

Enhanced Access to Primary Care: Project Evaluation Final Report

PREPARED BY:

Women's College Hospital Institute for Health Systems Solutions and Virtual Care (WIHV)

PREPARED FOR:

Ontario Telemedicine Network

The Ministry of Health and Long-Term Care

ACRONYMS

| | |
|---------|---|
| ACO: | Accountable Care Organization |
| EAPC: | Enhanced Access to Primary Care |
| eCE: | eHealth Centre of Excellence |
| ED: | Emergency Department |
| EMR: | Electronic Medical Record |
| FFS: | Fee For Service |
| FHG: | Family Health Group |
| FHO: | Family Health Organization |
| FHT: | Family Health Team |
| MOHLTC: | Ministry of Health and Long-Term Care |
| LHINs: | Local Health Integration Networks |
| OHT: | Ontario Health Team |
| OTN: | Ontario Telemedicine Network |
| PCAs: | Primary Care Advisors |
| PCPs: | Primary Care Providers |
| PoC: | Proof-of-Concept |
| PCCL: | Primary Care Clinical Leads |
| UHN: | University Health Network |
| WIHV: | Women's College Hospital Institute for Health System Solutions and Virtual Care |

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1. EXECUTIVE SUMMARY

The Ontario Telemedicine Network Enhanced Access to Primary Care (EAPC) initiative is the largest implementation of virtual primary care visits ever completed in Canada. Launched in September 2017, the project covered five Ontario health regions; it involved 194 primary care provider (PCP) users, and 14,291 registered patients (of whom 6,355 had at least one visit). There were 14,317 virtual visits requested by February 2019, and over 90% of the completed visits involved asynchronous messaging. This implementation is distinct from previous virtual primary care initiatives (e.g. the Medeo project in British Columbia) because i) it offered both asynchronous messaging and video; and ii) it encouraged continuity of care because the virtual visits were conducted by the patient's primary care team. WIHV evaluated EAPC to understand the value it provides to patients and providers, the implementation challenges, and the implications for potential spread and scale beyond the demonstration project.

Key Findings

1) Patients are very satisfied with virtual visits and do not overuse them: Forty-six percent of patients who were invited to use eVisits completed the registration process. Of those surveyed (n=1705), 98% felt that the visit was the same or better than in-person care, and 99.9% indicated they would use virtual care again. Virtual visits saved patients time (93% of survey respondents agreed), was more convenient than in-person (92% agreed), and saved patients money (75% agreed). Patients self-reported an average of \$11 saved on travel expenses (n=649) and \$56 saved by not having to take time off work (n=76). Further, 83% of patients agreed that it was easy to navigate, and 61% indicated a 10/10 likelihood to recommend it to friends and family. Despite high satisfaction, patients did not overuse it; 56% of registered patients had not used it and 23% had only a single visit. Less than 2% had seven visits or more over an average of 195 days.

2) Asynchronous messaging dominates in virtual primary care: Over 90% of visits used asynchronous, secure messaging. For both patients and providers, this was primarily due to the convenience of being able to respond *whenever* and *wherever*. Asynchronous messaging was sufficient for most providers for addressing concerns they were comfortable resolving virtually, with the occasional phone call or image needed to clarify issues. Coordination of video calls was noted as inconvenient due to logistical challenges, such as precise timing, webcam and microphone issues, and finding a private space in the clinic to conduct the visit.

3) Virtual visits replaced in-person visits, and providers felt they were appropriate: Eighty-one percent of the 14,317 completed eVisits required no additional follow-up. Patients reported

that 67% of eVisits replaced an in-person visit, 15% replaced a walk-in clinic visit, and 4% replaced an emergency department visit. Most PCPs reported having few issues with patients using the platform inappropriately. Patients' perceptions of appropriate use generally aligned with that of providers to include simple questions, issues relating to pre-existing conditions, or follow-ups to an in-person visit. Some providers (particularly those who rostered many patients) stated that virtual visits saved them time, allowed them to conduct more visits, and even allowed them to increase their roster. The majority, however, noted that currently there were no time savings due to the time required to repeatedly log in to both the platform and their electronic medical record (EMR). Many providers acknowledged that this will likely change in the future as the system becomes better integrated into their workflow. On average, PCPs sent 3.2 messages and patients sent 2.4 messages per visit, which sometimes took place over multiple days. Providers indicated that the effort of eVisits was similar to in-person visits and felt that remuneration should be similar.

4) All patients have the potential to benefit from virtual primary care. Although there are some groups who may derive greater benefit from virtual primary care, providers and patients said that almost all patients have the potential to benefit. However, improvements in access, quality and cost savings may be higher in patients from rural/remote areas or patients with reduced mobility. Importantly, patients most likely to benefit may be less able to advocate for themselves, so targeted outreach could maximize the impact of virtual primary care.

5) There is an up-front investment required for virtual primary care to be successful: Uptake by providers was highly variable, partly due to differing beliefs in the value of virtual care, but largely due to the variation in implementation strategies and supports provided. There is a substantial administrative burden in onboarding new patients, encouraging adoption, and learning to incorporate the technology into clinical workflow. Clinics with implementation team support tended to have more eVisits. Organizational readiness varied; some larger clinics had particular challenges including obtaining managerial approval, lack of support staff capacity, and a culture that was resistant to embracing digital solutions.

6) Virtual primary care creates opportunity for new models of care: Qualitative interviews highlighted several case examples where PCPs used eVisits to provide care they otherwise could not. For example, to address the issue of scarcity of PCPs who can support transgendered patients, one PCP used the platform to support this population across Ontario. Another provider mentioned the value of being able to check in on palliative patients remotely between home visits. Provider suggestions for applications outside the scope of this demonstration project included creating virtual walk-in clinics for after-hours care or the delivery of primary care to under-served geographically isolated populations.

7) Virtual technology can improve access to primary care: Some clinicians used the EAPC platforms to support patients who have more difficulty accessing care in-person. For example, supporting students who had temporarily moved away for schooling to enable continuity of care rather than using local walk-in clinics. Patients living in rural areas, those with limited mobility, and new parents with frequent questions and concerns were also identified as high-value users.

Recommendations

The findings from this evaluation suggest that if the MOHTLC provides the infrastructure (remuneration and a selection of certified virtual care platforms) and the implementation support, virtual primary care will improve patient care. Specifically, we have four broad recommendations.

1) Provide clinics with options for vendor solutions: Many of the technical issues identified by providers with the solution relate to EMR-integration and user experience with the platform. The specific “needs” and “wants” identified by clinicians varied substantially, indicating that there is value in allowing them to decide which eVisit platform they want to use, particularly since many EMRs now include this function. However, PCPs articulated concerns about privacy, security, and liability, and would therefore benefit from having a list of “recommended or certified vendors.”

2) Provide implementation support to ensure equitable distribution of virtual primary care: Uptake was highly variable across practices. Approaches that seemed to help adoption included, first, clinical champions who could vouch for the quality and value of the service, and who could guide PCPs in tailoring implementation strategies. Second, implementation support and ongoing technical support increased the number of patients registered, which could help ensure equitable patient access to eVisits. Making eVisits accessible to a wide range of practices and patients will require targeted recruitment and administrative support.

3) Remuneration for eVisits was seen as adequate in both fee for service and capitation based models when set on par with in-person visits: Under the current model, providers felt that the time and energy of eVisits was similar to in-person visits and should be paid on par. A better workflow integration, however, may change providers’ views. We identified a small number of clinics outside of this pilot who independently adopted eVisits without any compensation due to internal motivation, however, this is rare in Ontario.

4) Virtual primary care is likely to flourish under integrated value-based service models: If primary care combines efforts with hospitals and other healthcare providers to provide both urgent and non-urgent care for patients 24/7 using eVisits, it may reduce total cost of care and increase revenue in a shared savings model. This may prove to be a more compelling method of promoting eVisits than compensating via fixed fee per visit.

2. BACKGROUND

In Canada, patients often face considerable wait times to access a primary care physician (1); this delayed care can lead to frustration with the health system and suboptimal health outcomes such as greater risk of morbidity and mortality in patients with cancer and heart conditions and deterioration in condition among patients with mental health issues (2,3). Only 44% of Ontarians have access to same or next day appointments, with the same number reporting access to care on evenings or weekends without having to go to an emergency department (4).

Both clinicians and patients have demonstrated interest in leveraging technology to address this problem, provided that the tool is convenient, improves care, and saves time (5). There are a wide range of virtual care modalities, including voice, video, teleconference, online platforms, and mobile texting (6). Prior studies have indicated that the benefits of accessing primary care via digital technologies include their potential to increase convenience, provide quicker access to care, save time, and avoid work absences (7,8). A recent review of the literature on virtual visits in primary care found improvements in continuity, quality, efficiency, and access to care (9). Further, numerous studies have shown that most patients perceive the quality of virtual care to be equal to or better than in-person care (7), and that this approach can be reasonably used to manage routine conditions while reducing health system costs (10). However, some studies have shown that providing virtual care access may not have an impact on in-person visit frequency (11,12). Few studies have formally compared outcomes for patients seeking virtual care versus traditional in-person visits, highlighting considerable uncertainty about the overall impact (9). Finally, in Ontario and to a large degree in Canada, there is limited access to virtual primary care services and Canada lags behind large-scale virtual care implementations in the US (13–17). For example, more than half of Kaiser Permanente’s 110 million patient encounters are virtual (18).

3. PROJECT BACKGROUND

The Ministry of Health and Long-term Care (MOHLTC) funded the OTN- led initiative to enhance access to primary care. OTN worked closely with partnering LHINs and primary care providers to co-design a delivery model that supports a broad range of practice and incentive models including both blended fee-for-service (“FFS”) and capitation-based models. OTN adopted a phased approach, with three planned Proof of Concepts (PoCs) within a total of 5 LHINs. The PoCs helped identify the business and technical requirements, and clinical model to inform the policy needed to obtain a sustainable, fair remuneration structure and lay the foundations for a

provincial program. The Enhanced Access to Primary Care (EAPC) program aims to ensure all patients within a defined geographic region are able to conveniently access their primary care providers (PCPs) and receive same or next day medical advice through virtual visits.

A Vendor Of Record arrangement was established qualifying two vendors (Novari Health and Think Research) to provide primary care eVisit solutions. The solutions had capabilities for synchronous eVisits (i.e. video and audio) and asynchronous messaging. The technologies were developed in phases, with continuous additions and improvements made to the solutions throughout the proof-of-concept (PoC) pilot. Novari Health was used across 4 LHIN regions and Think Research was used in LHIN 2.

3.1 RECRUITMENT AND ONBOARDING

The first LHIN (LHIN 1) went live with the Novari Health technology in September 2017, followed by another LHIN (LHIN 2) in March 2018 on the Think Research platform. The two LHINs were on-boarded on their respective technology with the minimum configuration and development requirements for the demonstration project. The other LHINs (LHIN 3, 4, and 5) went live with Novari Health in July, August, and October 2018, respectively, with more advanced versions of the technology.

Recruitment and onboarding of PCPs varied significantly across regions. These teams supported the project recruitment, training, and implementation within their LHINs. The delivery partners were tasked with the recruitment of 100 PCPs in LHIN 1, 65 PCPs in LHIN 2, and 40 PCPs in the rest. Two members of the OTN EAPC team (Program Manager and Clinical Innovation Lead) were responsible for providing the majority of support to the rest of the LHINs where the project was deployed. Primary Care Clinical Leads and sub-regional Clinical Leads were also integral in supporting physician recruitment. The clinical innovation lead provided all the training to the PCA, UHN and OMD reps.

3.2 PATIENT REGISTRATION AND REMUNERATION

In the early phase of the PoC, patient registration was manual. Patients would indicate their interest in signing-up, and an administrative staff member or the clinician would manually input the patient's information into the eVisit platform. The platform would then send an email to the patient for them to complete their registration. In May 2018, the Think Research vendor introduced the ability to batch register patients, through which PCPs could invite large numbers of their practice. Another option that became available was a self-registration link that could be sent via email to patients. Providers could only register their own rostered patients.

Once registered, patients could request a virtual visit at any time, detailing their medical issue and their preferred method of communicating (i.e. secure messaging, video, or audio). The PCP would then accept the visit and either find time for a video/audio appointment or respond via secure messaging within two business days (note that providers determined the most appropriate mode of communication to support the visit). Once the visit was completed, the provider could close the visit and submit for remuneration. Organizations on capitation models could charge for shadow billing (i.e. 15% of the fee-for-service [FFS] amount). Billing was broken down by Phone/messaging – minor assessment (\$15.00 FFS, \$2.25 capitation) Phone/messaging – intermediate assessment (\$21.70 FFS, \$3.25 capitation), Video – minor assessment (\$21.70 FFS, \$3.25 capitation), or Video – intermediate assessment (\$33.70 FFS, \$5.06 capitation). Remuneration was provided to participating PCPs by the MOHLTC and administered by OntarioMD and eCE.

3.3 NUMBER OF USERS

Three hundred and twenty-six providers registered, from whom 194 completed at least one eVisit and 132 registered but completed no visits (Table 1). These PCPs conducted 14,317 total eVisits from September 2017 to mid-February 2019.

Table 1. Number of PCPs and Patients registered to EAPC as of February 15, 2019

| LHIN | Launch date (month, year) | Number of PCPs | Number of Active Patients ¹ | Number of Visits | Average visits per month | Average visits per PCP per month |
|--------------|---------------------------|----------------|--|------------------|--------------------------|----------------------------------|
| LHIN1 | September 2017 | 37 | 848 | 1,822 | 104 | 5.7 |
| LHIN2 | March 2018 | 44 | 2,442 | 6,584 | 573 | 36.2 |
| LHIN3 | July 2018 | 56 | 1,842 | 3,824 | 510 | 30.4 |
| LHIN4 | August 2018 | 38 | 956 | 1,669 | 303 | 10.8 |
| LHIN5 | October 2018 | 19 | 267 | 418 | 93 | 12.9 |
| Total | | 194 | 6,355 | 14,317 | | |

¹ “Active” is defined as patients who had at least one e-Visit during the demonstration project.

