

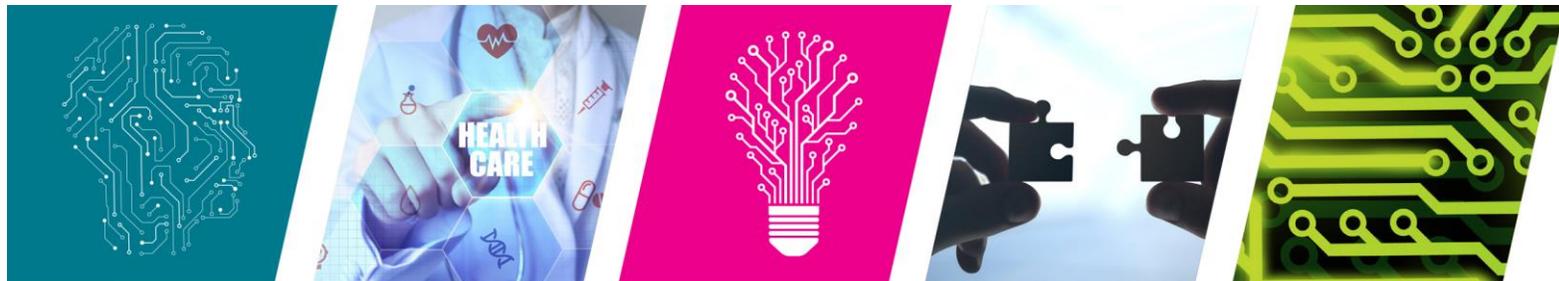
VIRTUAL CARE METRICS: Survey and Analysis Strategy

PREPARED BY:

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PREPARED FOR:

Ontario Ministry of Health and Long-Term Care



ACRONYMS

CDHE – Centre for Digital Health Evaluation

HCES – Health Care Experience Survey

MOHLTC – Ministry of Health and Long-Term Care

WIHV – Women’s College Hospital Institute for Health System Solutions and Virtual Care

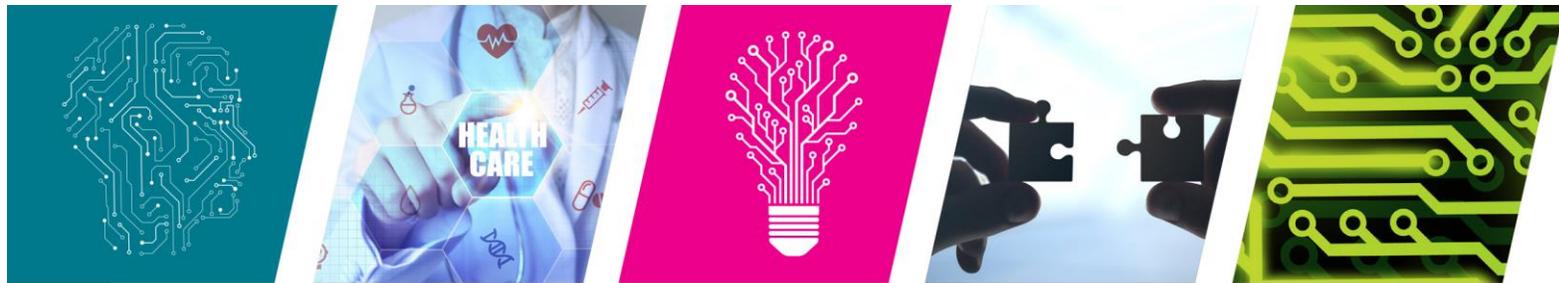
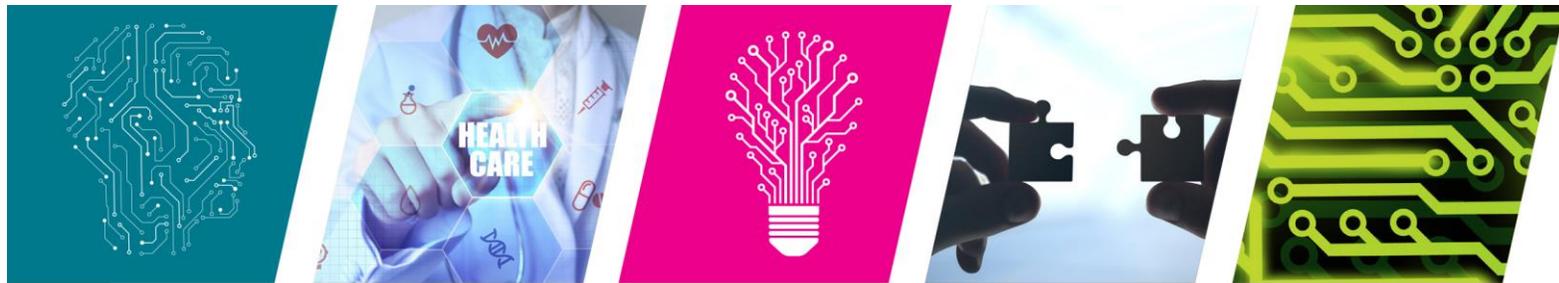


Table of Contents

1. PROJECT OBJECTIVES	4
1.1 DEFINING VIRTUAL CARE.....	4
1.2 ENVIRONMENTAL SCAN	5
1.3 EXPERT REVIEW	7
1.4 FINAL SET OF QUESTIONS.....	8
2. ANALYSIS STRATEGY AND STRATEGIC PLANNING	10
3. POTENTIAL COST IMPLICATIONS OF VIRTUAL CARE	15
4. LIMITATIONS.....	16
5. APPENDIX A. ARTICLE SELECTION.....	17
6. APPENDIX B. RESULTS & IMPLICATIONS OF SELECTED LITERATURE.....	18
7. APPENDIX C. QUESTIONS REPLACED, REASONS, & REFERENCES.....	22
8. APPENDIX D. FINAL SURVEY QUESTIONS.....	27
9. APPENDIX E. COST-EFFECTIVENESS ARTICLES.....	32
10. REFERENCES.....	38



1. PROJECT OBJECTIVES

The Digital Health Secretariat engaged the Women’s College Hospital Institute for Health Systems Solutions and Virtual Care (WIHV) to assist with the identification of metrics that will support the ability to measure use of virtual care by patients in Ontario. Data to support measurement will be primarily collected via the Health Care Experience Survey (HCES). This work is being completed with a view to inform two key provincial indicators for public reporting previously identified by the Ministry of Health and Long-Term Care (MOHLTC):

- 1) The percentage of Ontarians who have virtually accessed care in the previous 12 months; and
- 2) The percentage of Ontarians who have virtually accessed their personal health information in the previous 12 months.

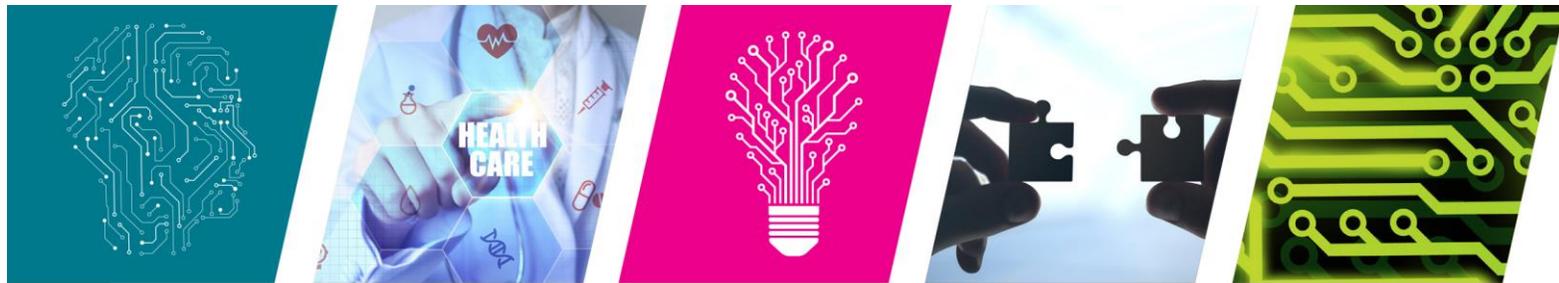
The MOHLTC also provided a first draft of questions as an indication of the style and types of questions of interest to the MOHLTC.

1.1 DEFINING VIRTUAL CARE

WIHV conducted a virtual care symposium in 2014, during which time a formal definition for Virtual Care was developed and published in a white paper.¹ The definition articulated then, and reflected in our work today, is:

“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.”

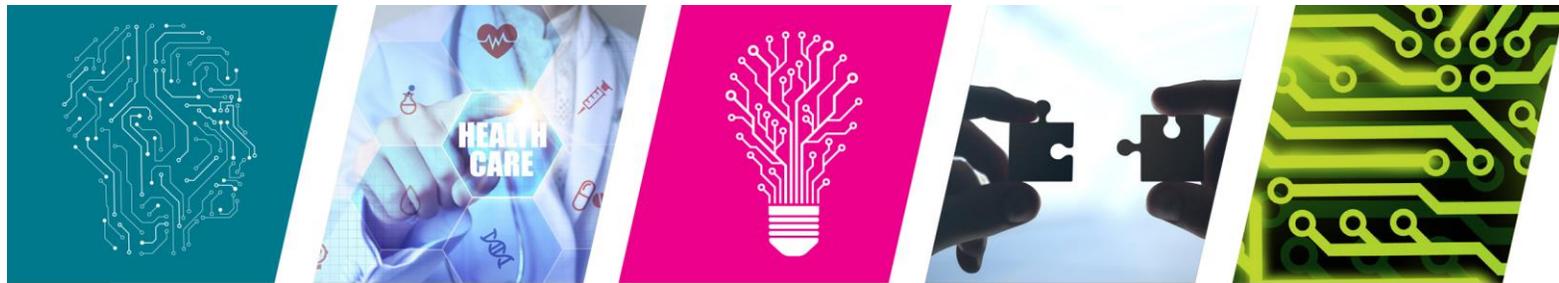
Central to this definition is an interaction between patients and a member of their circle of care, which requires a synchronous or asynchronous interaction between



two individuals. Considering this definition and the provincial indicators identified by the MOHLTC, we recommend expanding the scope of the HCES to explicitly measure i) engagement in virtual care; ii) engagement in activities that support virtual care; and iii) interest in virtual care. This expanded scope provides insights into activities (e.g., online scheduling and engaging with patient portals) that the MOHLTC can leverage to support progress towards the uptake of virtual care in the Ontario health system.

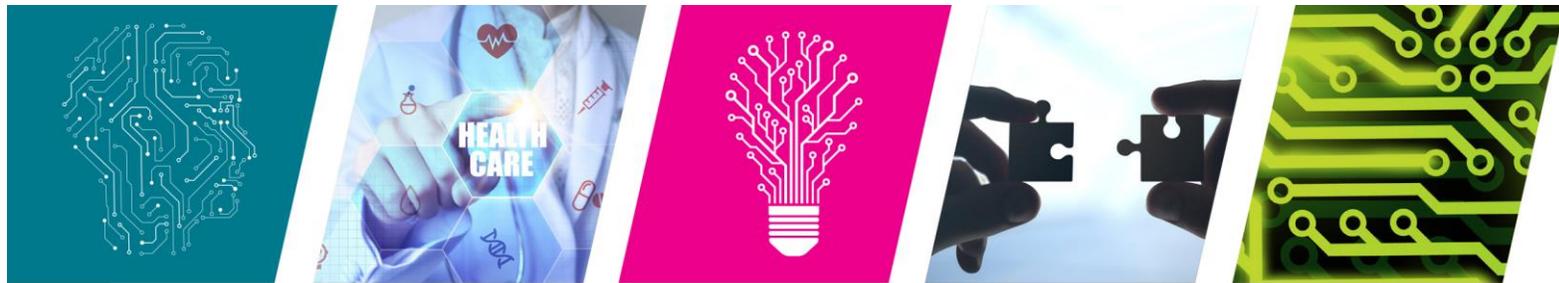
1.2 ENVIRONMENTAL SCAN

We conducted an environmental scan of existing programs and their measurement strategies. We conducted an academic search through MEDLINE, alongside a brief search of the grey literature (including white papers produced by government, non-government, and corporate organizations). MEDLINE search terms consisted of keywords and medical subject headings related to patient-collected data (i.e., “Surveys and Questionnaires”, “patient-reported.mp.”) at the population level (i.e., “population statistics.mp.”, “Population Characteristics/”) on virtual care (i.e. “Telemedicine/”, “digital health.mp.”). These keywords were employed in various combinations using both “OR” and “AND”. MEDLINE produced 530 results eligible for title and abstract screening and subsequent searching of grey literature and Google searchers yielded an additional nine potential literature sources. Reference lists were also examined for any additional relevant articles not previously identified. After a thorough review, 25 articles (21 academic, 4 grey) were selected to contribute to the development of the survey questions (see [Appendix A](#)). Key results were extracted from each article and interpreted in the context of potential additions or changes to the draft HCES questions provided by the MOHLTC ([Appendix B](#)). The application of these interpretations to the final set of survey questions can be found in [Appendix C](#).



