



Virtual care and the pursuit of the quadruple aim: A case example

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Abstract

Many healthcare organizations have adopted the quadruple aim to create system-level improvements for delivering enhanced experience and outcomes to patients, healthier populations, reduced per-capita costs, and better provider experiences. With a maturing health technology sector, virtual care is gradually being adopted in Canada and proving to be a viable tactic for achieving the quadruple aim. Despite increased acceptance of virtual innovations and their related benefits to patients and providers, implementation of virtual care can be challenging in a Canadian healthcare system. The Ottawa Hospital developed an innovation strategy to guide the adoption and maturity of virtual care as a means of supporting the pursuit of the quadruple aim and achievement of the organization's mission and vision. A case example presenting the strategy and recommendations for health leaders and providers considering implementation of virtual care is discussed.

Introduction

The adoption of technology in sectors such as banks, airports, grocery, and retail stores has led many Canadian consumers to prefer and expect digital service options. The healthcare sector, however, has not kept pace with this cultural transformation, leading Ontario's Ministry of Health (MOH) to announce the "Digital First for Health" strategy in 2019.¹ The strategy aims to expand digital healthcare services across the province, providing patients with more digital choices for their care, such as virtual care, on-line appointment booking, and electronic access to health records, thereby empowering patients to better manage their health. It also seeks to support frontline providers to communicate and share information with their patients and other providers through technology, and to enable health systems to manage themselves and improve performance through data integration and predictive analytics. This strategy sets new expectations and creates a road map for healthcare organizations and the newly created Ontario Health Teams to implement virtual care. While seemingly ambitious, the direction for virtual care has been supported with guidelines and standards by several key stakeholder groups, including the Ontario Medical Association, the Ontario Hospital Association, College of Nurses of Ontario, and Accreditation Canada.²⁻⁵

Definition

Virtual care occurs when patients obtain advice and support to optimize health and/or to manage acute or chronic medical condition(s), without a healthcare practitioner being physically present. Examples include on-line automated tools that provide medical advice, interactions with providers over telephone or video-based encounters, and real-time remote monitoring capability.

Recent factors for virtual care adoption

In recent years, there have been several contributing factors leading to the adoption of virtual care solutions. Most recently, the healthcare system has experienced tremendous pressure to innovate care delivery models as a result of the COVID-19 pandemic. The adoption of virtual care solutions in the Canadian healthcare system has accelerated at an unprecedented rate, in order to maintain access to services and provide continuity of care for those we serve. Prior to the pandemic, healthcare organizations were faced with a need to do more with the same or fewer resources due to budget constraints and an insatiable demand on services. At The Ottawa Hospital (TOH) for example, there are 1.3 million outpatient visits annually and volumes have continued to increase an average of 2% to 3% per year over the past five years, with limited additional operational funding or physical space. Additionally, given the widespread public use of technologies in recent years, patients and providers have expressed a willingness to adopt virtual care. Ontario's MOH reports two-thirds of Canadians are interested in communicating with healthcare providers through virtual means.¹ Finally, several hospitals have recently adopted enabling technologies such as state of the art Electronic Medical Record (EMR) systems and third-party monitoring capabilities, creating a new foundation for innovation of patient-centred virtual care solutions.

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Table 1. Benefits and challenges of virtual care to patients, providers, and organizations

