Evaluation of the Implementation and Use of an Asynchronous Virtual Care Delivery Platform to Safely Provide Care During Covid-19 and Beyond

Identifying Benefits and Barriers across the Quadruple Aim

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This report was authored by:

Emily Gard Marshall, PhD
Associate Professor, Department of Family Medicine
Primary Care Research Unit
Dalhousie University

Laura Sadler, MD, CCFP, FCFP
Dalhousie Family Medicine

Lauren Moritz, MA
Research Associate, Department of Family Medicine
Primary Care Research Unit
Dalhousie University

Richard Buote, PhD
Post-doctoral Research Associate, Department of Family Medicine
Primary Care Research Unit
Dalhousie University

Michael Donahue
IT Manager, Department of Family Medicine
Dalhousie University

Joanna Zed, MD, CCFP, FCFP
Medical Director, Dalhousie University Department of Family Medicine

With contributions from:

Sandra Chow
Clinic Business Manager, Department of Family Medicine
Dalhousie University

David Stock, PhD
Research Associate, Department of Family Medicine
Dalhousie University

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<div align="center">**Executive Summary**</div>

Rapid Shift to Virtual Care During COVID-19, the Need for Asynchronous Modalities, and its Evaluation

- In the wake of the COVID-19 pandemic, primary care providers across Nova Scotia spearheaded the expanded use of synchronous virtual care, via telephone and video. Patients and providers also identified a need for asynchronous virtual care (bidirectional messaging) options. An opportunity has emerged in Nova Scotia to implement an asynchronous virtual care platform (i.e., Pomelo Health) and evaluate its uptake, utility, and implications for scale-up and transfer in two family practice clinics. Two administrative staff, one family practice nurse, and four family physicians working at the clinics shared their experiences implementing asynchronous virtual care into their practice within this evaluation. We also gathered patient and provider administrative data on the uptake and uses of the new platform over time. The results of this evaluation provide evidence of the efficacy of this asynchronous virtual care platform to the clinics under study for regional stakeholders.

Provider Experiences Implementing and Using the Asynchronous Virtual Care Platform

What are the Short-Term Outcomes & Impacts of Using the Platform?
- **The platform is valuable to patients, yet technological barriers may limit use for some patients:** The platform is a *valuable modality* for communication between patients and providers. However, there are technological barriers for a small number of patients who lack access to a phone, computer, or printer.
- **Providers described pros and cons to using the platform:** The platform can *reduce conflict* by providing a "more neutral" mode of communication and may *improve the patient/provider relationship* by allowing the provider to be more accessible to the patient, with some exceptions. The platform is *more secure and private* than alternatives such as regular email and voicemails and can *improve documentation* of patient encounters. Participants described a mixed impact of platform use on their workload, stress, and work/life balance. Participants described some challenges implementing the platform in their clinic.
- **The platform is felt to be costly by some, but may also reduce clinic costs:** Although there is a cost associated with using the platform, there are potential *cost savings* such as fewer no-shows and mail-outs.

- **The platform has the potential to improve population health:** Participants described how the use of the platform *increases patient access to care and accessibility of providers* for certain populations. Some patients may not experience greater access to care due to technological barriers.

What Resources and Supports are Needed to Successfully Implement the Asynchronous Virtual Care Platform?
- **Implementing the platform** requires platform software, technical support and deployment staff, training for users (family physicians, nursing and clerical staff), and "super-users" of the platform who help new users navigate the platform.
- **Inviting patients to register for the platform:** Patients can be invited to use the platform through various modalities, but patients were more likely to register for the platform if they received a tailored invitation from the clinic or their provider.
- **Providers need suitable payment models:** There is no payment or remuneration model in Nova Scotia to compensate family physicians for the care they provide and their work using this platform.
- **Recommendations:** A payment model is needed to reflect the time spent or the level of engagement with the platform with clear guidelines to prevent misuse or abuse. Financial support from the province may be needed to enable wide-spread use of the platform.

How Do Staff and Providers Use the Platform?
- **To invite patients to use the platform:** Patients are invited to register through various types of communications but getting patients to register can be challenging due to some patients' concerns about the legitimacy of the invitation emails.
- **The platform can be used for many tasks such as:**
  - Sending secure messages, documents, and appointment reminders.
- **Workload of asynchronous virtual care platform**
  - Over a seven-month period, 578 patients used the platform, accounting for 1,380 interactions (2.4 interactions per patient who used the platform). These interactions consisted of, on average, 2.2 messages. Most interactions were closed within one day (50.6%), and 22.2% were closed within 15 minutes.

- **The platform has useful features such as:**
  - "Read" receipts, ability to link family accounts, ability to mark a conversation as "closed" by the provider, built-in forms and questionnaires, and technical support for patients.
- **One of the greatest benefits of the platform** lies in its security and asynchronous nature.

Who Used the Platform?
- **Characteristics of patients who use the platform from administrative data**
  - The platform is being used by patients of all ages, including patients over the age of 70 and adolescents.
  - Most users are women, and the greatest proportion of users are 50 to 64 years old, as compared to other age groups.
- **Characteristics of patients who use the platform from the perspectives of health care providers and clinic staff**
  - The platform is primarily used by patients who are comfortable with the computer and have access to technology.
  - Patients with a low socio-economic status are less likely to use the platform.
  - The platform is especially useful for patients who speak English as a second language, and who experience disabilities that impact their mobility.
  - Several participants use the platform with their own primary care provider and felt it was valuable.
- **Challenges of platform implementation and use:** One participant expressed that some aspects of clinic resources, structure, and patient populations may yield different experiences in the platform uptake.

Recommendations for Improving Utility of the Platform
- **Participants made several recommendations for improving the implementation and use of the platform such as:**
  - The need for training and time to learn the platform
  - The ability for patient interactions with one provider to be shared with staff and other providers within the clinics
  - Enable automatic release results of scans and lab tests
  - Improve integration with the electronic medical record

- o Improve flexibility to integrate with existing appointment scheduling systems

Conclusions
- Despite some challenges with implementing and using the platform, overall, participants felt the platform was beneficial and enables potential cost optimization, improved patient and provider experiences, and has the potential to improve patient outcomes through increased access and security. The secondary data provided by Pomelo indicated that patients across the lifespan were using the platform. Encounters were typically resolved within a day and only required around two messages to address the issue. Asynchronous virtual care platforms offer an avenue for addressing primary care needs in Nova Scotia, such as access and attachment to primary care. Implementation improvements and ongoing supports are needed to optimize the utility and uptake of the asynchronous virtual care platform provincially.

Introduction

Primary care providers and their teams, supported by Nova Scotia policymakers, have spearheaded the expanded use of virtual care within the province in the wake of the COVID-19 pandemic. Most virtual interactions took place using phone or video calls, with fewer using asynchronous modalities.[1] However, patients and providers have expressed a desire for more asynchronous options to utilize in primary care practice.[2] Asynchronous virtual care (AVC) involves bidirectional messaging (typically written text) which is not necessarily simultaneous like telephone or video.[3] Ideally, AVC can facilitate improvements across all four dimensions of the Quadruple Aim of Primary Care Framework[4] (see Figure 1). AVC can promote the health of the population by improving timely and appropriate access to care; optimize cost by providing an appropriate and efficient modality of care; improve patient experiences and access to patient-centred primary care; and support the health and wellbeing of the care team by reducing the burden and transmission risks with in-person visits and offers a time-efficient modality of care.

Figure 1: Quadruple Aim

To date, there is insufficient evaluation regarding AVC in Canada and internationally. What is known is that AVC has been successfully adopted and implemented in several cases – Kaiser Permanente is a prime example. In 2016, one-half of all "touches" (i.e., interactions) between patients and health care teams at Kaiser Permanente were virtual.[3] The greatest use of virtual delivery was 30 million secure messages between patient and care team, followed by 6.2 million telephone appointments and almost 100,000 video visits.[3] Within Canada, Ontario recently completed an evaluation of their Enhanced Access to Primary Care - Virtual Care Project.[5] This pilot project started in Sept 2017 and involved approximately 200 primary care providers and 14,000 registered patients (of whom 6,355 had at least one virtual visit). Between September 2017 and February 2019, 14,317 visits were conducted using asynchronous messaging or video. Most (90%) visits used asynchronous messaging, and both patients and providers offered positive feedback on their experience using AVC, citing the convenience and ease of use of the platform as facilitating features. Other Canadian jurisdictions have

implemented an AVC platform, including Alberta via the Connect Care initiative, the Northwest Territories via electronic medical records systems, and British Columbia.[3] In several of these regions, billing code infrastructure has been established to allow providers the ability to be compensated for their AVC utilization with patients.[3] No such billing infrastructure is yet available within Nova Scotia.

In March of 2018, an annual stipend of up to $12,000 per physician became available to all family physicians in Nova Scotia who enrolled patients in *MyHealthNS*, a platform that enabled patients to access their laboratory results and share information with their family physician.[6,7] Although a survey showed the value of the platform for both patients and providers, in August 2019, it was announced this stipend would end.[6,8]

Virtual care has been described as "empowering" for patients and providers,[9] and evidence is still emerging regarding patients' and providers' perceptions of AVC. Patients in several cases have reported feeling satisfied with AVC,[10] with 98% of surveyed patients in Ontario reporting that the visit was the same or better than in-person care.[5] In a pilot study in Massachusetts, patients with chronic conditions reported feeling satisfied with an AVC platform as a means of receiving follow-up care for their health needs.[11] Almost all patients in one evaluation reported that they would use AVC again (99.9%).[5] This demonstrates that patients have the opportunity to benefit from using AVC, enhancing access to primary care.[5]

Early evidence has shown that, beyond enhancing patient and provider satisfaction, virtual visits can replace in-person visits and decrease the burden of care on patients.[10,12] When asked what they would have done if AVC were not available, 64% of patients reported that they would seek an in-person visit.[12] Others indicated that they would have gone to a walk-in clinic (8%), the emergency department (2%), or would forego care (5%).[12] With AVC available, patients reported convenience, time savings, and accessibility of care.[10] As well, among those living with a chronic disease, patients reported having to take on less work to manage their health information.[10]

Purpose

An opportunity has arisen to pilot an AVC platform within Nova Scotia, Canada, and evaluate its uptake, utility, and implications for scale-up and transfer. Pomelo Health is a healthcare tool vendor with a mission to improve healthcare access and improve patient experiences and includes a secure e-mail alternative platform to allow rapid

communication and file-sharing with patients. The system was very recently adopted by a academic family medicine clinics in Nova Scotia, Canada to assuage barriers to primary care access resulting in part from COVID-19 pandemic measures. The use of a secure platform also addresses privacy and confidentiality considerations for patients and providers, which have been as significant concerns when utilizing virtual care modalities in Nova Scotia. [2]

Objectives

The objective of this study is to evaluate the uptake and establish the value of this new asynchronous communication tool among providers and patients across the Quadruple Aim. This study consists of multiple phases, and this report focuses on the objective of the study: to understand the uptake of the AVC for providers and patients as well as the provider and clinic staff experience with using an AVC platform and the implications of this platform within primary care practice. The results of this study provide evidence for the organization of the academic family medicine clinics under study and allow these clinics to better respond to patient needs. The results will also provide supportive evidence for implementation across other jurisdictions.

Methods

This overarching study uses a sequential, exploratory mixed-methods approach, incorporating an instrument design model. The sequential exploratory design, which is characterized by qualitative data collection and analysis (Phase 1a) followed by quantitative data collection and analysis (Phase 1b), is a valuable approach for this study as it is useful for exploring emerging or novel areas of research and allows for the data gathered during the qualitative study phase to inform future phases of the study (Phase 2 – Patient Experience Survey). Each of these phases and their respective results will inform indicators and methods to be used in Phase 3 to assess the cost and time implications of the platform on the health system. Each successive phase of the study was approved by Nova Scotia Health Research Ethics Board (#1027018).

This report describes the methods and results for Phase 1a and 1b of this project. This first phase explores what clinical and non-clinical users (e.g., administrative staff) identify as benefits, drawbacks, and recommendations of using the platform. This phase also describes the uptake and use of the AVC platform using secondary data provided by Pomelo.

Context

This study was performed within the two academic community-based Dalhousie University Family Medicine (DFM) Clinics in Nova Scotia, Canada. The two clinics are similar in size; both serve approximately 5,000 patients and support the primary care needs of their patients across the lifespan. Each clinic is home to two primary care teams, which consist of 4-6 family physicians and a family practice nurse, as well as administrative staff. In addition, the clinics are training sites for family medicine residents and provide clinical training to approximately 40 family medicine residents annually.

Key Informant Consultation (Phase 1a)

Recruitment

Purposeful recruitment was conducted to ensure diverse perspectives and to understand the benefits of using the AVC platform as well as drawbacks and/or recommendations for its implementation. Potential participants were individuals who could speak to the adoption, implementation, and early use of the AVC platform within the DFM clinics. Participants included representatives from DFM clinical leadership and team leads, administrative/front desk staff, nursing staff, and family physicians.

Potential key informants were approached via e-mail by study staff with an invitation to participate. Where potential participants were employees of the DFM clinic, they were approached by study staff to ensure confidentiality and prevent any perceived coercion to participate. Potential key informants were able to respond to the invitation should they wish to take part in a discussion. This recruitment process continued until data saturation was reached (i.e., no new insights were anticipated).

Data Collection

Discussions were conducted by Masters-trained research associates experienced in qualitative interviewing who have signed a confidentiality pledge. Discussions took approximately 1 hour and were conducted via Zoom (Zoom Communications Inc.), or telephone, to ensure physical distancing measures were followed. Discussions were recorded and the interviewer took field notes to facilitate analysis and ensure the key elements of the discussion were captured.

To address the research question, perspectives and experiences using asynchronous messaging on the Pomelo Health platform were elicited using a semi-structured interview guide that included eliciting *critical incident narratives.* In this method, the key informant was asked for a specific example where the use of the AVC platform may have changed care delivery or outcomes. Critical incidents refer to clearly-demarcated scenes that may describe a best-case or a challenging case incident.[13] Both types of incidents, best case and challenging, were queried during the interviews.

Qualitative Data Analysis

Following processing of interview transcripts to ensure all data have been de-identified, thematic analysis was conducted.[14] Thematic analysis consists of a 6-step approach that allows comparisons and contrasts among qualitative data. Trained qualitative researchers generate a series of themes from information gathered through key informant discussions. Through this analysis, the team identified benefits, challenges, and recommendations for the use of the AVC platform, as well as trends among perspectives of key informants. Initial themes were identified and a coding tree was created, which was then organized according to the Donabedian Model[15] and the Quadruple Aim.[4] The coding tree was reviewed for comprehensiveness by an expert member of the research team.

Analysis of Administrative Data (Phase 1b)

Pomelo extracted and provided data on the uptake and utilization of the AVC platform. These data look back to January 2021, when the platform was first implemented, to the latest dates available within Pomelo's records (at the time of this report, September 10th, 2021). The data were used to quantify registration invitations to patients, registrations with the platform, and provider-patient interactions (i.e., individual communications initiated by providers, patients and clinic administrative staff). We performed descriptive analyses of invitation (e.g., number of users who received an invitation, various modalities of invitation), uptake (e.g., number of patients who registered with the AVC platform using the link within the invitation), and interaction data (e.g., data on each interaction within the AVC platform, including a patient identifier, the name of the physician, the start and end date of the interaction, number of messages exchanged within the interaction, who initiated the interaction [patient, provider, clinic administrative staff]). Limited patient demographic data were provided, specifically age and gender. We characterized the users of the AVC platform by these characteristics.

We also examined differences in provider utilization based on the clinic location and the number of registered patients. The utilization over time (e.g., by month) was also examined.

Findings

Seven key informants took part in engagement discussion interviews between June and September 2021. Two participants were clerical staff working at the DFM clinics, one participant was a family practice nurse, and four participants were family physicians. Participants described the inputs, outputs, and impact of implementing and using the AVC platform.[16] Participants identified several ways that AVC can address the Quadruple Aim (see Figure 5).

Inputs

Participants described inputs for implementing this platform to include the platform software, technical support and deployment staff, users of the platform (family physicians, nursing and clerical staff, and patients) and "super-users" who help new users navigate the platform. A notable missing input was the lack of a suitable payment or remuneration model for family physicians who use the platform.

> "…we had heard about … Pomelo … But it wasn't until COVID hit that we actually booked meetings with Telus and looked at the two different providers for it. And we looked at other applications as well … we decided as a committee … that we wanted to go ahead with Pomelo." *Family Physician*
>
> "… [Information Technology staff]… helped a lot … just we just had to know how to sign up for it … I just got [IT staff] to go through it with me once…" *Family Practice Nurse*
>
> "[Super-users of the platform] do the initial training so we could train and troubleshoot with our colleagues here - the doctors as well as the nursing staff and … admin." *Administrative Staff*

Need for Suitable Payment Models

Participants discussed the lack of a payment or remuneration model for physicians using the platform. Suggestions for managing the lack of payment model and potential

payment models were made. One participant raised concerns about the potential abuse of payment models.

Lack of Payment Model

One issue identified by participants was the lack of remuneration or payment model for the use of the platform. Participants raised concerns about the amount of unpaid work taken on to use the system. One participant (Family Physician) stated that the lack of payment model might be a barrier to the uptake of the platform, stating that they thought *"…there are ... physicians that are understandably reticent or reluctant to initiate something that … they may never be remunerated for. And they're already busy as it is."*

Managing Lack of Payment Model

One participant discussed how they currently manage to work around the lack of remuneration model by integrating the use of the platform with other billable work such as a synchronous virtual visit. As this participant points out, having a payment model would enable physicians to free-up visits for other patients.

> "… most scenarios are me providing better care because I'm sending a message, I'm attaching something or sending a website link. But whether that was a phone call or an in-person [visit] … I'm already getting paid or that's counting as a visit. So, it's enriching that visit … at this point, I probably would encourage them to book a phone call appointment so I can talk about the rash and still get counted for remuneration. But in the grand scheme of things, it would be really nice to have a separate billing code for that, or some time set aside to do that. Because then that would save that other phone call visit for someone else." *Family Physician*

Payment Model Suggestions

Although some participants were unsure how the use of asynchronous messaging through the platform would be remunerated, a number of suggestions were made by several participants as to how best to remunerate physicians for asynchronous work. Some felt that a time-based system would be best, and some felt a fee code that reflects engagement or number of visits might be most appropriate, especially when considering fee-for-service physicians.

"… putting aside an hour of my day to be answering Pomelo messages would be probably most appropriate … I would want to have like a fee code where I could bill that one hour as asynchronous messaging time … if the province would allow us to do X number per year or per week, whatever, I feel like right now that would be easiest for me. Because it's hard to know sometimes if that completely replaced a visit. And if it didn't, is that half of a billing or a third of a billing? I feel like just having the time to provide that care is probably simplest, to me." *Family Physician*

"I find it hard to quantify how much time is involved in using it. So, I can't imagine that paying for it on a time-based model is going to work very well … it would almost seem to me that we should be remunerated according to the number of patients that are enrolled, and … a stipend that shows that you're engaged in it. Otherwise, the option would be to log those Pomelo visits as … Pomelo visits in the EMR, and there be a fee code for Pomelo …" *Family Physician*

Concerns About Abuse

When discussing remuneration, one participant expressed concerns about potential abuse of the platform, and the need for safeguards to ensure appropriate use. One family physician felt that *"there needs to be some stipulations around what is the type of engagement with patients that's going to be eligible for remuneration. Because I've seen where there's not tight definition, there's abuse of that system. And that'll be costly."*

Need for Provincial Supports

A few participants also identified the need for financial support by the provincial government to enable the use of the platform. Without such supports, one participant argued that solo practitioners may not be able to utilize the platform.