4. METHODS

We employed a mixed methods approach by triangulating qualitative data from patient and provider interviews with a provider and patient survey as well as usage data from the vendors (**Appendix A**). PCPs were recruited from across the five LHINs for interviews, as were a subset of PCPs using virtual primary care who were not part of the PoC. Patients were recruited for interviews from the first two LHINs, and responded to surveys both through the vendor platforms (on eVisit experience) and through a secure link sent out separately (on patient-reported cost savings and eVisit value). Data on visits collected from the vendors was analyzed using RStudio. See Table 2 for details on interviewees. For detailed methods, see **Appendix A**.

Table 2. Number of interviews completed by phase and data source

| Phase | Data Source | | Total Completed interviews | Interview by LHIN | | | | |
|----------|---|--------------------------|----------------------------|-------------------|--------|--------|--------|--------|
| | | | | LHIN 1 | LHIN 2 | LHIN 3 | LHIN 4 | LHIN 5 |
| Phase I | Providers | | 16 | 8 | 8 | | | |
| | Patients | | 17 | 8 | 9 | | | |
| Phase II | Providers | Lower users ² | 4 | 0 | 1 | 1 | 1 | 1 |
| | | Higher users | 7 | 1 | 2 | 1 | 1 | 2 |
| | | Out of PoC | 5 | | | | | |
| | LHIN stakeholders/ implementation teams | | 5 | | | | | |
| | Working Group Meetings | | 4 | | | | | |

4.1 LIMITATIONS

The eVisit platform evolved throughout the evaluation, so comments on technology-specific issues may no longer be relevant or have since been resolved. There was also variation in the implementation strategies between the LHINs, making it challenging to compare the virtual care platform across all of them in a uniform manner. The vendor data provided to WIHV was not collected was not informed by the research questions, but rather as a result of the data collection and storage processes of each vendor. Therefore, it was not optimized for the analyses we performed. Consolidating some variables led to loss of data from a particular vendor. Lastly, the implementation of this pilot and its early use may not be representative of how this digital health solution may operate in regular practice.

² User level here refers to providers falling roughly in the lower 20% of user volume levels and high users falling in the high 20% of user volume levels.

5. PATIENT EXPERIENCE

5.1 WHO REGISTERS FOR VIRTUAL CARE?

30,753 patients were invited to register to the platform and 14,291 patients fully registered. Substantially more female patients registered than male (9,480, 66%) and women were significantly more likely to register than men if invited (51% vs 39% ; $\chi^2 = 382.19, p < 0.001$). While patients from all age categories registered (Figure 1), there were significant differences ($\chi^2 = 854.47, p < 0.001$) between the likelihood of patients to register across various age categories. Adults in their 20's and 30's were more likely to register than the rest of the age groups.

Figure 1 Age Categories of Registered Patients

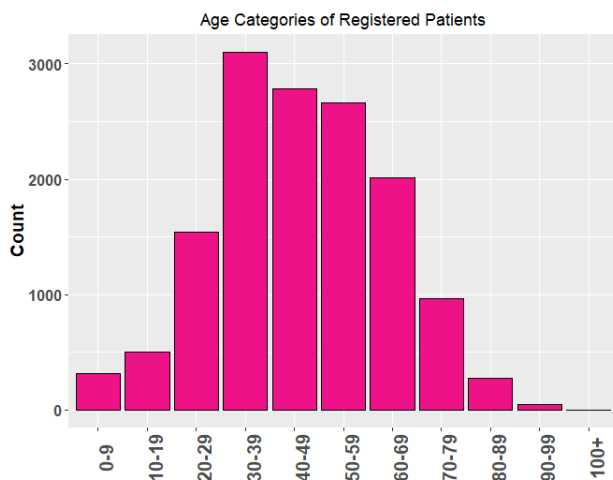
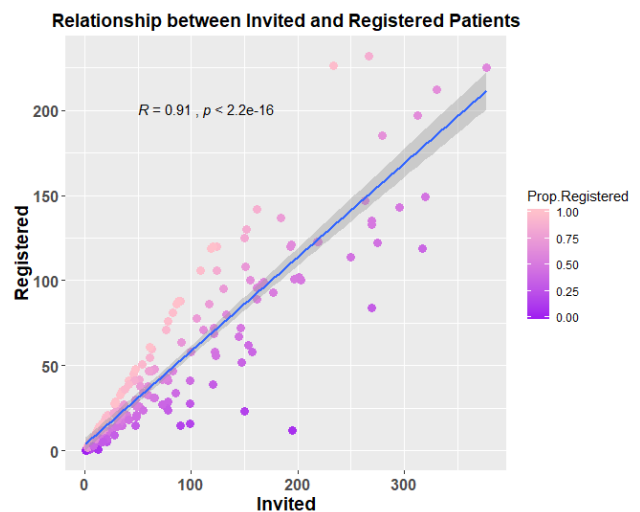


Figure 2 Relationship between invited and registered patients.



There was a highly significant, positive correlation between the number of patients invited and the number of patients registered ($R = 0.91, p < 0.001$), (Figure 2) showing providers with high numbers of registered patients had invited many patients. That being said, there was a much weaker, but significant, negative correlation between the *number of invited patients* and the *proportion of invited patients who register* ($R = -0.14, p = 0.042$), indicating that providers who had invited fewer patients had slightly higher registration proportions. From qualitative data, we know that PCPs who invited fewer patients tended to carefully select which patients to invite and reach out to them personally, which would have naturally increased the likelihood that the invited patients would register.

5.2 WHO USES VIRTUAL CARE?

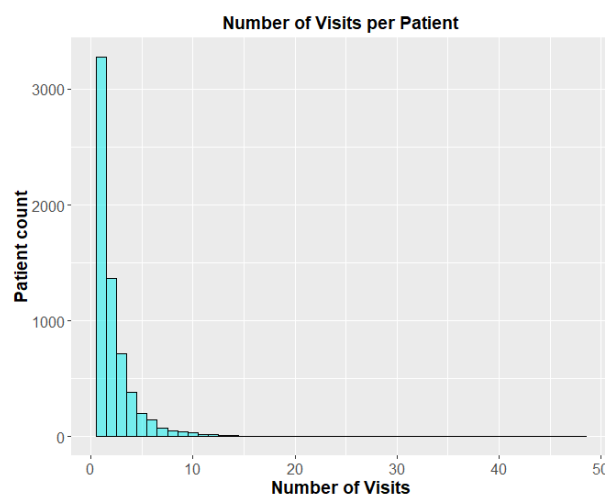
6,354 patients completed at least one eVisit on either the Think Research platform (2,442) or Novari Health platform (3,913) (Table 3). Visits could be initiated by both providers and patients on the Think Research platform, while on the Novari Health platform only patients could initiate the visits until January 2019.

Table 3. Patient characteristics of those who completed an eVisit (n=10,178).

| Characteristic | Categories | Number of patients | Percentage | |
|------------------|----------------------------------|---|------------|-------|
| Gender | Female | 4356 | 69% | |
| | Male | 1933 | 30% | |
| | Other or N/A | 65 | 1% | |
| Number of visits | Single visit user | 3278 | 52% | |
| | Multiple visit user (1-7 visits) | 2807 | 44% | |
| | Super user (7+ visits) | 269 | 4% | |
| Practice type | FFS | Comprehensive Care Model ³ | 363 | 5.8% |
| | | Family Health Group ⁴ | 1322 | 21.2% |
| | | Solo practitioner | 180 | 2.8% |
| | Capitation | Family Health Organization ⁵ | 2272 | 36.4% |
| | | Family Health Team ⁶ | 1160 | 18.6% |
| | | Other | 951 | 15.2% |

The average age of patients using the platform was 44 years (SD=18). Most patients (52%) used the platform only once for the duration that they had access to it (Figure 3). The average time from registration to first visit for patients was 67 days (SD=68). To examine differences in patient characteristics based on the number of eVisits, patients were grouped into three categories: single visit patients, multiple visit patients (2 to 6 visits) and

Figure 3 Number of Visits per Patient



³ Solo PCP who provides comprehensive primary health care including after-hours services to enrolled patients (19)

⁴ Groups of at least three PCPs who provide comprehensive primary health care including after-hours services to enrolled patients (19)

⁵ Groups of at least three PCPs who are compensated primarily through capitation but also receive FFS; eligible for specific bonuses/premiums based on patient enrolment (19)

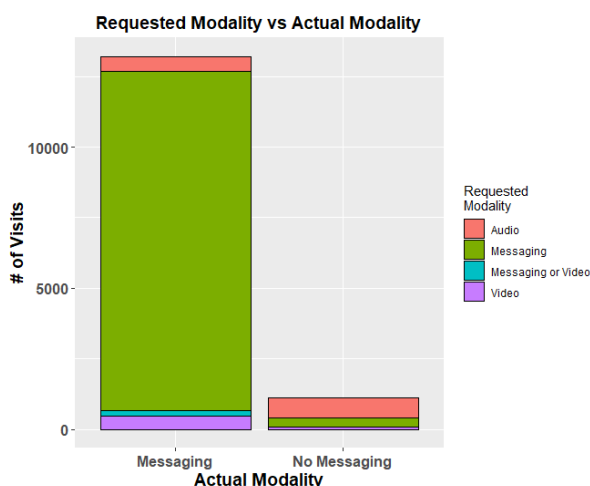
⁶ Team of physicians, nurse practitioners, registered nurses, social workers, dietitians, and other professionals who work together to provide primary health care for their community (20)

super user patients (7+ visits). Patients with seven or more visits were classified as outliers, thereby establishing the patient super user grouping (7 to 48 visits per patient).

There were no significant differences in age between the three patient user groups ($\chi^2 = 5.29, p = 0.073$). LHIN 2 had higher proportions of multiple and super user patients relative to the other LHINs ($\chi^2 = 173.9, p < .001$). There were more patient super users with FFS providers (102) than capitation (94), whereas single user patients were more likely to have providers under capitation than FFS (1881 vs 967), as were multiple users (1457 vs 796). Super user patients were more likely to have visits that deal with chronic conditions, while single and multiple user patients had more visits that dealt with new health issues ($\chi^2 = 118.7, p < .001$). Finally, multiple visit patients had shorter visit duration (0.79 days) than those of single visit (0.83 days) or super user patients (0.94 days) after outliers were removed ($\chi^2 = 7.65, p = .02$).

5.3 WHAT WERE THE TYPICAL VISITS?

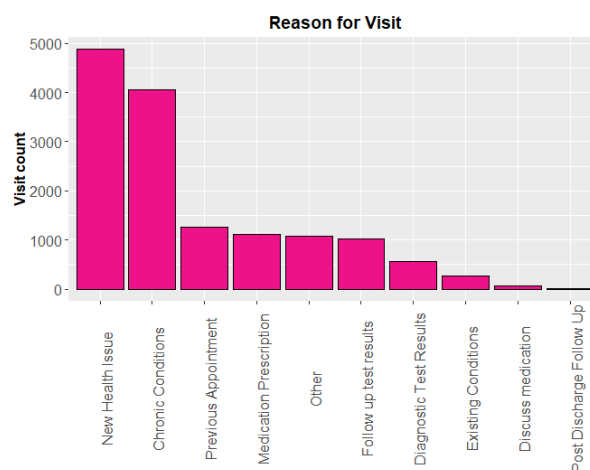
Figure 4. Visit Modality



80% of the visits were requested to be conducted through asynchronous messaging (secure messaging taking place asynchronously over one or more days). The majority of visits (97% for Think Research and 92% for Novari) used asynchronous messaging. In the Novari platform, video alone was used only in 17 visits (0.1%). (Figure 4).

The most common patient-reported reason for a visit was “New Health Condition” (34%), followed by a “Chronic Condition” (28%) (Figure 5). The most common provider reported reason for visit was classified as “Other, reason for visit not listed” in more than half of the visits (55%), followed by “Chronic disease management” (25%) (Figure 5). The median duration of a visit across modalities was 0.91 days (IQR=1.91 days), once outliers were removed (duration over 7.92 days was classified as

Figure 5. Stated reason for visit and diagnosis.



outliers). The average number of messages sent by providers were 3.2 (SD=3.2) and those of patients 2.4 (SD=3.4), although it varied substantially. 81% of the visits were completed with no follow-up required or with “patient to follow-up as necessary”. For LHIN 2, where visits could be requested by provider, 74% of the visits were requested by patients and 26% by providers.

