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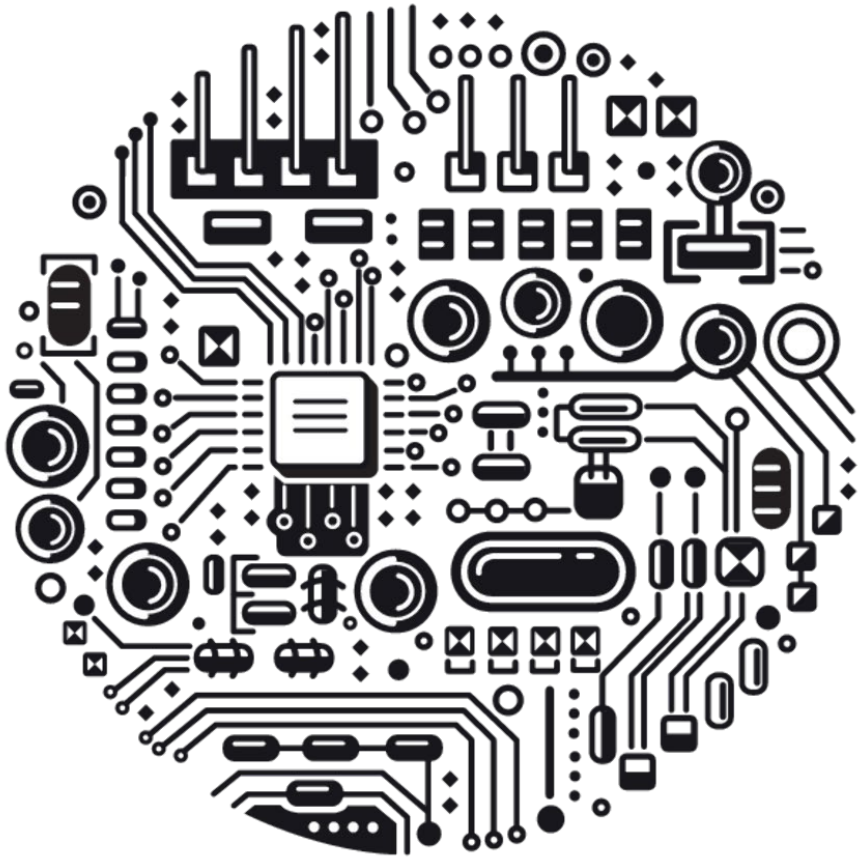

Atlantic Provincial Medical Associations

Environmental scan on virtual care – final report

April 2019

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1. Project background, scope and approach

Project background and scope

The Atlantic provincial medical associations recognize that virtual care is already impacting how consumers interact with the health system, and the pace and scale of impact is expected to continue to grow. The impact on and influence of physicians and medical associations in relation to virtual care is evolving and there is an opportunity for both parties to play an enhanced role.

The purpose of the research project requested of Deloitte was to undertake an environmental scan focused on current practices and future trends in virtual care.

Definition of "virtual care"	"Virtual care refers to any interaction between patients and/or members of their circle of care, occurring remotely, using any form of communication or information technology, with the aim of facilitating or maximizing the quality and effectiveness of patient care." (CMA, 2018) "Virtual care is the integration of telehealth into mainstream care delivery to complement or even substitute traditional care delivery. It involves the convergence of digital media, health technology, and mobile devices, and leverages additional modalities—such as text messaging, digital voice assistants, and decision support tools powered by artificial intelligence and augmented/virtual reality—to create a continuous connection between patients, physicians, and other caregivers." (Deloitte research: What can health systems do to encourage physicians to embrace virtual care?, 2018)

While virtual care can include a wide range of technologies and approaches, Deloitte was asked to focus the environmental scan on two categories of virtual care, **telemedicine** and **remote patient** monitoring, and research focused on services and technologies that enable communication, consultation, diagnosis, and treatment across multiple specialties. Services and technologies that have integrated artificial intelligence (AI) with virtual care were specifically examined.

The scan also considered Canadian and international jurisdictions, as well as both insured and non-insured health services. In addition, we were asked to focus on the work of physicians – either alone, or in conjunction with other providers.

Understanding the physician perspective

Although we were asked to focus on physician perspectives and the role(s) of medical associations, we understand that these are only two of a wide variety of stakeholder groups with interests in virtual care. Specifically, these also include patients/consumers, policy makers, technology providers, and all health providers.

Primary interests of physicians in virtual care:

- Improving patient health outcomes
- Increasing patient access
- Staying current on disruptive technologies and innovations that will shape their practice areas
- Leveraging technology to manage current and future challenges in healthcare
- Safeguarding patient privacy and data security
- Ensuring equitable reimbursement for providing virtual care
- Adapting to practice and workflow changes resulting from the adoption of virtual care

Primary interests of medical associations in virtual care:

- Ensuring that the voice of the physician is heard throughout all policy, statutory, and regulatory matters with respect to virtual care
- Encouraging physicians to adopt virtual care solutions that are both effective and safe
- Preparing the physician workforce for the multitude of changes that innovation and technological disruption brings to healthcare

Research questions and approach

In completing our environmental scan, Deloitte focused on five research questions:

i. What virtual care services are in-use, and likely to be in-use, in the next ten years?

ii. What benefits has the adoption of virtual care achieved, and what are some potential downsides?

iii. What are the barriers to physician adoption of virtual care?

iv. What are the enablers of success in encouraging physician adoption of virtual care?

v. What role(s) can physician associations play in adopting virtual care solutions?

Deloitte's approach to the research included literature gathering and review, interviews with Deloitte subject matter experts (SMEs) from Canada, the US, and the UK, and targeted interviews with leaders of virtual care initiatives across Atlantic Canada and beyond. Key activities supporting the development of the environmental scan included:

- A review of relevant and recent Deloitte research publications.
- Desktop research to gather publicly-available academic articles and government documents from Canadian provinces and international jurisdictions of particular relevance and interest;
- Ongoing consultation with SMEs, including:
  - Two US-based physicians who lead much of Deloitte's research work in virtual care;
  - The Research Director for Deloitte's UK Centre for Health Solutions;
  - A Chief Architect at Deloitte Digital who previously served as CTO for a telehealth company;
  - A health policy manager for Deloitte's US Center for Health Solutions; and
- Semi-structured interviews with key personnel in the Atlantic provinces and BC regarding virtual care initiatives.

The pages that follow summarize the findings from Deloitte's research, providing context and lessons learned in addition to answering the above-noted research questions.

