IMPACT OF VIRTUAL VISITS IN PRIMARY CARE

EXTENDED REVIEW

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References
Rapid Evidence Review

Impact of Virtual Visits in Primary Care

Review Questions

1. What is the impact of virtual visits in primary care on outcomes\(^1\)?
   a. Are there differences in outcomes if the service is provided by a known provider and team (ongoing relationship) compared to episodic care by a non-familiar provider?

2. How do virtual visits in primary care affect outcomes among specific populations\(^2\)?
   a. What are the barriers and facilitators of virtual visits among these populations?
   b. Which populations benefit from virtual visits? Which populations do not benefit?

3. Are there evidence-based tools and/or decision aids for the selection of patients, medical conditions and procedures for virtual visits in primary care?

In addition to the research questions listed above, Appendix E captures lessons learned that were extracted from the articles included in this review that are applicable to virtual care in primary care in Alberta.

Context

- During the COVID-19 pandemic, access to in-person ambulatory visits and procedures has been limited to urgent/emergent visits. In order to reduce potential for exposure to COVID-19, virtual care has been recommended where clinically appropriate.

- An initial Rapid Evidence Review on the impact of virtual visits compared with or in addition to in-person visits in primary and specialist care was prepared for the COVID-19 Scientific Advisory Group (SAG) in the summer of 2020.

- The SAG rapid review highlighted the need for an extended review of evidence on the impact of virtual visits in primary care within the context of team-based care as this aligns with the Patient’s Medical Home and patient-centred care in the Alberta context.

- The SAG review also recommended a detailed examination of the impact of virtual visits on populations considered vulnerable or marginalized.

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1 Outcomes: access, continuity of care, patient and provider/team experience and satisfaction, utilization of medical services (e.g., lab, diagnostic imaging, prescriptions, referrals, hospitalizations and emergency department visits)

2 Populations: elderly, poor mobility, disability, mental health, substance use, non-English speaking, rural/remote/urban, Indigenous, homeless, low income, low education, ethnicity/culture, and other marginalized and/or vulnerable populations
• A review panel involving primary care physicians, medical specialists, an evaluation consultant, health services researchers and patients was convened to define the final research questions for this extended review.

• The extended review focused on direct communication (asynchronous or synchronous) between a primary care physician and/or a team member and a patient using video, telephone, text or email modalities. All populations, including those marginalized and vulnerable, as well as all medical conditions for patients who presented to primary care, were included.

• Systematic reviews, randomized controlled trials (RCTs), meta-analysis, observational studies, survey research, interview and focus group research, and evaluation study designs were included.

• The extended review is intended for distribution to a broad group of stakeholders (e.g., AHS, AMA, AH, CPSA, ACFP, PCNs) to help inform the development of policies, implementation plans, and practice guidelines focused on the use of virtual care as a tool to address patient medical needs in Alberta. This report is also intended to augment the initial rapid review conducted for the AHS COVID-19 Scientific Advisory Group.

Executive Summary

The findings from this study confirm the results reported in the initial Rapid Evidence Review on the impact of virtual visits compared with or in addition to in-person visits in primary and specialist care, prepared for the COVID-19 Scientific Advisory Group (SAG).[1] While the overall state of evidence is insufficient, for the most part, to make definitive conclusions regarding the impact of virtual visits in primary care on patient outcomes and healthcare utilization, virtual visits appear to be the same as, or in some cases better than, face-to-face visits.

Among the 106 articles that met the inclusion criteria and were reviewed, many studies were heterogeneous, had small sample sizes with short patient follow-up times, and were at risk of significant bias, leading to mixed results for email, telephone and video virtual visit modalities.

Common outcomes examined across studies included acute care utilization, patient/provider satisfaction and experience, access to care (e.g., out of office hours), and chronic disease management. Virtual visits resulted in improved access to care and high patient satisfaction. Results were mixed for physician satisfaction, antibiotics prescribing rates, laboratory testing, and whether there was an increase in visits to primary care. Emergency department (ED) and urgent care utilization, as well as hospital readmissions, were unaffected by virtual visits. While many studies were unable to demonstrate any significant change in outcomes, there was evidence to suggest virtual visits were as effective (or ‘non-inferior’) as face-to-face visits.

No systematic reviews or RCTs explored how relational continuity impacted virtual visit outcomes. However, there is evidence, from qualitative studies, suggesting that established relationships are important to both patients and providers, and that this relationship should be present before a virtual visit is undertaken.

While results indicate virtual visit options can be an appropriate alternative to face-to-face visits, there are specific conditions that facilitate a greater benefit (i.e., considering when and where to conduct the visit and what patient cohort may derive the most benefit).[2]
Overall, most studies demonstrated positive effects when using telephone, email or video visits to address healthcare needs of low-income communities, older adults or ethnocultural populations, despite the relatively small number of studies that specifically addressed these populations. Evidence was gathered largely from feasibility studies focused primarily on improving service accessibility for specific subpopulations receiving healthcare. While these studies may not be methodically robust and are subject to bias, they identify common themes and findings for these subpopulations.

The current review was unable to identify evidence-based tools or decision aids to support the triaging of patients/conditions suitable for virtual visits in primary care. However, the literature noted that it was commonplace to use clinical judgement and past knowledge of patient need to decide which patients would benefit most from usual care or virtual visits.

Patient Advisor Engagement

The team would like to acknowledge the involvement of the patient advisor group, which took part in this evidence review. Patient advisors (n=3) provided feedback on the development of the review questions as well as feedback on the final draft of the report. The patient voice and perspectives enhance the applicability and relevance of the narrative and findings in this report to the Alberta context.

Practical Considerations

This review explored virtual visits in primary care within the context of team-based care, which aligns with Alberta’s primary care reform goals, including the Patient’s Medical Home. Given recent and anticipated growth in the use of virtual visits as another tool to provide safe, quality care to Albertans, family physicians, along with their multidisciplinary teams, will need to consider which conditions and elements of care are appropriate to be performed virtually. Based on the findings of this review practical considerations are listed below.

● Findings suggest virtual visits (i.e., telephone, video, email) provide an opportunity to support and augment relational continuity between patient and provider. Initial visits with patients (i.e., new patients or existing patients with new symptoms) should be face-to-face. Patients benefit when they see the same provider on follow-up visits (virtually or face-to-face).

● Virtual visits in primary care may increase access to care and decrease wait times for patients with different needs and preferences. Other groups who could benefit include patients who travel for work (e.g., long-haul truck drivers and oil field workers) and those whose lives are structured around education (e.g., university students) or childcare (e.g., single mothers or those with low support).

● Utilizing the primary care team (i.e., nurse, social worker, pharmacist), seemed to be the most effective way to implement virtual visits in primary care. This reinforces the notion of the Patient’s Medical Home model and leverages all aspects of shared care across team members. [3]

● There is mixed evidence on the impact of virtual visits on healthcare utilization; impact appears to be context-specific and depends on patient populations and the barriers and facilitators that exist to support virtual visits.

● Providing patients with chronic disease the opportunity to engage in more direct communication (e.g., secure messaging through a portal, email, or text message) with their primary care provider and care team appears to be an effective strategy to help patients manage their chronic conditions (e.g., diabetes, hypertension, depression).
● Patient satisfaction studies indicated patients perceived and experienced virtual visit options positively; however, there was mixed evidence for provider experience and satisfaction. This is likely due to individual preferences and context-specific situations.

● Most studies demonstrated positive effects when using telephone, email or video visits to address healthcare needs of low-income communities, older adults or ethno-cultural populations. Virtual visits appear to support primary care practices’ ability to reach vulnerable and marginalized patient groups.

● While there are no validated, evidence-based tools and/or decision aids for triaging patients/conditions for virtual visits in primary care, the use of patient risk as a proxy is a common strategy.

● Given the predominance of weak evidence in the existing body of literature, further research and evaluations on the impact of virtual visits on healthcare utilization, patient outcomes, and marginalized or vulnerable populations is warranted.

● Finally, there are many lessons learned that can be extracted from the evidence on virtual visits in primary care. With an ongoing increase in the use of virtual care over the past 10 years, coupled with the current COVID-19 pandemic context, rapid growth in evidence is anticipated. A reexamination of the literature on a regular basis may prove useful. Additionally, an evaluation of virtual visits in Alberta is timely and will provide further evidence of impacts that are context-specific.
Strength of Evidence

This review focused on direct communication (asynchronous or synchronous) between a primary care physician and/or a team member and a patient using video, telephone, text or email modalities. The OVID database was searched (Medline and PubMed), as were CINAHL, Google Scholar and TRIP databases, in June, 2020. The search was limited to English language articles published between 2010 and 2020 (2015-2020 for Question 1). Approximately 2600 citations were identified and reviewed, and 106 articles were included in the final review for Questions 1 and 2. Question 3 inclusion/exclusion criteria differed slightly, focusing on populations that were considered marginalized or vulnerable. Appendix A lists the inclusion/exclusion criteria for Questions 1, 2 and 3.

Of the 106 articles included for Questions 1 and 2, there were 8 systematic reviews (US=1, unknown country of origin=7), 14 RCTs from 7 countries (UK=4, US=4, Spain=2, Australia=1, Canada=1, Iran=1, Germany=1), 39 retrospective/prospective cohort studies, 37 qualitative research articles (including survey studies), 2 evaluation studies, 2 non-systematic reviews, and 4 pilot studies.

For Question 2, of the 25 articles pertinent to populations that were marginalized and vulnerable, the majority were qualitative study designs (n=9) and pilot studies (n=4). Additionally, there were 3 RCTs, 2 systematic reviews, 5 retrospective cohort studies and 2 cross-sectional surveys.

A separate search was conducted for Question 3. There were 39 citations identified and reviewed, 8 full text articles were reviewed and 1 article (care guideline report) was included in the final review for Question 3 (refer to Appendix A).