"There's so many [electronic medical record] provided by Telus users in the province, it would be nice if the province, much the way that they supported the My Health Nova Scotia … to support Pomelo or something like Pomelo integrated really easily with the EMR system … Because it's expensive. And I can certainly see if you were maybe a solo practitioner or…would it be worth your money? I don't know. So it would be nice if that were somehow taken on as a province thing again." *Family Physician*

Outputs

Participants described the numerous ways that the AVC platform can be used, and the activities that take place through use of the platform. These included patient registrations, the various features of the program, and benefits to using the platform. Participants also described the participation of patients in the program, including which patients are most likely to participate in the program.

Activities

   Patient Registration. Patients were invited to become users of the AVC platform through communication from their family medicine clinic. Four types of invitations were used: mass, broadcast, individual, and reminder. Mass invitations are sent via email to all patients who have provided their email address to the clinic. Broadcast invitations are also sent via email to all patients who have provided their email address to the clinic, but contain other general information (e.g., that the clinic is hosting a flu shot clinic), while the sole purpose of a mass invitation is to invite patients to join the AVC platform. An individual invitation is a tailored invite created for a specific patient. Finally, a reminder invitation is an invitation to the AVC platform that was attached to appointment reminder emails.

Table 1 shows the number of invitations sent to patients across the four invitation types along with the number of patients who registered using each invitation type. Individual invitations resulted in the greatest proportion of registrants (346 registrants from 569 invitations; 60.8%), while mass invites resulted in the greatest number of registrants (630 registrants from 4,106 invitations; 15.3%). Each type of invitation resulted in some registrations, suggesting that the various modalities each contribute to the uptake of the platform. Additionally, the broadcast and reminder invitations were attached to regular communications from the clinic, which offers a simple way to share invitations with patients. Figure 2 shows the cumulative number patients registered with the AVC platform. Most registrations occurred in February 2021, when the platform was rolled out – 922 registrations were completed in February 2021, accounting for approximately 54% of all registrations with the platform.
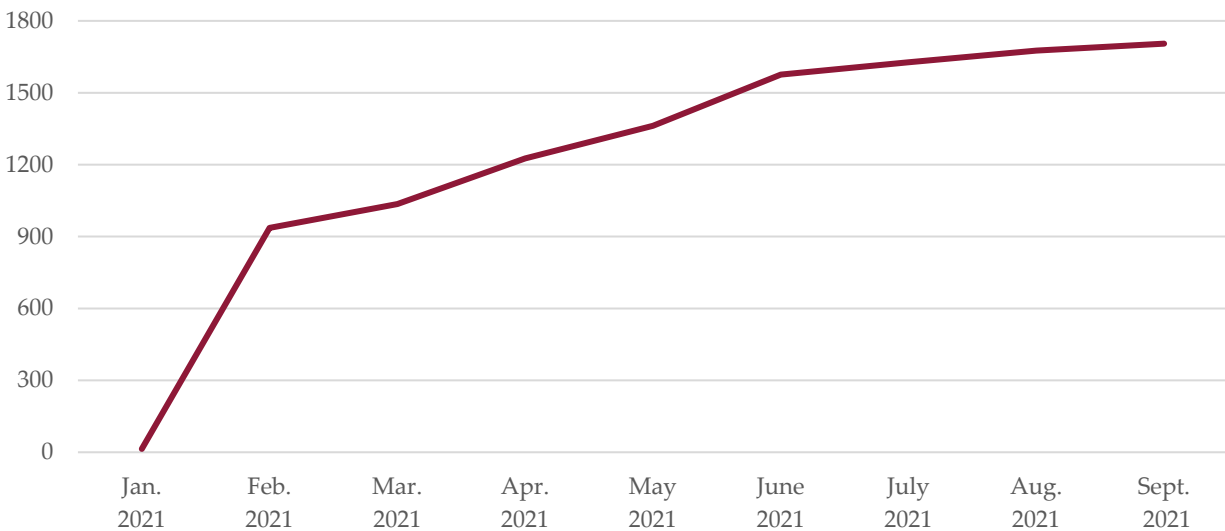
Table 1

AVC Invitation and Registration Activity

Invitation Type	Invitations sent (n)	Number of registrations (n)	Proportion of registrations
TOTAL	23631	1708	7.2%
Mass Invite	4106	630	15.3%
Broadcast Invite	15655	389	2.5%
Individual Invite	569	346	60.8%
Reminder Invite	3301	343	10.4%

Figure 2

Cumulative Number of Registered Patients (Total Eligible Patient N ~ 10,000)

Patients can be invited to register for the platform by individual or mass email. One participant shared those patients who were engaged in their health, interested in this service, and had experience using a similar platform tended to be early adopters. A few participants described slow uptake initially, and even patient concerns that email invitations were not legitimate. Participants described some challenges getting patients to register.

"… when the initial invite went out … the group of patients that value the ability to … send something my way … like my hypertensive patients who … have a home blood pressure cuff and would like to be able to send those documents to me, or who

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monitors their glucose and would like to send that, those patients saw that message and immediately signed up. And then for patients who don't appreciate the value to them, or who have ongoing questions or concerns about … the security of these kinds of systems … that would take more work for us to get them engaged in it. So the patients that signed up were the ones that had already been using NS Health, and are your usual early adopters." *Family Physician*

"… when we first started, our IT put out a whole mass email, and people thought it was all a fraud. Like, "No, we won't click on that because we don't know that it's legit." So, we had a lot of calls. Which was very overwhelming, of people calling, saying, "Is this right? Is this a scam?" … today someone called, and I mentioned about the Pomelo program with them, and they were like, "Well, what's that?" … they did have an email on their chart so I don't know if … an initial email was sent out to them and they just ignored it or it didn't go to them …"Okay, I'm going to send out the invitation to you. This is what it's called. It's not a scam." And I'll try to explain that to them … people do have their emails there but they're not getting the email … we tell them to check their junk mail just in case. But maybe they're ignoring it. But it's just something that … I find difficult. That you have an email on file, but yet you're still not registered?" *Administrative Staff*

All invitation modalities resulted in some registrations, although the individual invitations resulted in the greatest proportion of registrants. This could be attributed to patient distrust of the mass, broadcast, and reminder email invitation, in that patients felt that such invitations were not legitimate. Individual invitations sent following a discussion with a provider may help overcome concerns about potential fraud. A relatively low proportion of the approximately 10,000 clinic patients registered for the platform (n = 1,705 patients registered). This low proportion of registrants may have contributed to the interviewees' perceptions of low uptake. Additionally, providers' perception of slow uptake is not necessarily reflected within the registration data, as the greatest number of patients registered in February 2021. The perception of slow uptake may be attributable to the delay in individuals using the platform, as opposed to registering. Data on use of the platform shows that the usage of the AVC platform peaked in May 2021, and there was double the number of interactions in May 2021, as compared to February and March 2021. Data on interactions are shown later in the report, within Table 3 and Figure 2.

Platform Features and Benefits

Participants identified several features and benefits associated with using the AVC platform.

Platform Features

Participants also discussed a number of platform features that were beneficial to their work and patient care such as the ability to share documents, send secure messages, and receive confirmation messages to show if a patient has or had not opened their message. Participants also liked the Chrome extension which keeps messages up to date, the ability to link family accounts, patient technical support provided by the platform, appointment reminders, the ability to mark conversations as ended, and forms and questionnaires that are available through the system.

Platform feature	Illustrative quote
Ability to share documents	"I'll get messages through Pomelo, patients asking … "Could you send me a copy of my immunization record," or, "Are my immunizations up-to-date," … I love the fact that we can … attach those things and send it to the patient directly instead of printing it off and mailing it or having the patient to come pick it up themselves." *Family Practice Nurse*
Ability to send secure messages	"… you could play phone tag with someone … I might spend days trying to track down someone. You're calling and you're leaving a message. Or you're calling and they don't have their name on their voicemail so you can't leave a message. Like nothing detailed. But if you have their email and it's confirmed, then you can leave a more detailed message so they respond to you." *Family Practice Nurse*
Read receipts and reminder prompts	"I think initially I was worried that a message would go through, how would I know they got it? So … two weeks would go by, and that's what we set our parameter, that so-and-so didn't read their message I sent them. So, I got a message back, and I clicked on it, and it said your patient has not opened this message. Do you want to follow up? So, I was reassured by okay, those safeguards were there." *Family Physician*
Google Chrome extension	"… I've added the Chrome link at the bottom of my screen, which we've actually tried to help all faculty do, I can see when a message comes. And at this point the volume is never very high … at most

	I've had like four messages there. But I can see … it's continuously updating. So, I can see, oh, there's a message … I can write that person back, go see a patient, come back in. Oh, they maybe got back to me. So, I feel like I can squeeze in little bits of care in that manner." *Family Physician*
Ability to link family accounts	"… when patients … go to the invitation screen, and when they log on, it does say here's how to link your family" *Family Physician*
Technical support provided by Pomelo	"… luckily, Pomelo does all the support for the patient end … we certainly can help, but we're not necessarily supposed to … Part of what we pay for is their support for any troubleshooting with patients. That's not on us necessarily." *Family Physician*
Automated appointment reminders for patients	"The [appointment] reminder is great because we don't have time to call patients to give out reminders. So, they get an email or … a text … then we have less no-shows when they're actually on the Pomelo program because they are getting reminders that hey, you have an appointment. I don't know if it's the day before or two days. But it just sparks their memory. Because our doctors are booking out four to six weeks. So, if you make an appointment today, you may forget in four to six weeks that you did make this appointment. So, it gives them that reminder. So, we do have less no-shows for the people that are on the program." *Administrative Staff*
Ability to mark conversations as ended/close conversations	"… I can decide whether or not I allow them to reply to me. So, I can sort of say a reply and end, or I can say reply and keep it open … so for people that I worry a little bit about it being a long back and forth, back and forth, I'll just end it. Which means they can still write me back, they just have to go through the process … that … does save a little bit of time because you're not necessarily on the phone with some of the individuals who … no matter what, it's going to be a longer phone call than … a quick two-minute thing." *Family Physician*
Health questionnaires and forms available through the Pomelo Health platform	"There's also the … depression questionnaires and … standardized forms that are … built in the system, that the patients can fill out before you even see them. I think that's awesome." *Family Practice Nurse*

Platform Benefits

Among the platform functions that participants enjoyed was the security provided by the platform, the ability to send messages asynchronously, and that the platform was easy to use.

> "… the initial intention was to have a secure platform to message and communicate with our patients. And security was the big sort of concern." *Family Physician*
>
> "… we like the asynchronous component of it … I don't have to send it right now, and they don't have to be online right now to see it. Like I would like to be able to send them a message that they can check later and get back to me if needed. So really, it's a way to communicate with patients asynchronously on our own time, and it's secure and safe." *Family Physician*
>
> "I think it's just a really great system to use. It's very user-friendly." *Administrative Staff*

Participation

Participants described which patients are most engaged with the AVC platform and how they use the platform. A few participants also discussed concerns about the low uptake of the platform.

Patient User Demographics

An analysis of the AVC administrative data indicate that the platform is being used by patients across the lifespan. Table 2 shows the demographic characteristics of patients who had an interaction with the clinic using the AVC platform. The largest proportion of users are between 50 and 64 years of age (32.0%), while people aged 65 to 79 make up the second largest proportion of users (22.8%). Although the data indicate that very young people (e.g., two-years old) used the platform, this is not entirely accurate. Pomelo Health accounts can be created for young children, but a parent would use the account to interact with their child's health care provider or clinic staff. In fact, within the qualitative data, providers expressed that the best practice was for parents and their children to maintain separate accounts, so that records of interactions are maintained within the appropriate user's account. Most of the users of the AVC platform are women (71.5%), which aligns with typical care use within primary care (e.g., women are

higher users of primary care than men; older people are higher users of primary care than younger people).[17,18] These findings suggest that the AVC platform provides comparable access to primary care for individuals who are known to be the most frequent users of primary care.

Table 2

Demographic Characteristics of Patients Who Have Had an Interaction (n = 578).

Characteristic	n (%)
Age, years – mean (standard deviation)	52.2 (16.78)
Range	2-94 years
1-19	12 (2.1%)
20-34	86 (14.9%)
35-49	131 (22.7%)
50-64	185 (32.0%)
65-79	132 (22.8%)
80+	19 (3.3%)
Missing	13 (2.2%)
Gender	
Man	149 (25.8%)
Woman	413 (71.5%)
Missing	16 (2.8%)

The demographic characteristics of users of the AVC platform provided by Pomelo align with the experiences of the interviewees. Health care providers and clinic staff reported that the platform can be used across the life span, including older and younger patients. These participants found the platform was used primarily by those who were comfortable using the computer and was less used by patients with a lower socio-economic status. The platform was particularly useful for patients who speak English as a second language and for patients with disabilities impacting their mobility.

> "… I'm really surprised at who is doing Pomelo. Because I thought it would be more the younger clients, like in their 20s, 30s, the ones that are really techy, you know. And a couple of them do. But I find it's more like in the 70 age range." *Family Practice Nurse*

"… it's also sometimes a convenient way to communicate with adolescents … it's a little bit more private perhaps than having them talk on their phone or sending them another email if they have parents who are keeping track of their email. So, it can have some advantages there. The only group it doesn't really work for is children [laugh]." *Family Physician*

"Anybody who's willing, really … there are those who are worried about the use of computers … [and] their own skills. So those people are sometimes not eager." *Family Physician*

"I would say those that are of higher socioeconomic status [are engaged with the platform] … people who are … self-employed and have a home office set up. Certainly, patients who would be more middle class or higher would appreciate that, yeah. Or are able to navigate that a little bit more easily." *Family Physician*

"… the majority of my patients with high or complex care needs have care needs that would make it difficult for them to even understand the email ask message that went out to them and would require some training on it … patients who have more basic struggles, like where they are going to get their food or those sorts of things, they're going to be less inclined to be the early adopters." *Family Physician*

"It's been really [emphasis on really] helpful actually for one family that I took on … who were refugees from [Middle Eastern country] … One has … pretty good English skills. The other one has less good English skills. But they both … are better able to read and write English. So, it has been very useful for that family because I can then communicate with them back and forth with [messaging]. And it makes it a little easier than doing on a phone because … I would have to … get an interpreter, and have them patch the phone call in, and all that kind of stuff. Whereas … if there's quick communication, they're able to read that. So that's been a big advantage for that particular situation." *Family Physician*

"… I find … the seniors are using it a little more than what I anticipated. Which is good … some of them have mobility issues, right? So, it's hard to get into the clinic just to pick up a form or to come in for simple things. So, if there's anything you can do over Pomelo then it just helps them a lot, right?" *Family Practice Nurse*

One participant (Family Physician) felt that uptake of the AVC platform may be influenced by patient concerns about the security of the platform. This participant suggested that *"…for patients … who have ongoing questions or concerns about … the*

security of these kinds of systems … that would take more work for us to get them engaged in [the platform]."

Overall, the AVC platform is used by patients of all ages, although an individual's technological savvy and personal concerns about security may moderate the uptake of the platform among patients. Within this report, the qualitative data only describe the experiences of key informants who work at the clinic (e.g., clerical staff, health care providers). Additionally, the administrative data from Pomelo do not include patient characteristics, such as language and disability. A patient experience survey is currently underway to offer an understanding of the patient perceptions of the usability and security of the AVC platform and will capture a greater breadth of patient characteristics.

Participant Use as a Patient

A few participants shared experiences using the platform with their own family physician and felt the value of the platform as a patient themselves.

"…I liked it … I don't go to the doctor all that often. But I got my pap result back, and that was kind of nice, from my family doctor. She was on that same system. And it was nice to say, yeah, it's normal. Or I had blood work back … as a physician, it's very easy for me to interpret it. So, I was able to look, oh, yeah, everything looks good. Or … if there was something showed up … I should probably call her so we could talk about that." *Family Physician*

"My physician uses Pomelo. So I had an issue, and she was like, "Well, can you just send me a picture?" And I sent her the picture that I thought may be a cancer spot. And she reviewed it and she goes, "No, I think that's okay … we'll watch it for a little bit …" So I was able to stay at work. I didn't have to leave work. I scheduled her appointment around a break of mine. So I didn't have to leave work. I was able to get my issue looked at, and my mind at rest, and she was able to get paid for it." *Administrative Staff*

Patient Use of The Platform

Table 3 shows the interaction activity for the clinics, from February 1st, 2021, to September 10th, 2021. Overall, there were 1,380 interactions using the AVC platform. Interactions consisted of an average of 2.2 messages. Although 1,708 patients were

registered with the platform, only about 34% used it. There was a relatively even split between interactions initiated by the patient (51.9%) and the clinic (48.1%). As with registrations, the data show that patients across the lifespan made use of the platform, with the greatest proportion of interactions occurring among patients aged 50 to 64 years (28.0%). Again, like registrations, women accounted for most of the interactions (72.7%). On average, each physician had around 25 of their patients registered with the AVC platform, although five physicians had more than 100 of their patients registered with the platform, and one physician had more than 200. Figure 3 shows the number of interactions by clinic. This figure ends in August, as complete data were not available for September. Utilization dips in June, July, and August, although this may be attributable to the waves of COVID-19 in Nova Scotia, changes in care seeking behaviours among patients during summer months, or time off for providers within the clinics. There was a substantial wave of COVID-19 cases in Nova Scotia in May 2021, which might help to explain the relatively high use of the AVC platform at that time.[19] Each registered patient had an average of two interactions, thus, each physician had around 60 interactions over the study period. Most interactions were closed within one day (50.7%) with almost one quarter (22.2%) being closed within 15 minutes. Conversations open > 1 week (16.9%) likely reflect the practice of providers forgetting to 'end' the conversation, even when the communication was complete, which reflects the learning curve of new users.