Group impacted	Benefits	Challenges
Patients	<ul style="list-style-type: none"> • Increased access to care by eliminating barriers such as transportation or organizing time off work to attend appointments • Better quality care and prevention of additional visits • Efficient referral to specialist care • Reduced visits to hospital settings 	<ul style="list-style-type: none"> • Need to develop trust in virtual care innovations • Concerns that providers may overlook certain aspects when providing care virtually • May lack access to the technology devices or internet services required
Providers	<ul style="list-style-type: none"> • Streamlined access to secure health information • Reduced no show rates for clinic appointments, supporting improved productivity for providers⁵⁻⁸ • Improved work-life balance by enabling flexibility with scheduling and working in unconventional locations 	<ul style="list-style-type: none"> • Commitment to high-quality care requires trust in virtual innovations before adopting into practice • Reimbursement models for providers have not yet fully matured in jurisdictions across the country • Failure to integrate virtual care technologies into EMR creates additional workflow • Adoption depends on openness and proficiency with information technology
Organizations/ system	<ul style="list-style-type: none"> • Fewer in person outpatient visits and decreased in patient length of stay • Secondary quality indicators such as reduced infection rates in hospital, and lower per-capita costs 	<ul style="list-style-type: none"> • Budgeting for upfront investment costs • Managing change when providers have varying degrees of technological dexterity and commitment

Abbreviation: EMR, electronic medical record.

Benefits and challenges

Based on literature review and corporate-level experience to date at TOH, virtual care presents many potential benefits to patients, the healthcare system and providers, and yet also encounters several challenges to implementation (Table 1). The tension between these benefits and challenges presented a need to develop a virtual care strategy to guide implementation efforts.

The Ottawa Hospital virtual care innovation strategy

The Ottawa Hospital's virtual care innovation strategy was established to support the obtainment of the hospital's quadruple aim (Figure 1) as developed by the Institute for Healthcare Improvement (IHI) to optimize health system performance. According to IHI, the goal is to improve the experience and outcomes of patients, improve the health of a population, reduce per capita healthcare costs, and provide an improved provider experience.⁹ The Ottawa Hospital is committed to evaluating virtual care innovations on the four aspects of the quadruple aim, with specific focus on ensuring the best possible provider experience.

Foundation

The strategy has five foundational characteristics deemed critical to achieving the quadruple aim:

1. Culture: Providers and patients who are motivated to adopt virtual solutions to transform their model of care delivery.
2. Organizational structure: Dedicated leadership and decision-making structure, with clear operational accountability for execution and delivery of the plan.

3. Digital innovation centre: An internal entity fostering partnerships with external individuals and technology companies rooted in Canadian healthcare digital innovation.
4. Engaged partners: Strong relationships with internal and external stakeholders that support and champion virtual care innovation.
5. Alignment with Ministry strategy: Explicit alignment with the Ontario government's Digital First for Health strategy and priorities.

Technology platform

In June 2019, TOH with five partner hospitals in the Ottawa region (named the Atlas Alliance) launched the Epic EMR system in all clinical service areas. The adoption of a complete EMR with enhanced capabilities allows TOH to now consider virtual care solutions within the Atlas Alliance and with other external clients. An additional benefit of the EMR is the ability to adopt previously integrated technologies and workflows from across the Epic community and around the globe. While supporting the creation of solutions unique to the Canadian context, this direction also emphasizes the need for solution integration into Epic, serving as the patient's sole health record (one patient, one record). Furthermore, solution integration supports the adoption of well-defined organizational processes and policies regarding privacy and confidentiality as well as documentation guidelines for clinical encounters.

Technological capabilities

Five digital capabilities were identified as areas of focus for virtual care innovation:

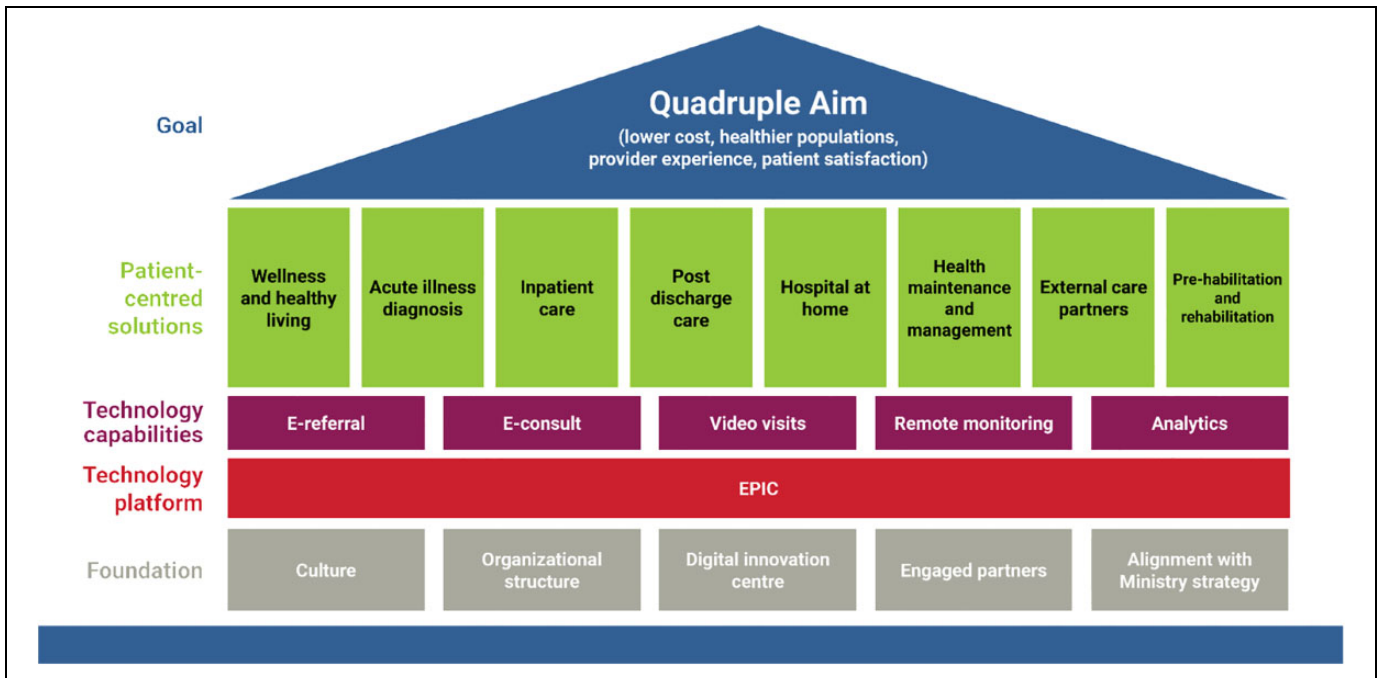


Figure 1. The Ottawa Hospital (TOH) virtual care innovation strategy.

1. E-referral: The ability for internal and external providers to electronically refer patients to tertiary and quaternary specialty care. This subsequently creates the ability to also monitor wait-times for patient access to care by specialty area.
 2. E-consult: The ability for internal and external providers to communicate and share information with a specialist regarding a patient currently within their care, preventing the need to refer the patient for an in-person specialty appointment.
 3. Asynchronous and synchronous virtual visits: Two-way digital communication between health providers and their patients that can include emails, teleconference, and videoconferencing/telemedicine.
 4. Remote monitoring: Web and app-based health systems used with smart phones, tablets, or personal computers that encourage patients to play an active role in their health. Patient data are securely sent to providers or the care team for review and consideration in evaluation of treatment.
 5. Analytics: Data integration and predictive analytics to increase access to health data for the purposes of improving population health and value for money across the health system.
- Patient-centred solutions**
- Eight distinct areas of healthcare delivery were identified to help focus efforts of innovation development and deployment:
1. Wellness and healthy living: Digital applications designed to help individuals maintain or improve their well-being through the promotion of healthy behaviours of living, such as diet, exercise, stress management, and illness prevention.
 2. Acute illness diagnosis: Patients requiring urgent/emergent care for a new condition or worsening chronic disease/illness presenting at the hospital or in the community.
 3. Inpatient care: Patients admitted to hospital requiring active monitoring of basic biometrics as well as the ability for bedside patient to provider or provider to provider virtual consultations.
 4. Post discharge care: Patients discharged from hospital receiving post-discharge follow-up care to monitor their condition and symptoms, preventing re-admission and Emergency Department (ED) visit avoidance.
 5. Hospital at home: Patient populations historically admitted to hospital or those that have been admitted or to the ED that can instead be safely discharged home with remote monitoring.
 6. Health maintenance and management: Ambulatory patient consultations/follow-up care historically scheduled as in-person visits with providers or care teams.
 7. External care partners: Patients undergoing care in external partner sites, such as hospitals, long-term care facilities, retirement homes, and so on, who require consultation and medical management.
 8. Pre-habilitation and rehabilitation: Patients receiving pre-habilitation or rehabilitation care by a provider or care team in accordance with their active care plan.