Limitations of Review

- The search strategy was limited to articles published in English from 2010-2020 (2015-2020 for Question 1). Given advances in technology associated with virtual visits, 10 years was deemed sufficient to capture the most pertinent studies for this review. Studies published earlier than 2010 that may have examined the effectiveness of older technologies on the delivery of healthcare, such as telephone and email, were not captured in this review.
- To ensure feasibility of the rapid review, articles that were both available and met inclusion criteria were selected.
- This review focused primarily on studies with strong methodology, such as systematic reviews, RCTs and cohort study designs. Most systematic reviews included RCTs; however, the majority of these studies were underpowered sufficiently to detect differences in clinical outcomes and health system utilization.
- Qualitative literature, such as survey, interview and focus group research, was included and data extracted. Grey literature was reviewed to identify and include previously published peer-reviewed studies.
- Results from the qualitative studies may contain selection, response, or early adopters’ bias. For example, individuals who participated in the surveys or interviews were voluntary patients, family physicians and other healthcare professionals who were early adopters of virtual visits. These participants are likely to be more inclined to agree to share their perspectives and are known to have different characteristics than middle to late adopters of virtual visits.
• This review did not consider cost, funding models, or remuneration in virtual care delivery, other than when noted, as a barrier to adoption and uptake of virtual visits. A review of costs associated with virtual visits for both primary and specialty care is presented in a review by Lunney et al.⁴[4]

• Lastly, high variability in the literature regarding how virtual visits are defined was noted in the review. For example, ‘video visit’ and ‘telehealth’ had the same meaning in one context, but were different in another context (i.e., occurring at home versus in a healthcare facility). This review ensures similar interpretations of virtual visits across the studies compared.

Framing the Review and Results

Common Terminology
There is a wide array of terminology used in the literature with reference to virtual care. The heterogeneity of these terms (e.g., telehealth, mHealth, e-Visit, e-Health, e-consultations, desktop medicine, digital health) reflect the different modes of delivery and can vary from one region to another. The current definition of ‘virtual care’ in Alberta and Canada is “any interaction between patients and members of their circle of care, occurring remotely, using any forms of communication or information technologies with the aim of facilitating or maximizing the quality and effectiveness of patient care.”⁵[5] Canada Health Infoway⁶[6] defines a ‘virtual visit’ as a “secure two way digital communication between health providers and their patients that can include emails, text messaging and videoconferencing”. The review uses the term ‘virtual visit’ to mean communication between a patient and provider using telephone, email/secure messaging, text or videoconferencing. A comprehensive list of terms and definitions is provided in Appendix B.

Asynchronous and Synchronous Communications
Virtual visits refer to encounters between a patient and provider that are separated by distance and time (asynchronous) or by distance only (synchronous). The asynchronous modes of visits are typically in the form of emails or text messages, whereas the synchronous modes of visits have either an audio-only component (e.g., telephone) or include both video and audio (e.g., videoconferencing).

Email communication was also referred to as ‘secure messaging’ within the virtual visit literature, usually in reference to communicating with a provider using a patient portal; in the context of this review email communication and secure messaging are considered synonymous. Visits that occur virtually have the ability to avoid the expense, burden and time needed for a patient to travel to a clinic to engage with a primary care provider and team.⁷–¹¹[7-11]

Patient Portals
Patient portals are secure online applications that allow patients to view laboratory and other test results, manage their health information, request medication refills, schedule appointments, access general medical information, or seek advice from a provider through secure messaging. Patient portals are often tethered to an enterprise-level electronic health record (EHR); as such, patients must be invited by a health authority to register and experience the features of the portal. An example of a patient portal is MyChart, which is associated with the EHR EpicCare. The secured messaging feature of the patient portal functions similarly to regular email except the patient must log onto the portal to send the message; this added step provides an additional
level of security and privacy. Patients are also typically limited to sending a message to only their primary care provider and/or team members.

Patient and Provider Characteristics of Virtual Visits in Primary Care

Table 1 below highlights common characteristics of patients and providers who utilized virtual care. These were extracted from the studies included in this review.

Table 1. Common patient and provider characteristics from the literature

<table>
<thead>
<tr>
<th>Virtual Care Adopters</th>
<th>Provider Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Groups</td>
<td>Provider Groups</td>
</tr>
<tr>
<td>- Young; less than 60 years of age in multiple studies. [12-17]</td>
<td>- Female physicians significantly more likely to use texting. [36]</td>
</tr>
<tr>
<td>- Predominantly women. Women utilize the healthcare system more than men and are more likely to work from home or care for children and prefer the convenience of not going to a clinic. [7,18-23]</td>
<td>- No variation based on age. [36]</td>
</tr>
<tr>
<td>- White, non-minority patients. [16, 24-28]</td>
<td>- Email communications used most often by physicians who were enthusiastic, young, unconcerned about time pressures, and/or working in a large urban or university-based practice. [17]</td>
</tr>
<tr>
<td>- Evidence suggesting virtual care use is more common among patients from urban areas. [17, 29-31]</td>
<td>- Reasons physicians adopted virtual care: desire to modernize practice, respond to patient needs, effective provision of care in remote locations, [36, 37] improve relationships/trust with patients, [38] increase availability to patients, [36, 37] effective for dealing with simple tests (e.g., prescription refill), [34, 36, 38] flexibility of asynchronous messaging, [36, 39] and/or face-to-face was not working for their practice. [26, 38]</td>
</tr>
<tr>
<td>- Evidence related to socioeconomic status is mixed and limited. 2 studies showed education, income and private insurance were connected to virtual care use, [17, 25] while another study found no association between virtual care usage and income and employment. [32]</td>
<td>- Physicians selective in who they offered virtual care to (e.g., patients with an established relationship, patients with mobility issues, etc.). [33]</td>
</tr>
<tr>
<td>- Common reasons for virtual care use reported by patients included: convenience, remote access, changing appointments, avoiding unnecessary visits, and asking questions about current treatment regimens (i.e., medication changes). [9, 14, 33-35]</td>
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Question 1

What is the impact of virtual visits in primary care on outcomes?

a) Are there differences in outcomes if the service is provided by a known provider and team (ongoing relationship) compared to episodic care by a non-familiar provider?

SUMMARY OF EVIDENCE

Common outcomes examined across studies included continuity of care, access to care (e.g.,
out of office hours), healthcare utilization, patient/provider satisfaction, experience with technology and chronic disease management. While many studies were unable to demonstrate any significant change in outcomes, there was evidence to suggest virtual visit options were as effective as usual care (i.e., face-to-face visits).

**Continuity of Care**

Given that relational continuity and attachment between patient and provider are the central tenets of primary care in Alberta, there is growing interest in how virtual visits impact these two constructs. In Canada, United States (US) and the United Kingdom (UK), Direct-to-Consumer (DTC) Telemedicine options, also known as ‘virtual walk-Ins’, have emerged. Additionally, the emergence of COVID-19 has led to an increased use of virtual visits. The combining of these two situations raises the awareness, interest and need to further understand the relationship between virtual visits and relational continuity and attachment in primary care.

The review’s findings suggest information technology provides an opportunity to support and augment relational continuity between patient and provider. One study that focused on Indigenous persons’ perspectives[10] on virtual visits highlighted the importance of continuity of care in reinforcing patient-physician attachment. Two fundamental elements were agreed upon by patients and physicians: initial visits with patients must be face-to-face, and patients must see the same provider on follow-up visits (virtually or face-to-face).[10, 13] Providers also emphasized provider continuity in patient care is an important factor in the acceptability and effectiveness of healthcare delivered through virtual visits. The study indicated that when physicians emphasized the importance of continuity of care, patients perceived the providers as invested in their care.[10] Similarly, patients indicated that longitudinal continuity with the same provider leads to open communication.

No systematic reviews or RCTs explored how relational continuity impacts virtual visit outcomes. However, several qualitative studies suggest established relationships are important to both patients and providers prior to a virtual visit.[10, 14-16] In a study by Donaghy et al.,[15] patients and family physicians identified the importance of an existing physician–patient relationship prior to follow-up video consultations. This relationship was especially important when physicians had to deliver difficult news to patients.[14, 15] Other studies noted virtual visits are not appropriate for all patients or for every condition.[13, 17] A physician’s knowledge of whether the patient is at a higher risk for complications, (e.g., patient has a history of non-compliance, or has verbal and/or cognitive impairments) will enhance success of the virtual visit encounter (i.e., text, email, telephone, or video).

An observational cohort study in British Columbia, Canada[16] noted that one-third of virtual visits occurred between patients and providers who had an existing relationship, and that patients over the age of 45, living in an urban centre with a complex health condition, were more likely to have a virtual visit with a known provider, while patients with a low socioeconomic status were least likely have a virtual visit with a known provider. The virtual visit with the known provider resulted in a higher rate of referrals for diagnostic imaging, with similar rates of laboratory testing as face-to-face visits. This study illustrated when an existing relationship is present between a patient and family physician, the virtual visit could be as effective as a face-to-face visit.

**Access to Care**

When compared to usual face-to-face care, virtual visits demonstrated improvements in access to care. In one study that focused on the delivery of virtual visits in rural settings - the primary benefit of virtual visits, identified by both patients and providers - was the potential for reducing
travel and healthcare costs. Other benefits included increased access and decreased wait times for patients as opposed to waiting for physicians and specialists to travel to their rural communities to provide care.\[^{10}\] Access to remote consultation was identified as a common theme from patient interviews in the Donaghy et al.\[^{15}\] study. For patients who commuted to work, and for those whose lives were structured around work, study, or childcare, virtual access was particularly convenient.