Based on the environmental scan, we recommend including metrics to provide the following insights:

- 1) **Determining whether Ontarians have access to required technology:**²⁻⁶ This is important for understanding who your *potential* market is. Ontarians require access to certain technologies to engage in most of virtual care. This indicator also provides insight into the ability of virtual care to engage people of varying demographics, helping the MOHLTC explore the equity impact of virtual care.
- 2) **Understanding *actual use versus interest in use*:**^{4,7-12} Understanding the relationship between interest and actual use informs potential for growth and consumer demand. Coupled with demographic information, this may help inform targeted marketing strategies or deployment efforts.
- 3) **Assessing Ontarians' satisfaction with and perceived quality of virtual care:**^{9,13,14} Numerous evaluations investigate satisfaction and quality of virtual care relative to in-person care; this is to ensure that patients perceive the value and quality of services received to be sufficient. Further, these can be good indicators to share broadly to help alleviate public concerns relating to virtual care.
- 4) **Investigating if virtual care is replacing other forms of care:**¹⁵⁻²⁰ Evidence shows that virtual care is cost-effective if replacing in-person care, but the cost-benefit is unclear if it occurs in addition to in-person care. This metric is central to understanding cost-effectiveness and return on investment.
- 5) **Capturing the potential breadth virtual care:**²¹ If the MOHLTC's primary objective is increasing engagement with virtual care at a system level, there are several types of virtual care that were not captured in the previous survey because they are not directly integrated with OHIP-funded services. We recommend including a separate question to identify if people are engaging in these types of virtual care beyond OHIP services as they more accurately reflect population-level use.

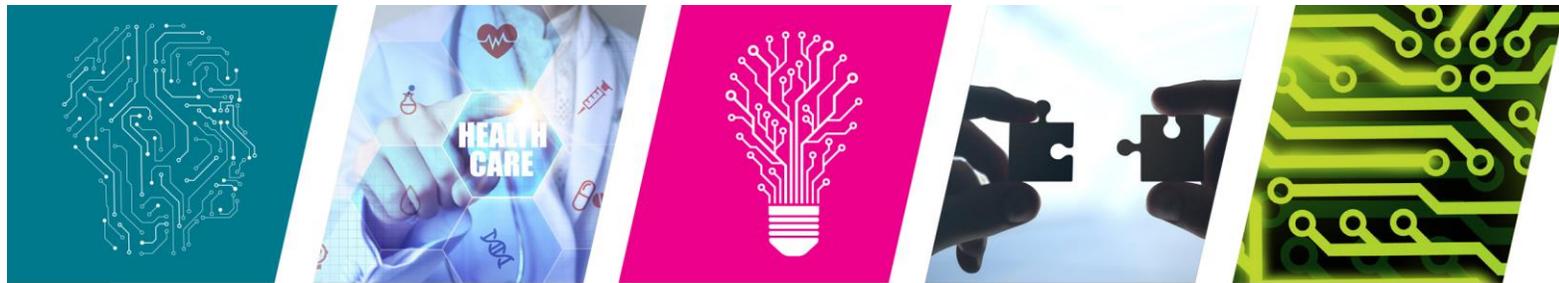


- 6) **Accessing virtual care as a delegate:**^{22,23} The use of virtual care and online services can support delegates and caregivers (e.g. for a child or elderly parent). This is a unique benefit of virtual care that is currently difficult to achieve in the system, at a time when increasing attention is being paid to caregiver burden and the cost-savings attributed to informal caregivers.

1.3 EXPERT REVIEW

Experts in areas including digital health research, digital health implementation and quality improvement reviewed the questions developed based on the environmental scan. They provided substantial insight into prioritizing and reducing the number of questions included, as well as refining the language to ensure accessibility to patients. There were two substantial suggestions from the expert reviewers that are reflected in the “ideal” set of questions:

- 1) **Distinguishing virtual care engagement with family medicine versus specialists:** The relative value of virtual care (e.g. improved access, time savings, cost savings) can change substantially depending on the clinician type. Expert reviewers highlighted that parsing out whether patients have engaged in virtual care with a primary care provider (family doctor) versus a specialist (e.g. OTN Telemedicine programs). This would also give a more holistic perspective of how patients are using virtual care solutions, which would improve our understanding of current gaps and potential high-value investment areas.
- 2) **Consolidating the questions about accessing medical records, labs, and immunization records:** It was thought that breaking out these questions related to accessing personal health information via online portals was not the best use of limited space. We suggest consolidating these into one set of streamlined questions of whether they are accessing their records from the hospital, family doctor, or labs. We have also proposed an additional question to capture motivations behind access to help understand the potential market.



1.4 FINAL SET OF QUESTIONS

The following are the “stems” of the questions included (i.e., the question without response options). For the full set of response options, see [Appendix D](#).

1) Do you own/have access to any of the following? (request they indicate all that apply)

2a) Have you had a visit with a doctor in the last 12 months that was not in person?

2b) *If yes*, was this with your family doctor, a specialist, or another type of provider?

2c) *If no*, are you interested in having access to visits with your family doctor in any of the formats below?

Section 3 is for virtual visits with a family doctor; Section 4 contains the same set of questions for specialist care.

3a) How did you communicate with your doctor in this visit?

3b) What was the purpose of your visit?

3c) Please rate your satisfaction with the services accessed:

3d) How did the service compare to in-person visit in regards to:

- Quality
- Length of time (e.g. commute time, waiting time)
- Personal costs incurred (e.g. taking time off work, parking, child care)

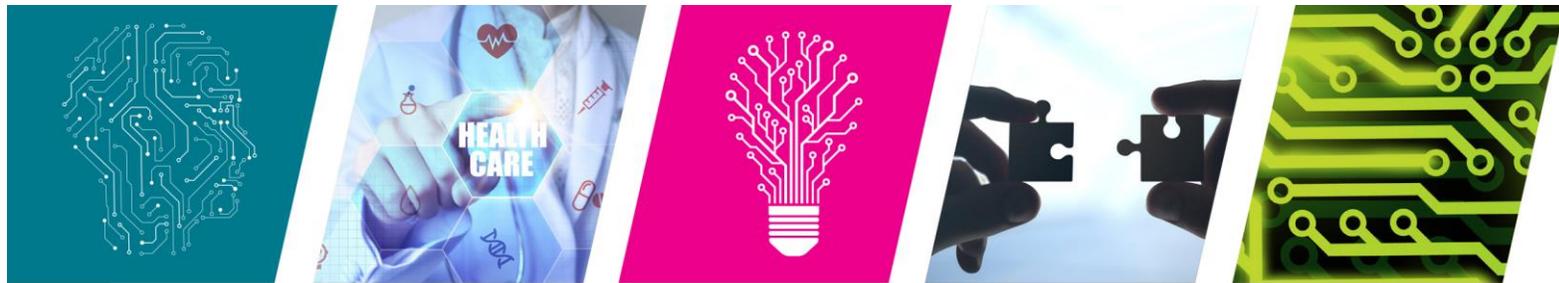
3e) Did your video call, text messaging, or email:

- Replace an in-person visit
- Replace an emergency room visit
- Replace a walk-in clinic visit
- None of the above

5) Have you used any of the following virtual services?

- Online educational resources
- Helplines (e.g. Telehealth)
- Disease screening tools
- Disease self-monitoring tools (e.g. tracking blood sugar, exercise, and eating for diabetes)
- Disease remote monitoring tools (e.g. tracking blood sugar for diabetes and sending it to your family doctor)
- Private pay online doctor's visit (e.g. Maple, Akira)

6a) Have you scheduled a doctor's appointment online in the last 12 months? (e.g. by going to their website or sending an email?) **(Modified existing question)**



6b) *If yes*, was it with:

- Your family doctor
- A specialist
- Other: please specify

6c) *If no*, would you like to be able to schedule appointments with your family doctor or a specialist online?

7a) Have you accessed your medical information (for example, hospital records, lab tests, immunization records) online from any of the providers below?

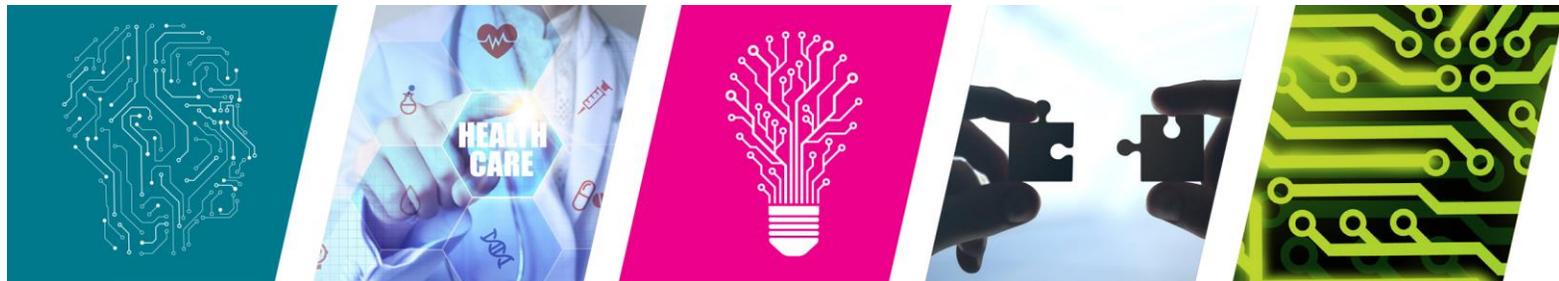
- Hospital
- Family doctor
- Labs (e.g. LifeLabs, Dynacare)
- Don't know

7b) *If yes*, why have you accessed your electronic medical records in the last 12 months?

7c) *If no*, are you interested in accessing your medical records online?

8) Have you accessed medical records or lab records online in the last 12 months for any of the following reasons:

- For a child
- For an elderly person (e.g. a parent)
- For an adult (e.g. a dependent)
- Other (please specify)
- No



2. ANALYSIS STRATEGY AND STRATEGIC PLANNING

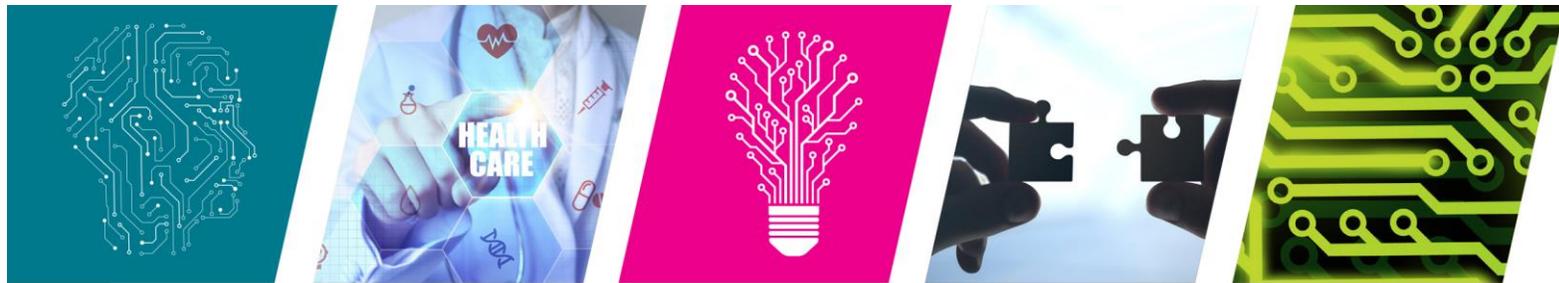
The first step will be to interpret these questions in the context of the two indicators prioritized by the MOHLTC. We have outlined an interpretation strategy below that maps to proposed questions.

- 1) **The percentage of Ontarians who have virtually accessed care in the previous 12 months:**

If the respondents answer “yes” to having had a visit with a doctor not in person (question 2a), that constitutes accessing virtual care, based on the definition provided on page 4. If you wish to exclude phone calls, count only those who respond yes to 2c (email, video, or text) or any of the options within question 5. That will constitute your numerator, with the total number of survey respondents as your denominator.

- 2) **The percentage of Ontarians who have virtually accessed their personal health information in the previous 12 months:**

Count the number of respondents who answer “yes” to having accessed their medical records online in the last 12 months (7a). That will constitute your numerator, with the total number of survey respondents as your denominator.