2. History and context

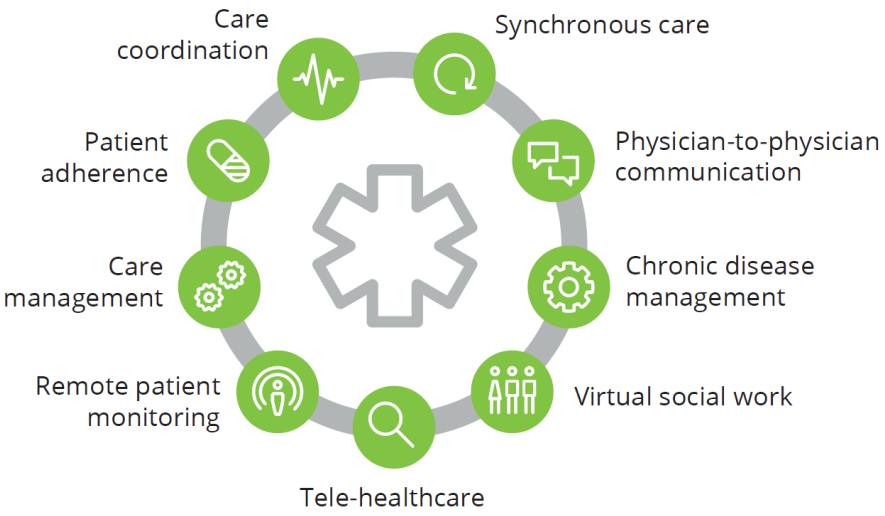
A brief history of virtual care

The history of virtual care can be traced back to 1905, when Dutch physician Willem Einthoven completed the first long-distance telephonic transmission of heart sounds. Then, in 1910, physicians in New York City successfully transmitted a variety of electrocardiograms. Following these two breakthroughs, the next century saw the concept of remote medical care evolve sporadically through advancements in two-way radio and telephone technologies. These basic forms of telemedicine are perhaps the earliest examples of what is now the diverse and expansive world of virtual care (see graphic on the right).

In the 1950s, the "first wave" of organized telemedicine initiatives began in the US, and lasted until the late 1970s when funding shortages caused a hiatus of nearly a decade. A "second wave" of these programs developed at much larger scale beginning in the 1990s, led at the state level in the US and the provincial level in Canada.

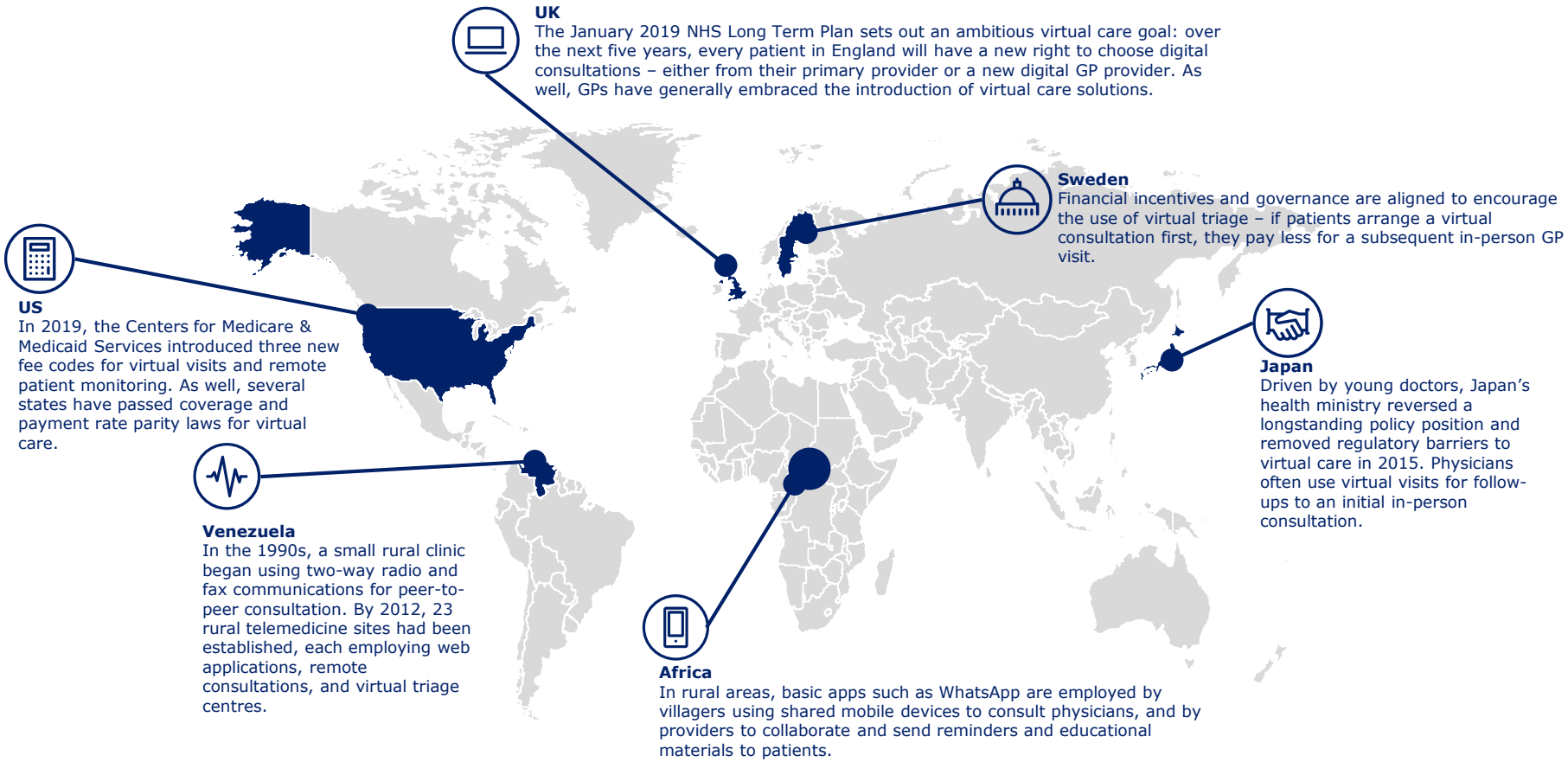
Although the CMA definition of virtual care previously mentioned is logical and comprehensive, a variety of terminology (e.g., "telehealth", "telecare", "virtual health") and categorization can lead to some confusion when evaluating current and future use cases. For the purposes of this report, and based on the scope of this scan as provided to Deloitte, virtual care technologies and services are organized in two categories:

- **Telemedicine:** virtual visits with providers for prevention, diagnosis, and treatment; and
- **Remote patient monitoring:** remote monitoring for prevention, diagnosis, and treatment.



High-level global examples of virtual care

Today, virtual care is being advanced worldwide, sometimes in locations that are less stereotypically associated with innovation and technological advancements.



UK
The January 2019 NHS Long Term Plan sets out an ambitious virtual care goal: over the next five years, every patient in England will have a new right to choose digital consultations – either from their primary provider or a new digital GP provider. As well, GPs have generally embraced the introduction of virtual care solutions.

Sweden
Financial incentives and governance are aligned to encourage the use of virtual triage – if patients arrange a virtual consultation first, they pay less for a subsequent in-person GP visit.

US
In 2019, the Centers for Medicare & Medicaid Services introduced three new fee codes for virtual visits and remote patient monitoring. As well, several states have passed coverage and payment rate parity laws for virtual care.

Japan
Driven by young doctors, Japan's health ministry reversed a longstanding policy position and removed regulatory barriers to virtual care in 2015. Physicians often use virtual visits for follow-ups to an initial in-person consultation.

Venezuela
In the 1990s, a small rural clinic began using two-way radio and fax communications for peer-to-peer consultation. By 2012, 23 rural telemedicine sites had been established, each employing web applications, remote consultations, and virtual triage centres.

Africa
In rural areas, basic apps such as WhatsApp are employed by villagers using shared mobile devices to consult physicians, and by providers to collaborate and send reminders and educational materials to patients.