Bishop et al.\[^{18}\] found similar results for video consultations, where patients reported time savings when accessing virtual care. Physicians in another study reported that text messaging improved same-day access to care for patients and enhanced their ability to manage their time during the day, creating more efficiencies and opening up more “time to care” for others.\[^{19}\] Primary care practices in the UK adopted a telephone-first approach in an effort to meet patient demand and increase patient access to care. All family physicians interviewed in this study reported speaking to more patients than under the traditional system.\[^{17}\]

While a virtual visit may not always be an appropriate substitute for a face-to-face visit, this review highlights several advantages from a patient’s perspective. For example, secure messaging through a portal (or other asynchronous communication modes) may provide a real-time reassurance and an opportunity to connect with a family physician about a specific question or uncertainty associated with a chronic illness. Usual care provides a discrete time window for a patient who may have several questions/concerns that could be overlooked if their communication style or preference is not commensurate with a short appointment. The ability for a patient to relay an issue as it occurs asynchronously, and not waiting for a face-to-face appointment, suggests that in some cases, virtual visits allow for a service option that is more patient-centric by increasing the availability of time (thus access) for a visit to occur.\[^{12}\]

**Healthcare Utilization**

Eleven observational cohort studies and one RCT examined the impact of virtual visits on patient healthcare utilization. These studies focused on ED or urgent care encounters (n=4), hospitalizations (n=3), follow-up visits to primary care (n=7), laboratory testing (n=5), referrals for diagnostic imaging (n=2), and prescription rates for antibiotics (n=6).

a) **ED or urgent care encounters**

Four studies (3 observational cohorts and 1 RCT) examined whether virtual visits resulted in a greater ED or urgent care utilization. The virtual visit was delivered by telephone in each study, on two different patient populations (i.e., general population, older and/or complex patients). Both studies indicated that virtual visits did not impact ED or urgent care encounters.\[^{21-23}\] In a study by Miller et al.,\[^{25}\] the impact of synchronous virtual visits on inner city, lower-income populations in Ireland demonstrated no changes in ED visits at one-year following the implementation of the program.

b) **Hospitalizations**

Three studies (2 observation cohorts and 1 RCT) examined whether telephone visits impacted hospitalizations. Two studies did not observe any difference in hospitalization rates when compared to controls.\[^{21, 23}\] In the third study, medication reconciliation with a primary care-based pharmacist post-discharge demonstrated a reduction in all-cause hospitalizations within 30 days in an elderly population.\[^{40}\]
In one systematic review[20] examining telephone follow-up in primary care post-hospital discharge, neither an increase or decrease was observed for hospital readmissions or subsequent ED use. Despite the growing use of telephone follow-up in primary care post-hospital discharge, there are few high-quality studies that demonstrate a benefit or drawback, suggesting that virtual visit follow-ups post-discharge are at least as good as face-to-face visits.

c) Follow-up visits to primary care

Seven observational cohort studies examined whether patients who used virtual visits had an increase in subsequent follow-up visits in primary care. The results were mixed for several studies that examined the diagnosis and treatment of respiratory and urinary tract infections in primary care.[26-28, 32] Three studies noted no change in the number of follow-up visits to primary care when virtual visits (telephone, video, email) were used compared to face-to-face visits.[22, 26, 41] Four studies noted an increase in the number of visits to primary care 24 hours, 14 and 30 days after the virtual visit (text messaging, telephone, and secure messaging via patient portal).[27-30]

d) Laboratory testing

Five observational cohort studies examined the impact of virtual visits on the rate of laboratory testing. Two studies reported virtual care providers were less likely to order laboratory tests for diagnosing bacterial respiratory and urinary infections.[26, 28, 32] McGrail et al.[16] noted an increase in laboratory testing if the virtual visit was with a provider who did not have a relationship with the patient. The fifth study examined the impact of text messaging on inner city, lower-income populations in Ireland, and did not find an increase in the number of laboratory testing that were ordered.[25]

e) Referrals for diagnostic imaging

Two observational cohort studies examined whether virtual visits (telephone and video) impacted the referral rate for diagnostic imaging. Both studies observed a decrease in referrals for virtual visits when compared to patients receiving face-to-face care.[16, 26] However, when the virtual visit was with a known provider, a higher rate of referrals was observed for diagnostic imaging.[16]

f) Prescription rates for antibiotics

Six observational cohort studies examined whether virtual visits impacted the prescribing rate of antibiotics. The results were mixed, with five studies reporting an increased rate of prescriptions provided to patients who had a virtual visit compared to face-to-face visits[16, 26, 27, 29, 41] and one study noting no difference.[28] McGrail et al.[16] did not differentiate antibiotics prescriptions, but indicated an overall increase in all prescriptions. The prescribing behaviours did not appear to depend on whether the physician had a previous encounter with the patient, as only two studies[16, 29] mentioned continuity of care as an outcome. Several of these studies noted a decrease in laboratory testing,[16, 26, 27, 41] suggesting that prescriptions for antibiotics were provided in the absence of laboratory confirmation.

Patient/Provider Satisfaction and Experience

Several studies noted improved patient satisfaction when seeking care using virtual visits with a known provider or when seeking care with a known group of physicians.[17, 18, 23, 31, 33] In many studies, patients expressed satisfaction with the convenience of virtual visits because it
eliminated the need for travel and provided flexibility to accommodate patients’ daily lives. Patients also reported appreciating the ease with which they could communicate with their providers through virtual modalities. Most family physicians reported their patients were more satisfied with their care post-initiation of electronic communication. In one qualitative study, both patients and physicians expressed satisfaction with the ability to accommodate personal schedules with secure messaging through a patient portal and appreciated having an electronic record of the communication.

Family physicians expressed both positive and negative experiences with virtual visits. In one retrospective cohort study, family physicians liked the flexibility of a telephone-first approach and were satisfied with an increase in control over their workday, but reported challenges balancing call-backs with other tasks. Physicians expressed concern that misunderstandings may arise during virtual visits and that too much of their time may be used responding to virtual requests. Additional concerns included lack of personal contact with the patients, acute issues and loss of income (inadequate reimbursement for virtual visits). In Quinlan et al., a national survey of family physicians in Ireland indicated 84% of physician respondents reported having positive experiences texting with patients.

**Chronic Disease Management**

Chronic disease management is a significant aspect of the services provided in primary care. It is therefore important to understand the impact of virtual visits as a tool to deliver effective care to this patient population.

Of the 106 studies reviewed, 15 involved chronic disease; there were 7 RCTs, 7 cohort studies and 1 qualitative study. Several studies examined support for self-management in patients with chronic disease (e.g., diabetes, hypertension) when comparing virtual visits to usual care.

Patients with chronic disease who have increased access to their information through patient portals are often motivated to self-monitor and change behaviours. Secure messaging was associated with better glycated hemoglobin (HbA1c) control in patients who sent more messages to their primary care provider than those who did not message at all. Personalized or patient-centred messages received by Indigenous patients with diabetes from their provider demonstrated improvements in patients’ management processes (measuring and uploading blood glucose results). One systematic review and meta-analysis noted a small and positive effect of virtual visits (defined broadly, as an ‘e-health’ intervention, including web-based interventions, mobile apps, email therapy, chat therapy, and video therapy) compared to usual care for patients with depressive symptoms or depressive disorders treated in primary care.

Overall, providing patients with chronic disease the opportunity to engage in more direct communication (e.g., secure messaging through a portal) with their primary care provider and care team appears to be an effective strategy to help patients manage their chronic conditions (e.g., diabetes, hypertension, depression).
Question 2
How do virtual visits in primary care affect outcomes among specific populations?
   a) What are the barriers and facilitators of virtual visits among these populations?
   b) Which populations benefit from virtual visits? Which populations do not benefit?

SUMMARY OF EVIDENCE

Overall, most studies demonstrated positive effects when using telephone, email or video visits to address healthcare needs of low-income communities, older adults or ethno-cultural populations, despite the relatively small number of studies that specifically addressed these populations. Further evidence about virtual care processes with elderly populations and persons who have disabilities would be beneficial given that benefits of virtual visits may accrue in populations having a higher prevalence of chronic medical conditions.

Evidence was gathered largely from feasibility studies primarily focused on improving service accessibility for specific subpopulations receiving healthcare in the US, UK, Spain, Australia and New Zealand. While these studies may not be methodically robust and are subject to bias, they identify common themes and findings for these subpopulations. The findings from these studies are described below using the dimensions of quality as a framework. Appendix C provides a summary table describing the overall direction of findings.

Acceptability
Several studies noted improved patient satisfaction and experience using telephone visits with lower-income or ethno-cultural groups.[11, 24, 48] These visits addressed longer-term health conditions and took place between providers (family physicians or nurses) and patients who had a previously established relationship. A care improvement project in a lower-income community showed that nurse-led telephone follow-up visits focused on supporting parents of young children in achieving healthy habit goals created during a face-to-face visit increased parent confidence and motivation, helped parents meet their goals, and was well accepted by parents and families.[48]

There were also mixed effects in some studies, highlighting areas requiring attention during virtual visit implementation. In one study, while over 90% of patients felt they could talk to their physician about everything they wanted to on the telephone and that their physician also understood them well, approximately one-third of culturally diverse patients did not like having a telephone visit because their physician could not touch or see them.[11] A systematic review highlighted the lack of research examining how older adults view telephone communication and management, in particular primary care nurse–patient telephone communication, and how older adults can be involved in improving nurse–patient telephone services that meet their needs.[49]

Accessibility
All studies examined in this review pertaining to specific populations found improvements in patient experience accessing services. This was demonstrated across US Indigenous populations,[10] homebound older adults,[50] multicultural groups,[11] lower-income populations living in the US and UK,[17, 32] and patients with mental health concerns seeking resources.[45] Indigenous populations living in rural and remote areas voiced concerns for in-person visits regarding travel time, finding housing and ground transportation, and orienting themselves to unfamiliar environments.[10] Benefits for these virtual visits included increased access compared to waiting for physicians to travel to rural communities[10] or homes.[50] Convenience appeared to be as critical as distance and the time of year (i.e., the winter season) in using emails to access
services for low-income populations.[32] In this study, patients who regularly sought care were more likely to use email.