Overall, it will be valuable to understand the usage patterns of virtual care and services to support virtual care in different demographics. Of particular interest are:

- **Rural versus urban:** Rural is a target demographic for virtual care in terms of improving quality of and access to care; it is also more cost-effective than in urban patients.
- **Access to family doctor:** If the patient has a family doctor, are they more or less likely to use virtual care? What about private pay virtual care? It is expected that patients without access to a family doctor will be more likely to use private pay virtual care.
- **Presence of chronic illness:** Patients with chronic illness represent a high-value target demographic for virtual care as a mechanism to improve management of their illness. Important to see if these individuals are engaging in virtual care.
- **Equity:** Can see if diverse groups are using virtual care or if it is inequitably distributed, as indicated by gender, race, age, income, and education.
- **Confidence in self-management:** It would be of interest to see if those with higher confidence in self-management demonstrate more interest in virtual care, and if those who currently use virtual care/access their records online have a higher confidence in self-management. This will inform if confidence in self-management is important for virtual care.
- **Within question correlations:** Are those who use virtual care more likely to have scheduled an appointment online and/or accessed their medical records online?

We have outlined analytic considerations for these areas of interest in the following table:

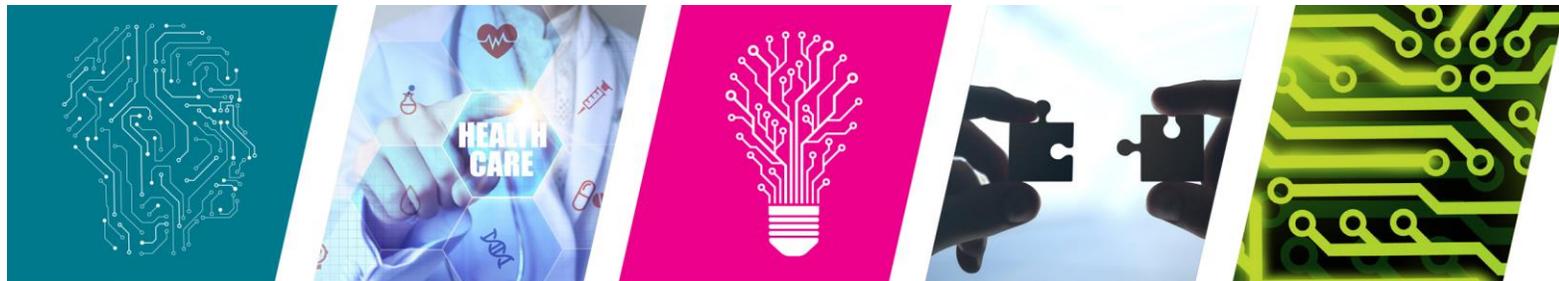
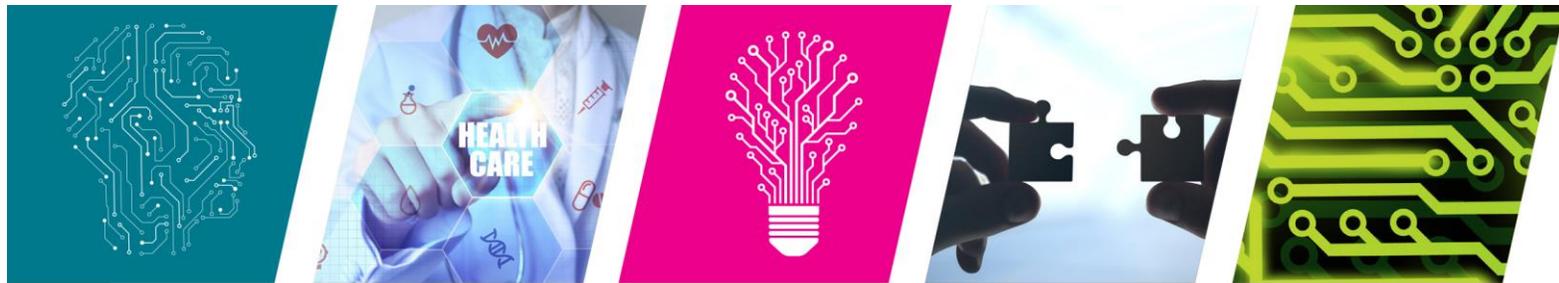


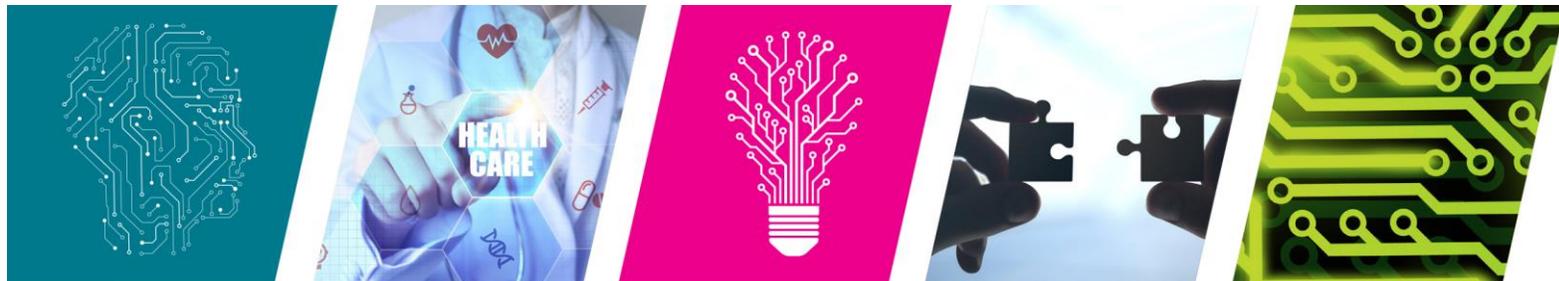
Table 1. Question-specific analyses, takeaways, and implications for strategic planning.

Relevant questions	Content area	Potential sub-group analyses/ correlations ⁱ	Takeaways and implications for strategic planning
(1)	Access to required technology (e.g. laptop, internet)	- Demographic correlations (gender, race, age, income, education, language)	Identify demographics that don't have access to necessary technology to access digital health care; potential for targeted access
(2a) (2b)	Have they had any type of virtual visit with doctor	- Demographic correlations - Confidence in care self-management -Correlate to use of other virtual care services outlined in this survey	Explains that we're interested in all visits that are not in person (simple explanation of virtual) with examples of types Identify demographics that are low / high users of virtual See if there is connection between virtual care use and confidence in self-management Are those who engage in some virtual services more likely to engage in others?
(2b)	Type of provider (GP, specialist, other)	- Demographic correlations	Clarifies whether using virtual care with family doctor or specialist or other
(2c)	Interest in virtual visit / modality	-Correlate to satisfaction with care in the community -Correlate to current ability to access same day care -Correlate to perceived quality of current care	Interest vs current use shows potential for growth and consumer demand
(3/4a)	Communication method (e.g. text, video, etc.)	- Demographic correlations	Valuable to distinguish the different rates of using virtual care with family doc vs specialist, but want same information on both
(3/4b)	Purpose of visit	- Demographic correlations	Understand more about the types of reasons that drive people to access virtual care (capitalizing on these is likely to increase engagement with virtual care at a quicker rate)

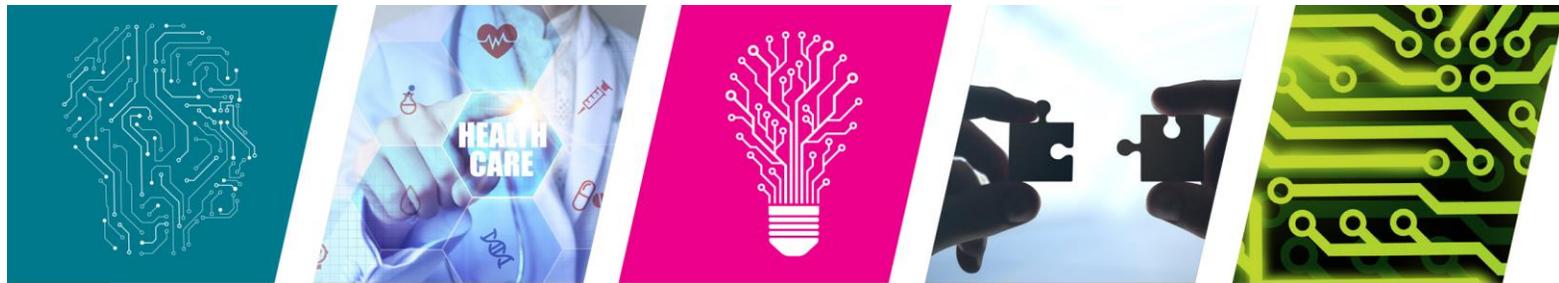
ⁱ Bolded variables come from other questions in the HCES, not from the virtual care questions.



(3/4c)	Satisfaction with the services accessed	<ul style="list-style-type: none"> -Correlation to type of visit -Correlation to reason for visit -Compare to existing satisfaction metrics on in-person care 	<p>Understand</p> <ul style="list-style-type: none"> -if they are satisfied with the quality of virtual care provided -if virtual care is more suited to certain reasons for visit -if they are more or less satisfied with virtual then in-person
(3/4d)	<p>Comparison to in-person visit in regards to:</p> <ul style="list-style-type: none"> -Quality -Length of time -Personal costs incurred 	<ul style="list-style-type: none"> -Correlate to modality (text, email, video) -Correlate to reason for visit 	<p>Compare value, quality, and convenience of virtual to in-person</p> <p>See if there is a correlation between the type and reason for visit to understand if certain visit types hold more value relative to in-person</p>
(3/4e)	<p>Did your visit:</p> <ul style="list-style-type: none"> -Replace an in-person visit -Replace an ED visit -Replace a walk-in visit -None of the above 	<ul style="list-style-type: none"> -Correlate to whether they have a family doctor -Correlate to whether they are rural or urban 	<p>Can have implications for cost in the system</p> <p>Is it more or less likely to replace in-person/urgent care services if they have a family doctor or if they are rural?</p>
(5)	Use of other virtual services	<ul style="list-style-type: none"> -Correlation to whether they have a family doctor 	<p>Alternative types of engagement with virtual tools to support health. Suggests an openness to virtual care more broadly.</p> <p>Are those with a family doctor more or less likely to use other types of virtual care? (Expect less likely unless provided by their family doctor given they have regular access to care)</p>
(6a)	Have you scheduled an appointment online?	<ul style="list-style-type: none"> -Correlate to use of other types of virtual care/related services as identified in this survey (e.g. if they schedule online are they more likely to access their PHI online?) 	<p>Have they booked online and with family doctor or specialist</p> <p>Are those who engage in some virtual services more likely to engage in others?</p>
(6b)	Interest in being able to schedule an appointment online	<ul style="list-style-type: none"> -Demographic correlations -Correlate to satisfaction with care in the community -Correlate to current ability to access same day care -Correlate to perceived quality of current care 	<p>Interest vs current use shows potential for growth and consumer demand</p> <p>Understand who wants to be using virtual care</p>



(7a)	Have you accessed your medical records online?	- Demographic correlations - Rural vs urban	Are people accessing their data online (streamlined into one question) Are those in urban settings more likely to be able to / choose to access their records online?
(7b)	Why have you accessed your medical records online?		Understanding patient goals of accessing records may encourage institutions/ providers to give access
(7c)	Interest in accessing records online	- Demographic correlations -Correlate to satisfaction with care in the community -Correlate to current ability to access same day care -Correlate to perceived quality of current care	Interest vs current use shows potential for growth and consumer demand
(8)	Accessing records as a delegate	-Correlate to whether they have a dependent	Particular benefits of virtual care for delegates

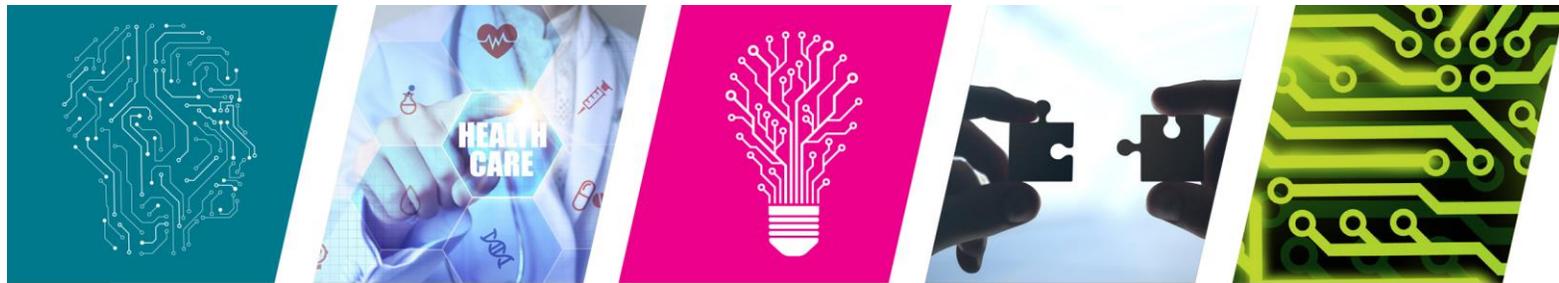


3. POTENTIAL COST IMPLICATIONS OF VIRTUAL CARE

The implications on cost-effectiveness of a virtual care solution is entirely dependent on the nature of the technology. We do not recommend making broad claims about cost across different types of virtual care, as the technologies are not comparable. Broad themes that we have identified across the literature reviewed ([Appendix E](#)) include:ⁱⁱ

