and access by improving referrals and consultations.
Tien, 2018	To describe Orgne's strategies to improve access to care for remote Indigenous communities.	Report type: Conference abstract Outcome measures: Nurse satisfaction.	Telemedicine consultations with nurses servicing four remote Indigenous communities.	Survey data from the nurses has uniformly been extremely positive of the value of the telemedicine support.
UBC Digital Emergency Medicine Evaluation Team, 2018	To implement and evaluate the use of digital technologies for on-demand support in emergency care.	Report type: Evaluative Outcome measures: Access, patient and provider experiences, cost of care, delivery.	This pilot explored two primary modes of virtual care service delivery: (1) just-in-time consultations using videoconference services; and (2) secure text messaging with asynchronous consultation.	In phase 1, the evaluation found that the service successfully connected rural physicians with emergency physicians and allowed rural physicians to care for patients with non-emergency conditions outside of regular hours. Rural physicians described a significant improvement in their quality-of-life due to increased confidence, reduced feelings of anxiety and distress, expanded capacity and skills, and increased professional development. Physicians felt patients were also satisfied with the service. Cost savings were estimated by physicians to be associated with ambulance services, health system efficiency, and

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
				<p>system overload. For patients, it was estimated that costs were saved by reducing travel, more efficient diagnosis, and reduced barriers to accessing care.</p> <p>Barriers to uptake and normalization included: technical challenges; roles and learning needs; workflow; and remuneration. Enabling factors included: building relationships; virtual care advocates; technology support; and continuing education.</p>
Young, n.d.	To improve the stability of in-patient coverage services at the Western Hospital with consistent high-quality inpatient rounding services each day; seamlessly integrate technology with high-user adoption rate from staff and physicians; and provide a safe, effective quality level of care and patient experience.	<p>Report type: Presentation</p> <p>Outcome measures: A continuous evaluation process at 3 and 6 months; patient population; patient outcomes; Maple platform; technology; costing.</p>	Maple, a Canadian company, developed a virtual care platform to connect patients to licenced physicians within minutes via text or video-chat 24/7, video conferencing, and the use of electronic health records.	High adoption rate from patients and staff; 100% uptime and rounding stability; integration of wireless peripheral devices (i.e., Bluetooth stethoscopes); recruitment of 3 new family physicians.
Waddel et al., 2018	To understand when and how virtual care is deemed appropriate to use to provide primary-care services in Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and New Brunswick.	<p>Report type: Rapid synthesis</p> <p>Outcome measures: N/A</p>	<p>(1) Teletriage service (Health Link) that has trained nurses providing health information and working with the Primary Care Networks to connect patients to HCPs;</p> <p>(2) Specialist consults requested by PCPs through MBTTelehealth and MyMBTVideo;</p> <p>(3) Rural and Northern Telehealth Service providing specialized telehealth service for mental healthcare to First Nations;</p> <p>(4) consults by specialists by virtual care through telemedicine networks.</p>	<p>All provinces included in the jurisdictional scan offer telephone and videoconference for both provider-patient interactions as well as consultations between primary and specialist providers.</p> <p>Telehealth and other virtual-care services are provided as part of their respective provincial insurance plans, with no extra cost to insured patients.</p>

Author/Yr	Study/Objective	Report Type/ Outcome measure(s)	Description	Key Findings
WHIV, 2019	To understand the value it provides to patients and providers, its implementation challenges, and implications for potential spread and scale.	Report type: Evaluative Outcome measures: Patient and provider satisfaction; access to primary care.	<i>Ontario Telemedicine Network Enhanced Access to Primary Care (EAPC) initiative:</i> This virtual care intervention covered five regions in Ontario and offered both asynchronous messaging and video services. The technologies were developed in phases, with continuous additions and improvements made to the solutions throughout the pilot.	Patients were satisfied with the virtual visits and did not overuse them. Asynchronous messaging was more popular among patients and providers than other services (e.g., video). Virtual visits replaced in-person visits and providers felt they were appropriate. Virtual care created opportunities for new models of care (e.g., caring for new patient populations). Providers were satisfied with the tool, and acceptance and adoption were variable across providers.



NORTH AMERICAN
OBSERVATORY
on Health Systems and Policies

The North American Observatory on Health Systems and Policies (NAO) is a collaborative partnership of interested researchers, health organizations, and governments promoting evidence-informed health system policy decision-making. Due to the high degree of health system decentralization in the United States and Canada, the NAO is committed to focusing attention on comparing health systems and policies at the provincial and state level in federations.