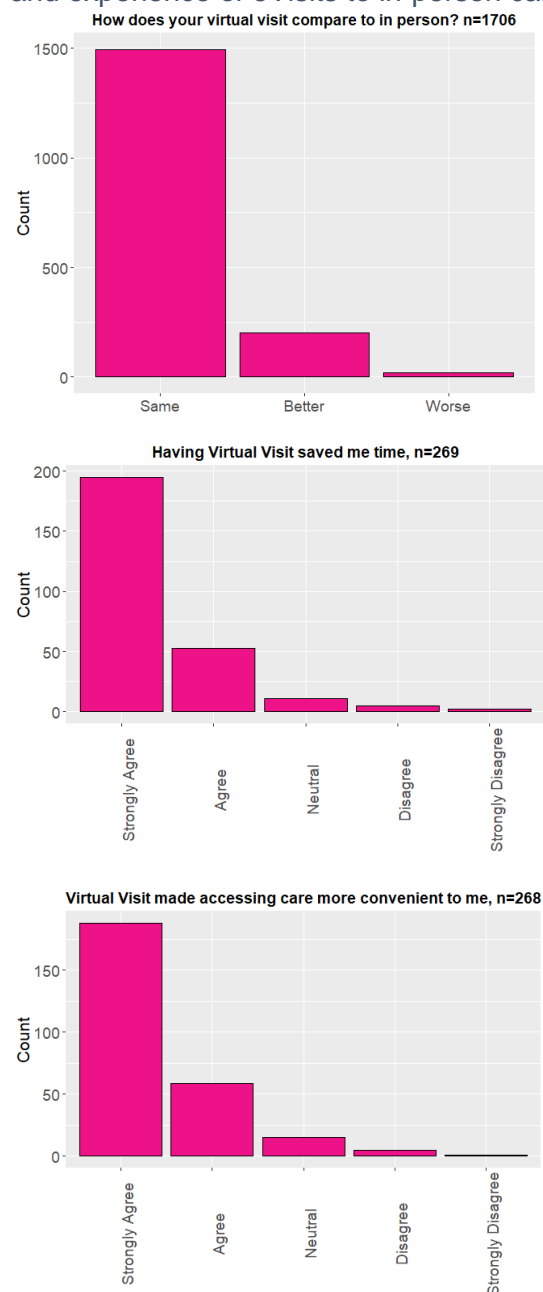
5.4 WHAT DO PATIENTS THINK ABOUT VIRTUAL CARE?

Surveys distributed via the Think Research and Novari Health platforms received a combined response rate of 1742 patients. The gender of the respondents mirrored the distribution of patient users (76% female, 24% male, <1% Other/Unknown). Most of the surveys were completed by patients who had more than one visit (79%) and most respondents belonged to a FHO (42%) followed by a FHG (32%). Surveys indicated that patients perceive the quality of virtual visits to be on par or better than in-person visits, and that eVisits make accessing care more convenient and saves them time (Figure 6).

Several questions addressed patient satisfaction with the eVisit experience (Appendix F). Almost all patients would use it again (99.9%), 90% agreed that they were satisfied with the care they received, and 61% rated the likelihood that they would recommend the platform to their friends and family as 10/10. Importantly, with little to no education or training provided to patients on using the platform, 83% agreed that the platform was easy to navigate, with only 6% who actively disagreed. This indicates that usability for patients was overall a minor issue, as supported by qualitative findings.

Qualitative interviews indicated that, overall, patients were very satisfied with the tool (reflecting the quantitative findings), noting the ease of set-up and user-friendliness of the interface. The majority preferred using the asynchronous messaging

Figure 6. Survey questions comparing quality and experience of eVisits to in-person care.



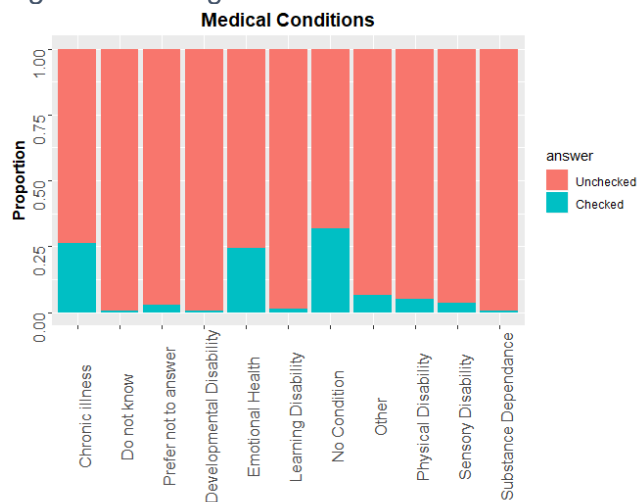
feature of the eVisit tool to the audio or video functions. Most patients had no suggestions for improvement; however, some patients raised challenges with device and web browser compatibility and the desire to schedule appointments through the tool (not available in the Novari Health platform).

In addition to the platform-linked surveys, WIHV conducted a survey distributed to 13,363 registered patients with an instruction to only provide a response if they had completed at least one visit. The survey focused on collecting additional demographic information on patients and contained questions pertaining to time and money savings in relation to using virtual care (Appendix D). One thousand and forty-four patients (74% female) completed the survey. The average age of respondents was 46.5 (SD=15, range: 18-89), and 77% of the respondents identified as Caucasians, followed by East Asian (5%) and South Asian (5%) respondents. Ninety-six percent reported English as their preferred language, 80% had post-secondary education, and 94% reported having average or above computer proficiency. Figure 7 shows the breakdown of participants' family income with the highest portion of participants (19%) reporting being in the highest income bracket supporting on average 2.7 members per family (range 0-7). Eighty-six percent of respondents reported that they live in their own place. Finally, 63% of respondents lived in an urban (100K+ people) setting.

Figure 7 Family Income Level

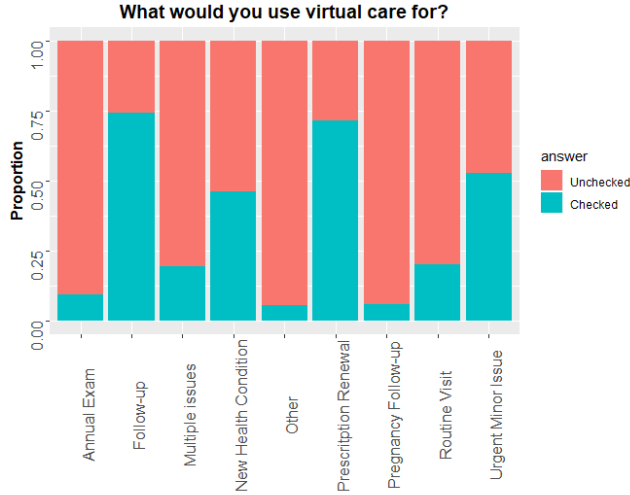


Figure 8 Existing medical conditions



Patients reported they see their providers on average four times per year (SD=4; range: 0-40) and 84% of the participants indicated that their health was Good or Better, with 32% reporting no chronic conditions. Twenty-six percent of patients reported a chronic condition and 24% reported having an emotional health disorder (e.g. anxiety, depression) (Figure 8). Overall, this suggests that virtual care was used by a relatively healthy sample of patients. Some of the most common

Figure 9 What would you use virtual care for?



uses of virtual care were for follow-up appointments, prescription renewals, urgent minor issues and new health conditions (Figure 9). Seventy percent of patients indicated that their virtual visit was same as in-person visit, and 13% said it was better. Most patients felt that the virtual visit was very helpful (70%) or somewhat helpful (18%) in dealing with the health condition for which they needed an appointment. Seventy percent of patients also indicated that if they had no access to virtual care, they would have waited to see their doctor in-person. Nineteen percent indicated they would have gone to a walk-in clinic, 7% indicated they would have not sought care at the time, and 4% indicated they would have gone to the Emergency Department.

Figure 10 Virtual Visit Outcome

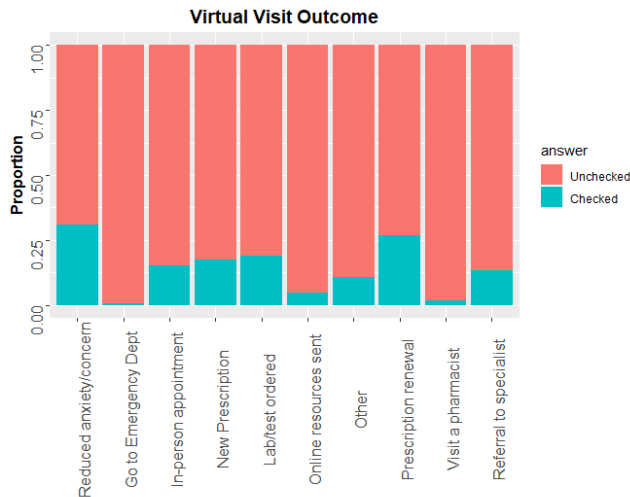
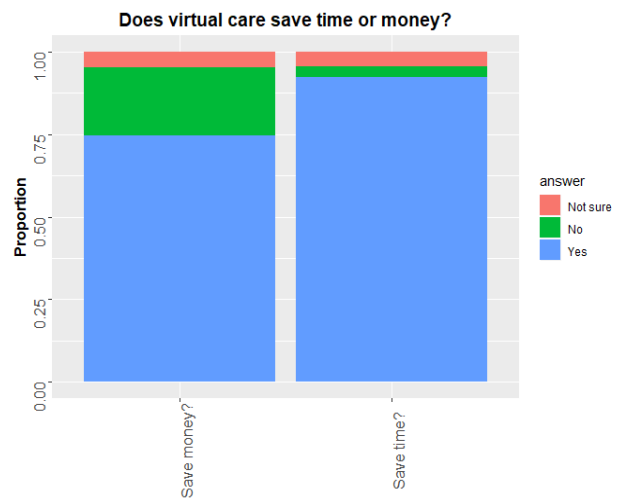


Figure 10 shows the most commonly reported virtual visit outcome was that the visit provided “Information that helped reduce anxiety or concern about my health care need”, followed by prescription renewal and a lab/test order (19%). Finally, 92% of the patients indicated that access to virtual care saved them time and 75% indicated it saved them money (Figure 11), with an average of \$11 saved on travel expenses (n=649) and \$56 saved by not having to take time off work (n=76).

Figure 11 Does virtual care save time or money?



5.5 WHAT DO PATIENTS EXPECT FROM eVISITS?

There was some lack of clarity and consistency about expectations of the tool. For example, some patients expected a response from their provider within a couple of hours, whereas others were aware of the 48-hour turnaround time. Ensuring that patients clearly understand the response times will support appropriate use and improve patient satisfaction. There was a consensus around appropriate use of the tool being for simple questions and issues relating to pre-existing conditions, or follow-ups to an in-person visit. This understanding of appropriate use mapped well to the expectations of most PCPs (Table 8).

Patients described a few potential barriers to eVisits; however, these were mostly speculation about other peoples' capabilities and not issues they had personally experienced. For example, they mentioned excluding certain patient groups like non-English speakers, those with visual impairments, and those who are not familiar or comfortable with using digital technology. Some patients noted the possibility that others might feel disconnected from their provider when communicating with them electronically. Finally, two patients noted a concern that their provider may underestimate the severity of their condition when the visit is conducted via messaging or audio calling due to the lack of visual component to the assessment.

Value proposition: Convenience (no travel)

Case example:

Ms. V and her young daughter both fell ill. Her husband had to come home from work to bring them both to their family doctor's office. Now that she has access to eVisits, Ms. V recognizes:

"...it would have been nice to have the eVisit system at that point... at least I could have taken care of my daughter through that rather than having my husband rushing from work and taking care of both of us."

Value proposition: Patient empowerment

Case example:

Before Othello had access to the eVisit tool, he had to request access to copies of his lab test and imaging results. This technology gives him control by allowing him to access and store his own health information. If he wants to, he can now bring these results to a specialist or another provider.

"It is my body, and the test was done on me, so I should have access to that information."

Patients provided insight on factors that are critical for the success of virtual care. They noted that the tool itself must be easy to set-up, have a user-friendly interface, and be compatible with their device (whether it be a smartphone, laptop, or tablet, and using any web-browser). They highlighted the need for patient education prior to using the tool, especially for those who are not technologically proficient. Finally, they wanted clarity and a promise of a reasonable response time: some preferred 24 hours, but there was overall acceptance of the 48-hour turnaround.

5.6 WHAT ARE THE VALUE PROPOSITIONS FOR PATIENTS?

Value proposition: Convenience (time-savings)

Case example:

Ms. J developed a serious cellulitis infection linked to her Type 2 Diabetes. Due to its severity, she had to follow up with her provider every two days to ensure the infection was under control. As a full-time employee, Juliet was grateful that she could use asynchronous messaging to send photos of the infection to her family doctor. This saved her a lot of time in travel and prevented her from needing to take time off work for in-person follow-ups.

Patients identified a number of possible value propositions of the virtual visit platform for patients. This included **convenience**, brought up by the majority of patients. They explained that the asynchronous messaging enabled direct and thus, faster access to their care provider irrespective of time or location. Related benefits included time savings, elimination of transportation difficulties, and avoidance of childcare.

Several patients mentioned the value of improved **access**: many patients found it difficult to get through to clinic reception to book an in-person visit, and taking time off

from work in order to come into the clinic further reduced access. Some patients perceived asynchronous messaging to be faster than an in-person visit, and appreciated that this would save time for themselves and their provider. The ability to connect with providers remotely and after hours meant that care was more accessible and timely. This was particularly valuable for patients who are busy during regular clinic hours, who have mobility issues, who have difficulty accessing transportation, or who live in remote areas. Patients reported an expected benefit of reduced wait times for in-person visits due to improved access and efficiency from virtual care. One patient explicitly stated feeling increased satisfaction with care because virtual visits gave them a direct access route to their PCP. Other benefits noted by patients included the avoidance of germ exposure in waiting rooms and empowerment from knowing they have access to their lab results and other health information. Finally, several patients mentioned an overall increased sense of security knowing that they could contact their provider with their health issues at any time and hear back within 48 hours.