- 1) **Virtual care tends to be cost-effective if it replaces in-person visits:**^{24–28} this can include replacement of general practitioner or physiotherapy appointments, in-person specialist screening, rehabilitation programs, and virtual assessments. However, the results are mixed; some have shown face-to-face interventions to be more cost-effective,²⁹ whereas others have indicated that a combination with standard of care is most cost-effective.³⁰
- 2) **Cost-effectiveness tends to be higher in rural areas:**^{28,31,32} The value of telemedicine in rural areas is higher as a mechanism to increase access to services that are easily accessible to those in urban areas. This has assumed (although we found no explicit evidence of this) benefit on preventing more severe illness that would result in hospitalization. In addition, there is benefit in reducing the cost of transportation to an in-person site for care. However, studies indicate that there is a need to achieve certain volumes of engagement for these solutions to become cost-effective.³¹
- 3) **The cost-effectiveness of solutions that are additional to standard of care is uncertain:**^{16–20} These can include solutions such as monitoring tools or additional support or follow-up. An e-mental health service that included online support and telepsychiatry showed favourable cost-effectiveness.¹⁶ However, an intervention to monitor chronic conditions showed low cost-effectiveness compared to a standard of no monitoring based on outcomes at 12 months.¹⁷

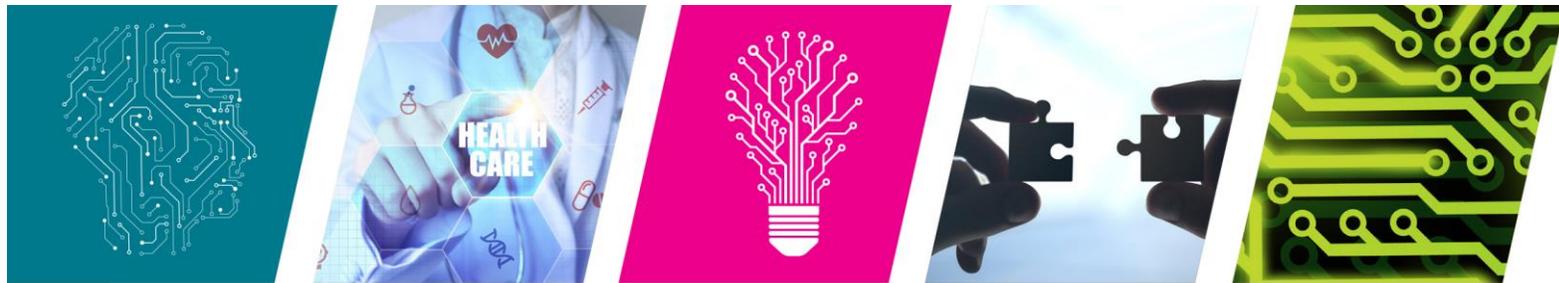
ⁱⁱ The above are themes that emerged from the articles identified through the environmental scan conducted to inform the survey ([Appendix A](#)). These findings are therefore not comprehensive and we would recommend further, more thorough investigation of the literature before making these common claims.



4. LIMITATIONS

A cross-sectional survey is an appropriate and valid method to collect data to inform metrics of virtual care engagement and access to personal health information, so long as the data are properly reported and considered within its limitations. The primary limitations to this form of data collection as a representation of provincial indicators are as follows:

- 1) **Sourcing of phone numbers:** The data will vary in how representative it is of the general Ontario population depending on how the phone numbers are being sourced. Does the list include only landlines, or also cell phones? Will younger people be adequately represented given the source? For example, if the list contains only landlines, it is likely that the reported incidence of virtual care usage will be under-representative, given that younger people are more likely to use virtual solutions²² and less likely to have a landline.
- 2) **Self-reported data tends to have substantial errors:** Self-reported data tends to have inaccuracies due to interpretation, poor recall and other, unknown reasons.^{33,34} However, it is not consistent as to whether patients tend to over or under-represent in their response, so it will be prudent to take caution in interpreting these results, and ensure they are qualified on the basis of being self-reported, not externally assessed.



5. APPENDIX A. ARTICLE SELECTION

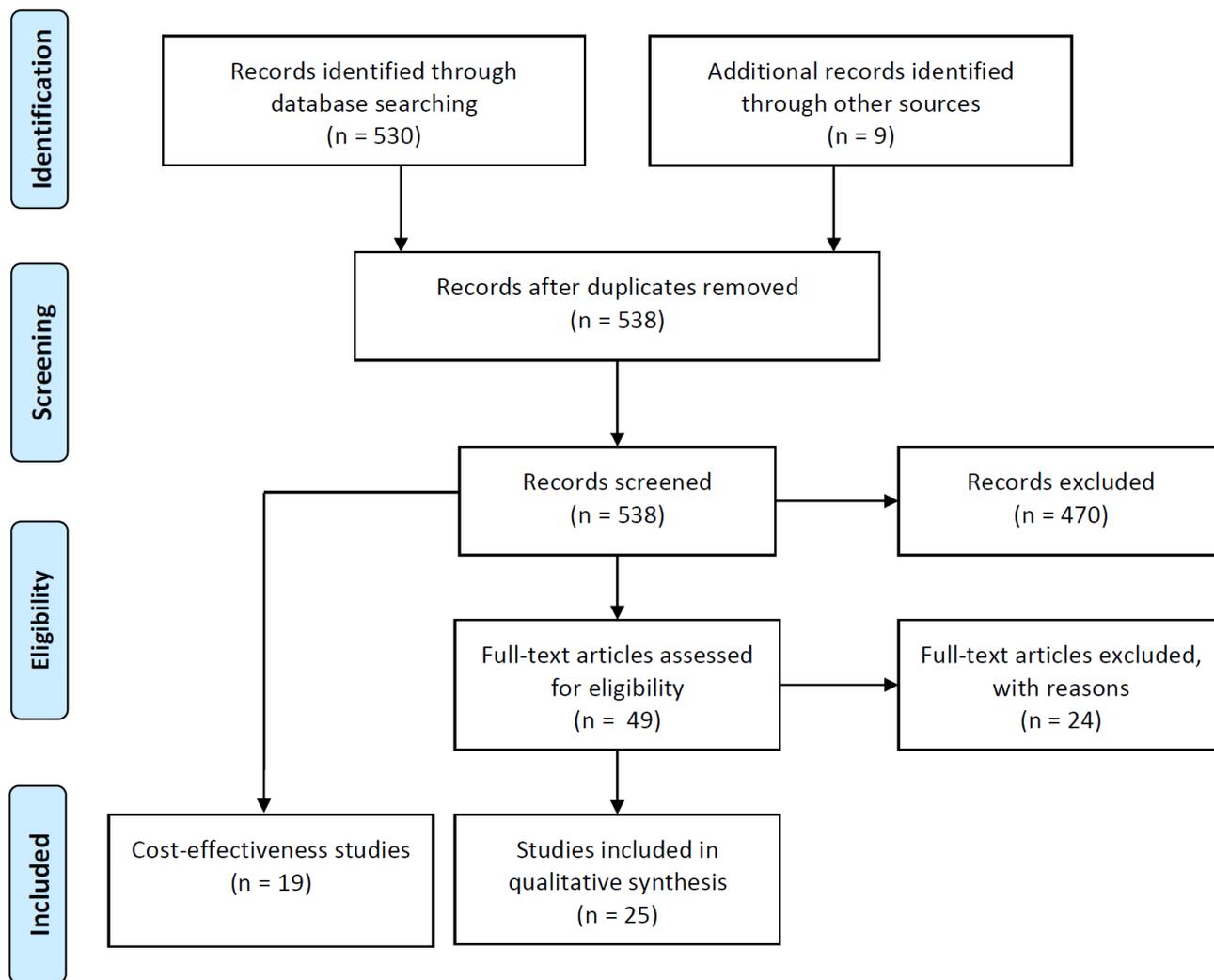
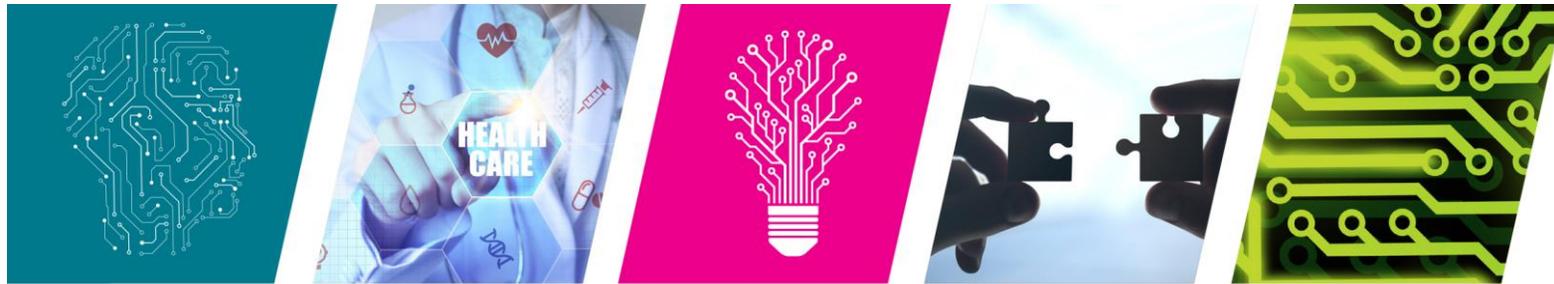


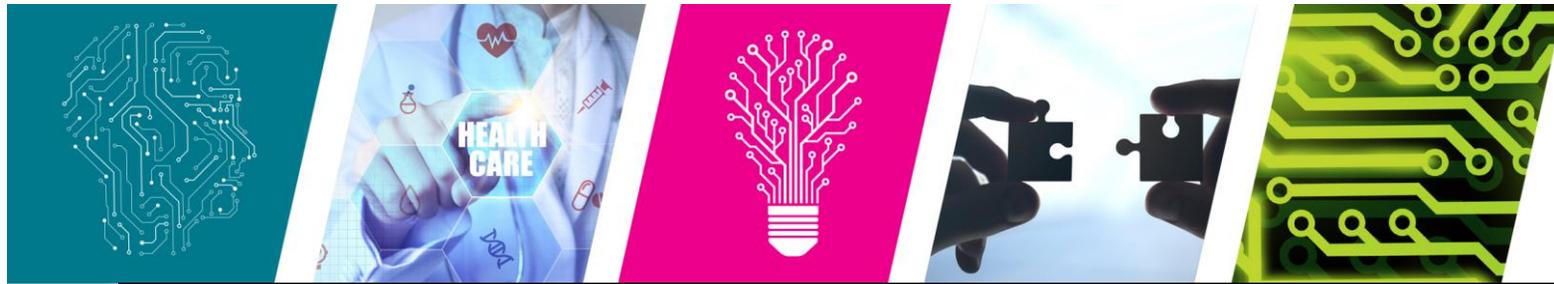
Figure 1. PRISMA diagram showing article selection process.



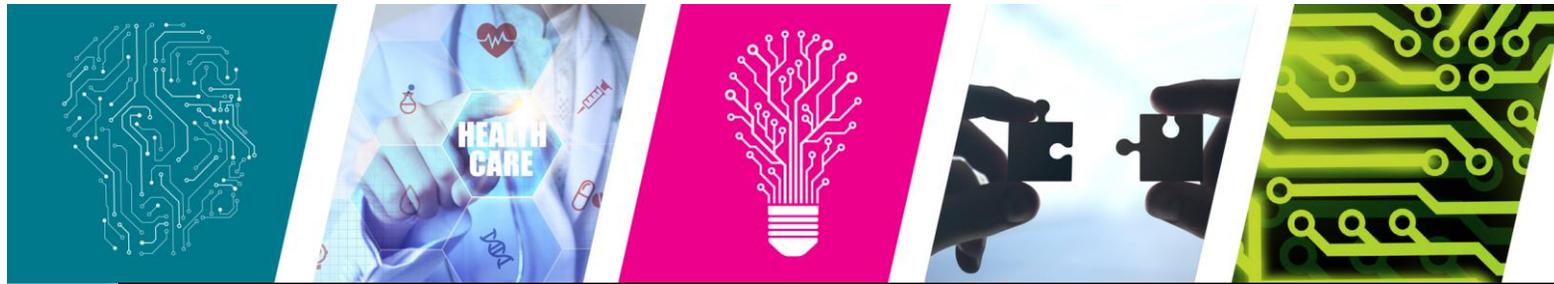
6. APPENDIX B. RESULTS & IMPLICATIONS OF SELECTED LITERATURE

Table 3. Data extraction from relevant articles, as identified through the search strategy articulated above (Appendix A).