Figure 3

Number of Patient-Clinic Interactions Using the AVC Platform
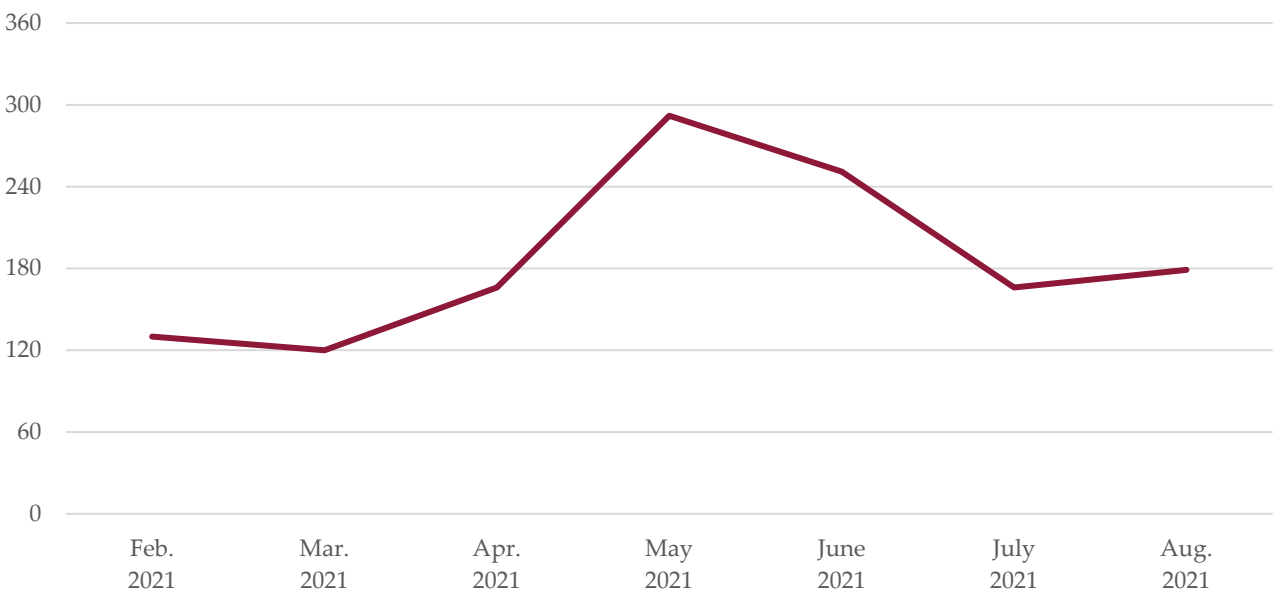
Table 3

AVC platform interaction activity (n=578 patients with one or more interactions)

Variable	n (%)	Variable	n (%)
Total # of interactions	1,380	# Interactions by age	
Total # of messages	2979	0-19	18 (1.3%)
Mean # of messages/interaction (SD)	2.2 (1.40)	20-34	248 (18.0%)
		35-49	354 (25.7%)
Interaction initiated by		50-64	387 (28.0%)
Patient	716 (51.9)	65-79	326 (23.6%)
Physician	419 (30.4)	80+	31 (2.2%)
Staff	186 (13.5)	Missing	16 (1.2%)
Registered Nurse	58 (4.2)		
Provider (Unknown)	1 (0.1)		
		Mean duration (SD)*	2 days 2.7 hours
			(3 days 8.3 hours)
# of interactions by gender		Open interactions	152 (11.0)
Men	354 (25.7%)	≤15 minutes	306 (22.2)
Women	1,003 (72.7%)	>15 to ≤1 hour	72 (5.2)
Missing	23 (1.7%)	>1 hour to ≤1 day	322 (23.3)
		>1 day to ≤2 day	101 (7.3)
Mean # of patients with interaction/physician	25.1 (32.27)	>2 days to ≤1 week	194 (14.1)
Median # patients with interaction/physician (IQR)	13 (5.5-27)	>1 week to ≤2 weeks	110 (8.0)
Mean # interactions per physician**	59.7 (84.13)	> 2 weeks	123 (8.9)
Ave. interactions per registered patient	2.02 (0.795)		
Ave. messages per patient per physician	4.30 (1.730)		
Number of registered patients with ≥1 interaction	578 (33.9%)		

* Durations longer than 15 days have been excluded from this calculation

** This only includes physicians with ≥1 patient registered with the platform; interactions performed by clinic staff or RN are attributed to the patient's primary physician

Participants described the many ways patients use the platform such as for messaging, sending photos, sending forms and documents, for requesting and cancelling appointments, and prescriptions.

Patient use of platform	Illustrative quote
Sending messages and images	"When a patient tries to send a message or a photo, it will say, who do you want to send it to? So, when they pick clerical, it'll say what sort of things you should message them for - like appointments. And then nursing, it'll say like more clinical things or questions. So, the patients will know to send it to nursing for a clinical question like this rash, and then it'll come to me." *Family Physician*

Requesting and receiving health resources	"I had a lot during COVID … COVID vaccines and just general health-related questions … "I'm breastfeeding. What do you think the best COVID vaccine would be," or is it safe? And … just things like that. And you can easily refer them to resources through messaging … You could send links or whatever through the Pomelo." *Family Practice Nurse*
Sending images	"… patients really enjoy it. Some patients really commented on it, how efficient the service is or how easy it is. If they're not able to come in, if they live far away, and they want to send the doctor something. Like even pictures of like rashes or anything like that, they can take pictures of that and send it through Pomelo." *Administrative Staff*
Requesting and receiving digital copies of health documentation	"I'll get messages through Pomelo, patients asking … This is why I love it. "Could you send me a copy of my immunization record," or, "Are my immunizations up-to-date," … I love the fact that we can … attach those things and send it to the patient directly instead of printing it off and mailing it, or having the patient to come pick it up themselves. And like the school forms, too, they can also send attachments to us. So then we get it right away." *Family Practice Nurse*
Easy to cancel appointments	"… they can send us cancellations and … then when they cancel, it comes right off of our [EMR] screen. So, it takes the appointment right away. So, somebody else will have an opportunity to get an appointment." *Administrative Staff*
No hold times for booking an appointment	"… if they're registered with Pomelo, they can send us a message … about just booking an appointment … then that way they don't have to be on hold in our queue for our phone lines for somebody to physically talk to them. It's just a lot faster service for them." *Administrative Staff*
Provides open channel of communication between patient and provider	"…another fellow emailed to me about medications, that there was some mix up. And I was able to straighten that out, straighten it out with the pharmacy, and respond to him … in less than sort of seven minutes. And previously it would have been a phone call, and that would be 10 minutes, if not longer, if I was trying to chase him down, and then another phone call to the pharmacy. So it's pretty seamless when it does work." *Family Physician*

When examining seven months of data from the AVC platform, we found that around 33% of registered patients (n=578) used the platform at least once, but on average, used it more than twice. Patients of all ages used the platform, and the average user was female, between 50 and 64 years of age. Many interactions were brief, with 22.2% being closed within 15 minutes. The value of the brevity of the interactions is supported by the provider interviews. Interviewees described functions of the platform that would require only a brief interaction, such as sharing health resources or documents. Providers also described the value of the platform for longer interactions, such as maintaining an open channel of communication. By leaving an interaction in an "open" state for multiple days, the provider could construct this open channel of communication, allowing the patient to respond at the time most convenient for them, demonstrating the value of the asynchronous nature of this platform. Within the data provided by Pomelo, an interaction that remains open would appear to be a lengthy interaction, although the amount of work associated with this interaction is not proportional to the time.

Low Uptake of the Platform

Several participants mentioned that the cost of the platform to the clinic was high, and one participant expressed concerns about uptake and utility of the platform, and whether this would justify the cost.

> " … I'm a bit disappointed on the uptake at one of our clinics. People just hadn't been using it … I'll be interested to see over time what the uptake is with people. And sort of to look at for the time we're putting in and the money we're spending, is it being used enough to justify carrying it." *Family Physician*

Short-term Outcomes & Impacts of Implementing and Using the AVC Platform

Participants described several short-term impacts of using the platform across the Quadruple Aim.

Patient Experience

Participants explained that the platform was a valuable added modality for communication between patients and providers. However, participants also described patient barriers to accessing and using the AVC platform.

Patient Technological Barriers to Using the Platform. Participants described barriers to patient use of the platform to largely involve technology barriers such as lack of access to a phone or computer, and lack of access to a printer. One participant was concerned that these patients would feel further marginalized. Another participant pointed out that patients who are newcomers to the country who do not have the needed technology may also be unable to use the platform.

> "I do have folks that don't have a printer … sometimes I'll send them a lab req, and they say, "Oh, I don't have a printer." But … we can leave it for pick-up. So it's not just people who have printers…" *Family Physician*
>
> "… we work beside our newcomer clinic … a lot of them don't have phones or computers or Internet access because they're all newcomer patients." *Administrative Staff*

Provider Experience

Participants described several ways the platform was beneficial for providers, as well as some implementation challenges.

Improved Patient/Provider Relationship with Few Exceptions. Participants described the various ways that the AVC platform affected the patient/provider relationship. Family physicians typically found that the platform strengthened the patient/provider relationship and clinic staff identified the potential for the platform to reduce conflict between staff and patients. Still, some participants found that, for some patients, the AVC platform could not overcome existing challenging patient/provider relationships.

Strengthening the Patient/Provider Relationship. Generally, family physicians felt the platform helped strengthen the patient/provider relationship. However, one physician described a situation where the AVC platform could not overcome existing challenges within a patient/provider relationship.

> "I think it strengthens it … it makes me more accessible to patients. And I know that's a fear of a lot of physicians, and it was a fear of mine. But to be honest, the people who use it and the scenarios where you need to use it, I do feel that it strengthens the

relationship. And I feel better knowing that … we've solidified the plan, that they know the plan, that I sent it through. I can check to see if it was sent, did I press go, did I not. Did I tell her about that? Oh, yeah, I did. I sent that in the message with the lab req. Yeah, so I do think that it strengthens the relationship. And I think I can provide better care, and … they have more access to their care." *Family Physician*

"… if I look at somebody that's trying to show me a skin lesion, even though I'm telling the person to come in, if I can reassure them that … I don't see anything particularly ominous there, that they don't need to rush in that evening, I think that's helpful." *Family Physician*

"… the patient who's kind of sending multiple messages … we have a challenging relationship anyway. I mean part of [patient's] expectations for what the medical system should provide … we're not necessarily meeting. So by giving [the patient] access to a tool that seemingly gives … more access to us … just further challenges that relationship." *Family Physician*

Reducing Conflict Between Patients and Providers. One administrative staff member felt the platform reduces conflict between staff members and patients. They felt that written communications were "more neutral" than verbal.

"If the patient is looking for an appointment, we give them their options, and they confirm or decline it, and say, "Well, I'm sorry, that's all we have." … that sort of open and closed subject there … it could save a lot of issues of frustration when people are calling … "I need to get this appointment. I need to see the doctor next week." "Well, I'm sorry, we don't have anything next week. Our next available is this date." On the phone … your tone of voice always … changes. Versus … doing it through typing, it sort of stays more neutral than it would on a telephone where it could escalate." *Administrative Staff*

Provider Perceptions that the Platform is More Private and Secure than Alternatives. Although participants discussed some concerns about the security of the platform, many felt that the platform is more secure than speaking on the phone, leaving voicemails, or sending emails using their personal email accounts.

"… it's also sometimes a convenient way to communicate with adolescents … it's a little bit more private perhaps than having them talk on their phone or sending them

another email if they have parents who are keeping track of their email. So it can have some advantages there." *Family Physician*

"… I'm glad we have it because then I'm not trying to call somebody and chase them down by phone or leave messages on a phone system that I worry is not private enough." *Family Physician*

"In reality, we're doing 'Pomelo' outside of Pomelo. Because patients are emailing us, and they're emailing physicians across the board across the province here. And people are responding because you have to. You can't just ignore people that email you. And this is a far more secure way and a safe way to do that kind of work. You know, it's within an EMR … we download those messages to the EMR. So there's a record of what has transpired. There's no chance that it's going elsewhere … Far better than what we're getting now, which is … people emailing from their Gmails and the rest of it. And the risk that we have that that's going hither and beyond. So I think … regardless, it is happening. It's happening outside of what is a pretty good system. And I think the stakeholders need to understand that if they don't do that, we're putting everybody at risk." *Family Physician*

How Asynchronous Care Contributes to Better Documentation. One family practice nurse explained that a positive feature of the platform is that patient messages are recorded verbatim, and a record is kept for others, such as the patient's family physician, to review.

"… this one person messaged me … "I'm coughing a lot and I find it hard to breathe. And … I just wonder if you could pass it on to the physician." … I did write [the patient] back and say, "It sounds like you need to book an appointment." [Patient] didn't like that. "No, I just want you to tell the physician." So I just had to go to the physician and say, "Hey, your patient so-and-so is messaging me, and here's all [their] symptoms … I'll download to the chart. You can read everything [the patient] wrote." But that's why I like it, right. Because when something's written, it's there verbatim. So that doctor ended up just calling [the patient] and handling that." *Family Practice Nurse*

Mixed Impact of Platform Use on Provider Workload, Stress, and Work/Life Balance. Participants discussed how using the platform impacted their workload. For some, their workload was relieved and there were time savings. For others, their workload and time spent was increased. One participant expressed concern that their

workload may increase as more patients become engaged with the platform. See Appendix D for additional quotes on provider and staff workload.

"… I'm pleasantly surprised that I'm not overwhelmed with patient messages … it's probably one a week. And they're pretty quick … And I'm glad we have it because then I'm not trying to call somebody and chase them down by phone or leave messages on a phone system that I worry is not private enough." *Family Physician*

"… there was another fellow emailed to me about medications, that there was some mix up. And I was able to straighten that out, straighten it out with the pharmacy, and respond to him … in less than sort of seven minutes. And previously it would have been a phone call, and that would be 10 minutes, if not longer, if I was trying to chase him down, and then another phone call to the pharmacy." *Family Physician*

"… if someone needs a requisition … I have to print it off, and I have to find an envelope, and then I have to address the envelope, and I have to walk it up to the front. You know what I mean? So there's all those steps eliminated through Pomelo." *Family Practice Nurse*

"…it's a lot easier to get in touch with patients. We tried them several times, and they haven't returned messages. We send them a message through Pomelo, and they seem to respond a lot quicker because they get an email notification. And to send anything out that way instead of mailing out to them, we find it a lot easier just to send it through Pomelo." *Administrative Staff*

"… our clerical staff has struggled with … keeping the demographics area of the patients' charts updated … we send out an invitation to any new emails in the system of people who haven't yet registered but … if the emails aren't getting there from clerical then that doesn't really do much good. And then if I'm needing something to go like today that I want to send them a req, then the option is for me to sort of enter it in and register them … it's just adding more time to my day-to-day things. Which I already find that I do not have enough time in a day [laugh] to even get a portion of the work done." *Family Physician*

"… every time I have to send a lab … rather than just hitting print, I go through that process of sending a lab req. That takes more time … it's not a huge amount of time, but it's probably a couple of minutes. And when you've got a 15 minute block that is already maybe … shorter than what you need. And then you're adding two minutes

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onto every appointment that you're needing to send something, it adds up." *Family Physician*

"… one of the patients that I presumed would kind of abuse the system has done so. There was a period in the spring where [the patient] would send a message probably every day for … a week and a half. And really just needed to book an appointment … that is very time consuming … rather than just having a visit." *Family Physician*

"… right now, I'm happy with the amount of sort of extra work, I'll call it, that I'm doing for Pomelo, where we're not sort of paid for this type of work. But I do wonder over time … people are going to like this, people are going to want this, and I feel like I'm going to be providing more care this way. So how am I going to work that into my day when it becomes more onerous? I'm still trying to grasp that." *Family Physician*

For clerical staff, the platform contributed to reduction in stress. Two participants described how clerical staff were able to manage requests for appointments in a more relaxed way than over the phone.

"… it's taken some of the pressure off us with the phone calls. So with the phone calls … you don't know what the next phone call is … the person on the other end doesn't know what the phone call was prior to that. So you still may be … processing that phone call when you're trying to deal with something else. But at least with the Pomelo program … people know that it's not immediate, like people on the phone do … we can do it in a more relaxed way … and not being up in arms on is this person going to start screaming at me on the phone or whatever. We can just … relax, saying thanks for your message. We look at the schedule, you know. And we don't have that, okay, they're going to start screaming at me on the other end if I tell them this - that they have to wait two weeks to get to see their doctor. So I think it helps us, and it makes us more relaxed and less stressed … dealing through Pomelo that way." *Administrative Staff*

One participant discussed the need to set boundaries around when to respond to asynchronous messages to protect their personal time.

"They send me an email every time someone sends a message to the portal. And so, at first I would get that email and I would say, oh, I better open it up and see what it is! And now I see it, and I say, it'll wait. It'll wait until I get to the office … they were coming too often. And then once you see what it is, you sort of feel, oh, I should

probably deal with it. And then that's on my personal time. So, I've now made a rule that I am not dealing with Pomelo stuff at all [emphasis on at all] during my personal time. I keep that. But because it comes into my email … your tendency is to want to just get the email done. And often when I'm doing my email, most of that is on my personal time, too … But I've now decided no more Pomelo during personal time. I think it's a good thing." *Family Physician*

Implementation Challenges

Challenging Triaging Asynchronous Messages

One family physician mentioned that there was an ongoing issue with clerical staff struggling to triage patient requests, which extended into clerical work with the platform as well.

"…we struggle a little bit with our clerical staff … a patient would … say, "I have some forms to fill out for [family physician]. Here are the forms." And my expectation would be the clerical would say, "Oh, they need to make an appointment for this. Let me make them an appointment." But they … send the forms back to me, and then I have to go into the EMR and send a task back to the clerical saying, "this person has forms, please book them an appointment." … But again, recognizing that even our clerical staff has been quite overwhelmed … with the changes of COVID…" *Family Physician*

Inappropriate Use of the Platform by Patients

Although typically the platform was being used appropriately by patients, some participants described instances of patients using asynchronous messaging through the platform inappropriately such as sending urgent messages, making diagnostic requests, sending multiple messages rather than booking an appointment, and sending messages through the wrong account.

"Some patients unfortunately do use it a bit inappropriately. And we do have little provisos on what they see as saying, hey, don't say anything urgent … I've had people say, 'My prescriptions didn't show up at the pharmacy.' And I'm like I'm seeing it now … I'm usually in clinic on Thursdays and then not again until Mondays. So now it's been three days. And it's kind of like [laugh] that is not within the

timeframe. So sometimes people do use it inappropriately. They use it for things that are maybe a little bit more urgent, that it would be better to make a call to the office." *Family Physician*

"I've had a couple people message me where it wasn't appropriate. Like, 'I'm having breathing problems and I've been coughing non-stop for 24 hours. And can you pass this on to the physician?' Like that's not appropriate, right? So that's … a phone call … we need to talk to that person and get them in here to see them, or send them to emerg, kind of thing … it's nothing for the system to improve upon, it's more the patients to know it's not a way to diagnose them or treat them." *Family Practice Nurse*

"…of the patients that I presumed would … abuse the system has done so. There was a period in the spring where [the patient] would send a message probably every day for … a week and a half. And really just needed to book an appointment." *Family Physician*

"… the time that it was most challenging was in a situation in which a patient had sent a message about their [child] under their account with an urgent skin issue … none of us knew how to get it into the appropriate chart because it was sent under the mother's … file … and we needed to get it into the child's file. So it was complicated because none of us knew how to navigate the system well enough." *Family Physician*

"I am also pleasantly surprised that people are using it appropriately. At least my patient population, they're not … messaging me with things that need to be answered yesterday. They're appropriate things that can wait a few days, as we've designed …" *Family Physician*

Clinic Costs

Although some participants felt like the high cost was a potential barrier, a few participants noted that the use of the platform could result in a net savings. One family practice nurse said that the platform *"…probably saves money. If we're talking about mailing out things, it saves on some money in that way."* An administrative staff member identified potential cost savings that may result from fewer missed appointments *"… we do have less no-shows for the people that are on the program [users of the AVC platform]."*

Population Health

Patient Access to Primary Care

Health care providers and clinic staff identified several ways in which the AVC platform influences patient access to primary care. The platform can potentially improve access to care, offer quicker access, reduce the number of missed appointments, and reduce patient burden in accessing care, by removing travel times. Participants also identified and discussed barriers to primary care access that are not resolved by the platform. See Appendix C for additional quotes on the provider and staff perceptions on care accessibility related to the AVC platform.