Overall evaluation of the virtual care strategy will be completed through the identification of qualitative and quantitative

measures including patient and provider satisfaction surveys, utilization data, and clinical outcome measurements. These will help evaluate the obtainment of the quadruple aim within the eight patient-centred dimensions of healthcare delivery.

“Health maintenance and management” case example: Virtual visits at an endocrinology and diabetes clinic

One example of adopting virtual care in the “health maintenance and management” dimension of the strategy was a pilot study in the Endocrinology and Diabetes clinic at TOH. In preparation for the pilot, a multidisciplinary committee was established to determine best practices based on a literature review, expert opinion, and an environmental survey of existing Ontario virtual care programs. Current and future state mapping and stakeholder engagement was used to develop and implement the program using TOH’s innovation framework.¹⁰ Eligibility criteria was established, including provider determination that the appointment was clinically appropriate to be conducted virtually, and patient access to a device with video/audio capability, internet connection, and an email account. Provider eligibility included access to an internet-enabled device with video/audio capability and registration with the provincial Ontario Telemedicine Network (OTN) platform. Both physicians and allied healthcare professionals in the clinical setting were included in the pilot.

After providers received one-on-one training of the virtual visit workflow and technology platform, the project was officially launched at a multidisciplinary Grand Rounds through an onboarding exercise. Providers received “at the elbow” support during their initial virtual encounters, and Plan-Do-Study-Act cycles were completed to refine the workflows throughout the pilot. A dedicated coordinator supported the booking of visits and reviewed associated workflows and technical requirements with patients in advance.

Methods and responses

Electronic surveys were distributed to collect feedback regarding patient and provider satisfaction with virtual visits. Of 492 surveys issued, 109 patients (22% response rate) and 149 providers (30% response rate) replied to survey invitations sent to patients and providers after each virtual visit. Over 76% of patients reported being satisfied or very satisfied with having their appointment conducted virtually as opposed to in-person, and being satisfied or very satisfied with their overall experience. Over 91% of providers reported that virtual visits improved access to care for patients, and both patients and providers felt that conducting appointments virtually saved time in their day.

Challenges experienced

Three main challenges were encountered during the virtual visit pilot:

1. Technical issues: Addressing technical difficulties experienced by patients and providers became significantly time consuming. Access to centralized technology experts may have helped address technical issues quickly as they arose. Hence, adopting a technology platform with a proven ease of use and efficient administration workflows could have improved the overall experience of providers and patients.
2. Engagement of healthcare providers: As with any new process, there were early and late adopters of virtual visits. Most healthcare providers became increasingly comfortable with this method of providing care after receiving additional at the elbow support. Therefore, allocating additional resources for training and support earlier may have helped alleviate frustration among some providers, ultimately leading to increased engagement and advancement of virtual visits during the pilot.
3. Framework for new method of healthcare delivery: As this pilot launched, virtual care was in its infancy in Canada with many unknowns concerning governance, physician remuneration, licensure for out-of-province care, guidelines for best practices, and safety and data security. Recently, there has been progress towards addressing these concerns and adopting professional frameworks. It is recognized that access to recognized and adopted guidelines and policies can aid institutions in designing and implementing safe and effective virtual care programs.