6. CLINICAL EXPERIENCE

6.1 PROVIDER CHARACTERISTICS

One-hundred and ninety four providers conducted at least one virtual visit during the demonstration project. It took on average 35 days for providers to have their first visit (SD=29.5), once outliers were removed (providers who took more than 130 days to have a visit). The median visit number across providers was 21.5 (IQR=55.75) (Figure 12). As a result, providers with 21 visits or less were classified as “low users”, while those with 22 visits or more were classified as “High Users”. Providers with more than 153 visits were classified statistically as outliers, and as a result, those providers were classified as “Super Users” (range 153-1181 visits per provider). The distribution of provider user types across the two main funding models (FFS and Capitation) did not vary $\chi^2 = 1.12, p = 0.57$ (Figure 13).

Figure 12. Number of visits per provider.

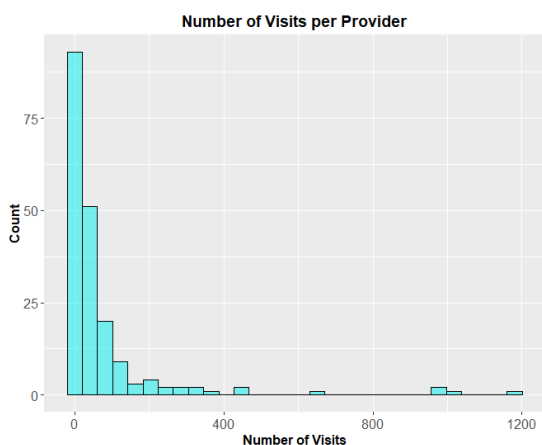
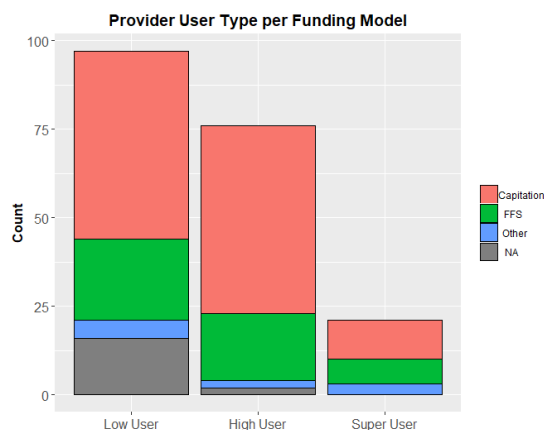


Figure 13. Provider user type per funding model.



Further, distribution of the three user types was relatively consistent across LHINs, with LHIN 2 hosting the most super users (Figure 14a). Further, super users conducted the vast majority (63%) of total visits, most of which were by users in LHIN 2 and 3 (Figure 14b).

Figure 14a Provider type by LHIN

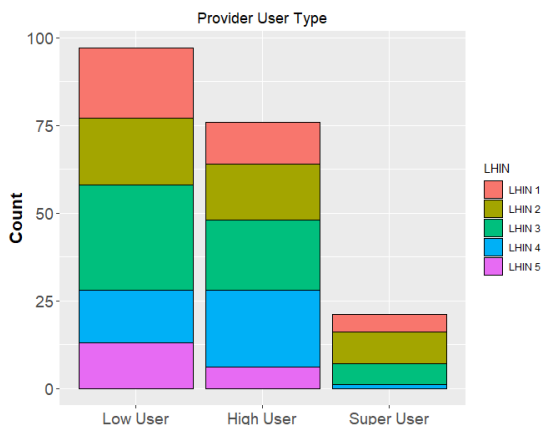
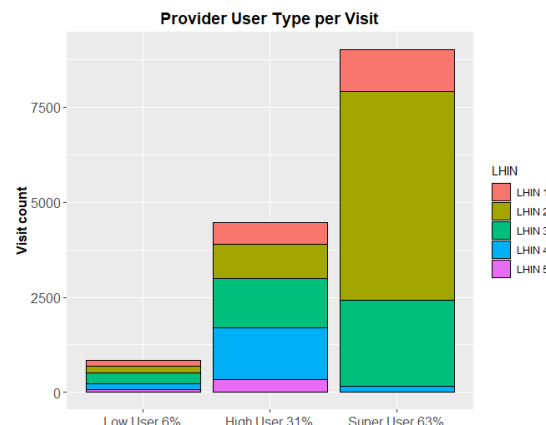


Figure 14b. Provider type visit count by LHIN.



The number of visits per provider were not correlated with the number of days their account has been opened ($R = 0.12, p = 0.12$) (Figure 15). While super users tended to have been registered for longer (Mean=248 Days, SD=119) than low users (Mean=184, SD=125) and high users (Mean=194, SD=107), the difference across the three groups was not significant ($F = 2.5, p = 0.08$) (Figure 16).

Figure 15. Relationship between provider use duration and number of visits.

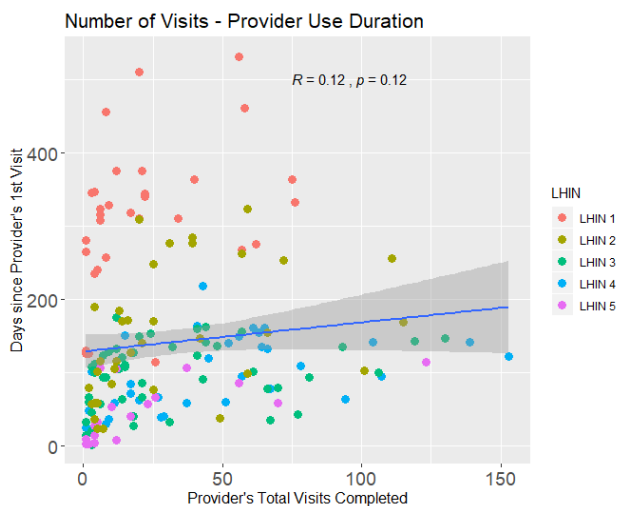
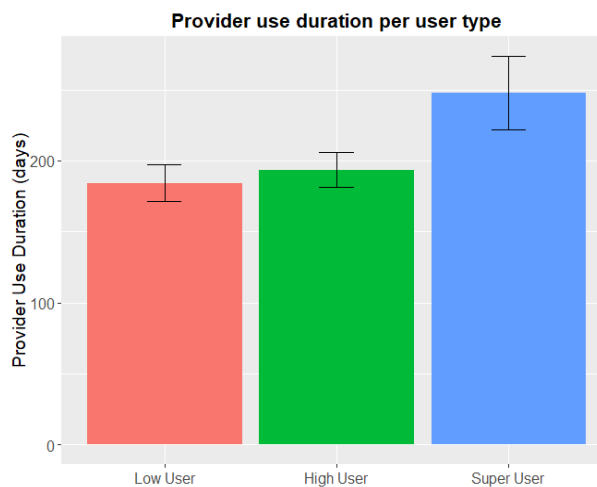


Figure 16. Use duration per provider user type



The majority of users had an average of only one or fewer visits per day (Figure 17). Super user providers had a higher number of registered patients (Median 225, IQR=230), compared to high user providers (Median=77, IQR=60) and to low users (Median=14, IQR=22); ($\chi^2 = 128.32, p < .001$). In other words, to be a super user one needed to have a high number of registered patients (Figure 18). Finally, there was a negative relationship between visits per day and days since the provider's first visit ($R = -0.22, p = 0.003$), suggesting that more recently joined users are more likely to be higher users, potentially due to better provider targeting by the implementation teams.

Figure 17. Average number of visits per day per provider

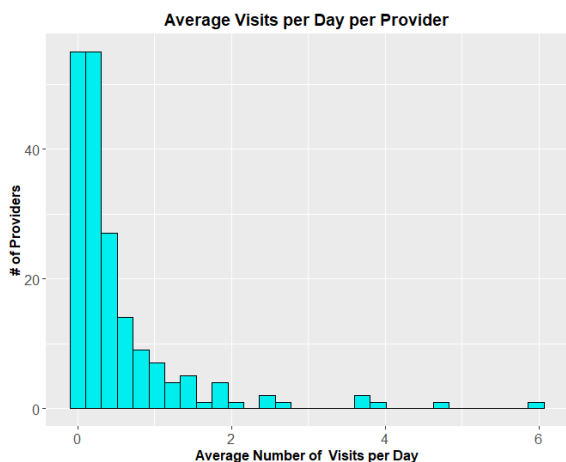
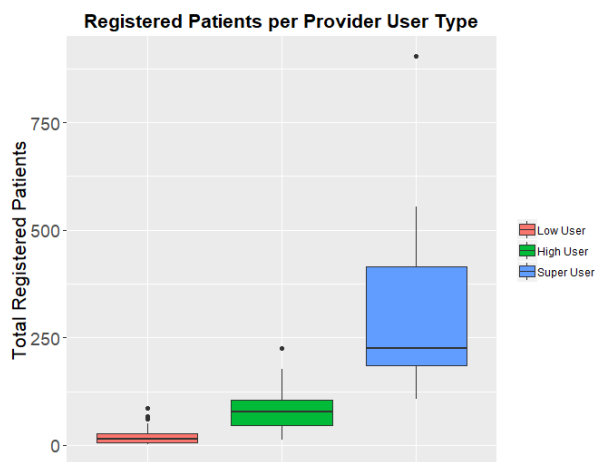


Figure 18. Provider user type per registered patients



6.2 TECHNOLOGY

The common reason noted from providers for using mainly asynchronous messaging was that both parties could respond when it was most convenient for them. There was generally low interest in using the audio or video features, with the exception of dermatological issues, or rare visits that need a visual (but not physical) assessment. Some providers noted that it is challenging to commit to a designated time slot for audio or video calls, especially if they are running behind schedule. Overall, most PCPs were satisfied with the interface of the online virtual care platform, especially those interviewed later as iterative feedback had informed the improvement of the tool.

When asked about the essential features of the virtual care tool, many providers agree that a secure, EMR-integrated platform with an asynchronous messaging feature is critical for success in uptake and spread of virtual care. Specifically, many expressed high value in the ability to send photos and videos through the platform, even though few visits had attachments, and also the ability to access the tool on-the-go (i.e. through a mobile application). Other essential features included the option to choose from multiple modalities of communication (i.e. video, audio, or messaging) and that the technology is free for both the provider and patient.

Despite overall PCP satisfaction with this virtual care tool, there were many technological barriers and challenges mentioned frequently during the interviews. Firstly, registration difficulties seemed to be a major barrier in getting patients on board to their provider's eVisit roster. Physicians noted that registration invitation emails went directly to patients' junk folders, which delayed the process or prevented patients from registering at all. Oftentimes, providers would also be unable to accept registration requests and would receive an error message. The batch registration process was perceived to be particularly time consuming as patient e-mails had to be exported from EMR systems and then cleaned to remove duplicate addresses, missing fields, wrong spaces, special characters and other errors in the file. Further, lack of documented consent to receive emails from their practice was a barrier for some clinics as this was a requirement for batch registration. Some technical glitches were reported, especially in the early phases of the pilot project. This included the notification system being down, and reports missing from the EMR. Consequently, this led to providers spending time troubleshooting their own or their patients' technical difficulties. Overall, a knowledgeable and responsive tech support team was needed to aid with any issues pertaining to the eVisit tool experienced by patients and their providers.

**Suggestions for improvement:
Mobile app**

"It frustrates me that I can't actually directly email or call a patient from the mobile app...I kind of feel like if it can be done on a standalone platform, why can't it be done from a mobile app? I think you'll have limited uptake on it until you get that. I think once you get that, with the exception of people who just want to separate their work time and their home time and don't want to be bothered after hours, I think you will find that most doctors will be quite happy to do it. It just has to be very user-friendly and all in one place."

Table 4. Suggestions for improvements of the technology from PCP interviews.

| Suggestions for Improvement | Provider Rationale |
|---|--|
| Develop mobile application with all of the same functionalities as the web browser | -Increase ease of being accessed when not in the office -Enable providers without webcam and microphone connection to desktop to conduct video visits |
| Integrate into EMR | -Desire for single login with fewer steps to get to the clinical interaction |
| Limit hours during which patients can contact them through the tool | -Avoid receiving messages when it is late in the evening or if they are on vacation -Improve work-life balance |
| Integrate an appointment scheduling tool into the platform | -Streamline in-person booking when it is required as a follow-up to the virtual appointment -Reduce administrative burden and free up phone lines |
| Send a reminder to PCP when visit is still open after a certain time period | -Prevent visits from staying open indefinitely due to forgetfulness (259 of visits were left open for over 30 days during the pilot) |
| Improve and increase the options for “Reason for Visit” | -Avoid most patients having to choose the “other” category -Provide more accurate information about the purpose and urgency of the visit |
| Provide a checklist of symptoms for patients to fill out before the visit | -Provide more comprehensive information about the reason for visit beyond the category |

Providers had several suggestions for improvement (Table 4). A common suggestion was to have some degree of electronic medical record (EMR) integration to streamline the clinical interaction. However, most providers acknowledged that complete integration with their EMR may not be feasible, and therefore provided a subset of EMR-related functions that would help reduce duplicate effort. These include the automatic population of patient and provider information on lab requisitions and medication prescriptions in the platform to relieve administrative burden. Several PCPs noted that they resort to populating the requisitions through their EMR, saving the PDF, and sending it to the patient through the platform, or sending the requisition to the pharmacy directly from their EMR. Other suggestions related to the Health Report Manager (HRM) document sent to their EMR, which tended to be multiple pages long, even when only a few lines of text were exchanged. Finally, there was some frustration in that the HRM document was a PDF, rather than a direct download of text, because the text in PDFs is not searchable in their EMR. Some PCPs chose to directly copy and paste the text exchange from the platform to circumvent this challenge. Finally, PCPs indicated that adoption could be further supported by ensuring clinicians are involved to a greater degree in the design of the tool to improve compatibility with their routine.