Improved Access to Clinic and Provider

Participants felt that the AVC platform improved the patient's access to the clinic and their provider. As one participant explained, access to primary care is a challenge in Nova Scotia, and the platform offers an unintrusive way for patients to access their provider. Some participants also described how patients experienced quicker access to care, as the AVC platform alleviates delays due to long hold times when telephoning the clinic.

"I think access is probably the most important. I think people in Nova Scotia, patients, particularly feel that they're bothering us, and that they can't get through. They're not going to bother. They'll just go to a walk-in, or they're going to ignore their health concerns. So, I'm happy to know that people can get me in a safe way … I'm happy to know that my patients can get care all the time." *Family Physician*

"… our clinic is busy, and the phones are always busy … I regularly hear complaints from people that they have had difficulties getting through on the phone … they've tried … all the lines are full, and so it just kind of bumps them off … this gives people another way to access the office that is perhaps less time intensive for them. So, I think overall it's an improvement in having that access to the office and to me for quick and simple things…" *Family Physician*

"… our clinic is a very busy clinic, and … has a phone queue. So, you call in and you're putting a queue, and the next available person will pick up the phone when it rings. So, I find with patient care-wise, that we're able to address people's issues sooner … people aren't sitting on the phone for say 20 minutes to half an hour waiting to get a hold of somebody to book an appointment or to address their concerns. So, with Pomelo, I find that improves patient care dramatically. It's just being able to reach out and speak to somebody. Because I can be on … hold … with a

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> specialist and still be answering Pomelo questions and continuing getting back to them … without that, they would have been on hold for the half an hour that I was on hold for before I could address their issue." *Administrative Staff*

Improved Accessibility for the Patient

Participants described ways in which the AVC platform improved the accessibility of the clinic to their patients. For one, the platform reduced the need for patients to travel to the clinic. Additionally, one family physician discussed how the platform enabled greater access for a newcomer to Canada who could read English better than speak it. Participants also described how the platform could improve access to primary care for other groups of individuals, including teens who may want additional privacy from their parents and people with disabilities that impact their mobility or hearing.

> "For patients … it's so convenient. It's saving so many trips in here." *Family Practice Nurse*
>
> "… patients really commented on … how efficient the service is or how easy it is. If they're not able to come in, if they live far away, and they want to send the doctor something … even pictures of … rashes or anything like that, they can take pictures of that and send it through Pomelo." *Administrative Staff*
>
> "What I've just heard in general with doing so much … phone medicine, is that if there's any barrier to understanding, whether it be language or hearing … it's magnified by it being on the phone, for instance. So … It avoided some phone calls, I think, that may have been challenging to do and would have needed a third-party interpreter involved." *Family Physician*
>
> "It makes the patients happier because it's more convenient for them … especially … the people that are hard of hearing." *Family Practice Nurse*

Barriers to Access

Despite the numerous ways the platform enabled access to primary care, some health care providers shared concerns about the platform perpetuating existing barriers to primary care for some patients, such as those who experience technological barriers.

> "… I think that the value of being able to have a safe, secure system to message back and forth to patients, there is a clear need for that … especially as we anticipate that virtual care is going to continue in some way regardless of pandemic … Keeping in mind that … for patients to have access to Pomelo or … an email address even, or … a printer beforehand, we should not make the assumption that this creates access to all patients. That we always need to be mindful of still who's being left behind because there's always going to be somebody who's still being left behind." *Family Physician*
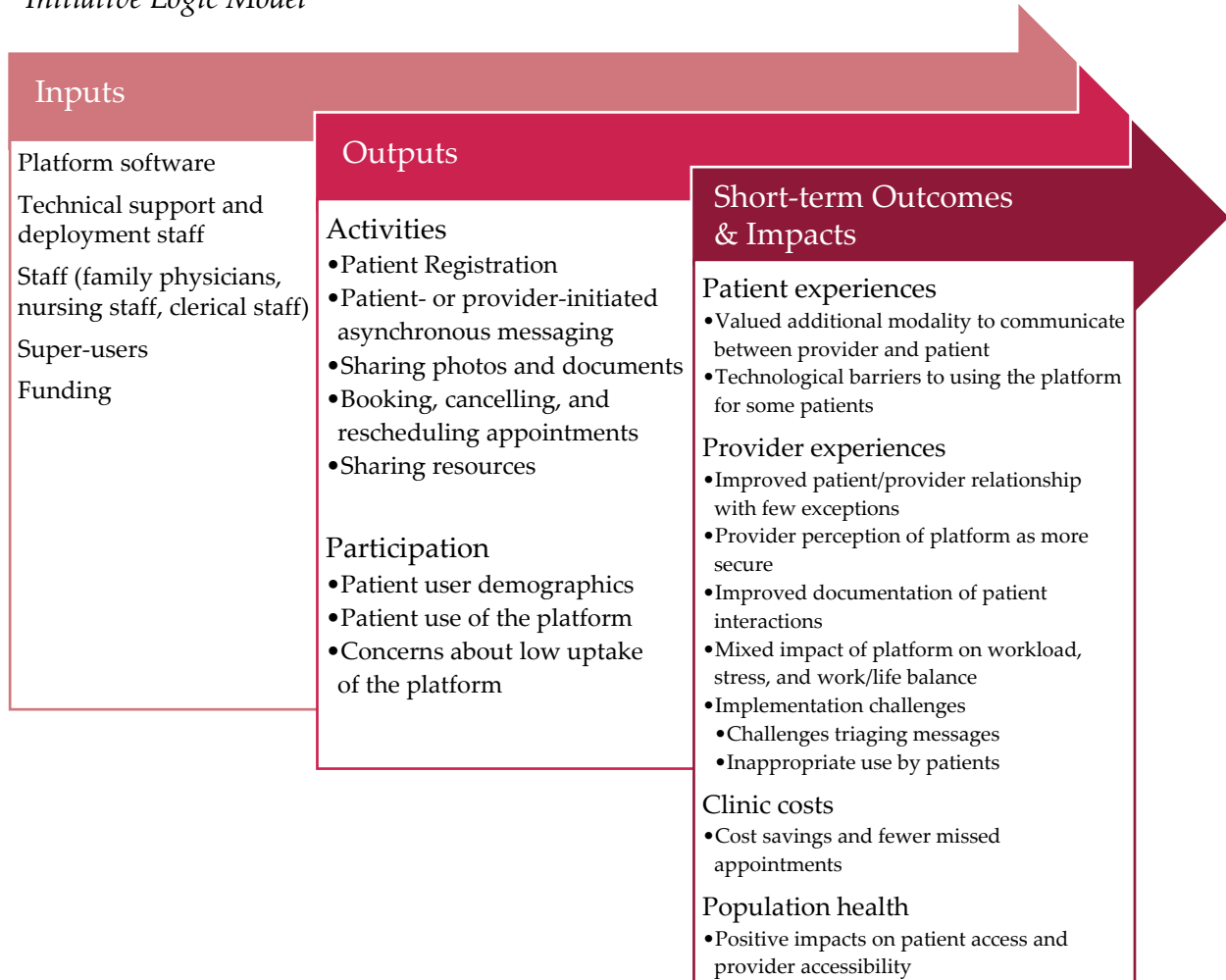>
> "… it's already frustrating for people … When they're challenged to navigate a system, and then to feel further sort of on the fringes because they just can't use the system because they don't have money to pay for it, or money to pay for the technology that's required to use it. I can only imagine that would be somewhat hurtful to patients." *Family Physician*

Logic Model

The findings from this evaluation have been mapped to a logic model (Figure 4).[16] This model identifies the inputs, outputs, and short-term outcomes and impacts of the AVC platform at the family medicine clinic. The inputs are the resources that have gone into the implementation of the platform at the clinic level and include the technical support, deployment staff, and the funding required for the service. The outputs include the activities and the participation that are a result of the inputs. These include the registration and the patient, health care provider, and clinic staff use of the platform. Finally, the model includes the short-term outcomes and impacts, mapped across the Quadruple Aim Framework. The platform has demonstrated impacts on patient and provider experience, clinic costs, and population health outcomes.

Figure 4

Initiative Logic Model[16]

Inputs

Platform software

Technical support and deployment staff

Staff (family physicians, nursing staff, clerical staff)

Super-users

Funding

Outputs

Activities
• Patient Registration
• Patient- or provider-initiated asynchronous messaging
• Sharing photos and documents
• Booking, cancelling, and rescheduling appointments
• Sharing resources

Participation
• Patient user demographics
• Patient use of the platform
• Concerns about low uptake of the platform

Short-term Outcomes & Impacts

Patient experiences
• Valued additional modality to communicate between provider and patient
• Technological barriers to using the platform for some patients

Provider experiences
• Improved patient/provider relationship with few exceptions
• Provider perception of platform as more secure
• Improved documentation of patient interactions
• Mixed impact of platform on workload, stress, and work/life balance
• Implementation challenges
  • Challenges triaging messages
  • Inappropriate use by patients

Clinic costs
• Cost savings and fewer missed appointments

Population health
• Positive impacts on patient access and provider accessibility

Recommendations Made by Participants

Participants discussed several areas where the implementation and use of the platform could be improved. Recommendations included enabling clerical access to conversations between providers and patients and enabling access to messages across clinic sites for nursing staff, automatic release of lab results to patients, better integration between the EMR and the platform for document sharing, direct appointment booking, and improved integration with existing clinic appointment scheduling software.

Challenge	Illustrative quote
Need for training/time to learn platform	"We need more training—[laugh] we don't have the time for more training right now—for [the platform] to actually … be useful in terms of not adding time. Because right now it's adding significant time because we don't know how to use it well…" *Family Physician*
Interactions the occur on Pomelo Health platform not shared with other providers (e.g., other physicians, nurses) and staff	"When patients send conversations to nurses or physicians, and they're trying to follow up on them, we can't see those conversations, unless they're downloaded afterwards to their chart … that's one of the drawbacks … we just didn't know if the physician said anything back to the patient…" *Administrative Staff*
	"Something I did notice though, and this probably can be fixed … If I'm the only nurse in the clinic here in [site], the [other site] nurses can check my tasks and check my phone and help me out. But they can't check Pomelo … it would be good if they had access to my messages as well for when I'm away or if I'm by myself … and it's hard to get to everything." *Family Practice Nurse*
The AVC platform does not automatically release results of scans and testing (e.g., x-rays)	"…we had been using the My Health Myself … the one that the province had supported. And one of the things … that patients really seemed to like was the automatic release of lab results and X-ray results, which this system doesn't do that … I personally was a little disappointed that it wouldn't do that because certainly that was the thing that patients really seemed to like about the other one … I didn't use messaging much, and they didn't use messaging much. But the release of the lab results was a big plus of the older system, which this one doesn't at this point have in a way that happens automatically." *Family Physician*
Poor integration with existing electronic medical record platform	"… if I want to download [documents] into the EMR file, I can't do that easily. I have to save it on my desktop, and then I have to upload it into my EMR, and it uploads into … just a generic area of the EMR. So then I have to open up that generic area of the EMR, and I have to re-classify it as a different entity so that it goes into the right part of the chart. And then I have to delete the thing that's on my desktop. And then I have to make sure that I remember to … delete my trash so that it's not just sitting on my desktop. So there are so many steps involved that I have now…I'm now not downloading it into the EMR. I will

download … the little abbreviated title, and just say … you're going to have to go to Pomelo for this data because I simply cannot take the time [laugh] to do all of those steps. That's far too much time out of a visit." *Family Physician*

"… to send anything to the patient, we have to download it and save it as a PDF to our personal drive. And that's a little bit of breach of confidentiality in case … we're not here or somebody's out sick, that person, then they can't send it to the person … if they forget or anything like that. But I'm sure it's being worked on." *Administrative Staff*

Difficult to integrate with the existing appointment scheduling system	"The [laugh] original reason we were looking at it was to allow eventually online booking. Which we should be able to do. Although our booking system here is quite complex so we haven't been able to quite figure out how to do it yet." *Family Physician*
Challenges with the AVC platform generating false appointment reminders for patients	"… I had a couple of calls yesterday saying, "I got an email stating that I had a doctor's appointment. Did I miss it?" or "I'm not available at that time" And when I go in, the doctor had actually put the patient on the schedule as admin time. So, it wasn't the fact that the doctor was going to contact the patient, but they were going to review their chart or do paperwork on them. But because they put it into the EMR, Pomelo picked it up and shot them off a message saying you have an appointment. So that has become … I guess a bit of an issue that patients are either upset that they missed an appointment that they didn't know about … they're not actual appointments. They're just where the doctor has blocked their own time off to look at forms or whatever on behalf of this patient." *Administrative Staff*
Difficulty marking tasks and interactions as completed	"So, we find it very challenging right now … that our conversations are constantly there … even if we archive them, they seem to stay up on our main screen. So, they never go away. So, it always looks like we have messages. And if they're opened or unopened, it's like the same colour. So … you can't quickly look at it and say, oh, this one's already been taken care of. But it's still on the list and it's not getting archived to the patient's chart. Or when it's on the list, there's no easy way to just click archive that conversation or download it. It's just there. And you have to go into each individual one. There's no external button

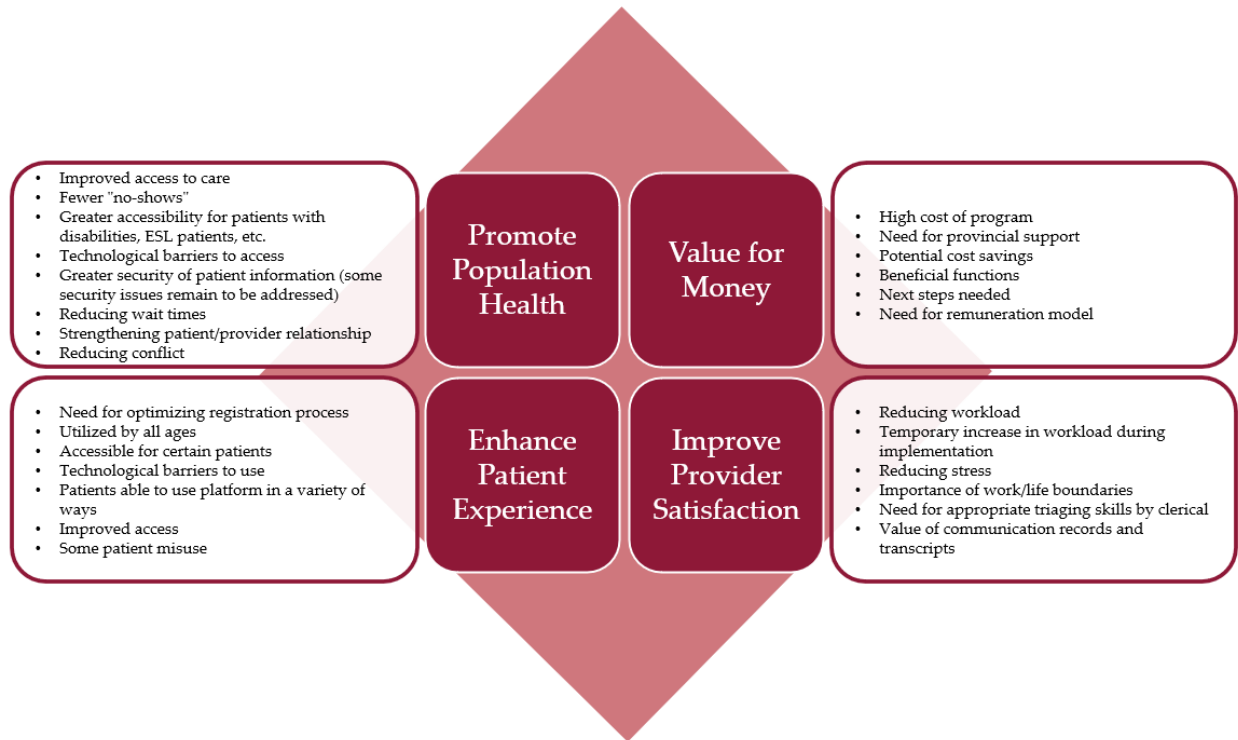|	on the list that you can just like check mark off and hit that it has been completed. So I find that a little challenging …" *Administrative Staff*
Need for message dictation	"… they send the message, and then I can send a response back. Oh, I would like to be able to dictate it. Maybe that would make it faster." *Family Physician*

Discussion

Key results

The Pomelo Health AVC platform was implemented by two family medicine clinics in Nova Scotia, Canada in early 2021 to offer a modality of virtual primary care delivery during the COVID-19 pandemic, when patients may have had concerns about seeking in-person care. Findings from the administrative data provided by Pomelo suggest that the AVC platform is being used by patients of all ages, and by both men and women. However, the characteristics of the most frequent users of the platform mirror the characteristics of primary care users; that is, the greatest proportion of users are older people and women. The use of the platform was highest in May 2021, which corresponds to a wave of COVID-19 cases in Nova Scotia. This shows promise for the use of the platform, as these initial data suggest that the AVC platform could replace some in person visits. A patient experience survey is currently underway to further understand how patients have used the platform.

Health care providers and clinic staff described several implementation and internal process challenges that required resolution to benefit fully from the use of the AVC platform. Aspects of clinic resources, structure and patient populations may yield different experiences implementing and using the platform. Despite these challenges, participants felt that the platform was beneficial across the Quadruple Aim, as it poses potential cost optimization, improved patient and provider experiences, and the potential to improve patient outcomes by addressing widespread primary care access issues. Figure 5 identifies the various ways in which the AVC platform can address the Quadruple Aim framework.

Figure 5

How Asynchronous Virtual Care Addresses the Quadruple Aim

- Improved access to care
- Fewer "no-shows"
- Greater accessibility for patients with disabilities, ESL patients, etc.
- Technological barriers to access
- Greater security of patient information (some security issues remain to be addressed)
- Reducing wait times
- Strengthening patient/provider relationship
- Reducing conflict

Promote Population Health

Value for Money

- High cost of program
- Need for provincial support
- Potential cost savings
- Beneficial functions
- Next steps needed
- Need for remuneration model

- Need for optimizing registration process
- Utilized by all ages
- Accessible for certain patients
- Technological barriers to use
- Patients able to use platform in a variety of ways
- Improved access
- Some patient misuse

Enhance Patient Experience

Improve Provider Satisfaction

- Reducing workload
- Temporary increase in workload during implementation
- Reducing stress
- Importance of work/life boundaries
- Need for appropriate triaging skills by clerical
- Value of communication records and transcripts

Interpretation

Primary care in Canada is challenged by several systemic issues such as high wait times to access primary care providers and high levels of patient unattachment to providers.[20] In Nova Scotia, the number of patients waiting to be attached to a primary care provider is at a record high.[21] Access and attachment have been greatly affected by the COVID-19 pandemic, and patient health concerns are likely to become exacerbated due to forgone care during the pandemic.[22–25] Innovation in primary healthcare access and delivery is urgently needed, and asynchronous virtual care offers an avenue for addressing this need. Although this is a pilot study of the implementation and use of an AVC platform, there are promising long-term impacts, including improved access to primary care.