3. Research question i:

What virtual care services are in use, and likely to be in use, in the next ten years?

Virtual care terminology and categories

At its essence, virtual care describes instances of health care provision where provider(s) and patient(s)/consumer(s) are not physically located in the same place. The myriad of terms used to describe the world of virtual care (e.g., "telehealth", "telecare", "telemedicine", "digital health", "virtual health" …) can create confusion, particularly as definitions can vary depending upon whom one asks. While two subsets of virtual care, **telemedicine** and **remote patient monitoring** (as defined by the Atlantic PTMAs) are the focus of this environmental scan, they are not mutually exclusive. For example, the use of electronic stethoscopes as part of a videoconference virtual visit is a combination of both telemedicine and remote monitoring. Complicating things further, a third category of virtual care, consumer-driven digital healthcare, can incorporate select elements of both telemedicine (e.g., reminders to attend appointments, educational materials developed by physicians) and remote patient monitoring (e.g., patients submitting pictures or videos of their conditions).

However, virtual care technologies and services that are currently in use with respect to the two categories of focus can be categorized by the following examples:

Telemedicine:

- **Synchronous:** Physicians, other health care providers, and/or a combination of both use telephones, videoconferencing, instant messaging, and/or apps to diagnose, treat, and prevent. This also includes primary physicians and specialists providing synchronous telemedicine in concert (e.g., in rural areas where certain specialties are not readily accessible).
- **Asynchronous (sometimes referred to as "store and forward"):** Patients record audio and/or video of their symptoms, and submit them to clinical teams for review at a later time (e.g., Horizon Health Network's patient health portal for autism patients and their families). This also includes collaboration between primary physicians and specialists (e.g., the eConsult program in ON and NL).

Remote patient monitoring

- This category of virtual care typically involves five steps: **Collection** (e.g., through a device such as a weigh scale and heart rate monitor for premature babies), **Transmission** (data is sent to care providers via the internet, text, apps, etc., either to teams working in hospitals or other facilities, or directly to physicians' smartphones regardless of where they are located), **Evaluation** (both software and providers themselves evaluate data and indicate any areas of concern to other providers and patients themselves), **Notification** (data indicating that immediate attention is required alerts emergency responders or other care teams), and **Action** (emergency response or other in-person interventions are initiated).
- **AI integration** is increasing within this category, as machine learning and advanced algorithms analyze real-time data from patients to identify those at risk of worsening or requiring in-person follow up. As such, AI is seen to be increasingly supporting the Evaluation and Notification phases of a typical remote patient monitoring use case.

Virtual care – a widening variety of uses

	Category of virtual care	
	Telemedicine	**Remote patient monitoring**
Prevention	• St. Michael's Hospital uses telemedicine appointments in kidney stone prevention. • Ontario has explored patient-initiated primary care virtual visits through an integrated platform incorporating audio, video, and email messaging.	• For dementia patients at risk for falls, remote monitoring can alert caregivers to intervention when a vulnerable patient is at-risk or in danger.
Diagnosis	• In NB, telemedicine was combined with remote patient monitoring: virtual visits through videoconferencing were supplemented with use of an electronic stethoscope (by a physician remotely, and a nurse or other provider in-person with the patient). • Online portals allow patients to submit images and/or video of their symptoms for diagnosis by a provider. • Virtual consultations also apply to primary care and specialist collaboration. This technology is frequently used to provide specialist access in remote areas lacking these physicians.	• Software that provides intervention alerts and/or treatment recommendations based on analysis of data collected through remote monitoring. • AI-integrated solutions (see below) can diagnose signs of at-risk patients and recommend courses of action including in-person interventions.
Treatment	• PEI's telerounding project is one of many examples of telemedicine used for treatment. Nurses and lab technicians located at Western Hospital use secure videoconferencing to connect with physicians located elsewhere and treat patients through virtual rounds. Reaction from both patients and providers has been very positive. • Virtual consultations, particularly through videoconferencing, allow physicians to treat patients as an alternative to in-person visits. • Ontario has piloted "telepalliative" and "telewound" virtual consultations for assessment and treatment.	• The DuoFertility wearable monitor and app works to identify ovulatory cycles. Data is collected and analyzed by a supporting team of fertility experts. A research study found the solution performed comparably to a traditional alternative (Rollason et. al, 2014). • Type 1 diabetes management through remote patient monitoring was found to be equal in effectiveness to a quarterly in-person visit (Chase et. al, 2003). • The Ontario Telemedicine Network's Telehomecare program helps patients and providers monitor and treat cardiopulmonary disease through the use of technology-integrated equipment.
AI integration	• Machine learning and AI can be paired with virtual consultations to analyze EMR data and provide patient care recommendations for providers. • AI algorithms are incorporated into chatbots that can recommend diagnoses based on symptoms and patient health data.	• The Stasis Smart Monitoring Solution tracks six key vital signs, and AI is deployed to add a layer of monitoring to identify patient deterioration. • Alignment Healthcare's AI-powered command center analyzes remote monitoring data and works to identify at-risk patients and escalate to in-person follow up visits where required.

There are examples of both telemedicine and remote patient monitoring in use across the continuum of care. These virtual care technologies are employed by physicians working alone, family physicians and specialists working together, physicians working with other health care providers, and non-physician providers such as emergency response teams.

Virtual care in the medium-term future

While there are many virtual care solutions in place today, exponential change is anticipated in the next decade. The accelerating pace of technological disruption makes predictions challenging; however, insight can be gleaned from Gartner and Forbes research through the "Strategic Planning Assumptions" they offer to health care providers:

Gartner's Strategic Planning Assumptions for Healthcare Providers[1]:

- By 2022, the first U.S. medical **malpractice** case involving a medical decision made by an advanced AI algorithm will have been heard.
- By 2023, U.S. **emergency department visits** will be reduced by 20 million[2] due to enrollment of chronically ill patients in AI-enhanced virtual care.
- By 2023, **virtual encounters** will exceed face-to-face care delivery encounters, resulting in a dramatic realignment of clinical care and health IT.
- By 2023, 60% of healthcare consumers will have **access** to and control of their health data using a technology of their own choosing.
- By 2023, one-third of Health Delivery Organizations (HDOs) globally will deploy cutting-edge clinical and operational **command centers** that will yield vital insights for real-time delivery excellence.
- By 2025, 50% of all healthcare delivery organizations will include material contributions from **digital giants** in their clinical diagnostic or treatment processes.

In addition, an in-depth **Forbes** article (2018) explored the top trends in telemedicine and remote patient monitoring:

- **Data analytics:** Big Data and analytics will play an increasing role, particularly in remote patient monitoring.
- **Mobility and cloud access:** mobile devices will continue to be come more ubiquitous, and storing medical records in the cloud will allow patients to access results online at any time.
- **IT security:** paired with the two trends outlined above, an increasing emphasis will be placed on safeguarding patient data and health records.
- **Decentralized care:** telemedicine will continue to shift from large hospital settings to community-based medicine, which can in turn be used as a physician attraction and retention tool as practitioners can keep flexible hours and are not always required to be in the same place as their patients.
- **Proprietary networks and hardware will become obsolete:** with the availability and affordability of secure software that is easy to implement, proprietary technology used by individual hospitals or telemedicine providers is becoming less common. As well, many enterprises have procured specialty-specific virtual care solutions that can be deployed across various types of hardware through the use of open networks.