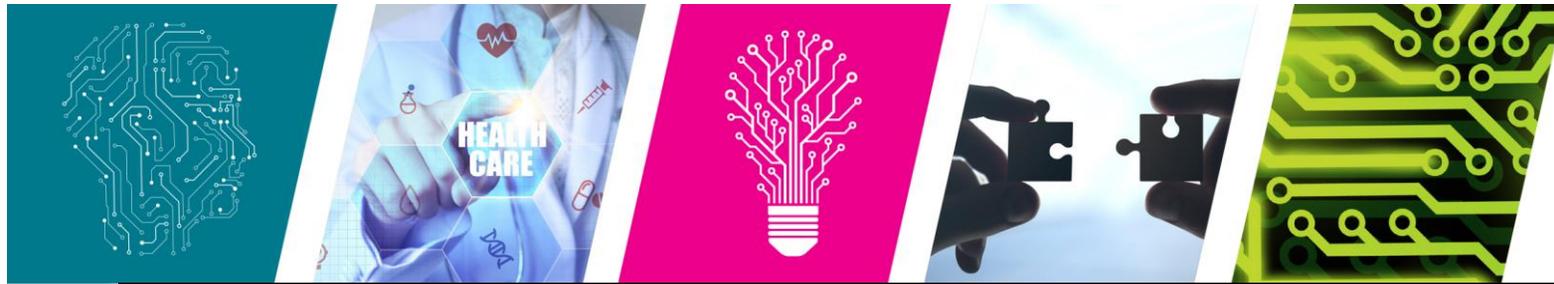
First author, year	Patient survey included?	Relevant Results	Implications for Survey
Gunn, 2018 ³⁵	Yes - patients with depressive symptoms	Mental health websites more likely to be used by people with severe depressive symptoms; associated with GP MH visits, psych visits, and other self-help strategies such as telephone helplines	Do we want to include phone visits/helplines? Do we want to capture websites like BWW?
Wang, 2017 ³⁷	Yes - Random digit dialing resulted in 511 working men at high risk of major depressive disorder	High-risk men more likely to use e-mental health resources Barriers included: privacy, stigma, ease of use, relevance, lacking personal interaction, time, and knowledge	Do we want to capture reason for visit i.e. acute, chronic, mental health, etc.? Do we want to capture barriers to use?
Petric, 2017 ²	Yes - random sample of 15000 users of most popular general OHC in Slovenia - 644 people	Those actively seeking help through OHCs have high self-reported eHealth literacy and ability to filter potential misinformation/ detect bad advice	Do we want to capture something about eHealth literacy? Potential questions from this study include: <i>-I do not have any difficulties understanding the terminology used by some online health resources</i> Do we want to ask people if they use Google/OHCs to investigate their health issues?
Robotham, 2016 ³	Yes - online survey collection (biased against people who would be likely to be excluded)	Lower digital exclusion than in 2011 but patients with psychosis still more excluded	Can get at this with ownership of digital tools and question re: eHealth literacy
Foster, 2015 ⁵	Yes	Primary reason for not participating: telehealth-related: 54.7% (3889/7115) of decliners said they did not have access or the skills to use the internet and/or computers	Reinforces importance of asking about skills/access



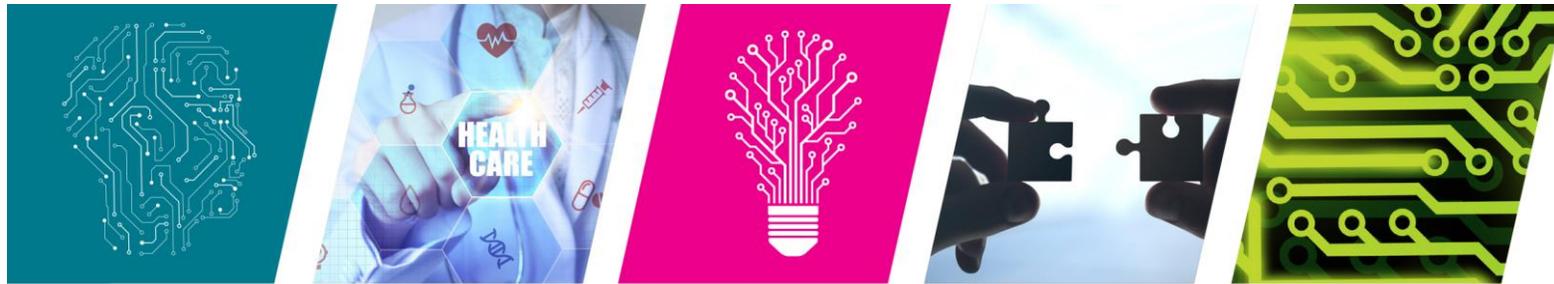
Serrano, 2016 ¹⁰	Yes - 3165 patients via US Health Information National Trends Survey (2013)	High willingness to share appointment reminders, general health tips, medication reminders, lab results, vital signs, behaviours, symptoms Low willingness re: diagnostic info Older adults less willing Correlations to willingness: education, income, trust in health care professional information	Add question about interest/ willingness to use digital tech to access personal health information/ virtual visits Could do sub-group analyses of willingness by education, trust, income, etc. Their question was worded: <i>How willing would you be to exchange the following types of medical information with a health care provider electronically through your mobile phone or tablet?</i>
Massey, 2016 ²³	Yes - US Health Information National Trends Survey	Older adults, minorities, and lower education populations are least likely to have accessed the Internet; 1/10 who don't use Internet seek it as a resource but through delegate	Potentially include something about whether they would use a delegate to access their care
Beckjord, 2007 ³⁸	Yes - Health Information National Trends Survey	Increased 7-10%; outdated	Similar time bracket: They have indicator of "Communicating online with a health care provider in the past 12 months"
Li, 2018 ³⁹	Yes	Trust is the major driving force of an e-Consultation service adoption; Rare, severe, or urgent diseases have decreased positive effect of trust on intention to use e-consultation because healthcare provider less capable of providing meaningful, qualified, and immediate service	Consider including question around trust of virtual visits
Gordon, 2018 ⁴⁰	Yes - 5240 aged 65-79	Elderly, black, latino, filipino less likely to have access to digital tools; they're populations with higher disease burden	Need to do subgroup analyses by race; Need to see if have access to digital tools
Haluza, 2016 ⁴	Yes - 562 Austrian adults; perceptions of eHealth/ telemedicine in population	Most had mobile devices; low desirability of using telemedicine in future; Perceived benefits - better quality care, location-independent access, better QoL Barriers - data security, lack of acceptance by docs, lack of technical prerequisites	Should include question about ownership of mobile/digital devices; Consider including question on desire to use virtual care; Should include data security in barriers questions



Kierkegaard, 2015 ²¹	No - have database of all telemedicine efforts in Denmark	<p>Comprehensive types:</p> <ul style="list-style-type: none"> Conferencing between healthcare professionals Communications support to the patient Consultation between healthcare professionals and patients Cross-sectorial collaboration Diagnostics Education, counseling and mentoring for healthcare professionals Monitoring and surveillance Other Patient education and counseling by patients Prehospital efforts Preventive health measures Remote healthcare services Screening Training and rehabilitation 	Use to inform question about type of digital health engagement
Johansson, 2014 ¹⁴	Yes - 151 participants	<p>Benefits: time savings, cost of transportation, reduced environmental damage</p> <p>Barriers: Concern that in-person would mean insecure and poorer care</p> <p>18% would rather go in-person from rural area to see specialist</p>	Need to get at concerns of quality and data security
Wilkowska, 2012 ⁴¹	Yes - 104 participants	<p>Data security and privacy important for all but especially females and health adults</p> <p>Multiple measurements of data security and privacy</p>	<p>Recommend including question on data security/ privacy e.g.</p> <p><i>How important is protection, restricted access, and confidentiality of your data to you?</i></p>
Almunawar, 2012 ³⁶	Yes - 366 participants	<p>High expectation of better health care services through ehealth</p> <p>Goal - improve health literacy, quality, efficiency of care</p>	<p>Interesting that a goal is to improve health literacy - should maybe include as a reason they would want access to PHI?</p> <p>Quality and efficiency should be included</p>
Terschuren, 2012 ¹⁵	Yes - 2006 participants	<p>36% knew of telemedicine</p> <p>1.8% had experience using them</p> <p>72% in favour of using them (declined with age)</p> <p>Believe it would reduce in-person visits</p> <p>Elderly feared loss of personal contacts with doctor</p>	<p>Perceived impact on in-person visits</p> <p>Barrier - loss of personal connection</p>



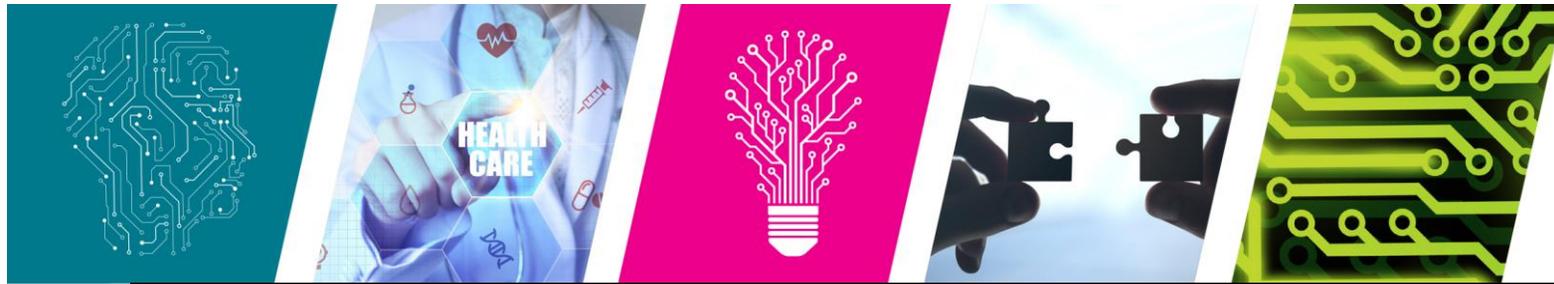
Gandiya, 2012 ⁶	Yes - 221 participants	General access to email, web, mobile phone, texting (not health specific) amongst cardiology patients	Identify who has access to these types of devices
Brick, 1997 ¹³	Yes - 461 participants telephone survey	2/3 less satisfactory than in-person Male, younger, high income more likely to think on par to in-person Benefits - convenience, easier contact, rural	Comparison of satisfaction/ quality to in person
Atallah, 2018 ⁷	Yes - 376 participants	Anxiety/depression 46% had 1-2 healthcare related applications on phone 64% used phones to access information related to health 64% interested in using phones to follow disease progression	Identify who has access to these types of devices and who would be interested in using digital health
Russo, 2017 ⁸	Yes - 751 participants	Sociodemographic, clinical, technical, attitudinal, advantages, fears, and willingness re: digital health 81% at least one social media account 72% would use app for telemedicine services 65% would perform televisit	Include question about interest in virtual visits
Spooner, 2017 ¹²	Yes - 3677 participants	Internet users, college grads, those with frequent GP visits more likely to have email eVisit; Hispanics and higher-income households more likely to communicate via text with GP	Subgroup analyses of education, frequency of GP visits, income with likelihood/ interest
National Quality Forum, 2017 ⁴²	No	Six areas to measure for telehealth: Travel, Timeliness of Care, Actionable Information, Added Value of Telehealth to Provide Evidence-Based Best Practices, Patient Empowerment, Care Coordination	Make sure include questions relevant to at least some of these areas
Deloitte, 2018 ⁹	Yes	While 77 percent of consumers have never tried a virtual visit, more than half (57 percent) of survey respondents said they are willing to try; High satisfaction with visits of those who tried (77%) Comparison to in-person (less knowledgeable, shorter wait time)	Compare interest/actual; Satisfaction if had visit Compare to in-person
American Well, 2017 ¹¹	Yes	Patient are interested in video visits; Consumers see many applications for telehealth - chronic conditions, post-discharge follow-up, after hours care, elderly care, prescription refills, birth control prescriptions	Add these options to reasons for eVisits
Yakovenko, 2018 ²²	Yes - 5000 participants	More respondents want virtual visit for child than themselves; Top 4 characteristics - young, live in cities, high earners, have private insurance	Include something about use for dependents; Subgroup analyses



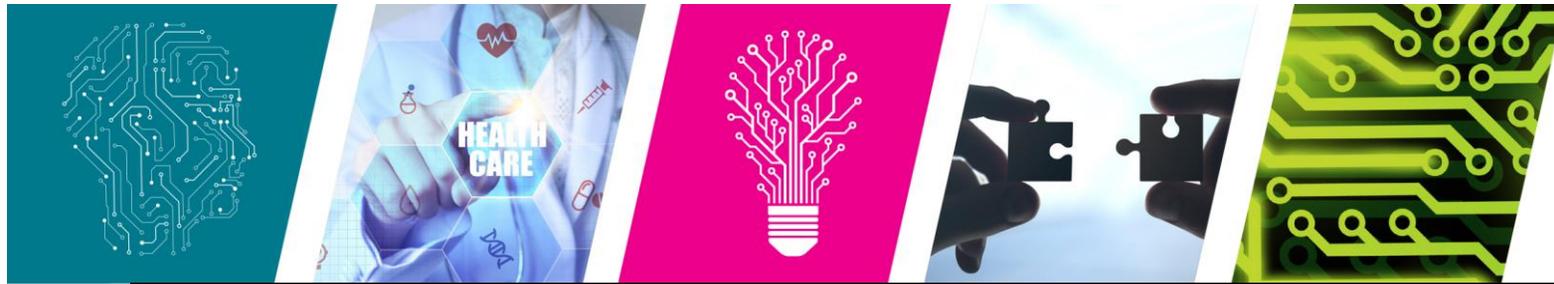
7. APPENDIX C. QUESTIONS REPLACED, REASONS, & REFERENCES

Table 2. Comparison of new questions to V1 of the questions provided by the MOHLTC.