Limitations

While saturation within the qualitative data was reached, our study was limited to a small number of volunteer participants. The available population of potential interviewees was limited to the number of providers and staff at each clinic. The population of providers includes two teams per clinic (four teams total) consisting of 4-6 family physicians and a family practice nurse for each team. In addition to the health care providers, there are 11 staff registered as administrators within the AVC platform. However, our data were strengthened by the participation of diverse participant roles, that included family physicians, nurses and administrative staff.

The secondary data provide insight into the use of the platform, but the breadth of information available within this data source is limited. A patient experience survey is currently underway to provide a clearer understanding of the patient perspective of the platform. Although there were several limitations, this study explores the initial experiences of patients, providers, and staff using the AVC platform within two academic family medicine clinics in Nova Scotia, Canada. Findings from this study may help to inform future decision-making on the use of asynchronous modalities in primary care in Nova Scotia, and other national and international jurisdictions. As implementation of AVC platforms emerge, considerations of data for research purposes should also be considered to provide ongoing evaluation.

Next Steps

This study provides insight into an AVC platform from the perspectives of family physicians, nursing staff, and administrative staff. It also provides data on the uptake and use of the platform using secondary data. Although participants (i.e., health care providers and clinic staff) identified potential benefits and challenges experienced by patients, the next steps involve garnering patient perspectives on the use of the AVC platform. To determine the benefits and concerns about using this platform identified by the providers and staff within this first phase, our future work will implement survey methods with patients who have used the platform.

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Appendices

Appendix A: Inputs Additional Quotes

Lack of Payment Model Quotes

"So right now I'm happy with the amount of sort of extra work, I'll call it, that I'm doing for Pomelo, where we're not sort of paid for this type of work." *Family Physician*

"… we haven't sorted out how faculty members will be remunerated for this. So we're AFP. We have to deliver X number of clinical visits per year. So I am mindful to watch how much I do this because I do like using Pomelo and sending messages and, you know, providing care this way. But at this point there is no billing code for it. And I am just taking time in between patients or at lunch to sort of do this. So I'm very mindful of how much of that I'm taking just for physician wellness and, you know, just making sure that… You know, no one wants more work when we're already feeling overwhelmed. So I guess the big picture of all of this is we need to figure out how much as a clinic we'll use it so that we can figure out how will we try to remunerate ourselves for this." *Family Physician*

"I think in fee-for-service, I'd be more fearful of my time, of this encroaching onto my personal time … I think it encroaches easier on the fee-for-service physicians … I think for fee-for-service folks to want to adopt this, there's really going to have to be some sort of … visit equivalent for them. Because it's care. It's still providing care. It's just different." *Family Physician*

"… I have enough money, I don't have enough time. So to me … it's not about having more money … am I given time within my FTE to do that work? … the work that I have already is bulging out the sides of the time that I actually am at work. I do a fair amount of work on my own time. And so that would probably just end up getting done on my own time, too … Without decreasing the other workload, it doesn't change anything. I'm still doing it on my own time … I'm not feeling like giving me more money is not a big enough incentive. My incentive right now is because it's something we're doing, it's something that I think is probably good for patients, it's something that may help me out with some phone call stuff. So it saves me a little bit of time. So to me, it's all about the time. It's not about the money." *Family Physician*

"… I think that time spent addressing clinical needs, regardless of whether or not it's in person, on the phone, by video or asynchronously needs to be accounted for … what I do not want to be doing is spending my evenings emailing that patient. I think, you know, if it gets to a point where I have more and more patients doing that, I need

to have time dedicated in my clinical day that is set aside to do that. And then that time should be remunerated at the same rate that … I'm paid for all of my other duties." *Family Physician*

"… there is no payment schedule for this. So, again, the thought to add work on and not know whether it would ever be remunerated, if we would ever receive any remuneration for it was a little anxiety-provoking." *Family Physician*

"…there are, I think, physicians that are understandably reticent or reluctant to initiate something that … they may never be remunerated for. And they're already busy as it is." *Family Physician*

Managing Lack of Payment Model Quotes

"… I'm mostly using it to enrich the care. So I would say most scenarios are me providing better care because I'm sending a message, I'm attaching something or sending a website link. But whether that was a phone call or an in-person … I'm already getting paid or that's counting as a visit. So it's enriching that visit … at this point, I probably would encourage them to book a phone call appointment so I can talk about the rash and still get counted for remuneration. But in the grand scheme of things, it would be really nice to have a separate billing code for that, or some time set aside to do that. Because then that would save that other phone call visit for someone else." *Family Physician*

Payment Model Suggestions Quotes

"… putting aside an hour of my day to be answering Pomelo messages would be probably most appropriate. So I would want to have like a fee code where I could bill that one hour as asynchronous messaging time. And you know, if the province would allow us to do X number per year or per week, whatever, I feel like right now that would be easiest for me. Because it's hard to know sometimes if that completely replaced a visit. And if it didn't, is that half of a billing or a third of a billing? I feel like just having the time to provide that care is probably simplest, to me." *Family Physician*

"… time spent addressing clinical needs, regardless of whether or not it's in person, on the phone, by video or asynchronously needs to be accounted for … I think where the challenge is, is that … there's variation in terms of the amount of time that one takes on using Pomelo. And if that's more because of lack of training and the time that gets involved there, you know, I'm not saying that I want to be remunerated just because I don't have the appropriate training. But … if it gets to a point where I have more and more patients doing that, I need to have time dedicated in my clinical day

that is set aside to do that. And then that time should be remunerated at the same rate that … I'm paid for all of my other duties." *Family Physician*

"I find it hard to quantify how much time is involved in using it. So I can't imagine that paying for it on a time-based model is going to work very well. So it would almost seem to me that we should be remunerated according to the number of patients that are enrolled, and … a stipend that shows that you're engaged in it. Otherwise the option would be to log those Pomelo visits as visits, as Pomelo visits in the EMR, and there be a fee code for Pomelo sort of work." *Family Physician*

"I think for fee-for-service folks to want to adopt this, there's really going to have to be some sort of … visit equivalent for them. Because it's care. It's still providing care. It's just different." *Family Physician*

Concerns about Abuse Quotes

"There needs to be some stipulations around what is the type of engagement with patients that's going to be eligible for remuneration. Because I've seen where there's not tight definition, there's abuse of that system. And that'll be costly." *Family Physician*

Need for Provincial Supports Quotes

"There's so many Med Access users in the province, it would be nice if the province, much the way that they supported the My Health Nova Scotia … to support Pomelo or something like Pomelo integrated really easily with the EMR system … Because it's expensive. And I can certainly see if you were maybe a solo practitioner or…would it be worth your money? I don't know. So it would be nice if that were somehow taken on as a province thing again." *Family Physician*

Appendix B: Outputs Additional Quotes

Patient Registration Quotes

"… if I have a patient that didn't know about it or they're interested in it, I just get their proper email and confirm it, and then send them an invite. So it just went from there. And it was slow. Like initially it was slow for people to pick up and use it. But once patients realized the purpose of it and how to use it, it's catching on fast."
Administrative Staff

"… when we first started, our IT put out a whole mass email, and people thought it was all a fraud. Like, "No, we won't click on that because we don't know that it's legit." So we had a lot of calls. Which was very overwhelming, of people calling, saying, "Is this right? Is this a scam?" … today someone called and I mentioned about the Pomelo program with them, and they were like, "Well, what's that?" So they did have an email on their chart. So I don't know if … an initial email was sent out to them and they just ignored it or it didn't go to them. However, I was able to send out… "Okay, I'm going to send out the invitation to you. This is what it's called. It's not a scam." And I'll try to explain that to them. But we find that … people do have their emails there but they're not getting the email. Or we tell them to check their junk mail just in case. But maybe they're ignoring it. But it's just something that … I find difficult. That you have an email on file, but yet you're still not registered?"
Administrative Staff

"… when the initial invite went out … the group of patients that value the ability to be able to … send something my way because they have a need to. You know, like my hypertensive patients who … have a home blood pressure cuff, and would like to be able to send those documents to me, or who monitors their glucose and would like to send that, those patients saw that message and immediately signed up. And then for patients who don't appreciate the value to them, or who have ongoing questions or concerns about security, the security of these kinds of systems … that would take more work for us to get them engaged in it. So the patients that signed up were the ones that had already been using NS Health, and are your usual early adopters."
Family Physician

"… the majority of my patients with high or complex care needs have care needs that would make it difficult for them to even understand the email ask message that went out to them, and would require some training on it … I'm talking about your high functioning adults who are engaged in their health care, that are very attentive to ensuring that they're doing all they can do to remain healthy. But for patients who

have more basic struggles, like where they are going to get their food or those sorts of things, they're going to be less inclined to be the early adopters." *Family Physician*

Platform Features Quotes

Document Sharing Quotes	"… it provides us an avenue to send securely by email things like lab reports and lab requisitions and whatnot." *Family Physician* "… especially with COVID, we've been working virtually with patients. Which means that if we want them to have investigations done, we're often mailing out pieces of paper to them with lab requisitions and whatnot. And this just seemed a much more seamless way to do it. And … then you have a record within your EMR that this actually went." *Family Physician* "I'll get messages through Pomelo, patients asking … "Could you send me a copy of my immunization record," or, "Are my immunizations up-to-date," … I love the fact that we can … attach those things and send it to the patient directly instead of printing it off and mailing it, or having the patient to come pick it up themselves." *Family Practice Nurse*
Secure Messaging Quotes	"…the Pomelo product allows us to send out, for example, blast secure messaging to groups of patients or to also message patients individually." *Family Physician* "It provides a platform that works within our EMR so we can download their messages, things that they send us." *Family Physician* "… we used it this morning to send out a blast message to those that are registered that we're running a vaccine clinic. And we know that there are lots of spots left for people to book. And we had nothing before, other than … putting something on our website. And we don't get a lot of website traffic so that's not particularly helpful." *Family Physician* "… you could play phone tag with someone … I might spend days trying to track down someone. You're calling and you're leaving a message. Or you're calling and they don't have their name on their voicemail so you can't leave a message. Like nothing detailed. But if

	you have their email and it's confirmed, then you can leave a more detailed message so they respond to you." *Family Practice Nurse*
	"For example, there's questions on a form for a referral for Continuing Care. So instead of calling that person … I listed those four questions. She wrote me back. "Okay, great. I will forward your referral and you'll hear from them," … so there's certain things like that." *Family Practice Nurse*
	"… this one person messaged me … I just had to go to the physician and say, "Hey, your patient so-and-so is messaging me, and here's all [the patient's] symptoms. You know, I'll download to the chart. You can read everything [the patient] wrote." But that's why I like it, right. Because when something's written, it's there verbatim." *Family Practice Nurse*
	"… if the doctors want us to send anything through the Pomelo, they'll send us a message." *Administrative Staff*
Confirmation Messages Quotes	"I think initially I was worried that a message would go through, how would I know they got it? So … two weeks would go by, and that's what we set our parameter, that so-and-so didn't read their message I sent them. So I got a message back, and I clicked on it, and it said your patient has not opened this message. Do you want to follow up? So I was reassured by okay, those safeguards were there." *Family Physician*
	"… I can see as soon as that patient opens it. Okay, that message is opened. They received that message. And if they don't open it in a certain timeframe … it will pop up. It'll come back to me saying this patient has not received this message yet. So then I can follow up with a phone call, right, or send another message, or say to the physician, "Hey, this person has not gotten back to me."" *Family Practice Nurse*
	"It's not often that we get a response back saying the patient hasn't opened their messages yet. But I did have one today, and it was the first one in a really long time … it will just say "patient hasn't opened this message yet. Would you like to try again?"" *Administrative Staff*

Chrome Extension Quotes	"… I've added the Chrome link at the bottom of my screen, which we've actually tried to help all faculty do, I can see when a message comes. And at this point the volume is never very high. Like at most I've had like four messages there. But I can see like later in my day, it's continuously updating. So I can see, oh, there's a message. So, you know, I can write that person back, go see a patient, come back in. Oh, they maybe got back to me. So I feel like I can squeeze in little bits of care in that manner." *Family Physician*
Ability to link family accounts	"… when patients … go to the invitation screen, and when they log on, it does say here's how to link your family" *Family Physician*
Technical support provided by Pomelo	"… luckily, Pomelo does all the support for the patient end … we certainly can help, but we're not necessarily supposed to. Like they are there. Part of what we pay for is their support for any troubleshooting with patients. That's not on us necessarily." *Family Physician*
Automated appointment reminders for patients	"… if they are sick, we can always switch their appointment from an in-person appointment to a phone call, and they can upload the information that they require so the doctor can continue with the appointment appropriately." *Administrative Staff* "We feel like we have more relaxed and we can take our time to actually book an appointment because, you know, we don't have somebody on the phone waiting as we're looking for an appointment." *Administrative Staff* "Patients can go on … and cancel appointments. So, we get that in enough notice that we can re-book their spot versus calling up and saying, "Hey, I've been trying since 8:00 to let you know that I'm not coming in for my 1:00 appointment," and now it's 11:30. So that's such a big advantage for them, for their scheduling, for their billing. Especially if somebody was fee-for-service physicians that get paid by the visit, that would help them…" *Administrative Staff* "As long as we have a correct email from all the patients and they're in agreement with using that system as a mode of communication, it's a great way for patients to look for appointments, cancel appointments…" *Family Practice Nurse*

	"… a lot of patients do complain, especially if we're short staffed out front, it takes forever. It might take 20 minutes or more to get through to someone on the phone. Whereas if you had Pomelo, you just send a message … to clerical requesting an appointment. So it is easier." *Family Practice Nurse* "The reminder is great because we don't have time to call patients to give out reminders. So they get an email or whatever, a text or whatever they use, is great. Because then we have less no-shows when they're actually on the Pomelo program because they are getting reminders that hey, you have an appointment. I don't know if it's the day before or two days. But it just sparks their memory. Because our doctors are booking out four to six weeks. So if you make an appointment today, you may forget in four to six weeks that you did make this appointment. So it gives them that reminder. So we do have less no-shows for the people that are on the program." *Administrative Staff*
Ability to mark conversations as ended/close conversations	"… I can decide whether or not I allow them to reply to me. So I can sort of say a reply and end, or I can say reply and keep it open … so for people that I worry a little bit about it being a long back and forth, back and forth, I'll just end it. Which means they can still write me back, they just have to go through the process of initiating that … that … does save a little bit of time because you're not necessarily on the phone with some of the individuals who … no matter what, it's going to be a longer phone call than, you know, a quick two minute thing." *Family Physician*
Health questionnaires and forms available through the Pomelo Health platform	"There's also the … depression questionnaires and … standardized forms that are … built in the system, that the patients can fill out before you even see them. I think that's awesome." *Family Practice Nurse* "… for prenatal patients … everyone should have the depression screening done. And I think it's awesome that it's already there … Because it all saves time. Because our visits are only like 15 minutes or 30 minutes." *Family Practice Nurse* "… I don't think I can take a lab req from the chart and attach it right away to Pomelo. I think I have to download it and then upload it into the message … it's not interconnected, like I'd like it to be. That's

	why those forms that are already in there is really good." Family Practice Nurse "We … go into Pomelo, we open it up, and then there's a part where it says check in, and you can print a code for each day. And patients can register that way… When COVID was really bad, you didn't want a lot of people coming into the clinic and trying to come to your window and register. So people that were registered [with Pomelo] were able to use the code to scan it … I think they felt more comfortable as well." Administrative Staff

Platform Benefits Quotes

"… the initial intention was to have a secure platform to message and communicate with our patients. And security was the big sort of concern." *Family Physician* "In reality, we're doing "Pomelo" outside of Pomelo. Because patients are emailing us, and they're emailing physicians across the board across the province here. And people are responding because you have to. You can't just ignore people that email you. And this is a far more secure way and a safe way to do that kind of work. You know, it's within an EMR … there's a record of what has transpired. There's no chance that it's going elsewhere … better than what we're getting now, which is, you know, people emailing from their Gmails and the rest of it. And the risk that we have that that's going hither and beyond. So I think, you know, regardless, it is happening. It's happening outside of what is a pretty good system. And I think the stakeholders need to understand that if they don't do that, we're putting everybody at risk." *Family Physician* "And we like the asynchronous component of it. So you know, I don't have to send it right now, and they don't have to be online right now to see it. Like I would like to be able to send them a message that they can check later and get back to me if needed. So really it's a way to communicate with patients asynchronously on our own time, and it's secure and safe." *Family Physician* "I think it's just it's very clear. The messages are clear. It's easy to use." "I think it's just a really great system to use. It's very user-friendly." *Administrative Staff*

Participant User Demographics Quotes

"… I'm surprised at how the demographics of my patients have chosen to sort of use this. I have some 80 year old patients that use it and message me, and also some 20 year olds. So I sort of thought that it would be perhaps the younger demographic that would be more likely. But even some of my older folks getting INRs, I'm able to send messages. You know, throughout the lifespan. So I've been actually really surprised by that. Which I think is great." *Family Physician*

"… I'm really surprised at who is doing Pomelo. Because I thought it would be more the younger clients, like in their 20s, 30s, the ones that are really techy, you know. And a couple of them do. But I find it's more like in the 70 age range." *Family Practice Nurse*

"… I find it's more the seniors are using it a little more than what I anticipated. Which is good." *Family Practice Nurse*

"I always ask people … do you have an email, and are you comfortable using a computer? And … we'll run into some people who aren't. Sometimes that's more likely to be in a geriatric population. But that being said, there's lots of geriatric folks out there who are, you know, all on board and using computers quite well." *Family Physician*

"… there is an older population, too. So I think it's harder for them. But yeah, but a lot of people do use it, and they do like it." *Administrative Staff*

"… it's also sometimes a convenient way to communicate with adolescents … it's a little bit more private perhaps than having them talk on their phone or sending them another email if they have parents who are keeping track of their email. So it can have some advantages there. The only group it doesn't really work for is children [laugh]." *Family Physician*

"Anybody who's willing, really. I find that, you know, there are those who are worried about the use of computers. Like either their own skills. So those people are sometimes not eager." Family Physician

"I always ask people … do you have an email, and are you comfortable using a computer? And you know, we'll run into some people who aren't. Sometimes that's more likely to be in a geriatric population. But that being said, there's lots of geriatric

folks out there who are, you know, all on board and using computers quite well." Family Physician

"It's a different patient population [at clinic site]. And I think there's a sense that the patient population may not be able to access it for various reasons, including … lack of technological savvy or IQ." Family Physician

"… a couple [patients] that adopting new technology just isn't their thing. You know, they don't have the skills to do it." *Family Physician*

"I would say those that are of higher socioeconomic status [are engaged with the platform] … people who are … self-employed and have a home office set up. Certainly patients who would be more middle class or higher would appreciate that, yeah. Or are able to navigate that a little bit more easily." *Family Physician*

"… the majority of my patients with high or complex care needs have care needs that would make it difficult for them to even understand the email ask message that went out to them, and would require some training on it … patients who have more basic struggles, like where they are going to get their food or those sorts of things, they're going to be less inclined to be the early adopters." *Family Physician*

"It's been really [emphasis on really] helpful actually for one family that I took on … who were refugees from [Middle Eastern country] … One has … pretty good English skills. The other one has less good English skills. But they both … are better able to read and write English. So it has been very useful for that family because I can then communicate with them back and forth with [messaging]. And it makes it a little easier than doing on a phone because … I would have to like get an interpreter, and have them patch the phone call in, and all that kind of stuff. Whereas … if there's quick communication, they're able to read that. So that's been a big advantage for that particular situation." *Family Physician*