[1]Gartner, Inc., Predicts 2019: Healthcare Providers Must Embrace Digital Transformation, Laura Craft e. al. December 10, 2018,

[2]This figure represents 14.6% of all US ED visits in 2015 (Centers for Disease Control and Prevention, n.d.).

The state of AI integration in virtual care

While AI is in its infancy in terms of being able to make detailed and effective medical diagnoses, disruption will continue to occur as development of this technology accelerates. IBM's Watson supercomputer provides an example of the former observation. Watson was heralded as a major innovation in the area of cancer research. However, during a recent partnership between IBM and the Memorial Sloan Kettering Cancer Center in New York, Watson frequently gave inaccurate diagnoses and medical guidance, and was heavily criticized by physicians in terms of its effectiveness and usability.

Although the Watson example suggests that AI has a long way to go in the world of healthcare, Philips' eICU program (which combines audio-visual solutions with AI, data visualization, and advanced reporting) is seen as a leading AI-enabled technology. For example, in rural South Dakota, this solution saved almost 11,000 ICU bed days, which amounted to $62 million in costs (Fischer, 2018). In addition, radiology has seen particularly advanced applications of AI. Deep learning neural networks can identify warning signs in radiological images more accurately than an average radiologist. Overall, the best AI applications in radiology are comparable to human performance, although these are generally only used in research environments, and again, more so in screening versus diagnoses.

Despite both positive and negative examples of AI applications in virtual care, it carries potential in terms of serving as a filtering device. The importance of coupling AI with virtual care solutions that have the potential to greatly increase demand has also been highlighted (e.g., a patient email portal, which carries the potential of an influx of questions that would occupy a large portion of a physician's time). An AI-supported filtering or triage mechanism could be employed in order to avoid unnecessary visits and infection risks while directing patients to an appropriate level of care (e.g., a nurse practitioner versus a specialist physician). In this sense, a patient may actually have more in-person touch points with health providers, but these will take place with the most appropriate provider in terms of the patient's care needs. To elaborate, AI can be used to direct patients to the level of care that they need, and cost savings can be achieved in this manner. However, multiple Deloitte SMEs cautioned that AI, particularly in a triage function, is in its infancy and only beginning to emerge as a robust augmentation to the work of physicians.

Renowned Indian American entrepreneur and venture capitalist Vinod Khosla (2016) provides an important caveat to keep in mind when considering the future of AI in disrupting the work of physicians. While over time, 80% of what physicians do may be replaced by technology, this does not mean that the physician workforce will be reduced by 80%. Instead, the roles of physicians will shift towards more human aspects of medicine, such as ethics and empathy. In this sense, AI and virtual care should be seen as an enhancement, rather than replacement, of physicians and their work.

3. Research question ii:

What benefits has the adoption of virtual care achieved, and what are some potential downsides?

The importance and benefits of virtual care

Given many encouraging results from existing programs and initiatives, virtual care can be seen as a measure to address some of healthcare's most pressing challenges. As improving life expectancy in many countries brings increasingly chronic and complex health conditions, new and innovative ways of meeting demand in an affordable manner are necessary.

The growing demand on healthcare systems is well known, as illustrated by several UK statistics. The average number of primary care consultations per person over 75 increased from 7.9 in 2000 to 12.3 in 2008. In 2009/10, over 2 million unplanned admissions for those aged 65+ accounted for 68% of hospital emergency bed days at any one time. As well, an increasing number of people will compete for a decreasing number of healthcare providers: the ratio of working age to retired people is expected to fall from 4:1 to 2.5:1 over the next 40 years (Deloitte Centre for Health Solutions UK, 2012). These demand figures signal a need to consider virtual care as a potential solution to manage demand .

Virtual care has been shown to offer a number of benefits to address these challenges, including improved health outcomes, increased patient access, improved physician retention and attraction, and health system cost reductions.

i. Improved health outcomes

- In South Dakota, Avera Health's use of the Philips eICU program achieved declines in mortality, saving 260 additional lives (Fischer, 2018).
- A US study of virtual visits found that 83% of health conditions were resolved after a virtual visit, and 5.6% of patients reported that they would have sought ED treatment if the virtual visit option was not available (Thielst, 2014).
- A remote patient monitoring program (using a tablet-based system to collect patient vital signs) at a moderate-sized Medicare home health agency was found to have reduced the all-cause 30-day hospital readmission rate from 19.3% to 5.2% over three years (O'Connor et al., 2016). As a result, virtual care has been integrated into the health system's broader hospital readmission reduction initiatives.

ii. Increased patient access

- Travel costs borne by patients in remote geographies can serve as a substantial barrier to accessing care, particularly specialists. Teleconference visits can reduce or eliminate these costs for patients, thus removing a barrier to patient access to care.
- Deloitte's 2018 survey of over 4,500 US healthcare consumers highlighted access improvement as a benefit of virtual care: 33% of respondents chose a virtual visit because of more convenient hours, 25% did so because they were too ill to leave home, and another 25% did so due to long distances between their home/work and the nearest doctor's office.
- Two-thirds of Zambia's approximately 1,600 doctors work in urban areas, while most of the country's population of 14 million reside in rural areas, creating significant access issues. The UK-based charity Virtual Doctors provides asynchronous telemedicine between doctors in the UK and local staff at rural health centres. As of 2016, the charity supported 19 of these centres, each of which have catchment areas of tens of thousands of patients (Coughlan, 2016).

The importance and benefits of virtual care (continued)

iii. Improved physician retention and attraction

- Physician shortages are a problem both within and beyond Canada: estimates of patients waiting for a family doctor in Atlantic Canada approach 175,000 (Whiffen and King, 2019), while in the US, shortages have been forecasted to reach up to 120,000 physicians by 2030 (AAMC, 2018). This shortage creates another issue – physician burnout caused by long working hours. In the US, 20% of doctors work 60-80 hour weeks, 38% of male physicians and 48% of female physicians report burnout, and 92% of millennial physicians highlight work-life balance as a top priority (Tong, 2018).

- In 2018, Medscape surveyed 15,000 US physicians, and found that 35% reported that physician burnout could be reduced through "more manageable work schedule/call hours". Virtual care can offer this by allowing providers to address routine issues remotely, while the convenience of virtual visits can reduce missed appointments, both of which will allow physicians to optimize their time. 20% also cited flexibility as a measure to reduce burnout, and virtual care can address this issue as well – physicians can block off "telemedicine days" during which they can work from home, saving valuable time by eliminating commutes (Peckham, 2018).