Video visits were the modality chosen in feasibility studies with Indigenous populations and homebound older adults. Focus groups with providers showed they believed telephone visits improved time management because of their brevity.[11] One systematic review[51] noted that while patient access is an often cited driver of virtual visits with marginalized populations, it has not been directly examined as an outcome of telephone triage with older adults.

**Appropriateness and Efficiency**

Although virtual visits were always considered on a case-by-case basis, several studies examined underlying issues for which patient populations and specific problems would optimally use virtual visits. Through focus groups and qualitative surveys, physicians commented most appropriate for telephone visits were medication management for chronic disease, discussions about laboratory test results, lifestyle counseling and depression follow-up.[11] An email content analysis found that patients from low-income areas used email for appropriate health-related communication, including: 1) action (66%) regarding medication, lab tests, referral to other physicians, and 2) for information (34%) regarding symptoms, tests or procedures, medications or treatments.[52] One patient survey in the UK suggested that up to half of patients’ problems could be dealt with on the telephone.[24] Patients also commonly reported virtual visits may not be the best option when discussing personal or serious issues or when receiving difficult and/or bad news, and that a face-to-face consultation would be more appropriate for these.[93] However, other studies have suggested the opposite; virtual visits may be a good option to discuss personal issues where the face-to-face discussion may be awkward.[53]

Physicians commented that telephone visits were not appropriate for patients with cognitive challenges or hearing problems, diagnoses that require an examination or point-of-care testing, or new patients.[11] Family physicians also commonly reported that virtual visit options are likely not a good option for patients dealing with new symptoms and/or complex health issues (i.e., end of life scenarios, multiple chronic conditions, mental health issues).[33] Two practices in economically deprived areas of the UK identified population groups who were challenged by the telephone first approach: patients for whom English was not their first language, older patients, deaf or hearing-impaired patients and patients without telephones.[17] Calls from patients with limited English proficiency were longer and more often made by a surrogate.[54] These patients received recommendations for higher acuity care more frequently (49.4% vs 39.0%), were less likely to follow recommendations (60.9% vs 69.4%), disagreed with recommendations more frequently (30.1% vs 20.9%), associations that remained even after adjusting for comorbidities and confounders.

**Effectiveness**

Two qualitative studies examined continuity and found positive effects. Providers working with US Indigenous populations emphasized that provider continuity in patient care is an important factor in the acceptability and potential efficacy of healthcare provided through telemedicine technology.[10] Similarly, in the same study, patients indicated that the continuity of seeing the same provider over time builds relationships and assists in open communication. In a multicultural setting, physicians felt that telephone visits improved patient-centeredness through improved access, continuity of care, and convenience for patients who did not have to take time off work or travel to a clinic.[11]

Two qualitative studies found support for adherence to provider recommendations using telephone visits. One feasibility study found that most low-income women who accepted
referrals for post-natal depression also accepted referrals for support (75%), with no differences by age, nationality, English proficiency or depression history.[55] In focus groups, physicians felt that patients followed up on recommendations (e.g., blood tests, vaccinations) after telephone visits as often as in-person visits (89%) and that telephone visits are more time-efficient than in-person follow-up visits (78%).[11]

Clinical Outcomes

Clinical outcomes or specific conditions appeared to show improvement through telephone visits. A systematic review of telephone visits with older adults showed that interventions were successful in improving predetermined, individual disease-specific health indicators across the US, Australia and Germany.[49] In a single-arm RCT conducted with low-income populations in California, mean values of mental health-related quality of life improved after health coaching and were comparable to other drug-using populations.[56] A feasibility study in Massachusetts identified early post-partum depressive symptoms in a clinically significant number of women who were referred for and accessed prompt treatment and support services.[55]

Health Service Utilization

Results focused on healthcare utilization patterns showed mixed effects across six studies, suggesting virtual visits with primary care providers do not always avert acute healthcare visits. Using an RCT design, telephone coaching by physicians did not produce a statistically significant reduction in the use of urgent or emergency services among elderly patients with high-level dependency.[21] Similarly, there was no evidence that using a telephone first approach with lower-income communities substantially reduced overall attendance at EDs or emergency hospital admissions.[24] Using cross-sectional electronic medical record (EMR) data on low-income groups, one study showed that antibiotics were more likely to be prescribed at an email visit for urinary tract or sinusitis infections.[41] However, it was reassuring that the fraction of patients with any follow-up visits was similar to in-person visits, since these follow-up visits are a proxy for misdiagnosis or treatment failure.

Three studies showed positive effects with health service utilization. In a retrospective EMR review, a transitions of care program, including telephone medication reconciliation following discharge from the ED, observation unit, or inpatient admission, led to a reduction in all-cause in-patient admissions within 30 days in an elderly population.[40] Cross-sectional surveys with a multicultural patient panel and their providers showed that 50% of after-hours telephone calls triaged by a nurse practitioner in a one-year time frame averted an ED visit.[57] Only 7% of these calls resulted in an ED referral, and these patients were appropriately referred based on complaints of unexplained pain, head injury, and high fever.[54] Lastly, an interrupted time-series design on telephone visits with primary care providers working with inner city, lower-income populations in Northern Ireland showed these visits reduced face-to-face consultations (-39%) with no change in lab test requests, no difference in rate of referrals to hospitals, no difference in general practitioner (GP) out-of-hours attendance rates, and no difference in ED attendance at the one year measure.[25]

A list of common barriers and facilitators are presented in Appendix D.

Question 3

Are there evidence-based tools and/or decision aids for the selection of patients, medical conditions and procedures for virtual visits in primary care?
SUMMARY OF EVIDENCE

No evidence-based tools and/or decision aids which have been validated for primary care to support triaging patients/conditions for virtual visits were identified in the literature. However, it was commonplace in the literature to see the use of clinical judgement and past knowledge of patient need to triage patients and make decisions on which patients would benefit from usual care compared to virtual visits. There are several practical consideration guides for providing virtual visits (some specific to COVID-19 and broader) from organizations such as Oxford University, Canadian Medical Association and Alberta Medical Association. Additionally, Health Standards Organization, the body that develops the standards used by Accreditation Canada, has issued a standard for virtual health. This standard emphasizes the role of the patient and family in the design and operation of virtual health services. Several guideline documents focus on practical considerations, recommendations, and challenges in providing virtual visits in numerous countries, including Canada. The Rotary District 5360[^8] created a short video to guide patients through video consultations. This is the only resource identified that indirectly addresses evidence-based tools; however, a variety of articles in the evidence review supported the use of patient risk or risk stratification as a process to help triage patients in terms of appropriateness for virtual visits.

Although there is a larger body of literature examining decision support tools in public health programs which focus on triaging patients through telephone service, these were excluded as part of the current search strategy. These services are population-based and provide coverage to a large geographical area. For example, triaging primary care programs is more common in the UK, where nurses use telephone triage to manage face-to-face appointments with physicians. There are computer decision support tools (i.e., triage-based decision tree algorithms) used in these programs to help nurses decide whether patients need an appointment within primary care or require emergent treatment. These programs are similar to Health Link in Alberta, and thus were not deemed to fit within the scope of this review.

For a brief discussion on lessons learned and considerations for virtual visits in primary care, please refer to Appendix E.
Appendix A

List of Abbreviations

ACFP: Alberta College of Family Physicians
AH: Alberta Health
AHS: Alberta Health Services
AMA: Alberta Medical Association
CDM: Chronic Disease Management
COPD: Chronic Obstructive Pulmonary Disease
CPSA: College of Physicians and Surgeons of Alberta
COVID-19: Coronavirus Disease-2019
DTC: Direct-to-Consumer
EHR: Electronic Health Record
EMR: Electronic Medical Record
ED: Emergency Department
GP: General Practitioner
HbA1C: Glycated Hemoglobin
KRS: Knowledge Resource Services
PCNs: Primary Care Networks
RCT: Randomized Controlled Trial
SAG: Scientific Advisory Group
STIs: Sexually Transmitted Infections
TTAS: Telephone Triage and Advice Services
TTOC: Tele-Transitions of Care
UK: United Kingdom
US: United States

Methods

Literature Search

Two literature searches were conducted by Lauren Seal from Knowledge Resources Services (KRS) within the Knowledge Management Department of Alberta Health Services (one search for Questions 1 and 2, a separate search for Question 3). KRS searched databases for articles published from 2015-01-01 to 2020-current (Question 1) and 2010-01-01 to 2020-current (Questions 2 and 3), and included: Medline, CINAHL, PubMed, TRIP Pro/Google Advanced Search. Briefly, the first search strategy involved combinations of keywords and subject headings including: (1 *Telemedicine/ (18612) exp *Videoconferencing/ (1146) *Telecommunications/ (3432) (virtual adj2 care).ti,ab. (221) (virtual adj2 health).ti,ab. (473) ehealth.ti,ab. (2458) mhealth.ti,ab. (2813) exp *Telephone/ (13121) exp *Electronic Mail/ (1334) e-mail.ti,ab. (6669) Patient Portals/ (358) "patient portal".ti,ab. (864) *Remote Consultation/ (3544) *Primary Health Care/ (50267) "primary care".ti,ab. (110344) exp *General Practice/ (49023) "primary practice".ti,ab. (484) "primary care team".ti,ab. (1350) 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (46126) 13 14 or 15 or 16 or 17 or 18 (170067) 19 and 20 (2296) (telehealth or teledentistry or teleaudiology or teleneurology or teleneuropsychology or teleneuropsychiatry or telerehabilitation or "teletrauma care" or telecardiology or telepsychiatry or telepsychology or teleradiology or telepathology or teledermatology or telesurgery).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept...
Articles identified by KRS in its search were initially screened by title against the inclusion/exclusion criteria listed in Tables 1 and 2 below. For Questions 1 and 2, there were slightly different inclusion/exclusion criteria (see Tables 1 and 2). 2,611 articles were identified by KRS, with references and abstracts provided for further review. 591 were excluded from the review in accordance with the inclusion/exclusion criteria stated below. Of the 2,020 remaining articles, 440 were selected for further review. There were 100 articles from the full text review included for analysis, with an additional 6 articles included from the team for a total of 106 articles relevant for this review (106 specific to Question 1; 25 specific to Question 2).