"… the refugee family is definitely an example. Just allowing us to communicate in English in a way that worked for them and worked for me because their spoken English wasn't strong yet." *Family Physician*

"I think the main thing that worked well is based on [the patient] being able to read and write English better than [the patient] speaks English. And … at the beginning, [the patient] was in quite a bit of distress … And not understanding … how … the system here works as far as health care. And I think it was nice … to have a relatively

straightforward system that [the patient] could contact me if … needed, and not have to worry about calling the office and perhaps not being understood or not understanding what was being said … I think it was probably an advantage or has been an advantage … that [the patient] would see, too …" *Family Physician*

"… even if [the patient] didn't speak English, I wonder if that would have been something that could have kind of been used - Google Translate in a way." *Family Physician*

"… we work beside our newcomer clinic, and they have a lot of patients that don't speak English. So for them to use Pomelo, where they can't speak English, they wouldn't be able to use… Unless it's like a language thing they're able to change." *Administrative Staff*

"… I find … the seniors are using it a little more than what I anticipated. Which is good … some of them have mobility issues, right? So it's hard to get into the clinic just to pick up a form or to come in for simple things. So if there's anything you can do over Pomelo then it just helps them a lot, right?" *Family Practice Nurse*

"… for patients … who have ongoing questions or concerns about … the security of these kinds of systems … that would take more work for us to get them engaged in it." *Family Physician*

Participant use as a Patient Quotes

"…I liked it … I don't go to the doctor all that often. But I got my pap result back, and that was kind of nice, from my family doctor. She was on that same system. And it was nice to say, yeah, it's normal. Or I had blood work back. And especially … as a physician, it's very easy for me to interpret it. So I was able to look, oh, yeah, everything looks good. Or … if there was something showed up, I'd said, oh, I should probably call her so we could talk about that." *Family Physician*

"My physician uses Pomelo. So I had an issue, and she was like, "Well, can you just send me a picture?" And I sent her the picture that I thought may be a cancer spot. And she reviewed it and she goes, "No, I think that's okay. You know, we'll watch it for a little bit and then we'll re…" So I was able to stay at work. I didn't have to leave work. I scheduled her appointment around a break of mine. So I didn't have to leave work. I was able to get my issue looked at, and my mind at rest, and she was able to get paid for it." *Administrative Staff*

Patient use of the Platform Quotes

Sending messages and images	"When a patient tries to send a message or a photo, it will say, who do you want to send it to? So when they pick clerical, it'll say what sort of things you should message them for - like appointments. And then nursing, it'll say like more clinical things or questions. So the patients will know to send it to nursing for a clinical question like this rash, and then it'll come to me." *Family Physician*
	"I had a patient who's been off work for an injury … [the patient] sort of improved quicker than we thought. And I'd written [the patient] a note for [the patient's] work to be off for two weeks. And a couple of days in, like things are really improving. And so [the patient] really wanted to go back to work - which is excellent. So instead of calling the clinic, trying to get through to me, trying to book an appointment, [the patient] sent me a Pomelo message and said, "Hey, I'm actually feeling so much better. I know I'm not seeing you until next week. I'd like to go back to work on Monday." So I wrote … back and said, "That's great." And I attached a letter, and we talked about it. So I could give [the patient] a letter to return to work earlier than [the patient] was going to just because it would have been too much of a pain to wait through on the phone lines to book a proper appointment for that. So I feel like that was a success. And [the patient] was super pleased. I think [the patient's] employer was pleased." *Family Physician*
	"Well, I can think back to somebody that has a skin lesion. They were asking me questions about what to do next." *Family Physician*
	"I had a lot during COVID, and COVID vaccines and just general health-related questions. Like you know, "I'm breastfeeding. What do you think the best COVID vaccine would be," or is it safe? And … just things like that. And you can easily refer them to resources through messaging … You could send links or whatever through the Pomelo." *Family Practice Nurse*
	"People looking for information on diabetes in general, or getting like a Free Style monitor to monitor their sugars, and that kind of thing. Like that's easy to do on Pomelo, right? And you can still give references." *Family Practice Nurse*

	"It's great for, say, new moms that have … general questions that nursing can answer without, you know, a phone call or coming into clinic." *Family Practice Nurse* "… if they have any questions for the physician, we can just assign it to the physician. And then that way they don't have to be on hold in our queue for our phone lines for somebody to physically talk to them. It's just a lot faster service for them." *Administrative Staff* "… some of them where it's just new, I think they just don't know how to use the program yet. Sometimes they can't remember how to send us a message or anything like that. So I will just go into Pomelo, send them a quick message, and then they'll respond back to me that way." *Administrative Staff*
Sending images	"So they can send a photo … When a patient tries to send a message or a photo, it will say, who do you want to send it to? So when they pick clerical, it'll say what sort of things you should message them for - like appointments. And then nursing, it'll say like more clinical things or questions. So the patients will know to send it to nursing for a clinical question like this rash, and then it'll come to me." *Family Physician* "… in one case, the mom sent a picture of a rash or something for her child, but it came in through the mom's chart. So we had to make sure we properly removed that, link the child to the mom, and had it go into the child's chart. So there's been a bit of … frustration. So that did take me more time to sort that out." *Family Physician* "… I have had people send pictures in. I have to say on one of those, I didn't feel comfortable … the patient took the picture themselves … and sent it over Pomelo. And the resolution wasn't great. So I had to say, listen, I can't do anything with this online, you'll have to come in." *Family Physician* "Patient care is to a certain extent … better because they can upload pictures." *Administrative Staff*

	"Somebody had this adverse reaction to something, and needed to send a picture. So they sent the picture. We were able to upload it. So when the doctor was able to talk to them, then they would be able to see it." *Administrative Staff*
	"What is so awesome about Pomelo … is pictures! Pictures of rashes and tick bites and … pictures that patients can send us and then I'm able to download into their chart and see … especially … with COVID restrictions and things, right, when we were doing a lot more phone calls, it was really handy, yeah. But even if they sent me a picture, and I showed it to one of the physicians, they still may want to see that patient. But then they have the heads up and kind of know what to expect, you know, when they come in." *Family Practice Nurse*
	"… patients really enjoy it. Some patients really commented on it, how efficient the service is or how easy it is. If they're not able to come in, if they live far away, and they want to send the doctor something. Like even pictures of like rashes or anything like that, they can take pictures of that and send it through Pomelo." *Administrative Staff*
Requesting and receiving digital copies of health documentation and resources	"… people sending me things that they need done, like forms." *Family Physician*
	"So somebody who has a form that needs to be filled out, it's not necessarily that they have to be seen for this form. They upload the form. The doctor has the form. So when the doctor calls, the doctor can just go over some of the information … and the doctor can now fill out the form without the patient coming in. Because the patient didn't really necessarily need to be seen, but because the doctor had questions and needed to ask them, the patient actually had to have that appointment." *Administrative Staff*
	"… I've heard that they're happy to be able to send stuff to us, like blood pressure measurements or glucose measurements. I've had a few like legal documents that were sent. So I think that that was a bit easier." *Family Physician*

	"… a patient was able to provide me with documentation that I needed to be able to determine how to best manage her." *Family Physician* "… so the patient needs. Mostly it's asking like a clinical question … Can I send this form to [participant]? Or can you have her fill out this form?" *Family Physician* "I'll get messages through Pomelo, patients asking … This is why I love it. "Could you send me a copy of my immunization record," or, "Are my immunizations up-to-date," kind of thing. So I love the fact that we can, you know, attach those things and send it to the patient directly instead of printing it off and mailing it, or having the patient to come pick it up themselves. And like the school forms, too, they can also send attachments to us. So then we get it right away." *Family Practice Nurse* "Oh, I had one the other day … a patient … had lost her form or something that I had filled out for her for her school. And so she just she just needed another copy. So that was easy." *Family Practice Nurse*
Easy to cancel and book appointments	"… any message goes to clerical or nursing … when they pick clerical, it'll say what sort of things you should message them for - like appointments." *Family Physician* "… I had a couple of calls yesterday saying, "I got an email stating that I had a doctor's appointment. Did I miss it or I'm not available at that time?" And when I go in, the doctor had actually put the patient on the schedule as admin time … that has become a bit of an … issue that patients are either upset that they missed an appointment that they didn't know about …" *Administrative Staff* "… it's a great way for patients to look for appointments, cancel appointments…" *Family Practice Nurse* "…it does take less time … people that are calling to book appointments … they call on the phone … We have to look through the schedule, find the appointment. They say, "No, it doesn't work."

	We find something else. [Through Pomelo] they just put in a request." *Administrative Staff*
	"Patients can go on … and cancel appointments. So we get that in enough notice that we can re-book their spot versus calling up and saying, "Hey, I've been trying since 8:00 to let you know that I'm not coming in for my 1:00 appointment," and now it's 11:30. So that's such a big advantage …" *Administrative Staff*
	"… they can send us cancellations and … then when they cancel, it comes right off of our Med Access screen. So it takes the appointment right away. So somebody else will have an opportunity to get an appointment." *Administrative Staff*
	"… if they're registered with Pomelo, they can send us a message … about just booking an appointment … then that way they don't have to be on hold in our queue for our phone lines for somebody to physically talk to them. It's just a lot faster service for them." *Administrative Staff*
	"If the patient is looking for an appointment, we give them their options, and they confirm or decline it, and say, "Well, I'm sorry, that's all we have." You know, that sort of open and closed subject there … it could save a lot of issues of frustration when people are calling, you know, "I need to get this appointment. I need to see the doctor next week." "Well, I'm sorry, we don't have anything next week. Our next available is this date." On the phone, of course, your tone of voice always, of course, changes. Versus Pomelo, it's words on a paper … it sort of stays more neutral than it would on a telephone where it could escalate." *Administrative Staff*
Provides open channel of communication between patient and provider	"… patients will message us looking to get … a prescription refill. We message back to them. So we correspond back and forth with these patients until … they're satisfied … I guess it works well that way." *Administrative Staff* "… there was another fellow emailed to me about medications, that there was some mix up. And I was able to straighten that out, straighten it out with the pharmacy, and respond to him, you know, in less than sort of seven minutes. And previously it would have

	been a phone call, and that would be 10 minutes, if not longer, if I was trying to chase him down, and then another phone call to the pharmacy. So it's pretty seamless when it does work." *Family Physician*
Codes for registering and checking in	"… we have our QR code that patients just scan. That's a lot easier for them to check in. So they don't have to wait in line or, you know, if they don't want to come to the window or anything like that to us to register, they can just register that way." *Administrative Staff* "… it's a code that we print off every day and we put in our front lobby … it's a different code every day. So it's a check-in code. So they just put their phones up to it and scan it. And then if they're registered already, all of the COVID questions or anything like that will pop up for them. So they can just sign in on their phone, register on their phone, instead of standing in line and checking in with us." *Administrative Staff* "When COVID was really bad, you didn't want a lot of people coming into the clinic and trying to come to your window and register. So people that were registered were able to use the code to scan it and stuff like that. So I think they felt more comfortable as well." *Administrative Staff*

Appendix C: Short-term Outcomes and Impacts Additional Quotes

Patient Technological Barriers to Using the Platform Quotes

"I do have folks that don't have a printer. So you know, sometimes I'll send them a lab req, and they say, "Oh, I don't have a printer." But, you know, we can leave it for pick-up. So it's not just people who have printers…" *Family Physician*

"I am using it probably most often for sending things to the patient. The downside, of course, is if the patient doesn't have a printer, then it's not always useful. So if I'm sending them a lab req, it will come into their email. But if they don't have a way to print it out, then I don't know how the lab would feel about them taking it in on their phone, saying, "Here's my lab req." I don't know if they like that or would allow it. I haven't heard any feedback on that. So I do check if people have a printer … if it's for a sick note that they can email to their boss, it's fine …" *Family Physician*

"… I can think of some of my population … they just don't have the technology at home. There are a couple that don't have computers…" *Family Physician*

"… I worry that those that don't have access to this because they just don't have the technology or the phone plan or whatever to be able to do it, you know, are they going to feel marginalized as a result of it?" *Family Physician*

"… we work beside our newcomer clinic … a lot of them don't have phones or computers or Internet access because they're all newcomer patients." *Administrative Staff*

Strengthening the Patient/Provider Relationship Quotes

"I think it strengthens it. I think it makes me more accessible to patients. And I know that's a fear of a lot of physicians, and it was a fear of mine. But to be honest, the people who use it and the scenarios where you need to use it, I do feel that it strengthens the relationship. And I feel better knowing that, you know, that we've solidified the plan, that they know the plan, that I sent it through. I can check to see if it was sent, did I press go, did I not. Did I tell her about that? Oh, yeah, I did. I sent that in the message with the lab req. Yeah, so I do think that it strengthens the relationship. And I think I can provide better care, and, you know, they have more access to their care." *Family Physician*

"I think people in Nova Scotia, patients, particularly feel that they're bothering us, and that they can't get through. They're not going to bother. They'll just go to a walk-

in, or they're going to ignore their health concerns. So I'm happy to know that people can get me in a safe way. So I don't worry that … I'm not in clinic right now, that someone's sending me an urgent message, because we've set up all of these supports. So you know, if they do send a message, it will go to clerical or nursing. And yeah, so I feel like I'm happy to know that my patients can get care all the time." *Family Physician*

"I think it's a good way to keep in touch … I saw a patient today, and I'm like, "Oh, yes, I remember the message you sent me, you know, a month ago about how you've been feeling," and … it's like, "Oh, yeah," you know. So it's a good way to keep in contact … to follow up on how people are doing in general." *Family Practice Nurse*

"… the patient who's kind of sending multiple messages … we have a challenging relationship anyway. I mean part of her expectations for what the medical system should provide her, we're not necessarily meeting. So by giving her access to a tool that seemingly gives her more access to us, or in her mind gives her greater access to us, actually just further challenges that relationship." *Family Physician*

Reducing Conflict Between Patients and Providers Quotes

"If the patient is looking for an appointment, we give them their options, and they confirm or decline it, and say, "Well, I'm sorry, that's all we have." You know, that sort of open and closed subject there … it could save a lot of issues of frustration when people are calling, you know, "I need to get this appointment. I need to see the doctor next week." "Well, I'm sorry, we don't have anything next week. Our next available is this date." On the phone, of course, your tone of voice always, of course, changes. Versus Pomelo, it's words on a paper … doing it through typing, it sort of stays more neutral than it would on a telephone where it could escalate."
Administrative Staff

"… it's taken some of the pressure off us with the phone calls … we can do it in a more relaxed way… and not being … "is this person going to start screaming at me on the phone?" … We can just … relax, saying thanks for your message. We look at the schedule … we don't have that, "okay, they're going to start screaming at me on the other end if I tell them … that they have to wait two weeks to get to see their doctor." So I think it helps us, and it makes us more relaxed and less stressed..."
Administrative Staff

Provider Perceptions that the Platform is More Private and Secure Quotes

"… it's also sometimes a convenient way to communicate with adolescents … it's a little bit more private perhaps than having them talk on their phone or sending them another email if they have parents who are keeping track of their email. So it can have some advantages there." *Family Physician*

"… having more virtual encounters now has really expedited the need for us to be able to have tools in which we can … send stuff back and forth to our patients in a secure fashion. I mean I do think other family doctors have been emailing their patients stuff for a long time, and not worrying about whether that's secure or not because they have the patient's permission to email them. So … that was kind of taking away that liability … in their mind." *Family Physician*

"… the value of being able to have a safe, secure system to message back and forth to patients, there is a clear need for that … especially as we anticipate that virtual care is going to continue in some way regardless of pandemic." *Family Physician*

"… I'm glad we have it because then I'm not trying to call somebody and chase them down by phone or leave messages on a phone system that I worry is not private enough." *Family Physician*

"In reality, we're doing "Pomelo" outside of Pomelo. Because patients are emailing us, and they're emailing physicians across the board across the province here. And people are responding because you have to. You can't just ignore people that email you. And this is a far more secure way and a safe way to do that kind of work. You know, it's within an EMR … we download those messages to the EMR. So there's a record of what has transpired. There's no chance that it's going elsewhere … Far better than what we're getting now, which is … people emailing from their Gmails and the rest of it. And the risk that we have that that's going hither and beyond. So I think … regardless, it is happening. It's happening outside of what is a pretty good system. And I think the stakeholders need to understand that if they don't do that, we're putting everybody at risk." *Family Physician*

"… I might spend days trying to track down someone. You're calling and you're leaving a message. Or you're calling and they don't have their name on their voicemail so you can't leave a message. Like nothing detailed. But if you have their email and it's confirmed, then you can leave a more detailed message so they respond to you." *Family Practice Nurse*

How Asynchronous Care Contributes to Better Documentation Quotes

"… this one person messaged me … "I'm coughing a lot and I find it hard to breathe. And … I just wonder if you could pass it on to the physician." … I did write her back and say, "It sounds like you need to book an appointment." [the patient] didn't like that. "No, I just want you to tell the physician." So I just had to go to the physician and say, "Hey, your patient so-and-so is messaging me, and here's all her symptoms … I'll download to the chart. You can read everything [the patient] wrote." But that's why I like it, right. Because when something's written, it's there verbatim. So that doctor ended up just calling her and handling that." *Family Practice Nurse*

Mixed Impact of Platform Use on Provider Workload, Stress, and Work/Life Balance Quotes

"… it saves on mailouts. So instead of printing and putting it in the fax tray at the office, I can now just send it myself. I don't have to get clerical involved. I can just deal with it because I was already dealing with them on the phone anyway. So … do the work now, not later, kind of thing. So I feel like that's been very useful." *Family Physician*

"In that case … I think clerical didn't have to get involved. She didn't have to be waiting on the phone line for an appointment. Nobody had to ask me, is it an in-person or is it over the phone? Yeah, so I think it sort of saved the clerical administrative burden in that scenario … it saved me seeing an in-person visit. And so I could probably do some other things." *Family Physician*

"… where I see things going really is, after the pandemic, if we can work out … people being able to book their own appointments … that will certainly take a load off our clerical staff, who are overwhelmed at the best of times." *Family Physician*

"… anybody who has registered, and the doctor will say, "Can you please mail out this requisition for them to get blood," we go online, see if they are actually registered. If they are, then we will send it through the Pomelo program versus printing it out, putting in an envelope, you know, sealing the envelope, putting it in the mail."
Administrative Staff

"If … we need to contact the patient … we'll call them the first time. But if I'm unable to get a hold of them, then we will send a request – "Please contact the office to book an appointment regarding whatever." So we find that's a lot easier than the phone call." *Administrative Staff*

"I just like how easy it is. So, we don't have to leave it on our task list. So, through our EMR, the doctors send, "Oh, can you call this patient to book?" So, I can quickly just type in sent request through Pomelo. I can close that task off, and it's still in the Pomelo program. And I would contact the patient saying the doctor would like to arrange a telephone conversation with you. Please advise date and time that would work best for you. And then I send it off to them. Now it's in their ballpark, so to speak. But because it's a continuous message going through Pomelo, when we're done with it, it can be archived to the EMR, and all that is there as well. So it's not like taking notes - Oh, yeah, we called, we called, we called. It's that dialogue is able to be on the EMR. Which helps say, "No, no, we contacted you and you messaged us back and said that this time or that date or whatnot works best for you." So that's what it's really good for – like the continuous dialogue between the patient and the office." *Administrative Staff*