- Physician shortages and physician burnout both drove the launch of PEI's telerounding pilot project. With multiple vacancies and staff transitioning to retirement, rural physicians had reached a breaking point in terms of burnout. Implementing virtual care temporarily stabilized the issue and allowed a beloved rural hospital to remain in operation, which had been threatened by physician resourcing issues. This stabilization was also seen to have potential to improve perceptions of the working environment when touring new potential physician recruits.

iv. Health system cost and utilization reductions

- **2014:** The US-based Alliance for Connected Care estimated the average cost of a telehealth visit in the commercial health insurance market was $40-50, compared to an average cost of $136-176 for in-person acute care visit (Thielst, 2014). This analysis incorporated the costs of care for settings where telehealth users reported they would have sought care otherwise.
- **2014:** A Houston-based program to integrate tablet telehealth into ambulance calls reduced unnecessary ED visits by 6.7%, amounting to approximately $1 million (USD) in annual savings. The program also reduced ambulance back-in-service time by 44 minutes (Deloitte Center for Health Solutions US, 2018).
- **2016:** In a study of its first 200 patients, a remote patient monitoring program for chronic heart disease led by the Vancouver Island Health Authority showed a 50-70% reduction in acute care utilization, and a cost prevention of $12,000 per patient (Ellis, 2016).
- **2017:** In the US, Accenture estimated that applying virtual care to ambulatory patient encounters could save over $7 billion worth of primary physicians' time annually (Accenture Consulting, 2017).
- **2018:** A study of 1,300 patients using Newfoundland & Labrador's eConsult program found that face-to-face consultations were reduced by 60% (CBC News, 2018).

The potential downsides and drawbacks of virtual care

While virtual care has achieved numerous positive results in recent years, it can also have associated drawbacks. These downsides can be grouped into three categories: data breaches and patient privacy violations, the use of virtual care in inappropriate situations, and unintended health system cost increases.

i. Data breaches and patient privacy violations

- Data breaches in healthcare are increasing. US analysis of health data breaches from 2010-2017 found that 2,149 breaches involved a total of over 176 million patient records. While this was driven by three large breaches that accounted for over half of stolen patient records, 70% involved data stored by healthcare providers (Carroll, 2017). Security and privacy concerns with respect to patient data also form a prominent barrier to physician adoption of virtual care, as detailed on subsequent pages of this report.

ii. The inappropriate use of virtual care

- In March 2019, a doctor consulting a patient and his family via videoconferencing in a Kaiser Permanente hospital in Fremont, California delivered end-of-life news. The patient passed away two days later, making for dramatic headlines as the experience caused family members to heavily criticize the use of virtual care in this situation. The family stressed that it should have been a doctor at the bedside delivering this news. Similarly, medical ethicists cautioned that telemedicine technology cannot pick up social nuances in highly emotional situations, and that providers may need to modify their approach when communicating sensitive information in virtual care interactions.

- In British Columbia, concerns over the potential for the introduction of virtual walk-in clinics have arisen in recent years. Firstly, as direct-to-consumer businesses begin to offer direct physician access through virtual visits, care fragmentation emerges as a risk. Patients may see a different physician for each virtual visit, and electronic medical records may not be integrated across multiple eHealth systems, creating threats to continuity of care for each patient. Past President of Doctors of BC, Dr. Bill Cavers, also highlighted the issue that a regulation requiring doctors billing for telemedicine to take full responsibility for ongoing care and coordination of the patient did not necessarily apply to virtual visits.

iii. Unintended health system cost increases

- While virtual care can improve patient access, it may not necessarily reduce overall healthcare spending. A review of 2011-13 utilization data in California found that only 12% of telemedicine visits replaced an in-person consultation, meaning 88% of these visits were new demand. As well, while a single virtual visit may be more cost effective than a single in-person visit, the former can require additional follow-up appointments and/or tests that increase long-term spending. Specific to respiratory illnesses, researchers found that annual costs increased $45 per telehealth user versus patients who did not use virtual consultations (Ibarra, 2017).

The potential downsides and drawbacks of virtual care – the story of British Columbia (page 1 of 2)

The story of virtual care in BC is somewhat infamous. It contains elements of two drawbacks discussed on the previous page: inappropriate use, and unintended cost increases. Virtual care has been a part of the BC health system for many years, starting with a system of hardwired end points in facilities connected through a secure network (typically used by specialists to deliver care remotely), and expanding to a home health monitoring program delivered in partnership with Telus, videoconference visits, two versions of provider-to-provider virtual consultations, and the introduction of online consultations by private providers. Despite a wide variety of virtual care use cases, the province has lacked a strategic framework that sets goals and measures progress with respect to virtual care. This is currently being developed by a small unit within the Ministry of Health.

Between 2012 and 2014, concerns arose regarding what was perceived as massive increases in demand and physician billings for virtual patient visits, which coincided with the entry of two secure virtual visit companies (Livecare and Medeo) into the BC market. Based on the concerns raised, the Ministry of Health ordered a review of telemedicine and the small unit within the Ministry focused on virtual care was created as a result.

Originally, BC required virtual care to be performed within a designated facility, and thus, fee codes for a virtual visit were initially set slightly higher than those for in-person visits, with the aim of compensating physicians for inconvenience. While this requirement has since been removed, the growth trajectory of virtual care services has continued upward. However, the total number of these services still pales in comparison to the total number of health services that are provided within the province's fee-for-service model. In addition, the fee code for a virtual visit with a GP is now based on an average of a sliding scale (based on patient age) through which physicians are compensated for traditional in-person visits.

In addition, part of this demand increase can be attributed to factors that are shaping healthcare regardless of whether virtual care is offered, such as the aging population. Part of this is also attributable to pent up demand. For example, roughly 15% of BC residents do not have a family doctor, and this segment is a prime target for general virtual consultations. While the issue of demand growth for virtual care in the province is complex, it has been driven by a general increase in demand for care and growing capacity due to an increased number of service providers, both in addition to growing demand specific to virtual care. To summarize – a five-fold increase from 2012/13-2016/17 in the number of insured virtual care services provided to patients may appear concerning when viewed in isolation, but it is important to keep the broader health system context, including its relative size, in perspective.

The potential downsides and drawbacks of virtual care – the story of British Columbia (page 2 of 2)

While it remains to be seen whether cost and demand increases for virtual care are sustainable, important lessons have emerged from BC's experience in this area:

- The physician reimbursement model is an important consideration, as different structures can shift physician focus towards what are the right methods to deliver care, versus whether or not they will be reimbursed.
- Continuity of care is an important concern. Technologically-enabled walk-in clinics could negatively impact perceptions and impacts of virtual care, as they would risk becoming purely episodic with no general practitioner as the most responsible physician.
- If medical associations adopt an overarching concept that assumes virtual care is generally beneficial, these organizations can look for ways to encourage conversations regarding how to most appropriately enable it.

3. Research question iii:

What are the barriers to physician adoption of virtual care?

An overview of barriers to physician adoption of virtual care

Throughout our research and consultations with SMEs both domestically and internationally, six barriers to physician adoption of virtual care emerged. These are outlined below and detailed on the pages that follow. We note that barrier #1 was frequently highlighted as being the most prominent challenge associated with empowering physicians to adopt virtual care technologies,

a. Lack of reimbursement, and/or inappropriate funding models

b. The learning curve associated with technology use

c. Capital investment requirements and increased practice costs

d. Physician skepticism and discomfort

e. Privacy and patient data security

f. Process and workflow implications

a. Reimbursement schemes and funding models are the top barrier to physician adoption (page 1 of 2)

Subject matter experts across Canadian and international jurisdictions report that any lack of, or discrepancies in the amount of, reimbursement for the use of virtual care is the top barrier to adoption from the physician perspective. The US has made several recent advancements in addressing this barrier. As of January 1, 2019, the US Centers for Medicare and Medicaid Services (CMS) officially introduced three new fee codes specific to virtual care:

1. **"Brief communication technology-based service":** physicians can be reimbursed for a virtual check-in used to assess whether an office visit is needed. Although amounts are modest, CMS is not limiting the frequency of these virtual visits. However, CMS is emphasizing the benefit of identifying situations where an in-person visit is unnecessary through time restrictions – this service cannot be charged within the seven days following an in-person visit.