The search strategy for Question 3 involved combinations of keywords and subject headings, in addition to the first strategy listed above, including: exp Decision Support Techniques/ (76925); Decision Support Systems, Clinical/ (7911) exp Decision Making/ (200726) Clinical Decision-Making/ (8792) (decision adj2 aid*).ti,ab. (5144) (decision adj2 instrument*).ti,ab. (220) (decision adj2 tool*).ti,ab. (4968) playbook.ti,ab. (78) (decision adj2 guide*).ti,ab. (4169) (evidence adj2 guide*).ti,ab. (12151) (evidence adj2 aid*).ti,ab. (485) (evidence adj2 instrument*).ti,ab. (352) (evidence adj2 tool).ti,ab. (455). One article was included for Question 3 in this review.

Articles identified by KRS in the search were screened by title against the inclusion/exclusion criteria listed in Table 1 below. 39 articles were identified by KRS, with references and abstracts provided for further review. 38 were excluded from the review in accordance with the inclusion/exclusion criteria stated below.

**Table 2. Inclusion/Exclusion Criteria for Question 1 and Question 2**

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>• Direct communication (asynchronous or synchronous) between a primary care physician and/or a team member and a patient, using video, telephone, text or email</td>
<td>• Studies focused exclusively on specialist virtual care</td>
</tr>
<tr>
<td>• Year: 2015 to 2020 to limit number of articles available to most recent evidence on this topic (i.e., communication technologies) and complete review in a timely manner</td>
<td>• Study design: news or opinion pieces; case studies or series; animal studies</td>
</tr>
<tr>
<td>• Study design: RCTs, observational studies, systematic review, survey research, interview and focus group research, meta-analyses and evaluations</td>
<td>• Studies where patients need to come into a clinic to use teleconference devices e.g., “Alberta Telehealth”</td>
</tr>
<tr>
<td>• English language, full text and grey literature</td>
<td>• Remote patient monitoring</td>
</tr>
<tr>
<td>• All populations (i.e., adults, pediatrics, all conditions, vulnerable or marginalized)</td>
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</tr>
<tr>
<td>• Geography: All locations</td>
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</tr>
</tbody>
</table>

**Table 3. Inclusion/Exclusion Criteria for Question 3**

- Studies focused exclusively on specialist virtual care
- Study design: news or opinion pieces; case studies or series; animal studies
- Studies where patients need to come into a clinic to use teleconference devices e.g., “Alberta Telehealth”
- Remote patient monitoring
<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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</thead>
<tbody>
<tr>
<td>• Primary care setting and primary care patients</td>
<td>• Studies were excluded if telemedicine was carried out without involving primary care providers and primary care patients</td>
</tr>
<tr>
<td>• Virtual visit intervention: direct communication (asynchronous or synchronous) between a primary care physician and/or a team member and a patient, using video, telephone, text or email</td>
<td>• Virtual visit intervention: provider-to-provider communications (e.g., eReferral), patient portal without secure messaging, self-management apps (i.e., no doctor/team involvement), artificial intelligence, traditional telehealth (i.e., patient joins call from healthcare facility, not their home), specialist physicians, remote monitoring.</td>
</tr>
<tr>
<td>• Year: January, 2010 to current, 2020</td>
<td>• Study design: perspectives, letters, editorials, animal studies</td>
</tr>
<tr>
<td>• Study design: RCTs, meta-analyses, observational studies, systematic review, survey research, interview and focus group research, evaluations, case studies, time-series</td>
<td></td>
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<tr>
<td>• English language, full text and grey literature</td>
<td></td>
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<tr>
<td>• Population: Populations of all ages who are hard to reach, vulnerable or marginalized (i.e., lower income, older adults, ethno-cultural groups)</td>
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<tr>
<td>• Geography: All locations</td>
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</table>
### Appendix B

#### Table 4. Common Terminology and Definitions

<table>
<thead>
<tr>
<th>Term(s)</th>
<th>Description</th>
<th>Author/Article</th>
</tr>
</thead>
</table>
| **Asynchronous Communications** | Consultations may be asynchronous, whereby patients answer structured clinical questions online and then receive care from a physician at a later time.                                                                | Jung and Padman[59]  
Mehrotra et al.[32]  
McGrail, Ahuja and Leaver[16] |
<p>| <strong>Desktop Medicine</strong>         | In desktop medicine, the clinician gathers risk factors by reviewing the patient's history, physical examination results and published clinical studies. The clinician then uses these risk factors to determine whether the patient is at sufficient risk to recommend treatment. | Karlawish[60]                                      |
| <strong>Digital Health</strong>           | Digital health can be described as the integration of the electronic collection and compilation of health data, decision support tools and analytics, with the use of audio, video and other technologies to deliver preventive, diagnostic and treatment services that promote patient and population health. | Canadian Medical Association[61]                    |
| <strong>Digital Health Literacy</strong>  | Digital health literacy is defined as the ability to seek, find, understand and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem.                         | Norman and Skinner[62]                             |
| <strong>Direct-to-Consumer (DTC)</strong> | Through real-time, direct-to-consumer telemedicine, patients can use their own telephones or computers to access care 24 hours a day, 7 days a week, from remote providers employed by national, commercial companies (e.g., Doctor on Demand in US). | Shi et al.[28]                                      |
| <strong>e-Consultation</strong>           | To submit an e-consultation, patients complete an online form to provide a structured medical account of their condition to a clinician. If the patient is identified as in need of immediate medical attention (through identification of red-flag symptoms) while completing the form, they are directed to relevant services. There are no financial charges for patients using the system. | Banks et al.[63]                                   |
| <strong>eHealth</strong>                  | The term eHealth has been used to describe a broad range of digital technologies and interventions used by a variety of stakeholders across diverse settings.                                              | Gaddi and Capello[64]                              |
| <strong>e-Visit</strong>                  | The structured e-Visit is an online tool that allows patients and physicians to communicate electronically in a secure network over the Internet. e-Visits enable the patient to complete a medical encounter with a doctor from home or work (or anywhere in the world with Internet access) for nonemergency healthcare issues. In the structured e-Visit, an established patient reports symptoms in a standardized way. | Albert et al.[42]                                  |</p>
<table>
<thead>
<tr>
<th>mHealth</th>
<th>The term used for medical practice supported by mobile devices is mHealth. The potential and accessibility of these new technologies have been recognized with regards to diagnosing, monitoring and treating diseases and chronic conditions.</th>
<th>Zapata et al. [65]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Portal</td>
<td>Patient portals are secure, online websites that give patients access to the personal health information stored in their electronic health record and typically include features that allow patients and providers to communicate via secure, electronic messaging. It has quickly become a viable new form of patient-provider communication.</td>
<td>Alpert, Dyer and Lafata [43]</td>
</tr>
<tr>
<td>Synchronous Communications</td>
<td>Consultations may be synchronous, whereby patients interact with physicians in real time via telephone (“teleconsultations”), videoconference (“virtual visits”), or even by text.</td>
<td>Jung and Padman [66] Mehrotra et al. [32] McGrail, Ahuja and Leaver [16]</td>
</tr>
<tr>
<td>Virtual Care</td>
<td>Virtual care is defined as “any interaction between patients and/or members of their circle of care, occurring remotely, using any forms of communication or information technologies, with the aim of facilitating or maximizing the quality and effectiveness of patient care”.</td>
<td>Shaw et al. [67]</td>
</tr>
</tbody>
</table>
## Appendix C