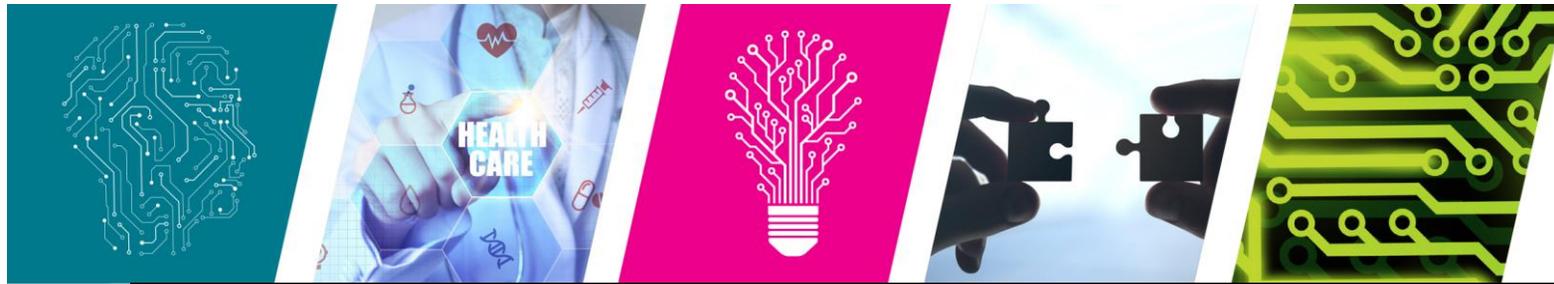
New questions	Question(s) replaced	Takeaways	References
<p>1) Do you own/have access to any of the following? (request they indicate all that apply)</p> <ul style="list-style-type: none"> • Desktop computer • Laptop • Smartphone • Tablet • Internet • None (include option for respondent not having email to skip out of further digital health questions) 	None	Identify groups of folks that don't have access to necessary tech to access digital health care; potential for targeted access	-Petric, 2017 ² -Robotham, 2016 ³ -Haluza, 2016 ⁴ -Foster, 2015 ⁵ -Gandiya, 2012 ⁶
<p>2a) Have you had a visit with a doctor in the last 12 months that was not in person? (*Prompt: For example, a video call, emailing, or text messaging)</p> <ul style="list-style-type: none"> • Yes • No <p>2b) <i>If yes</i>, was this with your family doctor, a specialist, or another type of provider?</p> <ul style="list-style-type: none"> • Family doctor (go to 3a) • Specialist (go to 4a) • Both (complete 3 and 4) • Other: please specify (go to 5) 	<p>2a) Could you contact your provider or their office by going to their website or using email to ask a medical question, get advice, for test results, etc.?</p> <p>2b) If yes, in the last 12 months have you emailed your provider or visited their website to ask a medical question, get advice, for test results, etc.? (Existing question)</p>	<p>Explains that we're interested in all visits that are not in person (simple explanation of virtual) with examples of types</p> <p>Clarifies whether using virtual care with family doctor or specialist or other</p>	-Gunn, 2018 ³⁵ -Kierkegaard, 2015 ²¹
<p>2c) <i>If no</i>, are you interested in having access to visits with your family doctor in any of the formats below?</p> <ul style="list-style-type: none"> • Email (Yes/No) 	<p><i>Sort of the questions related to barriers, which ultimately were about whether patients are choosing not to engage or they can't; interest question is a simpler way of asking this.</i></p> <p>3b) If no, is this because:</p>	Interest vs current use shows potential for growth and consumer demand	-Atallah, 2018 ⁷ -Russo, 2017 ⁸ -Deloitte, 2018 ⁹



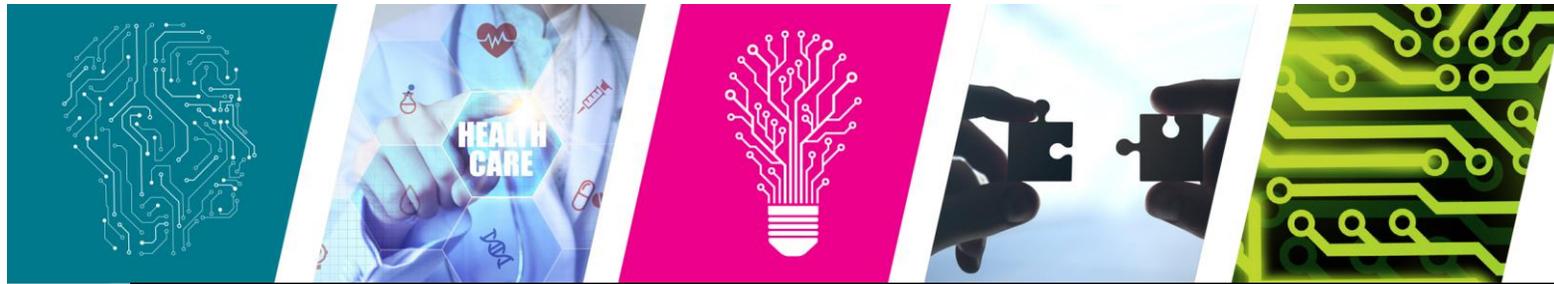
<ul style="list-style-type: none"> • Video call (e.g., Skype or Facetime) (Yes/No) • Text messaging (Yes/No) <p>(Following 2c, go to 6)</p>	<p>Your provider does not provide access this way You do not use video communication You prefer to see your provider in person</p> <p>4b) If no, is this because: Your provider does not provide access this way You do not use text messaging You prefer to see your provider in person</p>		
<p>Family Doctor/Specialist 3/4a) How did you communicate with your doctor in this visit?</p> <ul style="list-style-type: none"> • Text messaging • Email • Video call (e.g., Skype or Facetime) • Phone call • Other (please specify) 	<p>3a) First, via video, such as over Skype? 4a) What about via text messages? 5) What about other ways of communicating using a technical tool?</p>	<p>Valuable to distinguish the different rates of using virtual care with family doc vs specialist, but want same information on both</p>	
<p>3/4b) What was the purpose of your visit?</p> <ul style="list-style-type: none"> • Follow-up from in person visit (e.g. prescription renewal, lab/test results) • New health issue • Chronic disease management • After hours care • Other (please specify) 	<p>None</p>	<p>Understand more about the types of reasons that drive people to access virtual care (capitalizing on these is likely to increase engagement with virtual care at a quicker rate)</p>	<p>-From our evaluation of OTN's Enhanced Access to Primary Care (EAPC) findings -Serrano, 2016¹⁰ -Haluz, 2016⁴ -American Well, 2017¹¹ -Gunn, 2018³⁵ -Kierkegaard, 2015²¹</p>
<p>3/4c) Please rate your satisfaction with the services accessed:</p> <ul style="list-style-type: none"> • Likert scale (1=Very dissatisfied, 2=Dissatisfied, 3=Neutral, 4=Satisfied, 5=Very satisfied) 	<p>None</p>	<p>Understand if they are satisfied with the quality of virtual care provided</p>	<p>-From our evaluation of OTN's Enhanced Access to Primary Care (EAPC) findings -Brick, 1997¹³ -Deloitte, 2018⁹</p>



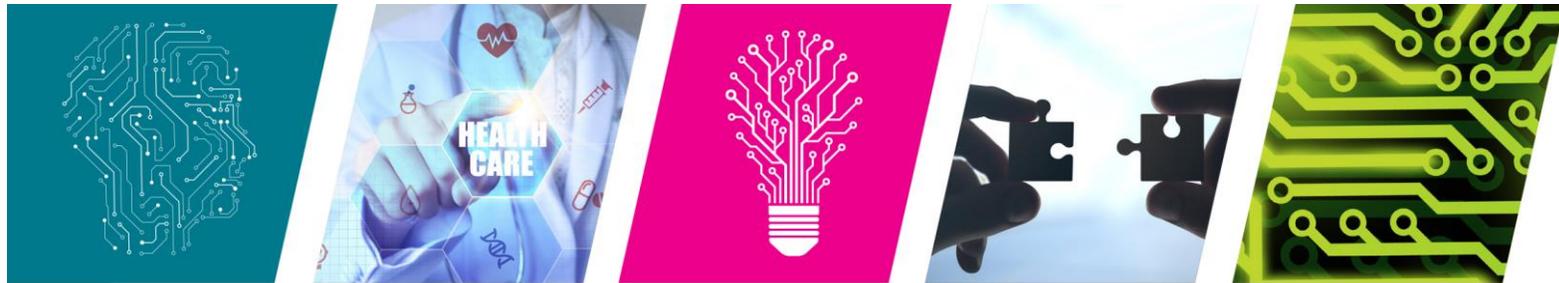
<p>3/4d) How did the service compare to in-person visit in regards to:</p> <ul style="list-style-type: none"> Quality (Worse, same, better) Length of time (e.g. commute time, waiting time) (Shorter, same, longer) Personal costs incurred (e.g. taking time off work, parking, child care) (Less, same, more) 	<p>None</p>	<p>Understand if quality is comparable to in person Also shows convenience factors and patient cost factors</p>	<p>-From our evaluation of OTN's Enhanced Access to Primary Care (EAPC) findings -BeACCoN Caregiver Voice Survey -Johansson, 2014¹⁴</p>
<p>3/4e) Did your video call, text messaging, or email:</p> <ul style="list-style-type: none"> Replace an in-person visit Replace an emergency room visit Replace a walk-in clinic visit None of the above 	<p>None</p>	<p>Can have implications for cost in the system</p>	<p>-From our evaluation of OTN's Enhanced Access to Primary Care (EAPC) findings -Terschuren, 2012¹⁵</p>
<p>Other 5) Have you used any of the following virtual services?</p> <ul style="list-style-type: none"> Online educational resources (Yes/No) Helplines (e.g. Telehealth) (Yes/No) Disease screening tools (Yes/No) Disease self-monitoring tools (e.g. tracking blood sugar, exercise, and eating for diabetes) (Yes/No) Disease remote monitoring tools (e.g. tracking blood sugar for diabetes and sending it to your family doctor) (Yes/No) Private pay online doctor's visit (e.g. Maple, Akira) (Yes/No) 	<p>None</p>	<p>Alternative types of engagement with virtual tools to support health. Suggests an openness to virtual care more broadly.</p>	<p>-Kierkegaard, 2015²¹ -From our consulting work with many virtual care technologies that are don't fit into virtual visits category nor into the system overall yet</p>
<p>6a) Have you scheduled a doctor's appointment online in the last 12 months? (e.g. by going to their website or sending an email?) (Modified existing question) (Yes/No) 6b) If yes, was it with:</p> <ul style="list-style-type: none"> Your family doctor 	<p>1b) If yes, in the last 12 months have you emailed your provider or visited their website to set up an appointment?</p>	<p>Have they booked online and with family doctor or specialist</p>	<p>From original survey</p>