2. **"Remote evaluation of recorded video and/or images submitted by an established patient":** physicians can be paid when evaluating images or videos submitted by patients through their smartphones. This code also has time restrictions and only applies to established patients.

3. **"Remote physiologic monitoring treatment management services, 20 minutes or more of clinical staff time":** this is an adjustment of a previous rule that allows clinical staff to contribute time to remote patient monitoring, and lowers the timeframe required from 30 minutes monthly per patient to 20 minutes, in the hopes of increasing physician adoption. The code also offers a separate payment for any time spent onboarding a patient to the new virtual care platform.

In addition, to encourage adoption of virtual care by physicians, over 30 US states have enacted coverage parity laws requiring equal insurance coverage across in-person and virtual care. Ten states have also enacted payment rate parity laws, which require that providers are reimbursed for virtual and in-person services at an equal rate. US physicians are typically members of associations organized by specialty and look to these societies first (many are at the state-level). As such, these specialty societies are often the mechanism through which the "voice of the physician" is heard, in particular with respect to advocacy related to statutory and regulatory changes that can enable the adoption of virtual care.

In contrast, there is the perception of a lack of understanding in Canada on the part of technology providers regarding the work of physicians and how they are reimbursed as a challenge. It is possible that medical associations could assume a greater lobbying and/or advocacy role in advancing the development of new fee codes that would enable equal reimbursement for virtual and in-person services. A potential additional barrier is the fact that the goals of Canada's public health system are generally outcomes-based. If physicians continue to believe that face-to-face medicine achieves superior health outcomes across the board versus virtual care, then their reluctance to adopt virtual care given the system's focus on outcomes is understandable.

In Atlantic Canada, a more specific example of this barrier emerged during the development of MyHealthNS. The program demonstrated significant value by providing online patient access to test results and e-messaging between patients and providers. However, the lack of a payment model for virtual care stymied adoption during the roll-out phase. In August 2018, the provincial government created a technology stipend to address this gap, and improved adoption is anticipated.

a. Reimbursement schemes and funding models are the top barrier to physician adoption (page 2 of 2)

This barrier also elicits consideration of whether fee-for-service (FFS) or salary/capitation-based physician reimbursement models are more effective in encouraging the adoption of virtual care. 2016 marked the first year that Kaiser Permanente had more than 50% of its visits conducted virtually. Chairman and CEO Bernard Tyson highlighted his company's capitation-based funding model as an enabler of virtual care. Since Kaiser is at-risk for care costs, it is incentivized to explore less expensive models of care enabled by virtual solutions. Tyson suggested that investing in virtual care infrastructure allows large returns to customers due to the use of this funding model. The NSHA/IWK pilot program for video consultations focused on salaried physicians and allied health care providers due to the current fee code restrictions for FFS physicians.

In the UK, GPs are paid through both capitation and the Quality of Outcomes Framework. When virtual care was introduced, it was found that physicians earned close to equal compensation for virtual care vis-à-vis in-person visits. Additionally, there are different ways for physicians to build their practice income, e.g., through offering extended clinic hours, or serving particularly challenged population segments such as the homeless.

In Canada, criticism of BC's virtual visits initiative and the concerns around unsustainable demand and cost increases that arose suggested that virtual care might be better suited to capitation or salaried physicians, as physicians can employ effective virtual care technologies without having to worry about reimbursement. Newfoundland and Labrador's eConsult program, which enables family physicians to virtually submit patient-specific, non-urgent questions to specialists, remunerates participating fee-for-service specialists only. Salaried specialists are not remunerated, as responding to an eConsult is seen as taking the place of an in-person consultation, and is thus perceived to be within their scope of practice. Family physicians, regardless of their payment structure, are not remunerated for participation, as they are not able to bill for generating consults in general. Although the program is largely viewed as a success, this reimbursement structure caused some pushback as it was launched.

Academic research in the US further highlights concerns associated with offering virtual care within FFS reimbursement models. As previously mentioned, a fair, balanced, and equitable reimbursement scheme is critical. If fees for virtual care services are set too low, they can jeopardize FFS revenue for providers and create disincentives to adoption. On the other hand, if set too high, runaway costs for health systems and payers can arise as physicians rapidly adopt virtual care solutions.

This research also explores emerging payment models with capitation components (e.g., Accountable Care Organizations) and the opportunities they offer with respect to virtual care. Health Maintenance Organizations (HMOs) in the 1980s and 90s held providers accountable for the costs of patient care, and evidence suggests that hospitals with higher HMO patient concentrations were less likely to use high-cost technologies that were frequently overused. Under non-FFS payment models, virtual care adoption can be further enabled, as adoption decisions are controlled by physicians, providing flexibility in experimenting with virtual care methods through which to minimize costs while maximizing clinical outcomes.

Additional barriers to physician adoption

The 2018 Deloitte Survey of US Physicians asked 624 physicians from a variety of disciplines several specific questions regarding barriers to adoption of virtual care. Importantly, these excluded external factors such as reimbursement and payment models, which have been discussed on the preceding pages. The following barriers (beyond (a) reimbursement and funding models) emerged as clear themes:

b. The learning curve associated with technology use: Physicians expressed a need for support in terms of training (on process adjustments as well as the technology itself) when adopting virtual care solutions.

c. Capital investment requirements and increased practice costs: Physicians are concerned about the initial outlay required to offer virtual care, as well as any impacts on ongoing operational costs.

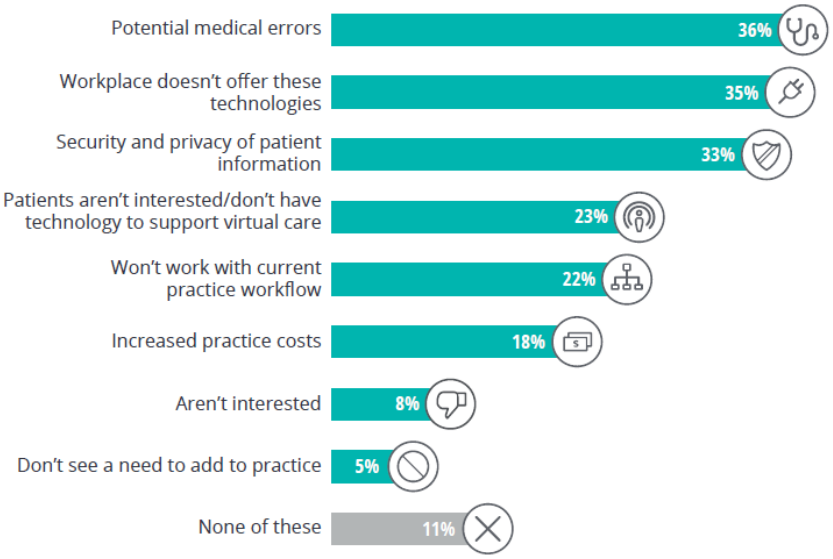
d. Physician skepticism and discomfort: physicians may view virtual care as an erosion of the practice of medicine, and have expressed discomfort related to ethics matters. The figure displayed on the right highlights some of the areas that have contributed to physician skepticism and discomfort.

e. Privacy and patient data security: in addition to concerns related to safeguarding patient data, privacy-related concerns with respect to videoconferencing may form an additional barrier.

f. Process and workflow implications: physicians may struggle to adjust daily routines, workflows, and processes within their practices as they move to provide more virtual care.