The lack of certain desired features along with the occurrence of technical glitches imply that the majority of PCP dissatisfaction with the functionality of the virtual visit solution stems from the iterative nature of the pilot project. For widespread scale of virtual primary care tools, providers and patients need a ready-made product, as beta versions of the tool lead to frustrations from a technological standpoint. Further, perhaps enabling a pre-selected marketplace for tools that meet certain specifications and approvals by OTN and/or the MOHLTC could be effective for the adoption of virtual primary care. This would allow providers and their practices to choose from various tools they wish to implement at their organization, while attaining the same level of security and safety as seen in the EAPC solutions. Thus, the technology can be aligned directly with the provider's particular needs and integrate optimally into their workflow.

Suggestions for improvement: Provider procurement

"I am probably just better off going to find my own solution. I think it is more nimble that way in the way our current healthcare system is setup where we are all like a private healthcare system with a single payer where we are all like little silos. We are all just nimble and do our own thing."

6.3 FEASIBILITY

6.3.1 Challenges and Solutions to PCP Adoption

Acceptance and adoption of eVisits was variable across providers, LHINs, and stages of implementation. Low utilization and adoption of eVisits may be reflective of the nature of the pilot, and not necessarily demand for this type of service. For instance, the short timelines and uncertain longevity of the project was a deterrent for many providers to participate in the PoC, particularly in LHINS introduced later in the project. Further, interviews with "low users" (identified based on gross number of visits) said they were keen to integrate eVisits within their practices, but did not have sufficient time and resources to do so. The majority of the PCPs indicated there is significant interest in virtual care, but adoption would take time due to design and incorporate changes in workflow. This was further supported by interviews with PCPs who were out of PoC who similarly described the requirement of high motivation to integrate eVisits within practices – despite lack of government funding or remuneration.

Many barriers to adoption were attributed to the nature of the pilot, however, several barriers to eVisits more broadly were highlighted in the interviews (refer to Table 5).

PCP Adoption: High interest, low time to commit

Case example:
Dr. H has always been curious about offering virtual visits to her patients. Instead of e-mailing her patients, she would like to use a secure messaging platform. But with her busy schedule she hasn't had time to think about how to integrate this in her practice.

"This takes time. Unfortunately we [PCPs] are not always quick with decision-making. We like to think things through."

Table 5. Barriers to Adoption of eVisits.

| Barriers to Adoption | Example | Supporting Quotation |
|---|--|--|
| Lack of EMR integration | Duplication of efforts due to lacking integration | <i>"I have no interest in it [EAPC platforms] because there is no way I am going to document in two places. And I can guarantee all my colleagues – we have 50 docs as part of our FHT and I don't think any of them would be interested in using a different platform, especially when there are [EMR] vendors that already provide a platform for it."</i> – Out of PoC PCP |
| Readiness for change | Differing paces at which people embrace changes in practice | <i>"It is a culture change. And culture change takes time. And it's nobody's fault. It is human nature that you have some people who embrace change readily and you have some people who resist change all the time. And you have people in the middle who just need more time to fully understand and how it applies to them and the risk-benefit for them. And if you give people the opportunity to change and make it a positive thing then eventually change will happen."</i> – LHIN Clinical Lead |
| Organization capacity and administrative oversight | Time, resources, and need for managerial approval | <i>"I have been trying to integrate it into my practice but when myself and my colleagues first got set-up back in December we first met because we wanted to figure out how to integrate it into our practice. But we all had different opinions, such as whether to send out a mass e-mail to all of our patients or not. And the problem is we couldn't come to an agreement."</i> – within PoC PCP |
| Liability | Concerns of liability of providing care virtually after hours | <i>"I am a salaried employee. And so when I get a ding at 9 pm I am not checking it until 9 am until the next morning. And if I am checking it on my own time, technically I am not covered by my insurance. So, it is a catch 22. On the one hand you want to improve access and if I have a few extra minutes, great. If not, you are going to have to wait until tomorrow. But if I do have a few extra minutes I am still not covered from a liability point of view."</i> – within PoC PCP |
| Impact on workflow | Perception eVisits would increase their workload and hours | <i>"I think a fear for all of us is that in the past many months it has really taken a huge chunk of time to really occupy this role. And sometimes I feel like a failed person, which is not...not really what I thought the role would be per se – a failed person for eVisits."</i> – within PoC PCP |
| Variations in PCP motivation | Perception that PCPs who are more concerned about remuneration/ resistant to change are less interested in eVisits | <i>"You might not embrace a tool like this if you are not paid to do it. But if your practice philosophy is 'we want to make our practice more accessible to patients' then you are going to do it. And if your practice philosophy is 'patients know where to find me and if they want to come and see me' then you are likely not going to use the tool even if there are billing codes attached to it. I think at the end of the day it all boils down to what someone's own personal philosophy is as a provider in terms of different ways they want to make themselves accessible to patients."</i> – LHIN Clinical Lead |
| Patient use of eVisits | Concerns of overuse and increased consumerism | <i>"Do patients really need this virtual access medically? Is it creating more consumerism? Is it going to be a burden on physicians?"</i> – within PoC PCP |

While many of these barriers relate to the nature of the technology (e.g., whether it is EMR integrated) and available resources (e.g., time and administrative support; pre-existing tools to communicate with patients), others were rooted in common perceptions and potential misconceptions of eVisits (e.g., that patients would overuse the tool or it would increase workflow). Finally, although some clinicians expressed concerns of liability or risk to patients as barriers to adoptions, many PCPs perceived the risk of eVisits to be the same as in-person visits.

Clinical Model: perceptions of risk

“Whether or not someone is calling in because they need an appointment because they have chest pain or if they are requesting an eVisit because they have chest pain – in either case the physician is dependent on clerical staff who are triaging the request to make the right decision. Any recommendation we are currently giving by e-mail or by phone, the risk to me is basically the same as if you are doing it through an eVisit tool.”

In terms of patient enrolment, PCPs deployed a range of strategies to discern whom to invite for eVisits. The majority of PCPs initially targeted certain patient groups such as those they had already been in frequent e-mail correspondence with, those who required routine follow-up appointments, or younger demographics appraised to be “tech savvy”. As they felt more comfortable conducting eVisits, many PCPs invited more and more patients with some eventually offering eVisits to their entire roster. In fewer cases, PCPs used a blanket approach opting to offer eVisits to their entire roster from inception. While many PCPs believed eVisits could benefit any patient, no approach appeared to take precedence over the other in terms of improving care or services rendered leading to the conclusion that providers should have autonomy over which patients they onboard.

Workflow Integration: dependent on physician boundaries

“A lot of doctors are worried about patients having direct access to them. But it is more about physician discipline to manage when they actually do the work. With asynchronous messaging you can do the work anytime and you have to deal [with] the compulsion to look up stuff at night or at dinner.”

Based on PCP and implementation team feedback, we have attributed some variation in adoption to the different recruitment approaches undertaken by the implementation teams assigned to each LHIN. We have synthesized this feedback into two overarching approaches that would increase the likelihood of adoption by PCPs:

- 1) Targeted recruitment:** Leveraging pre-existing relationships and seeking local eVisit champions tended to garner more success onboarding clinicians with high utilization. Many interviewees suggested that the validation of eVisits by providers they trusted was essential in their adoption. For example, in LHIN 2, the implementation team had long-standing relationships, a strong reputation and high credibility among primary care providers and this resulted in most super users of the tool to be concentrated in LHIN 2 (Figure 14b). Similarly, PCAs and the UHN implementation team leveraged their relationships within the primary community to identify strong candidates who were likely to be champions of virtual visits.
- 2) Provider-centered support:** Within all the LHINS, recruitment materials, training, and suggested ways to use the tool that were customized to match the needs and context of the practice were essential to support PCP adoption and utilization of eVisits. Further assistance on patient registration, and relaying feedback to the vendor were of considerable value to PCPs.

6.3.2 Challenges and Solutions to Clinical Integration

Within PoC and out of PoC providers agreed that introducing eVisits into their practice was a time consuming process. However, many also perceived this to be an inevitable “growing pain” associated with any significant organizational change that would confer downstream benefits over time. Reported effort was reflected in the time required to train PCPs, administrative staff and patients on the tool and arduous registration process. Further, there were numerous barriers to introducing the technology within their organization. For instance, some PCPs in FHTs, FHOs or FHGs described the need to obtain managerial approval and consensus on how eVisits would be conducted. A “low user” described how their involvement in the PoC became idle because providers in their practice could not agree on a protocol for eVisits. Involvement of administrative

Change Management: change requires a lot of upfront effort and time

“I practice in an enormous family health team...and so it was very difficult for us to do things in a very flexible and nimble way because we have processes in place that have to create a bit of a consistent system across all our doctors and sites. So it would be very difficult for individual one-off doctors to schedule patients in this way unless the physician was willing to do a lot of clerical activities on their own.”

staff or allied health professionals, such as nurses, was also contingent on whether the entire practice agreed to participate in the PoC to affirm shared allocation of resources.

Organizational readiness and culture to accept change was cited as an important consideration for eVisit implementation. Practices that had a high volume of eVisits demonstrated strong leadership, in-house champions and appropriate dedication of time and resources for this work. However, there was immense variation in how PCPs integrated eVisits into their routine (Table 6). Regardless of approach, the majority of PCPs (61%) did not have any issues closing their visits within the 48-hour window. Many involved administrative staff to help with registration and scheduling. However, some PCPs felt obligated to check the platform and respond to inquiries right away. In some cases, PCPs were already accustomed to being accessible around the clock as they were already in frequent e-mail or text messaging communication with patients. For instance, one provider described how they enjoyed using the tool as it offered a more secure platform for their patients to access them on a routine basis, especially given that they were often on the go between their various professional roles.

**Workflow Impact:
Asynchronous secure messaging as a game changer**

Case example:
Dr. B has moved all their patient phone and e-mail communication to the eVisit tool. All patient appointments and correspondence outside necessary in-person visits occur online. He answers messages at the clinic during business hours or when he has spare time and finds this is a more effective way to provide timely and high-quality care.

“When phone and voicemail come in the messaging is not necessarily clear. And sometimes we do not necessarily hear what people are saying to us. And we have to answer in real time, which forces us to not necessarily give the best response...with asynchronous text messaging, e-mail or otherwise – you get to wait, you get to sit. You do not have three other patients asking you questions while they are sitting in the front. So, you can wait and take a deep breath and then answer these questions. And if you don’t know it, you can ask a friend.”

Table 6. Workflow strategies to integrate eVisits.

| Category | Workflow strategies |
|------------------------------------|---|
| Finding time | Structured: Block time in schedule on daily or weekly basis |
| | Ad-hoc: Respond to eVisits throughout the day during breaks (only works for small volumes) |
| | Out-of-hours: Set strict guidelines on when to respond to avoid responding out of work hours |
| Modality | Asynchronous messaging: Overwhelmingly preferred for its additional flexibility |
| | Video: Valuable option to provide more comprehensive assessment, particularly for rural/remote or homebound patients |
| Administrative and nursing support | Triage: Engage clerical staff to triage virtual visits; Nursing staff were sometimes empowered to manage minor issues |
| | Supporting documentation: Preparation of requisitions and referral documents |

Overall, PCPs highlighted a few needs related to change management:

- 1) **PCP education on using the solution**, including an in-person demonstration and suggestions on integration into practice. Some suggested clinician trainers who could provide insight and recommendations on how to integrate the tool in practice.
- 2) **Patient education on using the solution**, including properly setting expectations on appropriate use of eVisits to avoid misuse. Consequently, PCPs suggested including more initial educational materials (e.g., a pamphlet, in-person or online demo) to discern appropriate versus inappropriate use.
- 3) **Ongoing technology and change management support** when questions or concerns arose, often related to tool functionality, billing, workflow integration, and appropriate use. Some PCPs described how patients encountered errors during registration that could not be resolved quickly due to lack of available technical support.

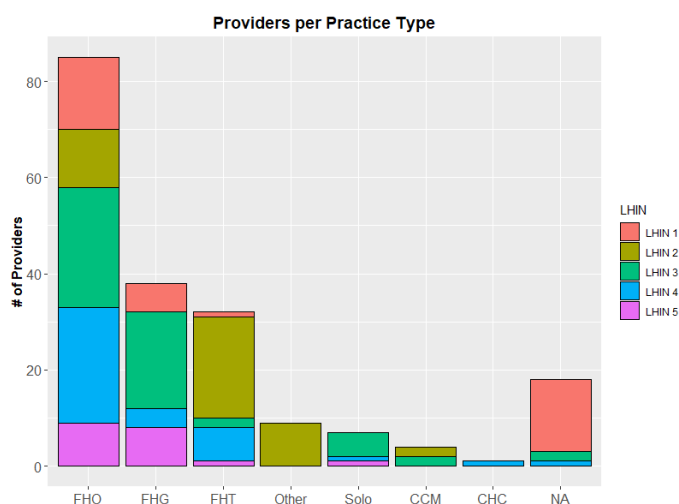
Qualitative interviews revealed that most PCPs felt that in the long-term, eVisits could generate efficiencies within their practice and schedule by diverting clinical encounters that do not require an in-person assessment to virtual care. However, the short timeline and upfront initiation activities of the pilot made this a hypothetical value proposition that could not be fully confirmed. Out of PoC interviews did reveal that eVisits produced efficiencies within clinics by freeing up administrative staff time, facilitating direct provider-to-patient communication and replacing unnecessary in-person visits.

6.3.3 Remuneration: Provider Perspective

Participating PCPs were part of diverse practice types (Figure 19) and demonstrated variation in their perspectives on remuneration.