<ul style="list-style-type: none"> • A specialist • Other: please specify 			
<p>6c) <i>If no</i>, would you like to be able to schedule appointments with your family doctor or a specialist online? (Yes/No)</p>	<p>1a) Could you contact your provider or their office by going to their website or sending an email to set up an appointment? (Existing question)</p>	<p>Interest vs current use shows potential for growth and consumer demand</p>	<p>-Serrano, 2016¹⁰ -Haluza, 2016⁴ -American Well, 2017¹¹</p>
<p>7a) Have you accessed your medical information (for example, hospital records, lab tests, immunization records) online from any of the providers below? Some examples of online systems are MyChart, MyUHN, kindredPHR.</p> <ul style="list-style-type: none"> • Hospital (Yes/No) • Family doctor (Yes/No) • Labs (e.g. LifeLabs, Dynacare) (Yes/No) • Don't know 	<p>6a) Does your provider make these medical records available to you online? Some examples of online systems are MyChart, MyUHN, kindredPHR, etc. 6b) If yes, have you ever looked at your medical records? 7a) Are your lab results available online through a lab website or portal? 7b) If yes, have you ever looked at your lab results online?</p>	<p>Are people accessing their data online (streamlined into one question)</p>	<p>From original survey just modified/consolidated</p>
<p>7b) <i>If yes</i>, why have you accessed your electronic medical records in the last 12 months?</p> <ul style="list-style-type: none"> • Increase control of your care • Improve understanding of health/ illness • Provide information to another doctor (e.g. give hospital records to family doctor) • General convenience • Other: please specify 	<p>None</p>	<p>Understanding patient goals of accessing records may encourage institutions/providers to give access</p>	<p>-Almunawar, 2012³⁶ -Spooner, 2017¹² -Deloitte, 2018⁹</p>
<p>7c) <i>If no</i>, are you interested in accessing your medical records online? (Yes/No)</p>	<p><i>Sort of the barriers question (same as above)</i> 6c) If no, which of the following is the main reason you have not looked at your medical records online?</p> <ul style="list-style-type: none"> • You do not have the technology or technical skills required • You have no need to look at your medical records • You have no interest in looking at your medical records 	<p>Interest vs current use shows potential for growth and consumer demand</p>	<p>-Spooner, 2017¹² -Deloitte, 2018⁹</p>



	<p>You have not been provided the information you need from your provider (or their office) to look at your medical records</p> <p>7c) If no, which of the following is the main reason you have not looked at your lab results online?</p>		
<p>8) Have you accessed medical records or lab records online in the last 12 months for any of the following reasons:</p> <ul style="list-style-type: none"> • For a child (Yes/No) • For an elderly person (e.g. a parent) (Yes/No) • For an adult (e.g. a dependent) (Yes/No) • Other (please specify) (Yes/No) • No 	<p>None</p>	<p>Particular benefits of virtual care for delegates</p>	<p>- Yakovenko, 2018²²</p> <p>- Massey, 2016²³</p>
<p>None</p> <p>These are very specific technology investigations that are not necessarily representative; unclear why these were chosen. Recommend removing.</p>	<p>9) Have you looked at your immunization records from your public health unit, you might have used Immunization Connect Ontario or some other online program? (Yes/No)</p> <p>10) Have you looked at your medical or health records using tools or apps like Ned that are designed to be used by people with specific health conditions? (Yes/No)</p> <p>11) Have you used any app or program such as Dot Health or MedChart that keeps track of ALL your health records in one place? This would include records from your provider, any specialists you have seen, lab results, immunizations, etc.? (Yes/No)</p>	<p>Immunization records access</p>	<p>From original survey</p>



8. APPENDIX D. FINAL SURVEY QUESTIONS

1) Do you own/have access to any of the following? (request they indicate all that apply)

- Desktop computer
- Laptop
- Smartphone
- Tablet
- Internet
- None (include option for respondent not having email to skip out of further digital health questions)

Part I: Virtual Visits

Intro text: Many family doctors and specialists are starting to hold visits with their patients through means other than in-person visits. This can include video call, emailing, and special phone or internet apps.

2a) Have you had a visit with a doctor in the last 12 months that was not in person?

(*Prompt: For example, a video call, emailing, or text messaging)

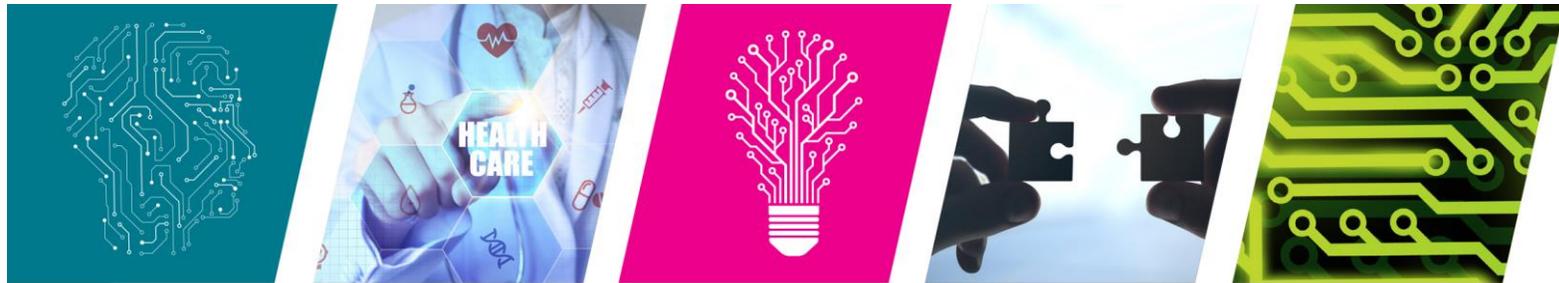
- Yes
- No

2b) *If yes*, was this with your family doctor, a specialist, or another type of provider?

- Family doctor (go to 3a)
- Specialist (go to 4a)
- Both (complete 3 and 4)
- Other: please specify (go to 5)

2c) *If no*, are you interested in having access to visits with your family doctor in any of the formats below?

- Email
 - Yes
 - No
- Video call (e.g., Skype or Facetime)
 - Yes
 - No
- Text messaging
 - Yes
 - No (Following 2c, go to 6)



Family Doctor

3a) How did you communicate with your doctor in this visit?

- Text messaging
- Email
- Video call (e.g., Skype or Facetime)
- Phone call
- Other (please specify)

3b) What was the purpose of your visit?

- Follow-up from in person visit (*Prompt: prescription renewal, lab/test results)
- New health issue
- Chronic disease management
- After hours care
- Other (please specify)

3c) Please rate your satisfaction with the services accessed:

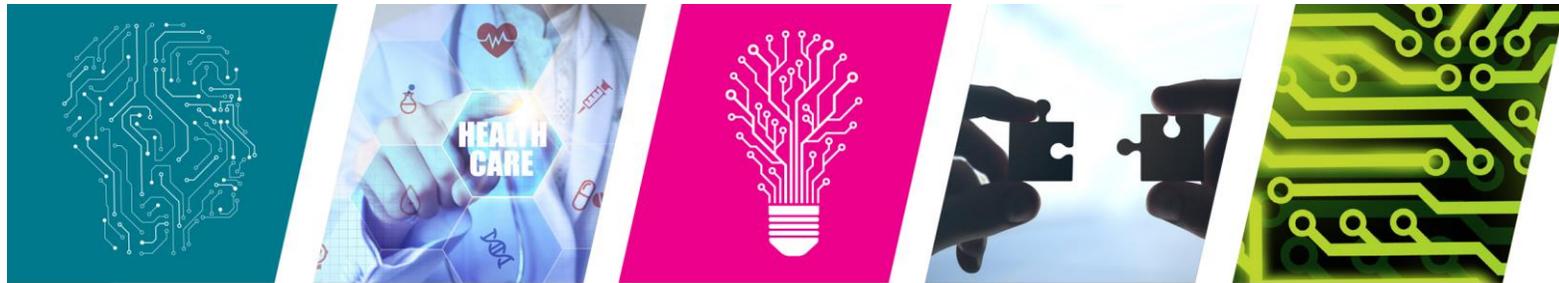
- Likert scale (1=Very dissatisfied, 2=Dissatisfied, 3=Neutral, 4=Satisfied, 5=Very satisfied)

3d) How did the service compare to in-person visit in regards to:

- Quality
 - Worse
 - Same
 - Better
- Length of time (e.g. commute time, waiting time)
 - Shorter
 - Same
 - Longer
- Personal costs incurred (e.g. taking time off work, parking, child care)
 - Less
 - Same
 - More

3e) Did your video call, text messaging, or email:

- Replace an in-person visit
- Replace an emergency room visit
- Replace a walk-in clinic visit
- None of the above



Specialist

4a) How did you communicate with the specialist in this visit?

- Text messaging
- Email
- Video call (e.g., Skype or Facetime)
- Phone call
- Other (please specify)

4b) What was the purpose of your visit?

- Follow-up from in person visit (*Prompt: prescription renewal, lab/test results)
- New health issue
- Chronic disease management
- After hours care
- Other (please specify)

4c) Please rate your satisfaction with the services accessed:

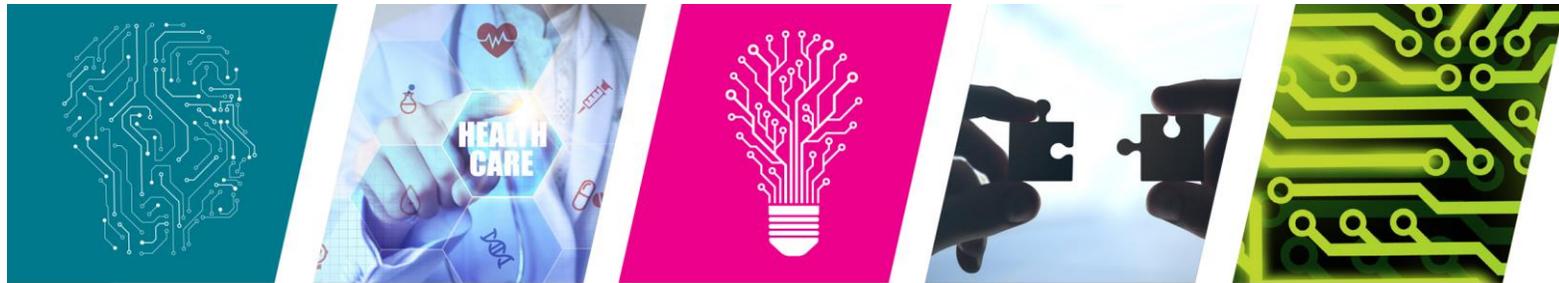
- Likert scale (1=Very dissatisfied, 2=Somewhat dissatisfied, 3=Neutral, 4=Somewhat satisfied, 5=Very satisfied)

4d) How did the service compare to in-person visit in regards to:

- Quality
 - Worse
 - Same
 - Better
- Length of time (e.g. commute time, waiting time)
 - Shorter
 - Same
 - Longer
- Personal costs incurred (e.g. taking time off work, parking, child care)
 - Less
 - Same
 - More

4e) Did your video call, text messaging, or email:

- Replace an in-person visit
- Replace an emergency room visit
- Replace a walk-in clinic visit
- None of the above



Other

5) Have you used any of the following virtual services?

- Online educational resources
 - Yes
 - No
- Helplines (e.g. Telehealth)
 - Yes
 - No
- Disease screening tools
 - Yes
 - No
- Disease self-monitoring tools (e.g. tracking blood sugar, exercise, and eating for diabetes)
 - Yes
 - No
- Disease remote monitoring tools (e.g. tracking blood sugar for diabetes and sending it to your family doctor)
 - Yes
 - No
- Private pay online doctor's visit (e.g. Maple, Akira)
 - Yes
 - No

Part II: Online services to support clinical visits

6a) Have you scheduled a doctor's appointment online in the last 12 months? (e.g. by going to their website or sending an email?) **(Modified existing question)**

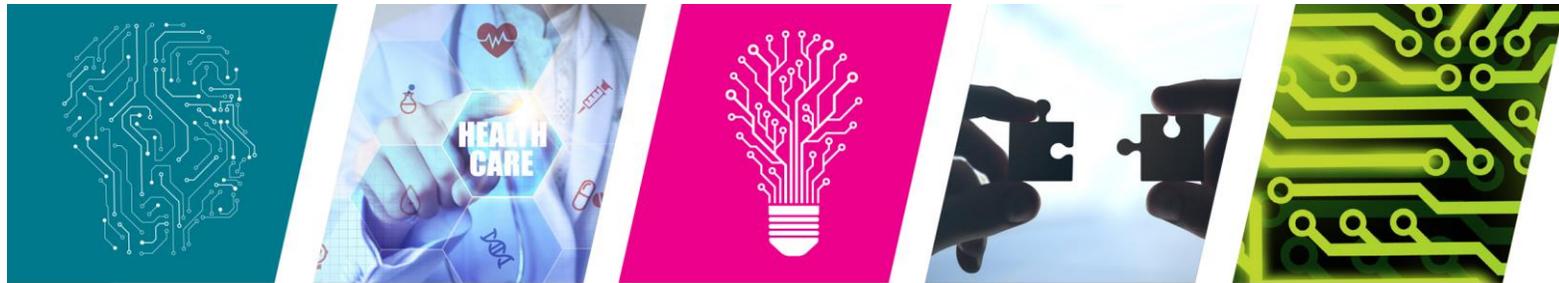
- Yes
- No

6b) *If yes*, was it with:

- Your family doctor
- A specialist
- Other: please specify

6c) *If no*, would you like to be able to schedule appointments with your family doctor or a specialist online?

- Yes
- No



Intro text: Doctors keep medical records of their patients which includes information such as age, weight, prescriptions, results of tests, x-rays, notes from specialists, etc.