Concerns about potential medical errors, patient privacy, and access to technology are the main barriers to adopting virtual care technologies

Survey question: Assuming satisfactory reimbursement and no regulatory and licensing barriers for telemedicine and virtual care, what are some of the reasons you would not use these technologies?



Base: 624 (all physicians)
Source: Deloitte 2018 Survey of US Physicians.

Understanding the additional barriers

Many of the themes of the Deloitte 2018 Survey of US Physicians were reflected in consultations with subject matter experts and other Canadian jurisdictions, as well as research publications on virtual care.

Barrier	Deloitte 2018 Survey of US Physicians	Additional detail on barriers and the methods to address them
Learning curve associated with technology use	• 67% of physicians want virtual care technology to be more interoperable. • 51% want training on virtual care technologies.	• The PEI telerounding project included technical training provided by the technology vendor, as well as EMR training by Health PEI. Part of this was delivered virtually, which helped test physician technology fluency. As well, training packages were circulated in advance, which reduced the time burden of live training for physicians. • A number of US medical associations provide training modules focused on virtual care technologies. However, delivery of the education model, and obtaining physician buy-in, are ongoing challenges.
Capital investment required	• 18% of physicians cited increased practice costs as a barrier to adoption. • The cost and complexity of virtual care technologies are likely to decline as consumer technology companies (e.g., Amazon, Google) begin to compete with traditional suppliers.	• Many virtual care technologies are not capital-intensive, and require only a secure internet connection and access to a mobile device, tablet, or laptop. Pilot programs in Atlantic Canada have leveraged simple and/or existing technology (e.g., eConsult in NL, ~~MyHealthNS~~). • Improving internet access and connectivity is a "big game-changer": access worldwide has increased 1,066% since 2000, and internet users now represent 55.1% of the global population (Deloitte, 2019). • Rural Africa has seen virtual consultations achieved through WhatsApp and SMS communications through communal devices in villages.
Physician skepticism and/or discomfort	• Concerns regarding medical errors can be a combination of cultural and practical considerations. • Physicians desire to access and understand robust evidence that demonstrates that virtual care is at least on par with traditional care in terms of accuracy. • However, medical errors can also stem from communication breakdowns, and in the case of new virtual care solutions, physicians may attribute these to unreliable technology.	• During the PEI telerounding pilot project, family medicine practitioners were skeptical that technology could substitute for the "hands and eyes" component of in-person consultations, as well as apprehensions regarding potential "erosions of practice" in the future. • Even though physicians using the NSHA/IWK pilot program rated the overall effectiveness of the program's virtual care tool at 92%, there was occasional discomfort during the NSHA/IWK pilot due to technical issues with the tool and/or some loss of physician control over the therapeutic environment.
Privacy and patient data security	• 33% of physicians cited patient information security and privacy as a barrier. • Mitigating security and privacy risks can be achieved through upfront integration of security and privacy requirements as part of virtual care technology design.	• During the NSHA/IWK pilot program, some physicians expressed discomfort around becoming privy to a patient's at-home surroundings. • Technology provider Babylon Health achieved success in the UK in part due to building a positive reputation regarding safety and patient data security.
Process and/or workflow changes	• 22% of physicians highlighted virtual care not working with their existing practice flow as a barrier.	• Physicians frequently highlight difficulties in changing daily routines as part of adopting virtual care solutions. • Process changes brought about by the adoption of virtual care can also be positive rather than representing a barrier to adoption. For example, PEI's telerounding project improved patient flow.

3. Research question iv:

What are the enablers of success in encouraging physician adoption of virtual care?

Enablers of success (page 1 of 2)

Throughout our research and consultations, multiple themes emerged regarding the key factors that have enabled success across a variety of virtual care initiatives. These are: physician champions, training and support, necessity (driven by several potential factors), and familiarity with virtual care.

Physician champions

- A key lesson learned as part of Scotland's Home and Mobile Health Monitoring (HMHM) program was the importance of local physician champions. In the Lothian region, these physicians spread word of the program's benefits, encouraged further implementation, and served as early adopters who aided in overcoming implementation issues. In the Tayside region, one clinical champion for weight management was credited with increasing the rate of adoption by inspiring her colleagues and thus increasing word of mouth. In the Western Isles, a region that lacked such a champion, uptake was challenged by varying levels of physician enthusiasm, and skepticism regarding the potential of the program from senior leaders.

- The expedient launch and subsequent success of PEI's telerounding pilot project was driven in part by a single physician who was the first in the province to signal an interest and willingness to consider the project as a potential solution to a critical gap in physician resourcing. This physician was impressed by the program and became an ad-hoc advocate for this virtual care solution amongst peers.

- Physician champions were also a key enabler in NL's eConsult program: a single, supportive physician within a given practice area received training, and was then encouraged to highlight the platform's effectiveness to colleagues through word of mouth.

- One lesson learned from BC's experience with virtual care was the importance of the passion and drive exhibited by health care professionals with interest in this space. These champions generate excitement and are also knowledgeable regarding evidence of the benefits and positive impact that virtual care solutions can offer.

Training and support

- Training and support needs for physicians can be grouped into multiple categories: use of the technology itself (including technical support), process changes, and evaluating technology providers and solutions.

- NL's eConsult program includes a 20-30 minute telephone orientation, as well as a "test run" of an eConsult, occasionally with an interested patient who volunteers to serve as a test subject. Ongoing technical support is also offered.

- The effective use of training modules with respect to process and workflow changes within a physician's daily routine that the adoption of virtual care often necessitates is an important enabler of success. An additional area where physicians require support is in determining which virtual care technology to employ. Evaluating different technologies and vendors is outside typical physician duties and capabilities, and support in determining what to invest in and implement could be helpful, as there are a multitude of companies marketing a variety virtual care solutions.

- In PEI's telerounding project, some components of training were themselves delivered virtually, which served as an excellent opportunity to test the technology fluency of physicians, identify any gaps, and increase physician comfort.

Enablers of success (page 2 of 2)

Necessity (e.g. driven by growing demand, remote geography, physician retention issues)

- Necessity played a role in both the PEI telerounding project and NL's eConsult program. In PEI, virtual care was essentially the only short-term alternative to closing a crucial and beloved rural hospital, which created a sense of urgency across stakeholder groups that allowed the program to be developed and launched in a short timeframe. In NL, long wait times in certain areas, as well as the travel burden for rural patients, were key drivers that supported the program's adoption.

- In Houston, the fourth most populous US city, strain on urban emergency departments led to the launch of the Emergency Telehealth and Navigation (ETHAN) program in 2014, which established ambulance-based video consultations via tablets. This system allows emergency physicians to conduct real-time assessments in support of EMS teams. For patients in need of an ED visit, EMS then provides transportation. For patients who do not need ED care, the EMS team uses an app to schedule appointments at partner clinics and/or their primary care providers, as well as facilitate at-home self-care. Local partners also assist with follow-up monitoring and additional support, which has led to patients being less likely to call 911 again after an encounter with the ETHAN program.