Overall recommendations of the virtual visit pilot

Establishing appropriateness criteria for inclusion of patients in virtual visits is recommended for providers. Patients who are independent and generally proficient with technology require less digital support, so understanding a patients’ ability in this regard is critical to enabling a positive experience. Appointing a physician lead to act as a champion as well as an administrative coordinator were also found to be important. Overall, this pilot demonstrated virtual visits are feasible and accepted by patients and healthcare providers as an alternate model of care delivery. At TOH, the lessons learned in this pilot helped inform the corporate rollout of virtual visits, which has seen the number of new active users increase from 167 to 442 (264% increase), and virtual video visits from 99 to 3,837 (3,775% increase) over the past 12 months. Health leaders seeking to implement virtual care in their organizations will first need to engage with physician and administrative leaders who are willing to champion new technologies. Providing appropriate training resources and technical supports for early adopters is highly recommended to help sustain troubleshooting and maintenance phases. Finally, corporate leaders will need to proactively collaborate with government partners to create sustainable and supportive

remuneration structures and policies that promote virtual care models to continue long term.

Conclusion

Unique enablers for adoption of virtual care innovations

In addition to the established organizational strategy, several unique enablers promoted rapid adoption of virtual care innovations at TOH:

1. **Global pandemic—essential services mandate:** In response to the global COVID-19 pandemic, Canadian hospitals moved to essential service models, slowing in-person visits, procedures, therapies, or treatments for non-urgent or emergent care. To enable continuity of care, many providers sought to adopt virtual care into their practices, such as video visits and remote monitoring sooner than previously anticipated.
2. **Physician remuneration model:** Although many physicians have provided care for some time through virtual methods such as phone, emails, or text messages on an ad hoc basis, historically these activities have not been remunerated. In Ontario, virtual care fee codes are now available within the Ontario's Hospital Insurance Plan (OHIP); therefore, creating no extra cost to insured patients. As an example, OHIP remunerates physicians for videoconferencing through the OTN at the same rate as face-to-face visits, and in one pilot, providers were paid an additional incentive fee for delivering the service using the technology. These changes to the local remuneration model have enabled practitioners to pivot their practice and integrate this new model of care delivery.
3. **Epic system:** As mentioned, on June 1, 2019, TOH launched its new health information system, Epic, bringing patient-centred care to the digital age. Providers now have real-time access to patient medical information, allowing them to make timely, informed decisions based on the most comprehensive and connected information available. This system served as a catalyst for virtual care innovation, with many providers promoting the maturity of its use to enable new models of care. As an example, patients now have greater access to their own information through a secure, on-line portal called MyChart which also allows them to communicate and upload information regarding their health and launch virtual visits.

Lessons learned and suggestions for success

The future of virtual care innovation is exciting, and leaders will naturally seek rapid adoption of solutions in clinical settings. However, it is important to recognize that some innovations represent significant changes to entrenched models of care and workflows. Fostering provider trust in

new technologies, including their ability to deliver safe, quality care, will take time. Innovations may be perceived as disruptive, inciting anxiety and creating potential for large-scale pushback. It is therefore critical that solutions be piloted in small groups with established relationships who can provide feedback for improvements prior to corporate rollouts. Early adopters who take ownership of the innovation's development are also required to help shape the final solution, recruit additional providers, and ensure adoption organizationally.

The promise of virtual care innovation

Rising healthcare costs, a critical shortage of access to care, and an aging population are creating an imperative for alternate care delivery models. The adoption and maturation of virtual care innovations in the Canadian healthcare context will bring about the system-level changes required to meet this need. To date, clinicians and patients at TOH have demonstrated great interest in leveraging this technology and early outcomes demonstrated in our case example include improved quality of care, effectiveness, and efficiency for patients, families, and providers. These outcomes will help propel the organization towards the achievement of the quadruple aim, and its vision “to provide each patient with the world-class care, exceptional service, and compassion we would want for our loved ones.”

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