### Table 5. Summary of Randomized Control Trials and Systematic Review Articles

<table>
<thead>
<tr>
<th>SYSTEMATIC REVIEWS</th>
<th>REFERENCE</th>
<th>THEME</th>
<th>YEAR</th>
<th>COUNTRY</th>
<th>SAMPLE SIZE</th>
<th>MODALITY</th>
<th>OBJECTIVE</th>
<th>PROVIDER TYPE</th>
<th>FINDINGS</th>
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</table>
|                     | CROCKER, ET AL. (2012) | Primary Care Follow-Up | 2012 | USA | 3 studies: 1765 patients | Telephone | To investigate the strength of telephone follow-up as an effective primary care-based intervention in improving quality outcomes for the post-discharge period | Nurse, Case Manager, Physician | • None of the eligible studies in this review demonstrated reduced readmissions or ED use in the post-discharge period.  
• Despite the growing use of primary care-based telephone follow-up in the post-discharge period, there were no high-quality studies demonstrating its benefit. However, its positive impact on patient engagement holds potentially meaningful implications. |
|                     | DOWNES, ET AL. (2017) | Patient experience | 2017 | N/A | 3 studies | Telephone | To utilize a systematic review to collate evidence on the use of telephone consultation as an alternative to face-to-face general practice consultations visits | Nurse, Specialist | • There is a lack of high-level evidence for telephone consultations in a GP setting; however, current evidence suggests that telephone consultations as an alternative to face-to-face general practice consultations offers an appropriate option in certain settings.  
• Teleconsultations resulted in more repeated visits but required providers to spend less total time with patients.  
• One challenge of researching GP consultation is the wide variety of conditions with which patients present. The many conditions addressed impede the measurement of diagnostic agreement between teleconsultation and in-person consultation. |
<table>
<thead>
<tr>
<th>Study Authors</th>
<th>Study Title</th>
<th>Year</th>
<th>N/A</th>
<th>Study Type</th>
<th>Study Methods</th>
<th>Sample Size</th>
<th>Interventions</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Lake, et al. (2017)  | Healthcare Utilization, Patient Experience, Provider Experience | 2017 | N/A | 10 systematic reviews | Telephone     | 4183 participants | To overview TTAS systematic reviews to determine the scope, consistency and general character of findings in relation to the governance, safety and quality of TTAS | • Majority of reviews that investigated patient satisfaction with telephone triage and advice services reported it was comparable to and occasionally greater than satisfaction with traditional care.  
• Some potential for reducing clinician workload, particularly for GPs.  
• Callers were more likely to comply with advice to seek emergency care or provide self-care than advice to visit GP or other health service.  
• The weakest evidence related to utilization of telephone triage/advice and service access and costs. |
| Massoudi, et al. (2019) | Access to Care, Clinical Health                   | 2019 | N/A | 14 studies: 4183 participants | Telephone, Email, Video | Physician, Nurse, Psychologist, Trained Advisor | To examine e-health interventions for anxiety and depression symptoms in primary care | • Only a small positive-effect size (statistically significant) for e-health interventions in most trials compared to all control groups. This may be due to selecting only RCTs from primary care settings which results in patients selected having lower clinical effectiveness using psychological interventions compared to specialist care. |
| Mold, et al. (2019)  | Access to Care, Patient and Provider Experience   | 2019 | N/A | 57 studies | Texting, Email, Video | Physician, Nurse, Clinicians, Allied Health Professionals | To assess evidence of delivering e-consultation using secure email and messaging or video links in primary care | • Timeliness of response were associated with patient satisfaction. Patients had high expectations regarding timeliness of responses.  
• Survey evidence suggests telemedicine was as good as or even better than face-to-face consultation for explaining care to patients.  
• Email consultations were shown to be clinically feasible in terms of diagnostic accuracy.  
• Videoconferencing used for management of hypertension through e-consultations found that intervention group had higher proportion of patients with blood pressure issues within treatment goals. |
• Providers reported: improved efficiencies; emailing patients and providing visits was noted easier than expected; email helped build partnerships and was patient centred.
• Very few e-consultations (email) required a face-to-face appointment.
• Video consultations in remote areas were seen as a way to maximize home support and bring providers and families together from various regions.

| RAPHAEL, ET AL. (2017) | Chronic Disease Management | 2017 | N/A | 5 studies | Telephone | To identify the range and scope of telephone use between licensed practical nurses working in primary healthcare and older people with long-term conditions; to explore which elements of this communication have been successful; to determine whether older people see telephone communication as useful for their needs | Nurses in primary care setting | Most studies showed telephone-based interventions were successful in improving predetermined, disease-specific health indicators.
• While all studies’ samples included older patients, they did not consider this population separately in relation to the effectiveness of the intervention. The patient perspective regarding effectiveness was also lacking in all but one study. |
<table>
<thead>
<tr>
<th>YE, ET AL. (2010)</th>
<th>Patient and Provider Experience</th>
<th>2010</th>
<th>N/A</th>
<th>24 studies</th>
<th>Email</th>
<th>To systematically review role of e-mails in patient–provider communication in terms of e-mail content, and perspectives of providers and patients on e-mail communication in healthcare</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAGER, ET AL. (2011)</td>
<td>Patient Outcomes, Chronic Disease Management</td>
<td>2011</td>
<td>N/A</td>
<td>61 studies</td>
<td>N/A</td>
<td>To systematically review the impacts of text messaging in healthcare</td>
<td>N/A</td>
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<td>• Most studies implied great potential of email to improve healthcare communication, satisfaction and quality of care.</td>
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<td>• Low % of patients had used email to communicate with physician, but many were interested.</td>
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<td>• Wide variation in % of providers who communicated with patients via email.</td>
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<td>• Reported benefits: convenience, access to provider, quality of care, comfort asking questions, record of messages kept.</td>
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<td>• Perceived barriers: response time, privacy/security concerns, physician compensation, physician workload.</td>
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<td>Studies suggest text messaging is beneficial to healthcare – 82% of the studies reviewed reported a positive effect on primary outcomes of interest.</td>
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<td>The majority of articles looking at the impact of short messaging services on healthcare was conducted outside the United States (Europe &amp; Asia).</td>
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<td>A gap exists in terms of the type of patients that were studied. There is a need for more studies examining SMS interventions in vulnerable populations. • Considering CDM, the majority of reviewed findings found that SMS led to improved outcomes for diabetes. Other notable positive effects for public health include SMS interventions for smoking cessation and STIs.</td>
<td></td>
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<tr>
<td>REFERENCE</td>
<td>THEME</td>
<td>YEAR</td>
<td>COUNTRY</td>
<td>SAMPLE SIZE</td>
<td>MODALITY</td>
<td>OBJECTIVE</td>
<td>PROVIDER TYPE</td>
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<tr>
<td>BILLINGTON, ET AL. (2015)</td>
<td>Chronic Disease Management</td>
<td>2015</td>
<td>UK</td>
<td>73 patients</td>
<td>Telephone</td>
<td>To investigate the feasibility of introducing a nurse-led educational</td>
<td>Nurse</td>
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<td></td>
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<td></td>
<td>telephone intervention for COPD patients in primary care</td>
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<tr>
<td>BLACKBERRY, ET AL. (2013)</td>
<td>Chronic Disease Management</td>
<td>2013</td>
<td>Australia</td>
<td>473 patients</td>
<td>Telephone</td>
<td>To evaluate the effectiveness of prospective goal-focused telephone</td>
<td>Nurse</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>coaching by primary care nurses to improve glycemic control in type 2 diabetic patients</td>
<td></td>
</tr>
<tr>
<td>CAMPBELL, ET AL. (2014)</td>
<td>Appropriateness of Team Member for Care Delivery</td>
<td>2014</td>
<td>UK</td>
<td>42 primary care practices</td>
<td>Telephone</td>
<td>To assess the impact of nurse-led or GP-led telephone triage on primary care workload and cost, patient experience of care, patient safety, and health status when compared to usual care</td>
<td>Family Physician, Nurse</td>
</tr>
<tr>
<td>GONZALEZ-ORTEGA, ET AL. (2017)</td>
<td>Healthcare utilization</td>
<td>2017</td>
<td>Spain</td>
<td>161 patients</td>
<td>Telephone</td>
<td>To determine whether a telephone health coaching intervention by a family physician for complex chronic patients reduces ED and hospital admissions</td>
<td>Family Physician (external to the primary care team)</td>
</tr>
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</tbody>
</table>
| **HOLT, ET AL. (2016)** | Appropriateness of Team Member for Care Delivery | 2016 | UK | 16711 patients | Telephone | To determine the impact of telephone triage on the consultation length and overall clinician time | Nurse | • Results suggest that there is no overall clinician time saved when comparing GP-led triage or nurse-led triage to usual care.  
• On average, regardless of intervention, the providers spent the same time in face-to-face consultation (10 min). |
| **LITTLE, ET AL. (2016)** | Chronic Disease Management | 2016 | UK | 56 primary care practices | Telephone, Email | To estimate the effectiveness and cost-effectiveness of an internet-based behavioural intervention combined with brief licensed practical nurse support in primary care | Nurse | • 32% of patients in the intervention groups achieved an additional 5% weight reduction at month 12, compared to 21% of control patients.  
• The incremental cost reduction was -25 UK pounds for the intervention per kg. weight lost compared to +18 UK pounds for the control group per kg. weight lost. |
| **LUCHSINGER, ET AL. (2011)** | Chronic Disease Management | 2011 | USA | 2169 patients | Video, Telephone | To examine whether improved Type II diabetes control through telem medicine is related to better cognitive outcomes | Nurse | • Patients who experienced virtual care and usual care both experienced cognitive decline (↑ CARE scores).  
• Patients in the Virtual Care group had significant improvements in HbA1c, systolic blood pressure and low-density lipoprotein (LDL) cholesterol.  
• Better HbA1c mediated the association between the intervention and better overall cognition. |
| **MAVANDADI, ET AL. (2017)** | Patient-centred Care | 2017 | USA | 75 caregivers | Telephone | To determine the effectiveness of a telephone-based care management program to improve frequency and severity of dementia symptoms, patient distress, and caregiver coping vs. mastery | Care Managers, Family Physician | • Telephone-based care management helped caregivers of dementia patients manage their emotions, have more favorable appraisals in response to stressors, and respond more effectively to patients’ dementia symptoms.  
• Caregivers’ ability to respond to demands following telephone-based |
<table>
<thead>
<tr>
<th>Study</th>
<th>Title</th>
<th>Year</th>
<th>Country</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILLS, ET AL. (2010)</td>
<td>Chronic Disease Management</td>
<td>2010</td>
<td>Canada</td>
<td>Telephone</td>
<td>Nurse</td>
</tr>
<tr>
<td>MONS, ET AL. (2013)</td>
<td>Chronic Disease Management</td>
<td>2013</td>
<td>Germany</td>
<td>Telephone</td>
<td>Nurse</td>
</tr>
<tr>
<td>NESARI, ET AL. (2010)</td>
<td>Chronic Disease Management</td>
<td>2010</td>
<td>Iran</td>
<td>Telephone</td>
<td>Nurse</td>
</tr>
<tr>
<td>NOEL, ET AL. (2020)</td>
<td>Chronic Disease</td>
<td>2020</td>
<td>USA</td>
<td>Video</td>
<td>Family Physician or Team</td>
</tr>
</tbody>
</table>

**MILLS, ET AL. (2010)**
- To determine comparative effectiveness of two approaches to cardiovascular risk reduction in primary care clinics: in-person clinic or nurse-led telephone intervention.
- **Nurse**
  - The 'in-person clinic' was more effective at improving cardiovascular disease risk scores compared with nurse-led telephone calls and usual care in high-risk patients.
  - Decline in LDL cholesterol and diastolic blood pressure was larger for the 'in-person clinic' compared to usual care.