- Virtual care is generally more common in remote areas, with necessity again serving as an impetus for adoption. In South Dakota, Avera Health has provided virtual care for over 20 years. More recently, its "eHelm" virtual hospital is used to provide client institutions such as rural hospitals access to specialists and other providers via videoconferencing. The University of Mississippi Medical Center also has a leading virtual care program, which offers access to over 35 categories of specialty care which are often unavailable in rural locations. These two examples represent very mature, highly developed virtual care programs built on the need to improve access in remote geographies, as well as address physician attraction and retention issues in these areas.

Familiarity to increase physician comfort and reduce skepticism

- The Deloitte 2018 Survey of US Physicians indicated that familiarity with virtual care is a condition that can overcome barriers to physician adoption. More than half of surveyed physicians who have adopted virtual care technology expect to increase its use in the next two years, while less than a third of those who have not done so plan to begin using virtual care in this timeframe. These survey results suggest that obtaining physician buy-in may not be as difficult as it is perceived, given that most physicians who have used virtual care tools have a positive impression of them and continue their deployment.

- Relatedly, a lack of familiarity with virtual care software and/or equipment can cause some cultural resistance from frontline staff, including physicians. Increasing familiarity through adoption can enable success by reducing physician skepticism caused by disruptions to established workflows, novel approaches, and shifting roles and responsibilities.

3. Research question v:

What role(s) can physician associations play in encouraging the adoption of virtual care solutions?

Potential roles for physician associations in encouraging the adoption of virtual care solutions (page 1 of 2)

Physician associations have played a variety of roles with respect to virtual care in other jurisdictions. In many cases, these organizations have focused more narrowly on the issue of fee codes and reimbursement schemes. There are some instances where medical associations have taken a somewhat broader role in encouraging the adoption of virtual care. While we have not identified clear, leading examples of medical associations driving the use of virtual care by their members, there may be opportunities to do so in the Atlantic Canada region, given close relationships between associations and physicians, as well as some encouraging recent initiatives in virtual care.

To address the barrier of reimbursement schemes and funding models, physician associations can:

- Consider advocacy and/or lobbying for the establishment or modification of virtual care fee codes that fairly reimburse physicians and incentivize them to adopt virtual care, but that also consider broader health system cost implications. In the US, national-level physician societies (organized by specialty) played a role in advocating for the new Medicare fee codes introduced in January 2019. The American Telemedicine Association is perhaps a model example of this role – with over 10,000 members, the Association works to enhance the use of telehealth, advocates for responsible policy, and provides education and supporting resources for healthcare providers. Beyond the specific issue of fee codes, medical associations can also advocate more broadly for fair and equitable physician remuneration structures that reflect the level of effort associated with providing virtual care, as well as leading practices with respect to encouraging the adoption of virtual care technologies and solutions in a fiscally responsible manner.

To increase physician familiarity with technology and comfort as an enabler of success, physician associations can:

- Identify physician champions within their membership. These could be physicians with innovative mindsets, those who have already adopted forms of virtual care or expressed an interest in doing so, and/or highly respected physicians within a specific group or specialty who can act as spokespeople and role models to encourage adoption amongst their peers. In this sense, physician champions can also enable success through increasing physician familiarity and comfort with virtual care technology through word of mouth, and through contributions to, or participation in, pilot programs or trials.

- Consultations also highlighted an important point: physicians generally have more trust in their medical associations versus other entities such as government departments. This trusting relationship suggests roles that these associations can play in increasing physician comfort. One example is working to dispel common myths related to virtual care. The most prominent of these include: the perception that telemedicine is still practiced with clunky technology confined to designated rooms in hospital basements; fears related to erosions of the "eyes and hands" elements of the practice of medicine; and concerns that AI-enabled solutions may become an economic threat to physicians and their livelihoods. Physician associations can provide messaging to their members on evidence that dispels these myths, while also proactively preparing physicians for the future of their work as healthcare continues to grapple with disruptive digital innovation.

Potential roles for physician associations in encouraging the adoption of virtual care solutions (page 2 of 2)

To enable success through supporting the development of training and support mechanisms, physician associations can:

- Consider playing a role in identifying the most appropriate and effective virtual care solutions from the wide range of devices and technologies that are being marketed today. This could be achieved either through developing a decision-making process (e.g., selection criteria for different categories of technology), or consolidating a list of "association-endorsed" technologies. This role would contribute to physician support infrastructure for virtual care, as selecting is beyond the typical duties and capabilities of physicians.
- Medical associations can play a role in developing protocols for virtual care (e.g., to address differing levels of liability between in-person and virtual visits). This could perhaps be achieved by engaging companies that have developed their own protocols for specific applications of virtual care, or through developing a review board that could leverage protocols from beyond Canada and perform annual reviews and updates of protocols. It was suggested there is a "vacant position" for medical associations that could provide step-by-step guidance on adopting virtual care (e.g., technologies, vendors, purchasing, protocols, enabling laws and regulations).
- Liaise with medical schools to ensure that curricula remain current in terms of technology and virtual care. This can further drive physician education and prepare the workforce for the digital disruption of the future.
- Consider arranging tours of virtual care practices in hospitals and communities so that physicians can apply knowledge and lessons learned from these programs when establishing virtual care in their practices.

To consider necessity as an enabler of success, physician associations can:

- Identify priority areas (e.g., remote locations or areas that have lost primary physicians) as potential fertile grounds for testing/pilot programs. Across Canada, Atlantic Canada is seen as a leader in select virtual care initiatives (e.g., PEI's telerounding project, NL's eConsult program, NS having established Canada's first province-wide telehealth network), and can leverage challenges such as remote populations and physician shortages to drive adoption.
- Leverage best practices from jurisdictions that have addressed issues in remote locations (i.e., patient access, physician attraction and retention) by adopting virtual care. These include South Dakota's Avera Health, The University of Mississippi Medical Center as previously mentioned, as well as Scotland, a jurisdiction characterized by a large remote geography and a national program to introduce telemedicine in order to address these challenges. Leading examples from Atlantic Canada that have done so in a similar manner, such as PEI's telerounding project, should not be overlooked.

4. Summary and closing remarks

Summary and closing remarks

As we step back from the environmental scan, we draw the following conclusions:

- Virtual care is happening everywhere around the world, either out of ambition or necessity.
- For the most part, virtual care is seen as making a positive contribution to health systems.
- Like Atlantic Canada, many jurisdictions can point to several successful virtual care initiatives that have generally been small-scale pilot programs. The next steps for most jurisdictions involve efforts towards introducing virtual care at scale. Scotland is seen as a jurisdiction that has been particularly successful in scaling virtual care.
- Virtual care is unlikely to be embraced by physicians until the key barriers are addressed: a lack of fair and appropriate reimbursement schemes, the learning curve associated with technology use, capital investment and practice costs, physician skepticism and discomfort, and process and/or workflow changes.
- There is real potential for medical associations to play a leadership role in advancing virtual care in Atlantic Canada as there is a leadership gap today.
- As a result of consumer demand and satisfaction, virtual care will continue to advance, with or without leadership being provided by physicians.

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