"We're able to receive things sooner if we're waiting on things that we need to get from the patient in order to complete our tasks. So I believe that it works well." *Administrative Staff*

"… I'm pleasantly surprised that I'm not overwhelmed with patient messages. You know, it's probably one a week. And they're pretty quick, you know. And I'm glad we have it because then I'm not trying to call somebody and chase them down by phone or leave messages on a phone system that I worry is not private enough." *Family Physician*

"… I might spend days trying to track down someone. You're calling and you're leaving a message. Or you're calling and they don't have their name on their voicemail so you can't leave a message. Like nothing detailed. But if you have their email and it's confirmed, then you can leave a more detailed message so they respond to you." *Family Practice Nurse*

"… I'm hoping it is cutting down on the phone calls out front as well." *Family Practice Nurse*

"…if the patients know it's part of the chart, they're going to stick to the point … non-medical conversations are avoided, I guess if you put it that way." *Family Practice Nurse*

"Say if someone needs a requisition, well, I have to print it off, and I have to find an envelope, and then I have to address the envelope, and I have to walk it up to the

front. You know what I mean? So there's all those steps eliminated through Pomelo."
Family Practice Nurse

"… it's just taking a load off all the way around with paperwork, with the mailing out things. You know, you might have forgot to ask a patient something in a visit. So you can just send a message to them." *Family Practice Nurse*

"…it's a lot easier to get in touch with patients. We tried them several times, and they haven't returned messages. We send them a message through Pomelo, and they seem to respond a lot quicker because they get an email notification. And to send anything out that way instead of mailing out to them, we find it a lot easier just to send it through Pomelo." *Administrative Staff*

"… we usually get about one or two [messages]. Like no more than five a day … we would like more people to use it." *Administrative Staff*

"… it's pretty easy. It usually only takes about 10 minutes or so. Usually they're just looking for appointments or anything like that. So we find them an appointment, and then we send them a message back stating this is the appointment date and time for the next opening. Any issues, send us a message back and we can change it." *Administrative Staff*

"… our clerical staff has struggled with … keeping the demographics area of the patients' charts updated … So when I see a patient or talk to a patient on the phone, and … I've got a req that I need to get to them, I'll do the little spiel about what Pomelo is … go into demographics, put in their email, send them the invitation, and then tell them to send me back a message once they're logged in so that I know to send their req … that adds some extra time … we send out an invitation to any new emails in the system of people who haven't yet registered but … if the emails aren't getting there from clerical then that doesn't really do much good. And then if I'm needing something to go like today that I want to send them a req, then the option is for me to sort of enter it in and register them. So, again, it's just adding more time to my day-to-day things. Which I already find that I do not have enough time in a day [laugh] to even get a portion of the work done." *Family Physician*

"… I could take everything that I want sent via Pomelo and send it out to the front desk and ask them to send it. But now our clerical staff is kind of overwhelmed. So I don't know … how well received that would be. And [laugh] it might tip some people over the edge." *Family Physician*

"… in our setting, I'm doing all the uploading to Pomelo, to the portal. Whereas in another office they may well put that on their clerical. It's just not something ours can handle at the moment." *Family Physician*

"… right now I'm happy with the amount of sort of extra work, I'll call it, that I'm doing for Pomelo, where we're not sort of paid for this type of work. But I do wonder over time, you know, people are going to like this, people are going to want this, and I feel like I'm going to be providing more care this way. So how am I going to work that into my day when it becomes more onerous? I'm still trying to grasp that." *Family Physician*

"… like anything new, you don't want to learn anything new, you don't have time for anything new. But once you use it, it does actually save you more time and make your life easier." *Family Physician*

"… there was another fellow emailed to me about medications, that there was some mix up. And I was able to straighten that out, straighten it out with the pharmacy, and respond to him, you know, in less than sort of seven minutes. And previously it would have been a phone call, and that would be 10 minutes, if not longer, if I was trying to chase him down, and then another phone call to the pharmacy." *Family Physician*

"… I think you're using your time more efficiently in some instances managing things … a quick email or a message back to me is far more efficient than having to sit on a phone or bring somebody in for a visit that really doesn't need to happen." *Family Physician*

"I noticed the phone calls have gone down a lot because … when you're on the phone, you get stuck in a phone call. You know, you kind of veer off track and you're off topic. So the phone call takes longer with the patient." *Family Practice Nurse*

"… if a patient called me and had a question, I would have to chart that phone call, go find a doctor, discuss it with a doctor, come back and call the patient back, and then chart that phone call. But now with Pomelo, if I feel like this shouldn't have came to me, like it should have went to a physician, I could just right away forward that message to the physician. Or I can respond to that message, and just upload it to their chart … anyone coming behind me can read our conversation back and forth on

Pomelo at the next visit … it's really great that way. It saves me a lot of time [laugh] in that way." *Family Practice Nurse*

"When we can't get in touch with patients, when we've left several messages and they haven't gotten back to us, we've used Pomelo … easier to get those messages off of our task list that doctors send to us. So then patient care is taken care of a lot faster." *Administrative Staff*

"Most of my challenges have just been with the extra time it takes. You know, the extra time of needing to print to PDF … Once I had figured out that process, it wasn't difficult. But it's the time it takes … that bit of extra time with every form you need to send. And not all but I would say at least half of the visits I do virtually I'm sending a form of some kind or a lab req or something. And sometimes you're sending two or three. So you're doing that with each one of them." *Family Physician*

"… every time I have to send a lab, I go through that process. Of rather than just hitting print, I go through that process of sending a lab req. That takes more time … it's not a huge amount of time, but it's probably a couple of minutes. And when you've got a 15 minute block that is already maybe … shorter than what you need. And then you're adding two minutes onto every appointment that you're needing to send something, it adds up." *Family Physician*

"… one of the patients that I presumed would kind of abuse the system has done so. There was a period in the spring where [the patient] would send a message probably every day for, you know, a week and a half. And really just needed to book an appointment … that is very time consuming … rather than just having a visit." *Family Physician*

"We emphasize to patients that this is not meant to replace times where we really need to have a conversation. And be that a phone visits or an in-person visit … what I'm not interested in is having … a series of 12 to 20 emails go back and forth to address a problem … I don't see that as being an efficient use of anybody's time … needing to try and find ways to still attend to the daily clinical care stuff in addition to now the potential for lots of … Pomelo messages that still take time to address. And not having built-in time during my day to be able to do that." *Family Physician*

"… there are so many steps involved that … I'm now not downloading it into the EMR … I simply cannot take the time [laugh] to do all of those steps. That's far too much time out of a visit." *Family Physician*

"… where none of us are super users, if it takes 20 minutes, half an hour, an hour to figure out what to do with this … two line … message to us, like we could have seen 6 patients, right? … We need more training—[laugh] we don't have the time for more training right now—for it to actually, you know, be useful in terms of not adding time. Because right now it's adding significant time because we don't know how to use it well and also because there's some inherent challenges with how it's been built." *Family Physician*

"I think with the Pomelo program, it could save a lot of issues of frustration when people are calling, you know, "I need to get this appointment. I need to see the doctor next week." "Well, I'm sorry, we don't have anything next week. Our next available is this date." On the phone, of course, your tone of voice always, of course, changes. Versus Pomelo, it's words on a paper … it sort of stays more neutral than it would on a telephone where it could escalate." *Administrative Staff*

"… it's taken some of the pressure off us with the phone calls. So with the phone calls, of course, you don't know what the next phone call is … the person on the other end doesn't know what the phone call was prior to that. So you still may be, you know, processing that phone call when you're trying to deal with something else. But at least with the Pomelo program … people know that it's not immediate, like people on the phone do … we can do it in a more relaxed way … and not being up in arms on is this person going to start screaming at me on the phone or whatever. We can just, you know, relax, saying thanks for your message. We look at the schedule, you know. And we don't have that, okay, they're going to start screaming at me on the other end if I tell them this - that they have to wait two weeks to get to see their doctor. So I think it helps us, and it makes us more relaxed and less stressed … dealing through Pomelo that way." *Administrative Staff*

"Trying to reach people by phone is really challenging. And [clerical staff] spend a lot of time … pursuing people by phone … this allows them to make one … stop and one attempt, and they know it's gotten through and they get responses. I think as far as booking appointments, when people request an appointment, I think it allows them some time to go through the schedule and respond with some opportunities they might not if they were on the phone and trying to do this under pressure." *Family Physician*

"They send me an email every time someone sends a message to the portal. And so at first I would get that email and I would say, oh, I better open it up and see what it is!

And now I see it, and I say, it'll wait. It'll wait until I get to the office. Like it just was they were coming too often. And then once you see what it is, you sort of feel, oh, I should probably deal with it. And then that's on my personal time. So I've now made a rule that I am not dealing with Pomelo stuff at all [emphasis on at all] during my personal time. I keep that. But because it comes into my email … your tendency is to want to just get the email done. And often when I'm doing my email, most of that is on my personal time, too … But I've now decided no more Pomelo during personal time. I think it's a good thing." *Family Physician*

Inappropriate Use of the Platform by Patients Quotes

"I am also pleasantly surprised that people are using it appropriately. At least my patient population, they're not … messaging me with things that need to be answered yesterday. They're appropriate things that can wait a few days, as we've designed …" *Family Physician*

"… if the patients know [the message is] part of the chart, they're going to stick to the point … They're not going to talk about other things … That saves time … a 15-minute phone call can be a two minute message. They're not going to ask me, "Oh, did you take any vacation the summer," … non-medical conversations are avoided…" *Family Practice Nurse*

"… they're advised that it takes about 24 to 48 hours for staff to respond in the case for staff are busy. So patients are aware like nothing urgent to send us through Pomelo because it might not be taken care of right away." *Administrative Staff*

"Some patients unfortunately do use it a bit inappropriately. And we do have little provisos on what they see as saying, hey, don't say anything urgent, you know. And I've had people say, "My prescriptions didn't show up at the pharmacy." And I'm like I'm seeing it now. You know, I'm usually in clinic on Thursdays and then not again until Mondays. So now it's been three days. And it's kind of like [laugh] that is not within the timeframe. So sometimes people do use it inappropriately. They use it for things that are maybe a little bit more urgent, that it would be better to make a call to the office." *Family Physician*

"… if a patient sends me a picture or a file with their home blood pressure readings so that I have those in my possession at the time of a phone call visit, for example. You know, we have a process issue in that that patient might send that to me, you know, like moments before that visit. Right now how our system is set up, is that are

our clerical staff are the ones that first screen that. So if they haven't gotten to it, then it might not have gotten to me." *Family Physician*

"So another example of a patient sending a picture, which is great because they wanted [laugh] to ask about a rash, which was great. Except that it was kind of an urgent request, and it was going into a system in which we've tried to say don't use this for urgent requests! And when we identified it as being maybe urgent, but the patient couldn't come in… Like literally trying to make sure that the person that was going to be talking to this person and seeing the picture was challenging because none of us knew how to forward a message in Pomelo through to another provider. And so I think because none of us are super users, yeah, we are struggling with it." *Family Physician*

"I mean I think the time that it was most challenging was in a situation in which a patient had sent a message about their son under their account with an urgent skin issue. And so, you know, we had a nurse that didn't know how to use the system that forwarded it to me. I was for some reason locked out of Pomelo and so needed to get our IT support to actually, you know, re-create my identity. I wasn't going to be in clinic at the time that the patient was coming in. I needed to be sure that [laugh] the person that was seeing her had access to this. And then none of us knew how to get it into the appropriate chart because it was sent under the mother's, you know, file essentially, and we needed to get it into the child's file. So it was complicated because none of us knew how to navigate the system well enough." *Family Physician*

"… the patient should know that it's not an emergent thing. Do you know what I mean? It may not get looked at in three to five days. Or someone could be away for a week and not look at it." *Family Practice Nurse*

"I've had a couple people message me where it wasn't appropriate. Like, "I'm having breathing problems and I've been coughing non-stop for 24 hours. And can you pass this on to the physician?" Like that's not appropriate, right? So that's like a phone call. Like we need to talk to that person and get them in here to see them, or send them to emerg, kind of thing. So it's not… So that's the only thing. But it's nothing for the system to improve upon, it's more the patients to know it's not a way to diagnose them or treat them." *Family Practice Nurse*

"… the patient who's kind of sending multiple messages … part of her expectations for what the medical system should provide her, we're not necessarily meeting. So by giving her access to a tool that seemingly gives her more access to us, or in her mind

gives her greater access to us, actually just further challenges that relationship."
Family Physician

"… the time that it was most challenging was in a situation in which a patient had sent a message about their son under their account with an urgent skin issue … none of us knew how to get it into the appropriate chart because it was sent under the mother's … file … and we needed to get it into the child's file. So it was complicated because none of us knew how to navigate the system well enough." *Family Physician*

Clinic Costs Quotes

"… to add the product in was costly. And I was worried that we would be spending this money, and really would not see the utility to it for the overall practice." *Family Physician*

" … I'm a bit disappointed on the uptake at one of our clinics. People just hadn't been using it … I'll be interested to see over time what the uptake is with people. And sort of to look at for the time we're putting in and the money we're spending, is it being used enough to justify carrying it." *Family Physician*

"… it is a pricey endeavor. So that's why we had to sort of all agree as faculty because we had to find the money for this." *Family Physician*

"We brought it forth to our faculty team and had to get approval from all of our faculty members to go forward with it because of costs." *Family Physician*

"It's not in our operating budget through IT, through EMR. So we had some money put away from some EMR incentive programs from a few years ago. And we'd been holding that for projects like this … we felt like it was a good use for that money where it was EMR-related, clinic-related. And so that's why we had the faculty meetings to agree do we want to use this money for that?" *Family Physician*

"…we decided on Pomelo because it is integrated into the EMR, and it was the … most supported by the EMR vendor … I think one of the main things was just how it integrates into the EMR, and with hopes that it will integrate even better as time goes on. And then we looked at cost and, you know, things like that." *Family Physician*

"I took it to our EMR committee and then we evaluated … what the utility might be for us and put a proposal together to have some funds allocated for it within our program. And … we proceeded from there." *Family Physician*

"… our doctors are booking out four to six weeks. So, if you make an appointment today, you may forget in four to six weeks that you did make this appointment. So, it gives them that reminder. So we do have less no-shows for the people that are on the program." *Administrative Staff*

Patient Access to Primary Care Quotes

"At this point, still the patients are starting to initiate … I feel that I'm sometimes reluctant to initiate the conversation with them because I'm just like how often are they checking their emails? You know, if they're only checking it once a week, and it's something that's sitting there, then it may get missed." *Administrative Staff*

"It's usually the patient. Yeah, it is usually the patient it comes from. Sometimes me. And I think it's shifting a bit more." *Family Practice Nurse*

"It's 50/50 … the patients do send us some messages to book appointments or any pictures or forms or questions they have for the physician. We can follow up with a phone call appointment or we forward to the physician, and they can go from there, and they could just advise us what to do next." *Administrative Staff*

"I think [the patient] felt like she could access us better. So, you know, she doesn't live close by. And so I think she did mention to me that she loves Pomelo. She finds it easy to use, and just we're more accessible … I think she felt just that she … has access to her family doctor more than she potentially did before." *Family Physician*

"… patients don't have to wait on the phone, they can request information much easier. I feel that the response time is probably much quicker. They're able to upload information so they don't actually have to come in. So if they are sick, we can always switch their appointment from an in-person appointment to a phone call, and they can upload the information that they require so the doctor can continue with the appointment appropriately*." Administrative Staff*

"… what I'm not interested in is having, you know, a series of 12 to 20 emails go back and forth to address a problem … I don't see that as being an efficient use of anybody's time. I don't know that the patients would agree with that because … might be sending that message at midnight." *Family Physician*

"… I actually had some feedback from patients who really enjoyed it. And one in particular was very positive about the back and forth about his appointment that I

ultimately saw him for. Felt it was much easier for him to get through." *Family Physician*

"… there was another fellow emailed to me about medications, that there was some mix up. And I was able to straighten that out, straighten it out with the pharmacy, and respond to him, you know, in less than sort of seven minutes. And previously it would have been a phone call, and that would be 10 minutes, if not longer, if I was trying to chase him down, and then another phone call to the pharmacy." *Family Physician*

"For patients? I think they really like it. I think it's so convenient. It's saving so many trips in here." *Family Practice Nurse*

"… I find it's more the seniors are using it a little more than what I anticipated … Which is good in what I said about saving time … some of them have mobility issues, right? So it's hard to get into the clinic just to pick up a form or to come in for simple things. So if there's anything you can do over Pomelo then it just helps them a lot, right?" *Family Practice Nurse*

"… I think it's just better access for the patients. Like the patients trying to call me, they have to call the front, and then the front will transfer them back. But they may be waiting, waiting, waiting. So the email system, they could email me at 10:00 at night, and I'll get it the next day. Or I can do the same, right?" *Family Practice Nurse*

"… patients, I think, really like using it as well. Just instead of waiting on the phone, they can send us a message, and they get a response quicker. Instead of being on hold for a long time if we're busy." *Administrative Staff*

"Some patients really commented on … how efficient the service is or how easy it is. If they're not able to come in, if they live far away, and they want to send the doctor something. Like even pictures of like rashes or anything like that, they can take pictures of that and send it through Pomelo." *Administrative Staff*

"… patients are like, "Oh, okay, I'll do that. It's a lot easier … instead of waiting on hold or anything like that, trying to get through."" *Administrative Staff*

"A lot of people … always have their phones with them or their laptops or anything like that. And they're always checking their emails, or a notification comes up saying that they have a message from their doctor's office. So I think they're more quick to

respond or open it that way and look at it at least to see what they would like, and respond back that way." *Administrative Staff*

"She didn't have to be waiting on the phone line for an appointment.*" Family Physician*

"I think it makes me more accessible to patients … I think I can provide better care, and, you know, they have more access to their care." *Family Physician*

"I think access is probably the most important. I think people in Nova Scotia, patients, particularly feel that they're bothering us, and that they can't get through. They're not going to bother. They'll just go to a walk-in, or they're going to ignore their health concerns. So I'm happy to know that people can get me in a safe way … I feel like I'm happy to know that my patients can get care all the time." *Family Physician*

"… I think it's the way of the future. I think we can provide better, more comprehensive and better access to care … access is such a huge topic in Nova Scotia, I really think that this can help the access problem … we know not everybody is going to want to do this as patients. But for those who do, it can open spots for those who do not to be seen in-person or on the phone. So I think access to me would be the biggest benefit." *Family Physician*

"… I was impressed that last year in the pandemic, they quickly shifted to allow virtual care pretty quickly. So I think if we can keep the ball rolling and … look at the impact of access for our patients and how valuable that is." *Family Physician*

"I think the fact that [a patient] could reach me and then … we decided that she came in was great. I could see where … you'd be able to eliminate the need for a visit." *Family Physician*

"In that case … [the patient] didn't have to be waiting on the phone line for an appointment… it … saved the clerical administrative burden in that scenario." *Family Physician*

"… our clinic is busy, and the phones are always busy … I regularly hear complaints from people that they have had difficulties getting through on the phone … they've tried … all the lines are full, and so it just kind of bumps them off … this gives people another way to access the office that is perhaps less time intensive for them. So I think

overall it's an improvement in having that access to the office and to me for quick and simple things…" *Family Physician*