The majority of PCPs believed eVisits should be at least similar with in-person visits. Interviewees communicated several considerations when exploring what is appropriate remuneration for eVisits:

Figure 19 Providers per practice type



1) Motivation: One of the hypothesized barriers to current physician adoption of eVisits is the lack of reimbursement for services rendered over this medium. This resonated with several interviewees who described that their motivation to participate in the pilot was to receive additional income for work they were already performing via e-mail, phone calls, or in-person. In a very small number of cases, PCPs were less concerned about remuneration but were motivated to use virtual visits to generate efficiencies and improve patient care. These PCPs were under a capitation model, and thus, described how they are typically paid the same irrespective of how they communicate with their patients.

2) Time and effort: Most PCPs agreed that eVisits should be appropriately remunerated to reflect the amount of time and effort involved in this form of care. Effort was reflected in the provider and patient registration and onboarding, in the administrative work surrounding eVisits (e.g. billing, documentation) and in responding to eVisits. The time to complete a visit could reportedly be longer than an in-person visit depending on the frequency of messages, if consultation with another provider/specialist was required, if the eVisit was a specialized type of visit (e.g., palliative care or mental health follow-up) or if technical issues arose (e.g., during a schedule phone or video call).

3) Liability: Some PCPs who discussed concerns of liability felt compensation should account for the additional risk of providing care virtually compared to in-person.

4) Modality: PCPs had mixed opinions about whether billing should vary by modality. Some believed asynchronous messaging required the similar time and effort as video or phone communication; others believed there should be tiered billing based on modality. They felt messages were often quick and easy to respond to, while phone/video required scheduling and more interpersonal interaction. Finally, others believed eVisits should be based on time or the number of virtual exchanges (e.g., receiving \$1 per message).

5) Specialized care: Some PCPs indicated that to incentivize use of virtual care for specialized primary care (e.g., palliative or mental health care), higher billing codes would be required, as they are remunerated at higher fee codes than general care in person.

6) Coverage of cost of the technology: Out of PoC PCPs (who were all under a capitation model and integrated eVisits at their own expense) were less concerned about remuneration for services. However, they recommended public funding to compensate procurement and maintenance of the tool; some also emphasized that billing codes would incentivize further adoption.

PCPs also had mixed perspectives on **appropriate funding models**. FHT/FHO PCPs generally agreed they should receive shadow billing alongside block funding to reflect the administrative burden of eVisits. FFS PCPs believed remuneration should be similar to the OTN model but compensation should be on par with in-person visits. However, capitation PCPs were more heterogeneous in their preferred funding model. Some suggested small shadow billing, some requested shadow billing alongside block funding, some only requesting block funding, and fewer were only concerned with coverage of the tool. To motivate PCPs on capitation, one provider suggested coupling access bonuses to eVisit targets. For example, they described how PCPs could be credited on their access bonus if they performed some threshold target of eVisits (e.g., on a monthly basis), irrespective of outside service usage. Under this mechanism, the Ministry could keep eVisits as an in-basket service but incentivize inclusion of eVisits in their workflows.

Remuneration: Variable provider perspectives

“Because we are taking the risk of conducting eVisits and are saving the system money by not having to access health services elsewhere I think it should be compensated similarly to what it would be in-person.”

“I actually do not know if I have been billing properly for it...and honestly I do not really care that much. Being under a FHO model it is a difference of \$3-\$5 which is not enough to get to uptight about one way or another. I do think being remunerated for this is important because it is part of patient care and nobody likes to be asked to do more work for no money. So having a small token for each interaction really helps.”

6.3.4 Billing of Virtual Care within the PoC

There were four codes that providers could use during the PoC: Phone/messaging – minor vs intermediate and Video – minor vs intermediate. As there were few video eVisits, video billing codes accounted for less than 2% of the visits that were billed. 50% of the visits were billed with an intermediate phone/messaging code, and 49% were billed with a minor phone/messaging code. As a result all further analyses were done excluding the video billing codes. Only 11% of all visits were classified as “Not a billable visit”. Provider super users had a higher proportion of intermediate billing codes compared to low and high provider users had a higher proportion of minor billing codes ($\chi^2 = 232.18, p < .001$). Visits with intermediate billing codes were of longer duration (Median=1 day) than those of minor codes (Median=0.75 days) ($\chi^2 = 97.83, p < .001$). Chronic condition visits were more likely to be billed a minor code, while new health issues were more likely to be billed as an intermediate code ($\chi^2 = 6.8, p = .009$). There were no significant differences between what patients would have done (e.g., gone to walk-in clinic) and the billing codes used.

Visits requested by providers were relatively equally split between intermediate and minor assessments, while those requested by patients were more likely to be minor assessments ($\chi^2 = 9.11, p = .003$). Provider-requested visits were for medication discussion, existing conditions, follow-up of test results and post discharge follow-up with the highest proportion (57%) being for test results follow-up. Within provider requested visits only, minor codes were more likely to be visits for “existing conditions” or “previous appointment” follow-up, while intermediate billing codes were more likely to be to “discuss medications” or “other” ($\chi^2 = 9.59, p = .001$).

6.3.5 PCP Value Propositions

Primary care providers identified a number of value propositions of the virtual visit platform from their respective vantage point in the health care system (Table 7).

Table 7. Provider value propositions to use eVisits.

| Value Proposition | Description | Examples |
|-------------------------------------|---|--|
| Efficiency and Revenue | <p>Increase the number of patients providers can see per day, while not overwhelming their workflow</p> <p>Increase provider revenue through increased efficiency or payment for work previously unpaid</p> | <ul style="list-style-type: none"> -Providers perceived virtual visits as an appropriate channel of care for non-emergent concerns, which freed up time for in-person care that was required for more critical cases -Direct connection between patient and provider enabled by virtual visits enabled supports efficiency by eliminating the need to set up appointment via administrative staff, freeing up their time for other tasks -Rectify the challenge of contacting providers by phone, which often results in missed/repeated calls -Receive compensation for doing similar work through the virtual platform that they were already doing by email and phone |
| Quality of care | <p>Enable clinicians to improve the quality of care they deliver</p> | <ul style="list-style-type: none"> -Direct communication enabled them to provide extra support and as a result, feel more connected to their patients – especially those who live remotely or have difficulty attending in-person -Connecting with patients virtually enabled them the opportunity to re-emphasize information or cover information they could not fit into the in-person visit -Time to provide more thought-out responses before replying to patients |
| Access to care | <p>Improve access same-day or for rural/remote patients</p> | <ul style="list-style-type: none"> -Reduced wait times -Faster response times -Reduce use of external services |
| Security and confidentiality | <p>Improve security of asynchronous communication with patients compared to email</p> | <ul style="list-style-type: none"> -Many providers had been using less secure forms of communication prior to having access to the virtual platform without compensation |

6.4 IMPACT

6.4.1 Impact on In-Person Visits

During early stages of the pilot, there was a common concern that eVisits would increase PCP workload by making them too easily accessible through the platform. However, interviews with PCPs and implementation stakeholders at later stages of the pilot revealed that these concerns were not actualized as, for the most part, patients appeared to be appropriately using the tool. This was reflected in the low number of super user patients. Out of PoC providers described some cases of overuse or misuse, but felt this did not hinder their workflow, as they were able to easily manage these patients by reiterating expectations or rescinding their access to eVisits. One clinic that was out of PoC also described the utility of formal written protocols that outline how to quickly resolve situations of misuse/overuse.

Impact on In-Person Visits: How it is used

"I just started a transgender health clinic in my practice, so I get a lot of referrals from people in neighboring cities and towns who have to travel. I was looking at this as an opportunity to connect with these patients more effectively, because these patients tend to be in their 20's and 30's so they are usually more internet savvy and willing to try this out...The majority of time I use secure messaging for instructions on results and what to do next."

How was it used?

Given the range of primary care models implemented in Ontario, it is no surprise that diverse clinical models for eVisits were identified in the evaluation. For instance, some PCPs only reserved eVisits for unique circumstances, such as providing care to university students who temporarily moved away for school or conducting video visits with rural and remote patients. Moreover, many providers highlighted the potential for the platform to foster improved chronic disease monitoring and management through its capacity to enable patients and providers to connect remotely. Overall, there appeared to be variation in the level of comfort with using the tool for specific circumstances (see Table 8 for specific examples).

Table 8. Use Cases for eVisits

| Appropriate Use Cases | Mixed Perceptions on Appropriateness | Inappropriate Use Cases |
|---|---|--|
| <ul style="list-style-type: none"> • Lab results • Medication renewals • Follow-up on previous diagnosis • Specialist referral • Non-urgent concerns (e.g., rash or cold) • Chronic disease management • Providing care to new mothers • Routine check-ins • Assessment of visual symptoms (e.g. cellulitis, conjunctivitis, rash) | <ul style="list-style-type: none"> • Mental health follow-up • Palliative care • New diagnosis • Providing care to infants/pediatric patients | <ul style="list-style-type: none"> • Initial consult with a new patient • Cases where physical examination was needed • Urgent care • Providing “bad news” via asynchronous messaging • Managing patients with severe mental health symptoms or addictions • Prescribing narcotics |

Who should use it?

There were mixed opinions among providers with respect to which patient populations would be most appropriate for using the tool. Some offered access to the virtual platform to their entire roster while others selectively chose patients. For the latter group of providers, examples of target demographics included:

- University students who have moved away;
- Patients with busy schedules (e.g. parents with young children); and
- Younger patients, because they viewed them as tech-savvy and as having fewer/less complex medical conditions.

However, these patients often have lower needs and thus lower benefit and less value from increased access to care. Many providers countered the limited use of the tool to the above populations, stating that complex patients should be given access, at least to ask questions that could be addressed remotely between regular check-ups. There were mixed perspectives regarding use for mental health concerns. Some providers commented that mental health patients could strongly benefit from the tool, particularly those with anxiety or depression who would likely prefer to stay at home. However, most providers agreed that the tool would not be appropriate for patients with severe mental health problems who would likely require an in-person consultation or assessment.

The type of relationship that patients had with their providers was another factor that influenced perceptions regarding the appropriateness of the tool. Specifically, some providers stated that the tool might be more appropriate for patients who have long-standing relationships with their providers as opposed to more newly rostered patients because they have a clearer understanding of the patient's history/ medical conditions. Among providers who chose to selectively offer the tool to patients, some took into account patients' personalities when considering who the platform would be suitable for. Some providers felt more comfortable offering the tool to patients who they felt were more responsible and would use the tool appropriately. Conversely, some providers did not offer the tool to patients who they felt might misuse the platform by sending numerous messages, who would need constant reassurance, or use profanity.

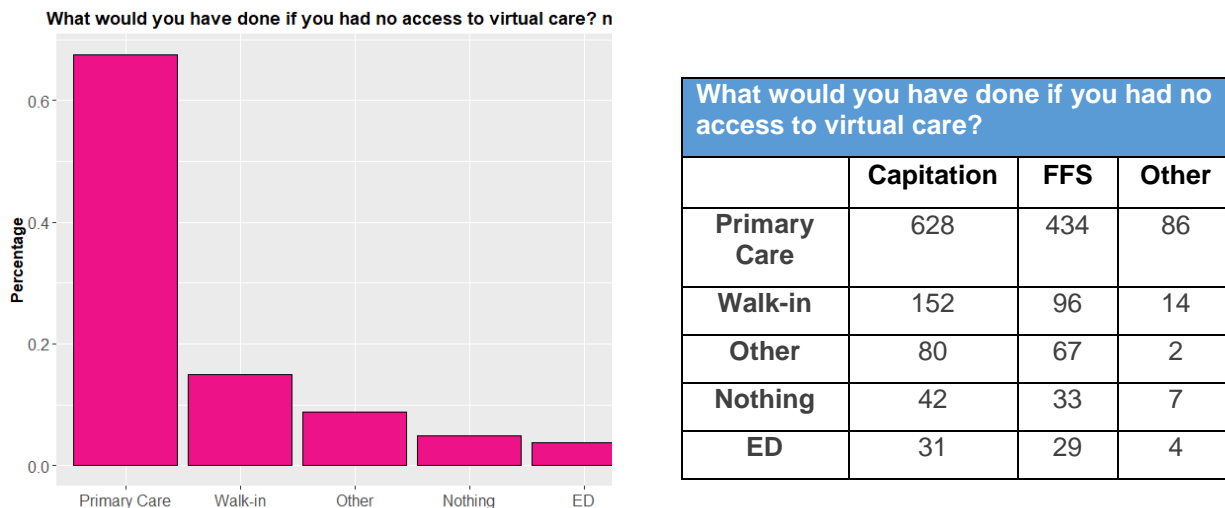
6.4.2 Impact on walk-in/ED visits, and replacing in-person visits

The majority of primary care providers interviewed reported that virtual visits would likely reduce the number of in-person and walk-in visits by making care more accessible, and most visits (81%) required no additional follow-up. Many providers perceived that patients prefer to access care specifically through their own primary care provider if they were given the opportunity to do so and this is supported by the fact that 67% of surveyed patients said they would have gone to their primary care provider if they had no access to virtual care. Providers also expressed the importance of supporting continuity of care. Providers clarified that decreasing in-person visits did not necessarily mean that the total number of visits a day would be reduced. In some cases, providers expressed that virtual visits might actually increase their clinic volume by driving up both in-person and virtual visits by making them more accessible online alongside their regular clinic appointments. However, this was likely to be more the case for providers with large baseline clinic volumes and long wait-times and for those who added eVisits within their regular clinic schedule (in contrast to those who replaced in-person appointments with eVisits). Moreover, interviews with providers revealed mixed opinions with respect to whether or not virtual visits could potentially impact emergency department (ED) use. One provider rationalized that virtual visits would not likely impact ED use because the tool is not intended for emergency cases (an intent that is communicated to patients).