**MONS, ET AL. (2013)**
- To investigate whether telephone-based counseling sessions improved diabetes-related medical and psycho-social outcomes.
- **Nurse**
  - After 12 months of telephone counselling, diabetic patients experienced:
    - Improved systolic blood pressure but this was not maintained after 18 months.
    - No changes in HbA1c.
    - No changes in quality of life (SF-12) but improvements were noted in the physical component score.
    - Improved changes in geriatric depression score but this was not maintained after 12 months.

**NESARI, ET AL. (2010)**
- To determine if a nurse-led telephone follow-up could improve the level of adherence to a therapeutic regimen in patients with type 2 diabetes.
- **Nurse**
  - HbA1c level decreased by 1.87% in the telephone follow-up group compared to 0.4% in control group, after 12-weeks.
  - Diabetic patients in the telephone follow-up group had improved medication adherence.
  - Both intervention and control groups showed improved diet and exercise adherence.

**NOEL, ET AL. (2020)**
- To evaluate the effects of tele-transitions of care (TTOC) (weekly video).
- **Family Physician or Team**
  - Compared with the standard of care, TTOC patients were more likely to have medicine reconciliation and were...
Management visits with daily remote patient monitoring) on standard of care

7 times more likely to adhere to medication than the control group.

- TTOC patients exhibited enthusiasm and confidence that telehealth could improve their healthcare.
- 100% of TTOC patients found the intervention to be valuable. 98% would continue using TTOC to manage their healthcare needs if given the opportunity.
- TTOC showed no statistical significance on ED utilization or readmissions.

| SEGURANYE S, ET AL. (2014) | Patient-centred Care | 2014 Spain | 1401 patients | Video, Telephone | To determine if the combination of video and telephone visits are as effective as standard care in post-partum women | Midwives

- Patients who videoconferenced with midwives made fewer visits to the healthcare centre than the usual care group.
- First-time mothers were more likely to use videoconferencing visits.
- No difference in patient satisfaction between videoconferencing and in-person visits.

| STAHL, ET AL. (2010) | Patient and Provider Experience, Quality of Patient Care | 2010 USA | 175 patients | Video | To examine the feasibility, effectiveness and acceptability of a face-to-face office visit compared to a videoconference visit | Physician

- Both patients and doctors were generally satisfied with videoconferencing, although face-to-face interaction was preferred.
- Videoconferencing appeared to be better suited for some kinds of complaints than others, consistent with previous work showing telemedicine can influence both the style and effectiveness of patient-doctor communication.
- Videoconferencing may be useful in primary care consulting.
<table>
<thead>
<tr>
<th>DIMENSIONS OF QUALITY</th>
<th>POPULATION</th>
<th>VISIT MODALITY</th>
<th>STUDY DESIGN</th>
<th>JURISTICTION</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptability (satisfaction, experience)</td>
<td>Multicultural</td>
<td>Telephone</td>
<td>Qualitative focus groups and surveys (providers &amp; patients)</td>
<td>New York, USA Kyanko et al. (2018)</td>
<td>+, -</td>
</tr>
<tr>
<td></td>
<td>Some lower-income</td>
<td>Telephone</td>
<td>Cross-sectional data and time-series</td>
<td>England, UK Newbould et al. (2017)</td>
<td>+, -</td>
</tr>
<tr>
<td></td>
<td>Older adults</td>
<td>Telephone</td>
<td>Systematic review</td>
<td>Australia, Germany, USA Raphael et al. (2017)</td>
<td>-</td>
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<tr>
<td></td>
<td>Low-income</td>
<td>Telephone</td>
<td>Quality improvement project</td>
<td>Ohio, USA Schlottmann et al. (2019)</td>
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<td>Accessibility (experience)</td>
<td>Indigenous</td>
<td>Video</td>
<td>Qualitative focus groups (providers &amp; patients)</td>
<td>Hawaii, Alaska, USA Hiratsuka et al. (2013)</td>
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<tr>
<td></td>
<td>Homebound older adults</td>
<td>Video</td>
<td>Feasibility study</td>
<td>New York, USA Latus-Olaifa et al. (2019)</td>
<td>+</td>
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<tr>
<td></td>
<td>Multicultural</td>
<td>Telephone</td>
<td>Qualitative focus groups and surveys (providers &amp; patients)</td>
<td>New York, USA Kyanko et al. (2018)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Low-income</td>
<td>Email</td>
<td>Cross-sectional EMR data</td>
<td>Pennsylvania, USA Mehrotra et al. (2013a)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Some lower-income</td>
<td>Telephone</td>
<td>Qualitative interviews (GPs, practice manager, receptionist)</td>
<td>England, UK Newbould et al. (2019)</td>
<td>+</td>
</tr>
<tr>
<td>Appropriateness (for which patients and problems)</td>
<td>Some older adults, Low-income</td>
<td>Telephone, Email, Video, E-consultations</td>
<td>Ethnographic (providers &amp; patients)</td>
<td>UK Atherton et al. (2018)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Multicultural</td>
<td>Telephone</td>
<td>Qualitative focus groups and surveys (providers &amp; patients)</td>
<td>New York, USA Kyanko et al. (2018)</td>
<td>+, -</td>
</tr>
<tr>
<td></td>
<td>Low-income</td>
<td>Email</td>
<td>Qualitative email content analysis</td>
<td>California, USA</td>
<td>+</td>
</tr>
<tr>
<td>Continuity (relational, management, informational)</td>
<td>England, UK</td>
<td>Cross-sectional data and time-series</td>
<td>Newbould et al. (2017)</td>
<td>+</td>
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<tr>
<td>Some lower-income</td>
<td>England, UK</td>
<td>Qualitative interviews (GPs, practice manager, receptionist)</td>
<td>Newbould et al. (2019)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Multicultural, Limited English proficiency</td>
<td>Minnesota, USA</td>
<td>Retrospective cohort study</td>
<td>Njeru (2017)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Continuity (relational, management, informational)</td>
<td>Hawaii, Alaska, USA</td>
<td>Qualitative focus groups (providers &amp; patients)</td>
<td>Hiratsuka et al. (2013)</td>
<td>+</td>
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<tr>
<td>Multicultural</td>
<td>New York, USA</td>
<td>Qualitative focus groups and surveys (providers &amp; patients)</td>
<td>Kyanko et al. (2018)</td>
<td>+</td>
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<tr>
<td>Adherence (compliance)</td>
<td>Massachusetts, USA</td>
<td>Feasibility pilot study</td>
<td>Jenssen et al. (2016)</td>
<td>+</td>
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<tr>
<td>Multicultural</td>
<td>New York, USA</td>
<td>Qualitative focus groups and surveys (providers &amp; patients)</td>
<td>Kyanko et al. (2018)</td>
<td>+</td>
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<tr>
<td>Clinical Outcomes (mortality, morbidity, quality of life)</td>
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<td>Single-blinded RCT</td>
<td>Baumeister et al. (2014)</td>
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<tr>
<td>Low-income, Multicultural</td>
<td>Massachusetts, USA</td>
<td>Feasibility pilot study</td>
<td>Jenssen et al. (2016)</td>
<td>+</td>
<td></td>
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<tr>
<td>Older adults</td>
<td>Australia, Germany, USA</td>
<td>Systematic review</td>
<td>Raphael et al. (2017)</td>
<td>+</td>
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<tr>
<td>Health Service Utilization</td>
<td>Spain</td>
<td>RCT</td>
<td>Gonzalez-Ortega et al. (2017)</td>
<td>-</td>
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<tr>
<td>Older adults</td>
<td>Michigan, USA</td>
<td>Retrospective EMR review</td>
<td>Liu et al. (2019)</td>
<td>+</td>
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<tr>
<td>Multicultural</td>
<td>Telephone</td>
<td>Cross-sectional survey data</td>
<td>Michigan, USA Marvicsin et al. (2019)</td>
<td>+</td>
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<tr>
<td>Low-income</td>
<td>Email</td>
<td>Cross-sectional EMR data</td>
<td>Pennsylvania, USA Mehrotra et al. (2013b)</td>
<td>+, -</td>
<td></td>
</tr>
<tr>
<td>Low-income, Inner city</td>
<td>Telephone</td>
<td>Interrupted time-series for lab tests and consults</td>
<td>Northern Ireland, UK Miller et al. (2019)</td>
<td>+</td>
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<tr>
<td>Some lower-income</td>
<td>Telephone</td>
<td>Cross-sectional data and time-series</td>
<td>England, UK Newbould et al. (2017)</td>
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## Appendix D