"… our clinic is a very busy clinic, and … has a phone queue. So you call in and you're putting a queue, and the next available person will pick up the phone when it rings. So I find with patient care-wise, that we're able to address people's issues sooner … people aren't sitting on the phone for say 20 minutes to half an hour waiting to get a hold of somebody to book an appointment or to address their concerns. So with Pomelo, I find that improves patient care dramatically. It's just being able to reach out and speak to somebody. Because I can be on … hold … with a specialist and still be answering Pomelo questions and continuing getting back to them … without that, they would have been on hold for the half an hour that I was on hold for before I could address their issue." *Administrative Staff*

"… if the doctor is not able to come into the office due to whatever the case may be … they're … in self isolation … they don't have to wait as long to get an in-person one. Versus saying, oh, the doctor's not going to be in for two weeks because of this, they could get an appointment sooner because of Pomelo … uploading documentations, pictures, things like that, forms." *Administrative Staff*

"Well, the advantages … patients don't have to wait on the phone, they can request information much easier. I feel that the response time is probably much quicker. They're able to upload information so they don't actually have to come in." *Administrative Staff*

"… I actually had some feedback from patients who really enjoyed it … one in particular … Felt it was much easier for him to get through … there was another fellow emailed to me about medications, that there was some mix up. And I was able to straighten that out, straighten it out with the pharmacy, and respond to him, you know, in less than sort of seven minutes. And previously it would have been a phone call, and that would be 10 minutes, if not longer, if I was trying to chase him down, and then another phone call to the pharmacy." *Family Physician*

"… I think you're using your time more efficiently in some instances managing things. You know, by a quick email or a message back to me is far more efficient than having to sit on a phone or bring somebody in for a visit that really doesn't need to happen." *Family Physician*

"… a lot of patients do complain, especially if we're short staffed out front, it … might take 20 minutes or more to get through to someone on the phone. Whereas if you had Pomelo, you just send a message … to clerical requesting an appointment. So it is easier. And I'm hoping it is cutting down on the phone calls out front as well." *Family Practice Nurse*

"… I think it's just better access for the patients. Like the patients trying to call me, they have to call the front, and then the front will transfer them back. But they may be waiting, waiting, waiting. So the email system, they could email me at 10:00 at night, and I'll get it the next day." *Family Practice Nurse*

"… patients … really like using it as well … instead of waiting on the phone, they can send us a message, and they get a response quicker. Instead of being on hold for a long time if we're busy." *Administrative Staff*

"…if they're registered with Pomelo, they can send us a message … that way they don't have to be on hold in our queue for our phone lines for somebody to physically talk to them. It's just a lot faster service for them." *Administrative Staff*

"… we register patients to check in and everything, we always check their demographics … to add their email address, we ask them that to promote Pomelo a lot easier. And patients are like, "Oh, okay, I'll do that. It's a lot easier … instead of waiting on hold or anything like that, trying to get through."" Administrative Staff

"… [patient] lives actually [one hour away]. So for her to come all the way in town to get a return to work letter sort of would … be a barrier … I definitely was able to … avoid two in-person visits with our communications back and forth." *Family Physician*

"For patients … it's so convenient. It's saving so many trips in here." *Family Practice Nurse*

"… the seniors are using it a little more than what I anticipated. Which is good … some of them have mobility issues, right? So it's hard to get into the clinic just to pick up a form or to come in for simple things. So if there's anything you can do over Pomelo then it just helps them a lot…" *Family Practice Nurse*

"… patients really commented on … how efficient the service is or how easy it is. If they're not able to come in, if they live far away, and they want to send the doctor

something. Like even pictures of like rashes or anything like that, they can take pictures of that and send it through Pomelo." *Administrative Staff*

"It's been really [emphasis on really] helpful actually for one family that I took on in February who were refugees from [Middle Eastern country] … One has … pretty good English skills. The other one has less good English skills. But they both … are better able to read and write English. So it has been very useful for that family because I can then communicate with them back and forth with that. And it makes it a little easier than doing on a phone because … I would have to … get an interpreter, and have them patch the phone call in, and all that kind of stuff." *Family Physician*

"… the refugee family is definitely an example. Just allowing us to communicate in English in a way that worked for them and worked for me because their spoken English wasn't strong yet." *Family Physician*

"… the main thing that worked well is based on [the patient] being able to read and write English better than [the patient] speaks English … it was nice … to have a relatively straightforward system that [the patient] could contact me if … needed, and not have to worry about calling the office and perhaps not being understood or not understanding what was being said …." *Family Physician*

"What I've just heard in general with doing so much … phone medicine, is that if there's any barrier to understanding, whether it be language or hearing … it's magnified by it being on the phone, for instance. So … It avoided some phone calls, I think, that may have been challenging to do and would have needed a third-party interpreter involved." *Family Physician*

"It is … advantageous for people like my refugee family, or maybe adolescents if they're looking for a more private way to communicate something. So … I see it sticking around." *Family Physician*

"It makes the patients happier because it's more convenient for them … especially … the people that are hard of hearing." *Family Practice Nurse*

"… our doctors are booking out four to six weeks. So, if you make an appointment today, you may forget in four to six weeks that you did make this appointment. So, it gives them that reminder. So we do have less no-shows for the people that are on the program." *Administrative Staff*

Barriers to Access Quotes

"… I think that the value of being able to have a safe, secure system to message back and forth to patients, there is a clear need for that … especially as we anticipate that virtual care is going to continue in some way regardless of pandemic … Keeping in mind that … for patients to have access to Pomelo or … an email address even, or … a printer beforehand, we should not make the assumption that this creates access to all patients. That we always need to be mindful of still who's being left behind because there's always going to be somebody who's still being left behind." *Family Physician*

"… I think there's a sense that the patient population may not be able to access it for various reasons, including lack of access to technology, lack of technological savvy…" *Family Physician*

"… I can think of some of my population … they just don't have the technology at home. There are a couple that don't have computers, and a couple that adopting new technology just isn't their thing … they don't have the skills to do it." *Family Physician*

"… I worry that those that don't have access to this because they just don't have the technology or the phone plan or whatever to be able to do it … are they going to feel marginalized as a result of it?" *Family Physician*

"… it's already frustrating for people … When they're challenged to navigate a system, and then to feel further sort of on the fringes because they just can't use the system because they don't have money to pay for it, or money to pay for the technology that's required to use it. I can only imagine that would be somewhat hurtful to patients." *Family Physician*

"There's still a few people out there that don't even have an email … you meet people that don't even have a cell phone … there's still a few people that don't have that access…" *Family Practice Nurse*

"… we work beside our newcomer clinic, and they have a lot of patients that don't speak English. So for them to use Pomelo, where they can't speak English … a lot of them don't have phones or computers or Internet access because they're all newcomer patients. So it's all new to them coming to a new country. So they won't be able to use Pomelo easier than we can use Pomelo. I think that will be a little bit more challenging for them." *Administrative Staff*

Appendix D: Recommendations Made by Participants Additional Quotes

Need for training/time to learn platform	"We need more training—[laugh] we don't have the time for more training right now—for it to actually, you know, be useful in terms of not adding time. Because right now it's adding significant time because we don't know how to use it well…" *Family Physician*
Interactions the occur on Pomelo Health platform not shared with other providers (e.g., other physicians, nurses) and staff	"When patients send conversations to nurses or physicians, and they're trying to follow up on them, we can't see those conversations, unless they're downloaded afterwards to their chart … that's one of the drawbacks … we just didn't know if the physician said anything back to the patient…" *Administrative Staff* "Something I did notice though, and this probably can be fixed … If I'm the only nurse in the clinic here in [site], the [other site] nurses can check my tasks and check my phone and help me out. But they can't check Pomelo … it would be good if they had access to my messages as well for when I'm away or if I'm by myself … and it's hard to get to everything." *Family Practice Nurse* "… if we're able to see conversations between physicians and patients. I know there is a confidentiality thing there. But it just makes our job a little easier when we're sort of the middleman and trying to figure out what the patient needs or if the doctor responded or anything like that." *Administrative Staff*
Pomelo Health does not automatically release results of scans and testing (e.g., x-rays)	"… our patients are used to [MyHealthNS], which was the program where they automatically had all their labs released. And so I think for a lot of people, they thought that was going to happen automatically with Pomelo. But Pomelo is really a secure asynchronous communication tool. So I certainly can send them copies, but I have to specifically seek that person out, know that they want it, attach it to a message and send it to them. So I certainly can. But I feel like that's been one ask from patients that they would like to see that at some point. Which I don't know if necessarily is even to do with Pomelo, it's maybe more of the One Patient, One Record piece. But yeah, that was the one piece that a few people have asked about." *Family Physician* "…we had been using the My Health Myself or whatever it's called, the one that the province had supported. And one of the things … that patients really seemed to like was the automatic release of lab results

	and X-ray results, which this system doesn't do that … I personally was a little disappointed that it wouldn't do that because certainly that was the thing that patients really seemed to like about the other one. They very rarely used messaging in that one, I found for me. Like I didn't use messaging much, and they didn't use messaging much. But the release of the lab results was a big plus of the older system, which this one doesn't at this point have in a way that happens automatically." *Family Physician* "… people will message me wondering what their lab results are, right? So for me to relay lab results, I still have to run it by a doctor. But as long as it's okay to pass that information on, then it's easy to get back to them on that." *Family Practice Nurse* "I'd love if there would be some sort of other extension where people can choose to be, you know, sent out their results. If there was some way that sort of [MyHealthNS] where they had that. That was just something that a lot of our patients had enjoyed. And … I think that's probably my wish list for Pomelo at this point." *Family Physician* "… if it would become so seamless that it would automatically release lab results to people, that would be fantastic … Because now what happens … if I'm talking … on the phone and then they … Pomelo back saying, "Can I have a copy of my lab results?" And so then I'm going in again and printing them to PDF and uploading them and downloading them, and doing all that kind of stuff … I think patients really [emphasis on really] liked that with the other one … Plus, then they have a copy of their own lab results. So when their naturopath or their chiropractor wants a copy of their blood work or their X-ray, they've got a copy … this way the patient then takes that responsibility … they've got a copy, they can give it to whoever they want." *Family Physician*
Poor integration with existing electronic medical record platform	"… the system is working on a way to make it easier to attach things to a message. So if I want to attach a bloodwork to a message I've sent to a patient, I actually have to save that bloodwork sheet on my desktop and add it through that. So they're working on a fix so that it is all very seamless. So you just have to sort of like attach and grab it from your computer to send the message through. So I know that's been probably a little bit frustrating for some faculty. There's just an extra step when you

attach something. But those have been our growing pains, I feel like."
Family Physician

"I think the thing that I didn't fully recognize when we were choosing it, is that it is not connected in the way that I would hope that it would be connected with our EMR … if I want to send someone something, whether it be a copy of their lab results because they've requested that, or whether I want to send them a req for their lab work or whatever, I have to go through the process of printing that to PDF, saving it on the hard drive, and then going back into Pomelo and uploading it onto Pomelo … I would much rather have something where there was a button on the lab result or a button on the lab req that I could just push … all this … needing to print it and then save it, and change the title, the name of it so that you know … which patient … then having that stuff on my hard drive. So I have to go through regularly and delete all these things that are on work computer or my, if I'm working from home, they end up on my laptop." *Family Physician*

"I'm still disappointed that it's not better integrated … I've heard murmurings and talking at our EMR committee … that they may be working on some of these better connections. But … It adds more time to my day … it's not a huge amount of time, but it's probably a couple of minutes. And when you've got a 15-minute block that is … already maybe shorter than what you need. And then you're adding two minutes onto every appointment that you're needing to send something, it adds up." *Family Physician*

"Once I had figured out that process, it wasn't difficult. But it's the time it takes. And it could be … fewer steps for me if it was just something that was integrated more seamlessly within the EMR. So I think that's my biggest sort of complaint at this point about Pomelo, and the thing that I have found most challenging, is just that bit of extra time with every form you need to send. And not all but I would say at least half of the visits I do virtually I'm sending a form of some kind or a lab req or something. And sometimes you're sending two or three. So you're doing that with each one of them." *Family Physician*

"… if I want to download that into the EMR file, I can't do that easily. I have to save it on my desktop, and then I have to upload it into my

EMR, and it uploads into … just a generic area of the EMR. So then I have to open up that generic area of the EMR, and I have to re-classify it as a different entity so that it goes into the right part of the chart. And then I have to delete the thing that's on my desktop. And then I have to make sure that I remember to … delete my trash so that it's not just sitting on my desktop. So there are so many steps involved that I have now…I'm now not downloading it into the EMR. I will download, you know, the little abbreviated title, and just say, you know, you're going to have to go to Pomelo for this data because I simply cannot take the time [laugh] to do all of those steps. That's far too much time out of a visit." *Family Physician*

"… if I want to send like a lab requisition to a patient I've done a phone visit … right now we're sending through our clerical. But that's what they have to do. They have to download it to the desktop and upload it and send it to Pomelo. And that just seems like too many steps to make it really that useful at this point." *Family Physician*

"… I feel it's a bit insecure, right? Like if I do one of those steps wrong then I may have somebody's private data information. Albeit my desktop is secure. But you know, I mean it's just now sitting there in another, you know, maybe slightly less secure place that I feel is inappropriate." *Family Physician*

"… with the [previous platform], we didn't have the ability to send documents back and forth. It literally was just messaging. So this was … sold to us as a really nice feature. I mean that sounded awesome. But there's just too many steps. It's not seamless." *Family Physician*

"… when it came time for me to put [a document] in her chart, I gave up. Because I would have had to go through those 20 steps to do that. So I essentially summarized what she had said to me in my chart note." *Family Physician*

"… one thing … this is probably the reason I defer to the staff to send out lab reqs and whatnot, is you have to download the req. If you're doing a blood req for somebody, say, or lab investigation, you have to download it onto the computer and into a secure file, and then you have to upload it and attach it to … the message. So … that's a bit time

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consuming. And to me, it's an administrative task, the way you have to do it. If it was simply that I would write a note and pull it from the EMR, that would make life really simple." *Family Physician*

"… right now to transfer it from Pomelo to Med Access … I have to download the picture, upload it into the chart … And then delete the picture on my computer." *Family Practice Nurse*

"… the only challenge is … if it's on the desktop, I have to right away delete it, right. So there is that risk. Like I wouldn't want to forget to delete it. But I believe what I'm hearing is that's going to be solved soon, too." *Family Practice Nurse*

"… I don't think I can take a lab req from the chart and attach it right away to Pomelo. I think I have to download it and then upload it into the message. Like it's both ways. Like it's not interconnected, like I'd like it to be." *Family Practice Nurse*

"… to send anything to the patient, we have to download it and save it as a PDF to our personal drive. And that's a little bit of breach of confidentiality in case … we're not here or somebody's out sick … then they can't send it to the person, you know, if they forget or anything like that. But I'm sure it's being worked on." *Administrative Staff*

"…we'd love to see that we can easily attach things. So that's apparently in process." *Family Physician*

"… if there's an easier way to send forms or anything like that, instead of downloading. Like we have to scan them and download them to our system, and then send them to the patient that way. But I think otherwise it's a great system." *Administrative Staff*

"… we can connect to it easily through the EMR but if I want to send someone something … I have to go through the process of printing that to PDF, saving it on the hard drive, and then going back into Pomelo and uploading it onto Pomelo … then having that stuff on my hard drive … I have to go through regularly and delete all these things that are on work computer or my, if I'm working from home, they end up on my laptop." *Family Physician*

	"I have to save it on my desktop, and then I have to upload it into my EMR … then I have to delete the thing that's on my desktop. And then I have to make sure that I remember to … delete my trash so that it's not just sitting on my desktop … I feel it's a bit insecure … if I do one of those steps wrong then I may have somebody's private data information. Albeit my desktop is secure. But … it's just now sitting there in another … maybe slightly less secure place that I feel is inappropriate." *Family Physician* "… if it's on the desktop, I have to right away delete it … there is that risk. Like I wouldn't want to forget to delete it. But I believe what I'm hearing is that's going to be solved soon, too." *Family Practice Nurse* "… to send anything to the patient, we have to download it and save it as a PDF to our personal drive. And that's a little bit of breach of confidentiality in case … we're not here or somebody's out sick, that person, then they can't send it to the person … if they forget or anything like that. But I'm sure it's being worked on." *Administrative Staff*
Difficult to integrate with the existing appointment scheduling system	"One of the features that we hope to use but we're not using is the self-booking phenomenon for patients to be able to go online and book their appointments with us. Our booking templates are much too complicated for the Pomelo system to actually be able to handle … it's been delayed by COVID. We've had too many other changes and things to think about. But we are looking at possibilities of simplifying how we book to make it more amenable to having some of those appointments available for self-booking. You know, with our learners, we do a lot of co-booking and co-booking with nurses. And it's just the Pomelo system as it currently stands can't handle it. And I'm not sure that they will be driven to further fashion the software to meet our needs in that way. So we will probably have to fashion our booking or change our booking to better fit into what that program can do. But a lot of patients, as I'm talking to patients in the office about signing up for it, that is something that that they say, "Oh, yeah, that would be great," you know … having the self booking I think would be a patient-friendly, a patient-centred kind of thing. But we can't do it yet. So we're working towards that." *Family Physician*

	"Because of the way our bookings go … patients can't book online. So that aspect of it is just off the table because our appointments are complex so it's just too difficult … I don't think at this point that we could utilize it any better than what we are." *Administrative Staff* "The [laugh] original reason we were looking at it was to allow eventually online booking. Which we should be able to do. Although our booking system here is quite complex so we haven't been able to quite figure out how to do it yet." *Family Physician* "I'm hoping that we will be able to figure out a way that we can use the booking part of it." *Family Physician* "We're hoping at some point we'll be able to use it where patients are able to register online so it's a little easier. It's a little difficult for us because of our residents. So the scheduling is a little bit more difficult because you have to pair a patient with the resident and the physician at the same time." *Administrative Staff*
Challenges with Pomelo Health generating false appointment reminders for patients	"… I had a couple of calls yesterday saying, "I got an email stating that I had a doctor's appointment. Did I miss it?" or "I'm not available at that time" And when I go in, the doctor had actually put the patient on the schedule as admin time. So it wasn't the fact that the doctor was going to contact the patient, but they were going to review their chart or do paperwork on them. But because they put it into the EMR, Pomelo picked it up and shot them off a message saying you have an appointment. So that has become … I guess a bit of an issue that patients are either upset that they missed an appointment that they didn't know about … they're not actual appointments. They're just where the doctor has blocked their own time off to look at forms or whatever on behalf of this patient. Which they don't need the actual patient's appointment time. So that is one of the issues that we're dealing with right now with the program." *Administrative Staff* "So we find it very challenging right now … that our conversations are constantly there … even if we archive them, they seem to stay up on our main screen. So they never go away. So it always looks like we have messages. And if they're opened or unopened, it's like the same colour. So … you can't quickly look at it and say, oh, this one's already been taken care of. But it's still on the list and it's not getting archived to the

	patient's chart. Or when it's on the list, there's no easy way to just click archive that conversation or download it. It's just there. And you have to go into each individual one. There's no external button on the list that you can just like check mark off and hit that it has been completed. So I find that a little challenging …" *Administrative Staff*
Need for message dictation	"… they send the message, and then I can send a response back. Oh, I would like to be able to dictate it. Maybe that would make it faster." *Family Physician*