Further, most patients (67%) who completed the surveys indicated that they would have gone to primary care if they had not used eVisits, but 15% indicated they would have used a walk-in clinic and 4% indicated they would have gone to the emergency room. This suggests potential for cost-savings due to reduced use of outside services in about 20% of cases (Figure 20). Further, only

5% of respondents indicated they would have done nothing, suggesting that this is replacing other forms of care rather than adding to it.

Figure 20 Survey response on what patients would have done if there were no access to virtual care.



7. BEYOND THE PROOF-OF-CONCEPT

According to Bodenheimer’s ten building blocks of high-performing primary care (21), the “template of the future” is the ultimate goal of primary care practice and includes visits that vary in length and type such as “e-visits, telephone encounters, group appointments and visits with other team members”. What does it take to achieve this? According to the authors, the minimum requirement is payment reform that adequately compensates virtual visits. The *Enhanced Access to Primary Care* (EAPC) project is a first step towards that transformation in Ontario. The project allowed physicians in Ontario to charge for virtual visits for the first time. The project, led by the Ontario Telemedicine Network (OTN), had high recruitment ambitions that resulted in the largest virtual care implementation within primary care in Canada. Over 14,000 thousand visits connected patients with their own primary care physician across 5 regions in fewer than 18 months, with many regions having been part of the proof-of-concept (PoC) only for a few months. Given that nothing like this has been implemented before in Ontario, the breadth of knowledge that was acquired by talking to end users (patients and providers) and by examining the platform user data, provides a strong foundation of understanding the potential of virtual primary care in Ontario. We

summarize our major findings below and position them in the context of what we know about virtual care in other jurisdictions and what is available in the literature.

Patients

There is substantial patient interest in virtual care. Nearly half of the patients that were invited to register for online care completed their registration, suggesting a relatively high adoption rate. Women were more likely to register and use the platform, which is consistent with the literature (7,22–25) and also consistent with the gender imbalance in the likelihood of seeking medical advice (26,27). Further, there were patients from across the age continuum, suggesting that this is not a solution just for the young. Patients love having the opportunity to connect with their primary care physician online, they perceive it to be of equal value to an in-person visit (28), and 99.9% of patients indicated that they would use it again. While in many ways the motivation behind this project was to improve access in terms of timeliness, what was striking was that patients simply loved the convenience of it. This was evident both from the surveys (95% saying virtual care saved them time and 92% said it was more convenient) and also from the patient interviews conducted. Our findings are consistent with past studies reporting high satisfaction rates among virtual care patients (23,29). They are also consistent with past reports showing that in fact patients in Ontario are not dissatisfied with the timeliness of their care, but they seek convenience (30).

Virtual care also provides a unique opportunity to support primary care physicians in chronic disease management. Almost a third of the visits were noted as chronic disease management. As chronic disease often requires frequent appointments that may not necessarily need a physical examination, virtual care can provide the means for both patients and providers to stay continuously in close contact. With 44% of adults over the age of 20, having at least one chronic condition(31) and chronic disease being on the rise due to an aging population, primary care physicians will look for innovative ways to manage chronic conditions (32) and virtual care takes them one step closer to being able to implement these approaches.

Physician Adoption

While patients love and easily adopt virtual care, physicians face many challenges adopting virtual care into their practice despite their interest in doing so. Providers stated a variety of reasons for their interest in virtual care, including efficiency and revenue, quality of care, and improving access for patients, consistent with other reports (9). Many challenges, however, prevent them from adopting such solutions entirely or at a large scale. These barriers are similar to those reported previously in the literature (9) and include their organization's readiness of change, their

capacity to handle the initial administrative load of onboarding patients, the significant workload impacts on already overburdened providers, and concerns of inappropriate use by patients.

Due to the pilot nature of the project and the uncertain fate of the project upon completion, the adoption rate of physicians in this study is likely to be lower than in a stable program. Almost half of registered physicians did not complete a visit (recognizing that some of these physicians may not have been part of the project long enough to have an opportunity to engage). We also do not know how many approached physicians refused to participate. We do know, however, that there was a significant variation in provider engagement across regions. For example, in LHIN 2, providers directly contacted the implementation teams asking to gain access to the platform, while in other regions many physicians refused to join. Differences in implementation strategies likely also contributed to differing adoption rates. For example, clinics that had administrative support from implementation teams or admin personnel for inviting a large number of patients to the platform tended to be the leaders in the number of eVisits conducted. The more patients invited, the more patients register, as the proportion of registered patients generally did not vary much with the number of patients invited.

Through interviews, some physicians indicated that they carefully select the patients they invite, and yet the data shows that despite some physician's careful selection, adoption rates remain similar across providers. As a result, the "super user" providers were providers who had invited many patients. This is especially important, as a significant challenge that physicians face in adopting virtual care is that the volumes of virtual visits are relatively low at the beginning, which makes it difficult to consistently integrate them into practice (e.g. blocking time for eVisit consultations), impeding workflow. As a result, many providers indicated in our interviews that they respond to visits outside of normal business hours, which makes adoption more challenging. Increasing volumes to a level where providers can systematically integrate virtual care into practice is an important first step, and the data suggests that inviting more patients may be a solution to this. As a result, support for physicians in inviting patients and further improvement in the batch registration processes (which can likely be improved through EMR integration) should be a focus of further technology development. While the technology itself is rarely a problem in digital health implementation projects and it was also not an issue in this PoC, many physicians said that the lack of EMR integration is a significant barrier of integrating virtual care into their work and is a significant workflow challenge.

Potentially and at least partially due to these workflow integration challenges, asynchronous messaging dominated with 86% of completed visits falling in that category. The value of

responding when convenient was highlighted as a benefit for both patients and providers and has been reported before elsewhere (33). Providers also indicated that it was sufficient for addressing most concerns they were comfortable resolving virtually.

Remuneration and Cost

Overall, providers perceived appropriate remuneration to be on par with in-person remuneration due to several factors, including motivation to use virtual visits, equivalency of visit time and effort, and the potential liability of resolving issues without seeing the patient face-to-face. Many providers reported that virtual care increases their workload due to the burden of onboarding and registering patients, the time to complete billing and documentation around the visit, and the unpredictable time associated with a visit depending on the need for consultation with other providers or multiple exchanges to resolve the issue. This is reflective of findings in the literature which indicate that asynchronous virtual care has the potential to reduce workload, but in some cases can add to it (33). For example, some providers believe that secure messaging shifts work from nurses to providers, increasing their workload and lengthening their work day (33)

In asynchronous messaging, the number of messages exchanged between provider and patient can be used as a proxy for effort and time. Providers sent an average of 3.2 messages, whereas patients sent an average of 2.4; this is slightly higher than what was reported in another study, which indicated that eVisits require on average 1.2 exchanges between patient and physician (23). In this same study, however, 82% of the visits were completed within two exchanges, whereas in the current project only 52% of the visits were completed within two provider responses. Studies of interviews with providers elsewhere, however, have shown that it is not writing the reply itself that takes up most of the provider's time, but rather the research that needs to happen ahead of the response(e.g. look up the patient's history, medications and/or allergies)(33).

There was a relatively even split between minor and intermediate billing codes. The only difference between the two codes is that intermediate assessments are “to be used when the completion of the phone/messaging/video assessment requires a high-degree of back-and-forth spread out over time”. Intermediate assessment visits were longer in duration, which suggests physicians generally used the codes appropriately. It may also suggest that these types of visits were more complex in nature.

LHIN 2 physicians had an opportunity to request visits, which was not an option in other LHINs until nearly the end of our evaluation period. Provider-initiated visits were equally likely to be billed as minor or intermediate assessment, while patient requested visits were more likely to be billed

as a minor assessment. It is hard to interpret what this means. It may be possible that providers were more comfortable initiating more complex visits online than patients. The reason for most physician-initiated visits, however, was to follow up on results and one could argue that follow-up assessments should have been more likely to be minor in nature.

Impact

Most visits (81%) required no additional follow-up, suggesting that virtual visits replaced in person care. Further, from those patients who responded to the survey, 67% indicated that they would have gone in for an in-person visit if virtual care was not accessible to them. Previous studies have shown that virtual care visits cost less than in-person visits (13,24,34,35), especially when patients see a known provider (34). Although our project couldn't explore this, other studies have suggested that although virtual visits might replace in-person visits, they can result in more follow-up visits as compared to in-person visits (36,37). Studies have also shown that eVisits may lead to an increase in overall number of visits, potentially prompting patients to seek care for minor illnesses that otherwise would have not induced an in-person visit (13,38,39). Without access to administrative health data, we simply do not know what the effects of virtual care on health system use are in Ontario. If virtual care billing codes are incorporated into OHIP and a long enough period has elapsed to allow for better physician and patient adoption, we will be able to explore directly what the effects on health system cost and utilization are (including impacts on no-shows and cancellations, which may differ between virtual and in-person (14)).

Regarding physician effort, some providers, particularly those who rostered a larger proportion of their clinic, indicated that virtual visits saved them time, allowed them to conduct more visits in a day, and even allowed them to increase their roster. Other providers, however, noted that there was no time savings in using virtual care, consistent with some published reports (40). Mixed findings exist in the literature as well (33) and at least in Ontario, the variation of primary care practice types would have resulted in different impact on providers depending on the administrative or team-based support that they have in their organization.

Many organizations and jurisdictions have an interest in virtual care, as it holds potential to reduce emergency department visits and hospital admissions. The survey responses from patients indicated that 15% of the respondents would have considered going to a walk-in if they had no access to virtual care and 4% indicated that they would have gone to the Emergency Department (ED). The cost impact of walk-in visits differs across primary care funding types (FFS vs. capitation). This specific implementation of virtual care was not designed to handle acute urgent care visits and, as a result, the low impact on ED visits was somewhat expected. Some studies

that have examined more comprehensive acute, but non-urgent care have demonstrated lower rates of ED admissions for virtual care visits (41,42).

Bodenheimer et al. (21) suggest that one feature of the “template for the future” building block of high performing primary care is the elimination of FFS in favor of capitation models that adjust payments based on quality, patient experience, and health system use. In Ontario, there may be an opportunity for primary care physicians to be rewarded for decreased hospital use. In February, 2019, the MOHLTC introduced the creation of Ontario Health Teams (OHT) (43) that will integrate health services provided by primary care, hospitals, home and community care, palliative care, residential long-term care, and mental health services. Effectively, this will create Accountable Care Organizations (ACOs) in Ontario. ACOs are groups of physicians, hospitals and other healthcare providers who come together to deliver care to patients (44). The United States (US) established ACOs in 2010, whereas in Ontario, Health Links and Bundled care initiatives are the only similar enterprises. Virtual care services can be pivotal in the OHT initiative. Such integration may allow primary care and hospitals to work together in providing virtual services for both non-urgent and urgent care, and have a greater impact on health service utilization.

A more comprehensive virtual care model will improve continuity of services, another building block of high performing primary care (21), and likely physician adoption of virtual care services. For example, many primary care physicians are resistant to offer services outside regular business hours, but hospitals may be more motivated to offer 24/7 virtual care services, as it may have the potential to reduce ED visits and hospital admissions. In addition, inclusion of virtual care in OHTs would allow an instant integration of virtual care services with home and community care, palliative care, residential long-term care, and mental health services. These are areas of need for improved access and all areas that were mentioned in our interviews as potential high-value use cases of virtual care. Currently, the lack of specialized billing codes (e.g. codes for diabetes, palliative care, and mental health) in the PoC was stated by several physicians as a significant barrier to fully exploring the possibilities of virtual primary care.

In summary, this is the largest virtual care implementation within primary care in Canada. Patients love using virtual care and the virtual visits seem to replace in-person visits. Many providers also seem motivated to integrate virtual care into their practice, but an up-front investment in the form of implementation support is required for virtual care to be successful. Finally, virtual care is likely to flourish under integrated value-based service models.

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APPENDIX A. METHODS

QUALITATIVE METHODS

Recruitment of PCPs and LHIN Stakeholders

Recruitment for interviews was employed through a two-phase strategy:

Phase I recruitment employed a convenience sample technique based on referrals by the implementation teams in LHIN 1 and 2 for providers within the PoC project.

Phase II recruitment involved a more targeted approach based on the provider's level of engagement with the tool. The vendors provided a utilization spreadsheet for LHIN 3, 4, and 5, which we used to categorize PCPs as either a "high user" or "low user". Our target was to interview one high user and one low user per LHIN. To capture a wider perspective of providers using the platform, we also interviewed those operating under various remuneration models (both capitation and FFS). We also targeted interviews with the PCCLs involved in recruitment of other PCPs. Further, a convenience sample of providers using an alternative virtual primary care technology outside of the PoC, or "out of PoC" was also interviewed. Out of PoC providers were targeted to inform our understanding of more implicit motivations to using virtual primary care, as these PCPs chose to implement the technology without remuneration. Lastly, targeted interviews and working groups were conducted with the implementation team or primary stakeholders from each LHIN. We had four working group sessions to share learnings gathered during the implementation of the demonstration project and to inform strategies to improve the uptake and utilization of eVisits among PCPs.

Recruitment of patients

The vendors confidentially provided contact information of patients from LHIN 1 and 2 to WIHV. These patients consented to be contacted for evaluation purposes when signing onto the platform. All potential interviewees were contacted by email and asked if they were interested in participating in a voluntary interview about eVisits; interviews were arranged with those who agreed.

Interviews

Thirty-two PCP interviews were conducted from February 6, 2018 to March 4, 2019; seventeen patients were interviewed from March 19, 2018 to August 21, 2018. Finally, five interviews were conducted for LHIN stakeholder and implementation team members, and four working group meetings took place. Of the providers interviewed, two were operating under a FFS compensation

model, while the remaining were under a capitation model. Two of the providers interviewed in LHIN 1 in *Phase I* were also PCCLs.