### Table 7. Common Barriers and Facilitators to Providing Virtual Visits in Primary Care

<table>
<thead>
<tr>
<th>Facilitators and Barriers to Implementing Virtual Care</th>
<th>Facilitators</th>
<th>Barriers</th>
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<tbody>
<tr>
<td><strong>Facilitators</strong></td>
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<tr>
<td>Management support</td>
<td>- Provides staff and/or patient education[^18]</td>
<td>- Patients unaware of alternative virtual care options[^68]</td>
</tr>
<tr>
<td></td>
<td>- Creates time in physician and receptionist schedules for VC visits/calls[^18, 49]</td>
<td>- Virtual care options not communicated to patients</td>
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<tr>
<td></td>
<td></td>
<td>- Lack of receptionist education/knowledge of VC options or VC appointment availability</td>
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<tr>
<td>Funding</td>
<td>- Allows practices to adopt new care approaches[^18]</td>
<td>- Lack of engagement from front-end users</td>
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<tr>
<td></td>
<td>- E.g., government funding;[^18] clinical commissioning groups[^17]</td>
<td>- Clinic staff often not consulted prior to new VC implementation[^7, 24, 37, 68, 71]</td>
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<tr>
<td>Patient demand</td>
<td>- Patients appreciate easier access to providers[^18, 46]</td>
<td>- Technology difficulties</td>
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<td></td>
<td></td>
<td>- Technological issues disrupt the consultation/care process[^10, 15, 50]</td>
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<tr>
<td></td>
<td></td>
<td>- Low computer literacy[^72]</td>
</tr>
<tr>
<td>Education</td>
<td>- Clinic staff well educated on new virtual care systems/platforms/etc.[^17, 68]</td>
<td>- Patient and provider resistance to change</td>
</tr>
<tr>
<td></td>
<td>- Patients provided with clear guidelines for appropriate use of VC systems/platforms/etc.[^17, 33, 69]</td>
<td>- Physicians and/or clinic staff experience difficulty adapting to new ways of communicating with patients[^18]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lack of reimbursement[^12, 13, 18, 48]</td>
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<tr>
<td></td>
<td>- Physicians not compensated for VC visits</td>
<td>- Traditional fee-for-service model is a barrier</td>
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<tr>
<td></td>
<td>- Additional demands for introduction of VC - learning new systems, misuse by patients, patient demand exceeding physician supply[^13, 18, 24, 33, 39]</td>
<td>- Workload</td>
</tr>
<tr>
<td></td>
<td>- Patients concerned for being viewed as a burden/nuisance[^33]</td>
<td>- Confidentiality Concerns</td>
</tr>
<tr>
<td>Patient-Provider Relationship[^10]</td>
<td>- Supports good communication between patient and provider</td>
<td>- Concerns regarding texting the wrong individual[^19]</td>
</tr>
<tr>
<td></td>
<td>- Valuable to overall healthcare encounter</td>
<td>- Inappropriate message content[^33]</td>
</tr>
<tr>
<td>Communication</td>
<td>- Non-verbal communication shows promise for connecting with harder-to-reach, underserved populations[^70]</td>
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<td></td>
<td>- Bilingual healthcare providers address low English proficiency[^11]</td>
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Appendix E

Lessons Learned: Considerations for Virtual Visits in Primary Care

Until recently there has been limited concrete, step-by-step implementation support provided to patients or providers related to “rules of engagement” for a quality virtual visit.\(^5^6\) However, with the emergence of virtual care in the last ten years, as well as COVID-19 prompting virtual visits into the forefront of primary care, the generation of evidence is expected to increase. A frequent reassessment of the evidence base may prove useful. Based on the findings of this review, there are several practical considerations for virtual visits in primary care:

1. **Engagement for Planning and Implementing Virtual Visits in Primary Care**

   When introducing a new initiative to an organization, there is a need to ensure quality communication, clear vision, and strong leadership, particularly when integrating changes within existing routines. It is important to recognize the potential of all primary care team members, including receptionists, as crucial to the introduction of any new communication systems. Additionally, the decision about when to offer an alternative to face-to-face consultations is linked to the ability to provide a safe, efficient, and equitable service\(^6^8\) as well as helping to assess need and manage demand.\(^7\) This speaks to addressing the rationale as to why virtual visits may be a reasonable, safe and effective option, and which type of alternatives might be most effective for the patient population served.

2. **Informing Patients of Alternate Virtual Care Options**

   The evidence indicates many approaches have been used by practices and clinics to inform their patients about new methods of consultation, such as virtual visits. The approaches varied due to the type of virtual visit modality and the rationale for its implementation.\(^3^7, 7^1\) In one study, a small group of family physicians (n=7) practicing at several primary care offices across New Zealand reported a 20% or less patient uptake of the patient portal at their practices. This meant that a large proportion of their patients were not using the portal; they learned the low uptake was mainly attributed to insufficient promotion of the service due to a rushed implementation.\(^3^7\) Similar findings were reported across other studies, where clinics were not communicating the availability of virtual visits to patients, leading to low uptake.\(^7, 9, 6^8\) If a clinic decides to offer a virtual visit option and invests the capital and time into developing the option, a clear communication plan should thus be developed to ensure adequate uptake. Clinic staff should be aware of the different options available to patients, and should be communicating these to patients in a structured and equitable way.

3. **Working Differently: Redistributing the Workload among Team Members and Patients**

   In a team-based primary care setting, specific virtual visit modalities (e.g., email, secured messaging) appeared to provide the opportunity for family physicians to redistribute work tasks to other team members where the risks were perceived low (e.g., prescription refill) or appropriate. For example, Casey et al.\(^7^1\) reported a redistribution of work from family physicians to administrators and patients, where patients took on the task of completing their own summaries (e.g., symptom trackers) in advance, taking the onus off family physicians to collect all the data during the visit itself, which allowed physicians to be more prepared at the face-to-face or virtual visit, thus freeing up time during the visit. Similar results were reported in other studies, specific to email, text and secured messaging, resulting in reduced workload for
receptionists and released time for medical assessments for family physicians.\cite{18,73} One important consideration was to ensure patients continued to connect with their own family physician when specific tasks were re-distributed across teams and patients in order to preserve continuity of care.\cite{13} Implementing team-based care was recommended as a solution to the added workload of adopting virtual care where the “non-provider staff can help triage and manage electronic communications.”\cite{18}

4. **Logistical Considerations for Successful Implementation in Primary Care**

There was evidence of specific logistical considerations that spoke to successful implementation (perceived or supported by outcomes) of virtual visit options in primary care. Examples include clinics and teams able to integrate different forms of virtual communication in a sequential fashion. One of these was a survey examining potential barriers and facilitators to using scheduled telephone visits as a substitute for face-to-face visits in the US, where respondents suggested a tiered system, with patients first contacted via secure messaging prior to a telephone visit, when appropriate.\cite{13} This allowed for the incorporation of pertinent details around the patient visit (i.e., symptoms, reason for visit) which can help better prepare the family physician for the telephone consultation. The evidence suggested patients who were reporting new symptoms, despite having a virtual visit, were likely to have a follow-up face-to-face visit regardless,\cite{31,73} thus using virtual visits sequentially in order to establish a structured way to assess the appropriateness of which virtual care option is likely to be best suited for the patient and condition, or if a face-to-face is warranted.

5. **Sustainability of Virtual Care**

The COVID-19 pandemic disrupted the delivery of primary care in Alberta and across Canada. Within a matter of weeks, providers were no longer seeing patients face-to-face and so ‘usual care’ transformed into ‘virtual care’.\cite{74} The data from this review considers those practices that have already implemented virtual care into their regular practice, pre-COVID. It is worth considering the reason why those practices implemented virtual care in the first place. It may have been patient need due to geographical constraints (e.g., remote-rural) or from a provider’s need to shift towards a patient-centred medical home.\cite{75} The findings from this review suggest that those best suited to working with these new workflow demands are likely going to be those practices with an embedded culture of quality improvement.\cite{24} Newbould et al.\cite{24} concluded virtual visits worked best in “highly organized data driven practices that already had a handle on demand and was less likely to prove successful in practices where the ability to cope with demand was already out of control.” That is, much like the implementation of an EMR, providing a virtual visit is not likely to be the “band-aid” that fixes demand issues; rather, it will likely only exacerbate an existing workflow issue.

6. **Provider Strategies for Communicating with Patients (Etiquette and Rules of Engagement)**

Sieck et al.\cite{33} notes that providers could benefit from training on the aspects of the patient portal that face them as providers, such as how to view and send a secure message. Additional training that exposes providers to the patient view of the portal may provide a more complete understanding of the patient experience and help them to better interact with their patients. As an example, as physicians prefer to give concise answers by email, they may be particularly concerned that misunderstandings may arise and that too much of their time may be used
writing a longer answer, whereas patients see email consultations as an opportunity for a quick health check and personal coaching. This results in potential difficulties when patients and family physicians communicate with each other through a written medium. Providers indicated three main concerns regarding secure messaging via patient portal: 1) patients often did not include sufficient, clear information to make recommendations; 2) patients were including inappropriate and/or irrelevant information in their messages; and 3) there was incorrect use of the message feature (i.e., to book appointments rather than the ‘book an appointment’ option). As a result, physicians emphasized the need to clarify the “rules of engagement” among patients through training, patient accountability, and guidance through the portal.\textsuperscript{[33]}

In Hefner et al.\textsuperscript{[76]} physicians and patients both detailed patient-specific training related to the use of a virtual visit and discussed the potential of this training to improve patient–physician communication via secure message. These training suggestions relate to three main themes: mode, timing and content of training. Both groups felt that multimodal training would be most beneficial, at start-up or initiation, using in-office video training and an electronic tutorial in the portal. To ensure appropriate use requires an understanding of the type of information that should be conveyed via the portal and the etiquette rules of electronic communication. By using predefined guidelines and expectations for email consultations, it may be possible to minimize the risk of potential misunderstandings and improve the experience for both patients and providers.\textsuperscript{[18, 31]}

7. Empowering Patients for a Successful Virtual Visit

The Canadian Medical Associate recently released a “Virtual Care Guide for Patients” document,\textsuperscript{[74]} which covers topics that can empower patients to understand: when a virtual visit may be an appropriate option for them; what the technologic requirements are (i.e., smartphone, tablet, phone, computer) for some virtual care services; how to come to a virtual visit prepared; and what to consider during a virtual visit. There are also YouTube videos to aid patients in preparing for their virtual visit.\textsuperscript{[77]} Patient education for virtual communication is critical to establish appropriateness for use\textsuperscript{[33]} as patients require clear guidelines for virtual visits.\textsuperscript{[17, 33]}

Patient advisors who participated in this review also provided suggestions for empowering patients for successful virtual visits. Recommendations included: providing patients and providers with clear guidelines/etiquette for virtual visits; advertising and/or communicating virtual care options to all patients (i.e., creating awareness of alternative care options); articulating to patients the reason or benefit(s) of receiving a virtual visit versus a face-to-face appointment; and considering the impact of provider bias when offering virtual care to specific patient populations (e.g., visible minorities, older adults, etc.).

References