Interviews were semi-structured and followed the respective interview guide (**Appendix B** [PCPs] and **Appendix C** [Patients]). For PCPs, actual interview questions were refined based on whether the provider was a high or low user, and within or outside of the PoC. Interviews were conducted by phone and audio recorded; detailed notes were taken from the recordings of all interviews. Interview notes were transcribed using emergent thematic coding. Inter-rater reliability was conducted to ensure the validity of the coding. Two individuals independently coded the first three interviews and then met to compare coding and establish a coding schematic to be applied to the remaining interviews. The research team analyzed the coded data to identify key themes related to the patient experience and clinical experience subdivided into the technology, feasibility, and system impact of EAPC.

QUANTITATIVE METHODS

Survey

After completing a virtual visit through the platform, patients were invited to complete a short survey (**Appendix D**). The survey was created in REDCap, a secure web application for building and managing online surveys. Survey questions pertained to the patients' demographics, their virtual visit experience, patient-reported costs, and overall satisfaction.

The two vendor surveys did not contain the same questions with the exception of “What would you have done if you did not have access to Virtual Visits” and “How was your experience compared to an in-person visit?” (**Appendix E**). However, these survey questions were linked to the patient's visit information, therefore some inferential subgroup analyses were conducted especially in regards to the question of what would patients have done if they did not have access to virtual care. This question was the only one in the current study that gives us a suggestion of impact on health system use.

User data

De-identified user-level data was collected from both vendors. This included demographic characteristics of patients and providers, information on the visit such as length of the visit, date, reason for visit, and resolution. The two databases were consolidated where they had overlapping variables and analysis was conducted on the combined data set.

The data was analyzed using RStudio, Version 1.1.463. Data distributions were checked for normality and outliers. Normally distributed statistics report on mean and standard deviation and

parametric tests were run, while non-normally distributed data reports on median and interquartile range (IQR) and non-parametric tests were run for comparison between groups.

The categorical variables in the data were recoded so that they can be consolidated into one. The age of the patients was given only in categories from one of the vendors with overlapping ranges between categories (e.g. 10-20, 20-30 and so on). As the other vendor had provided the raw age of patients, in order to combine the results, a new age variable was created where the “median” age was selected for each group (e.g. 10-20 was converted to 15). For analyses including age categories, raw age was converted to new categories (0-9, 10-19 and so on) and the vendor categories were recoded to fit these new categories (e.g. 10-20 was converted to 10-19). As a result there is some error in these categorical variables, as patients on the overlapping edges could have been entered in 2 different variables.

APPENDIX B. INTERVIEW GUIDE: PROVIDERS

OTN Primary Care Interview Guide: OTN Enhanced Access to Primary Care PCP Version January 17, 2019

We are conducting these interviews because we are trying to understand whether primary care doctors think that a virtual care model could be valuable and if so, what type of model do they think is most valuable for their particular practice.

Role

- Please describe your involvement and level of knowledge of the EAPC project, if any?

Technology

- Are you aware of any practices in your regions using virtual care (emails, video, asynchronous/synchronous messaging, even phone when used for consulting)?
- Are there specific technology features that you think are essential for virtual care to succeed?
 - Probe: E.g. EMR integration? How integrated should the technology be with their EMR (e.g., ability to transfer data and files or automated synchronization)
- What do you think is the overall demand for this type of technology among primary care providers?

Organization

- Do you think your LHIN supports innovation initiatives?
- Do you think your LHIN has the resources to innovate?

Condition

- What kind of patients do you think will mostly benefit from virtual care?
- Do you think it's more appropriate for acute or chronic care or both?
- Would it be beneficial for patients of specific sociocultural background or socioeconomic status?
 - All of the above in reference to their own region

Value Proposition

- Is virtual care valuable in your opinion? If so, in what ways?
 - Are there certain gains virtual visits create for you? (e.g., does it allow you to do things you cannot in-person?)
 - Are there certain pains it alleviates?
 - From all of the value propositions mentioned which are the essential ones (e.g. if you did not have that you would not even consider using virtual care in your practice)
- [If they have experience with eVisits] Has the use of virtual visits actualized in the way you expected?
 - Did it address the issues you hoped?
 - Did any added benefits materialize?
 - Were there any expected or unexpected disadvantages of the technology?
- Do you think your patients would value having the option to use virtual care and if so, why do you think it will be valuable to them?

Adopters

- What kind of changes in staff roles do you think need to be made to implement virtual visits?
 - What is the role of your administrative and nursing staff in managing virtual visits?

Wider System

- How do you think the use of virtual visits will impact the broader system?
 - E.g. access, ED visits, walk-in visits
- What do you think is appropriate remuneration for virtual visits?
 - Block funding vs fee-for-service
 - Should funding be different from in-person visits? Why or why not?
- How does the effort in conducting a virtual visit compare to an in-person visit?
- Are there regulatory/liability challenges that concern you with virtual visits?

Embedding and Adaptation Over Time

- Do you think the various primary care practices have the capacity to continue to adapt to changes to technology and virtual care services over time?
- What activities and elements need to be in place for the implementation of virtual visits to succeed over time?
- Any other suggestions for how to scale, spread and sustain virtual visits in primary care?

APPENDIX C. INTERVIEW GUIDE: PATIENTS

OTN Primary Care Interview Guide: OTN Enhanced Access to Primary Care Patient Version May 9, 2018

Motivation to use virtual primary care model?

1. Why did you decide to register for this service?
2. Approximately how many e-visits have you done with your primary care physician?
3. What are the benefits to using the technology?
4. What might be the disadvantages to using the technology?
5. How important is it for you that you can access your doctor through e-visit?

Current experience with technology

1. How does the technology fit into your daily schedule?
2. What kind of appointments do you think an eVisit is suitable for and what kind of appointments is it not?
3. How does this technology improve or diminish your access to your doctor? (faster, easier, more likely to contact them)
4. Thinking about a time when you used the service, what would you have done if the technology were not available?
5. How does the e-visit compare to an in-person visit?
 - a. What aspects might you consider better or worse?
6. How easy was it to set up an e-visit? (Is there anything you would like to improve?)
7. Generally, what were the outcomes of the visit(s) you've experienced?
 - a. Did you consider seeking care through another service for the same problem?
i.e. emergency department or walk-in-clinic?
 - b. Would you consider using the technology in the future?

Technology specific

1. What mode have you used when facilitating an e-visit (messaging, video, phone), and did this mode meet your expectations?
 - a. Would you have preferred having access to a different mode of communication?
 - b. Were you the one to choose the mode of communication or did your doctor choose it?
2. What device did you use for the visit (phone, laptop, desktop)?
3. Generally, how well did the platform work for you? Positive and negative aspects?
(assessing the functionality)
4. To what extent was the technology easy to use?

Technology improvement ideas

1. What, if any, concerns or issues have you experienced with using the service?
2. Could anything change about the technology to make it better?

APPENDIX D. PATIENT SURVEY

Have you had a virtual primary care visit with your primary care practitioner?
Yes/No (If no, take to end of survey)

General and Demographic Questionnaire

1. Age: _____

2. First 3 characters of your Postal Code: ___ _ _ XXX

3. Self-identified gender:
 - Male
 - Female
 - Non-binary/ third gender
 - Prefer to self-describe: _____
 - Prefer not to answer

4. Ethnicity:
 - Black
 - Caucasian
 - Latin American
 - Indigenous
 - Middle Eastern (e.g., Egyptian, Iranian, Lebanese)
 - South Asian (e.g., Indian, Pakistani, Sri Lankan)
 - East Asian (e.g., Chinese, Japanese, Korean)
 - South East Asian (e.g., Vietnamese, Cambodian, Filipino)
 - Mixed heritage (e.g., Black – African and White – North American) (Please specify) _____
 - Prefer not to answer
 - Do not know
 - Other: _____

5. Is English your preferred language? (Yes/No)
 - a. If No, what is your preferred language? _____

6. Are you currently:
 - Married
 - Widowed
 - Divorced
 - Separated
 - Single (never married)
 - Living common law

7. What is your highest level of education completed? Check ONE only.
- Elementary High school Undergraduate
- Post-graduate degree University/College/Trade
8. What was your total family income before taxes last year?
- \$0 to \$29,999 \$120,000 to \$149,999
- \$30,000 to \$59,999 \$150,000 or more
- \$60,000 to \$89,999 Prefer not to answer
- \$90,000 to \$119,999 Do not know
9. How many people does this income support? _____
- Prefer not to answer Do not know
10. What type of housing do you live in?
- My own place (with roommate (s)/partner(s)) Boarding home
- Parent/guardian's home Shelter/hostel
- Relative or Friend's home Homeless/on the street
- Foster home Correctional facility
- Group home Other (Please specify) _____
- School residence Do not know
- Supportive/assisted housing Prefer not to answer
11. Community Size:
- Rural – Under 10,000 residents
- Mid-sized – 10,000 to 99,999 residents
- Urban – 100,000 residents and over
- Don't know
- Prefer not to answer

12. Do you have any of the following? (Check ALL that apply)

Chronic (long-term) illness (e.g., asthma, diabetes, cancer, arthritis)

[If checked] Please specify all chronic conditions you have been diagnosed with: _____

Developmental disability (e.g., intellectual disability, autism)

Drug or alcohol dependence

Learning disability

Emotional health disorder (e.g., anxiety, depression)

Physical disability

Sensory disability (e.g., hearing or vision loss)

Other (Please specify) _____

None

Do not know

Prefer not to answer

13. In general, you would say your health is:

Excellent

Very Good

Good

Fair

Poor

14. Approximately how many times per year do you see your family doctor at their clinic?

_____ times per year

Virtual Visits

1. How would you rate your proficiency with computers or digital tools?

None

Basic

Average

Advanced

Expert

2. Please indicate under which circumstances you would use virtual visits for (select all that apply):

-Routine examination

-Annual examination

-Follow-up of a health problem

-Pregnancy follow-up

-New health problem

-An urgent but minor health problem

-Prescription renewal

-Many issues to discuss

-Other, please specify: _____

3. On average, how long does it take you to commute to your family doctor's office?

- Less than 5 minutes
- 5 to 15 minutes
- 16 to 30 minutes
- 31 to 60 minutes
- 61 to 120 minutes
- More than 120 minutes

4. On average, how long do you wait in the waiting room at your doctor's office?

- Less than 5 minutes
- 5 to 15minutes
- 16 to 30 minutes
- 31 to 60 minutes
- 61 to 120 minutes
- More than 120 minutes

5. Do virtual visits save you time (e.g. by avoiding travel or arranging care for dependents, etc.)?

- Yes
- No
- Not sure

6. Do virtual visits save you money (e.g. by not having to pay for transportation/parking, care for dependents, nor having to time off work, etc.)?

- Yes
- No
- Not sure

7. If yes, please indicate how much money you saved (on average) for the following by having a virtual visit instead of an in-office appointment (indicate only for those that apply).

| | Canadian Dollars |
|--|------------------|
| a) Dollars saved by not having to travel to the clinic (e.g., cost of bus, cab, Uber/Lyft, gas, parking) | |
| b) Dollars saved by not having to arrange for care for a dependent (e.g., a babysitter) | |
| c) Income saved by not having to take time off work | |
| d) Other dollars saved (please specify): _____ | |

8. On average, compared to an in-office visit how was your experience with receiving care through a virtual visit?

- Better than an in-person
- Same as an in-person

- Worse than an in-person
- Not sure

9. What was the outcome of your most recent virtual visit? (Select all that apply)

- A prescription renewal
- A new prescription
- Information that helped reduce anxiety or concern about my health care need
- A new lab or diagnostic test was ordered
- Advice to make an in-person appointment with my family doctor
- Online resources about my health care need
- A referral to a specialist
- Advice to visit a pharmacist
- Advice to call 911 or visit an emergency department immediately
- Other (please specify):

10. To what degree did the virtual visit help you with the health issue for which you needed the appointment?

- Very helpful Somewhat helpful Neutral Not helpful Not at all helpful

11. What would you have done if you had not been able to see a doctor online?

- Walk-in clinic
- Waited to see my family doctor
- Emergency Department
- I would not have sought care at the time

Please add any additional feedback you have regarding virtual visits with your primary care physician.

APPENDIX E. VENDOR SURVEYS FROM NOVARI AND THINK RESEARCH

Novari

1. What would you have done if you had no access to eVisits?

- Emergency room
- Walk-in clinic
- Make an in-person appointment with my family doctor
- Nothing
- Other

2. Rate your experience with eVisits compared to in-person visits:

- Better than in-person visit
- Same as in-person visit
- Worse than in-person visit
- Not sure

3. Would you ever use eVisits again?

- Yes
- No
- Not sure

Think Research

1. What would you have done if you did not have access to Virtual Visits?

- Booked an in-person appointment with my doctor or nurse
- Visited the emergency room
- Called the office and resolved my issue over the phone
- Nothing
- Visited the walk-in clinic
- Other

2. How was your experience compared to an in-person visit?

- Same as in-person visit
- Better than in-person visit
- Worse than in-person visit

3. The Virtual Visit was easy to navigate

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

4. Virtual Visit made accessing care more convenient to me

- Strongly agree
- Agree
- Neutral
- Disagree

Strongly disagree

5. Having Virtual Visit saved me time

Strongly agree

Agree

Neutral

Disagree

Strongly disagree

6. I am satisfied with the care received through a Virtual Visit

Strongly agree

Agree

Neutral

Disagree

Strongly disagree

APPENDIX F. ADDITIONAL HIGHLIGHTS OF SURVEY RESPONSES

Figure 21. Survey questions related to satisfaction with eVisits