7a) Have you accessed your medical information (for example, hospital records, lab tests, immunization records) online from any of the providers below?

Some examples of online systems are MyChart, MyUHN, kindredPHR.

- Hospital
 - Yes
 - No
- Family doctor
 - Yes
 - No
- Labs (e.g. LifeLabs, Dynacare)
 - Yes
 - No
- Don't know

7b) If yes, why have you accessed your electronic medical records in the last 12 months?

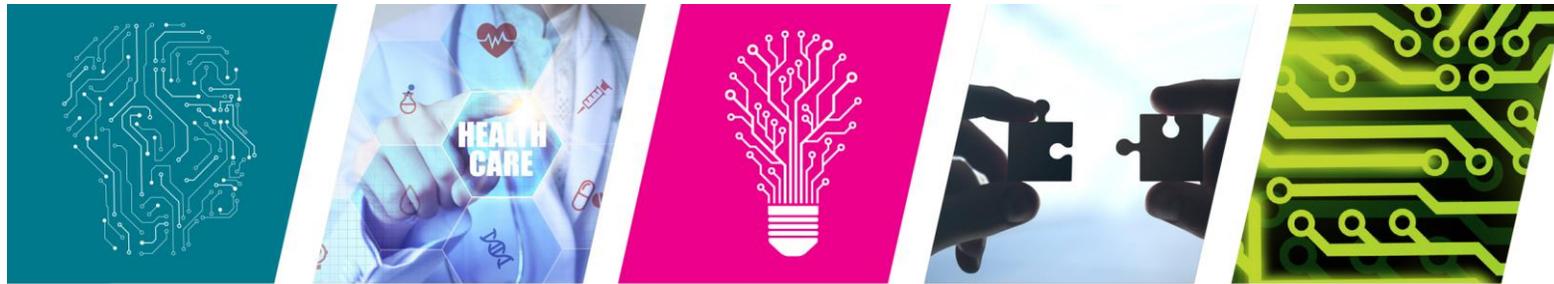
- Increase control of your care
- Improve understanding of health/ illness
- Provide information to another doctor (e.g. give hospital records to family doctor)
- General convenience
- Other: please specify

7c) If no, are you interested in accessing your medical records online?

- Yes
- No

8) Have you accessed medical records or lab records online in the last 12 months for any of the following reasons:

- For a child
 - Yes
 - No
- For an elderly person (e.g. a parent)
 - Yes
 - No
- For an adult (e.g. a dependent)
 - Yes
 - No
- Other (please specify)
- No

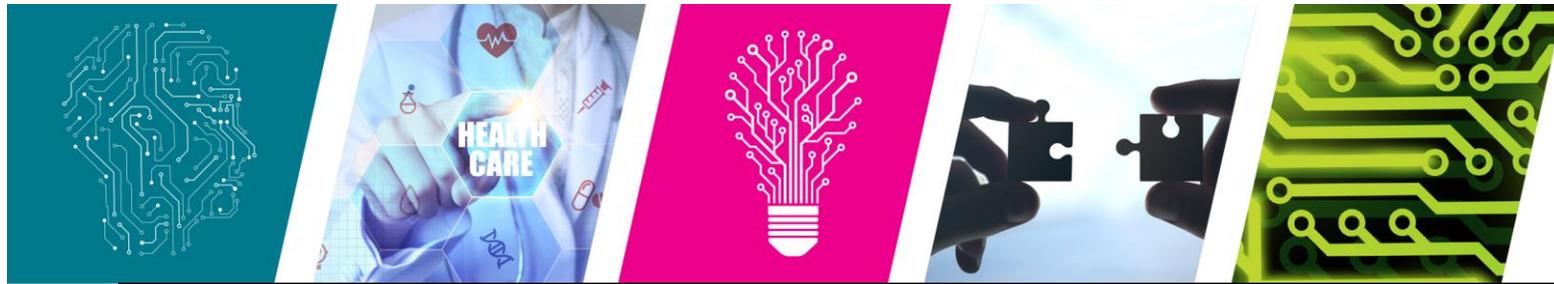


9. APPENDIX E. COST-EFFECTIVENESS ARTICLES

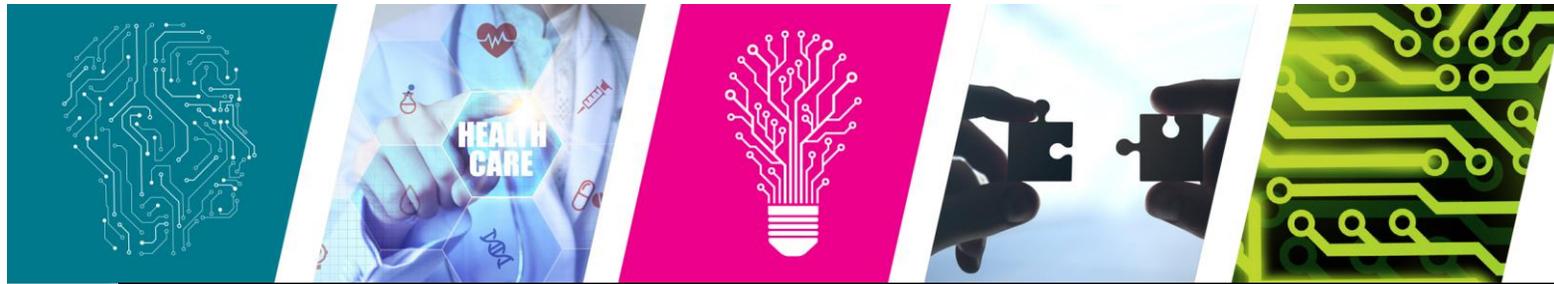
Please note that these findings came from articles identified from the search strategy for population-level virtual care measures, and not a dedicated search for cost-effectiveness. This aligns with the project plan, however, there is likely a number of virtual care cost-effectiveness articles that have were not identified in this search and therefore are not reported on above.

Table 4. Data extraction from cost-effectiveness articles, as identified through the search strategy articulated above (Appendix A).

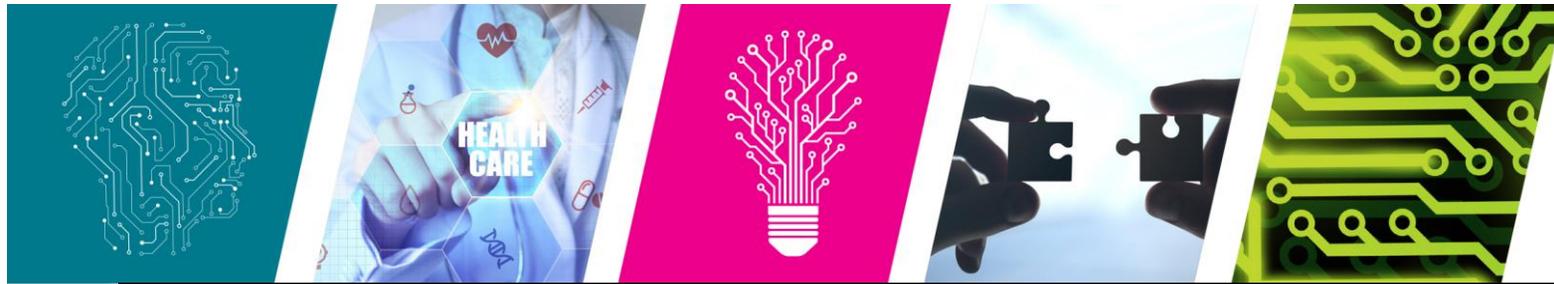
Author, year	Type of technology	Who is using it	Implications for cost savings
Isaac, 2018 ⁴³	Telemedicine screening modality for retinopathy of prematurity (ROP) – digital fundus images with remote interpretation (compared to in-person binocular indirect ophthalmoscopy (BOP))	Digital fundus images obtained by non-ophthalmic personnel (nurses) from infants with remote interpretation by an ophthalmologist	<p>Cost analysis findings suggest that telemedicine screening for ROP could be economically viable.</p> <p>Cost to transfer to central reading site and number of infants screened per year are the greatest factors that influence cost/infant screened via telemedicine.</p>
Jackson, 2008 ⁴⁴	Store-and-forward telemedicine: medical data captured for subsequent interpretation by a remote expert	For infants with birth weight less than 1500 g	<p>Telemedicine is more cost-effective than standard ophthalmoscopy for ROP management. Both strategies are highly cost-effective compared with other health care interventions.</p> <p>Costs per quality-adjusted life year gained were \$3193 with telemedicine and \$5617 with standard ophthalmoscopy.</p>
Frederix, 2017 ³⁰	Remote delivery of rehabilitation services via telecommunication technologies (phone, internet, video conference communication) between patient and healthcare provider. It encompasses a comprehensive programme with multiple components such as telemonitoring, telecoaching, and e-learning.	Patients with cardiovascular disease, who have had an acute cardiac event and require secondary prevention programmes to prevent recurrent disease for CAD and HF	<p>Program remained cost-efficient up to 2 years after the end of the intervention</p> <p>Telerehabilitation demonstrated health benefits compared to conventional care, but were not fully maintained at the end of the telerehab phase</p> <p>Telerehabilitation plus standard care is more effective and less costly than standard care alone in the long-term</p>



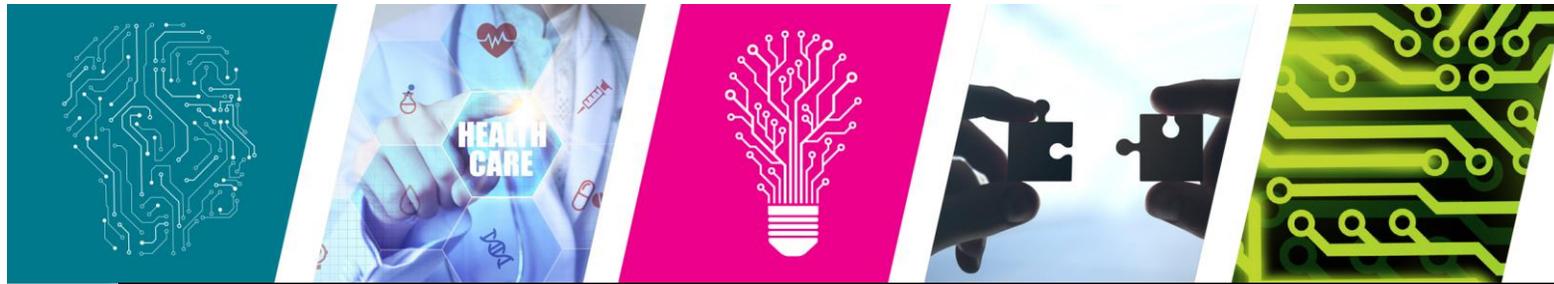
<p>Dixon, 2016²⁰</p>	<p>De novo, theory-driven, web and telephone-based service (scripted) for high risk cardiovascular disease patients, intended to promote behavior change, optimization of medication, improved coordination of care, medication adherence</p> <p>Scripted telephone support and responsive advice delivered by NHS health information advisors</p> <p>Encounters responsive to need, participants could request calls and could be directed to relevant information to manage their condition</p>	<p>For individuals with 10-year risk of a cardiovascular event of >20% calculated using QRISK2 algorithm and with at least 1 modifiable CVD risk factor</p>	<p>Compared to standard care (control group), response to treatment was modestly higher in the treatment group, reduction in blood pressure, weight, improvements in diet, physical activity, medication to care, and satisfaction with treatment</p> <p>NHS costs were the same in both arms (primary care consultations, medications, use of community services, secondary care)</p> <p>Costs to the NHS were higher in the intervention arm due to the cost of the intervention</p> <p>Intervention is cost-effective at a threshold value of 20,000E per quality of life years</p> <p>Intervention was estimated to be cost-effective (measured as a function of the ratio of incremental costs to incremental QALYs) from an NHS perspective after 12 months of trial follow-up.</p>
<p>Rein, 2011²⁷</p>	<p>Telemedicine screening – retinal digital photography – low cost alternative to annual evaluation by eye care professional. Enables screening in non-ophthalmologic settings. Images are electronically transferred to a grading center for evaluation, and patients with evidence of mild to severe DR are referred to an eye-care professional for full evaluation. Has shown better sensitivity and specificity than ophthalmoscopy. Costs less due to lower provider reimbursement and lower patient productivity losses</p>	<p>Performed in a primary care office on diabetic patients, initial gradable fundus photograph and then interpreted by an ophthalmologist</p>	<p>Most cost-effective when other eye conditions were not considered or when it's assumed to detect refractive error. More research needed to determine whether it is more cost-effective than biennial eye evaluation.</p> <p>Annual telemedicine assessments had the highest Incremental Cost-Effectiveness Ratio compared to self-referral (\$55,000 USD per QALY gained), compared to biennial and annual evaluation</p>



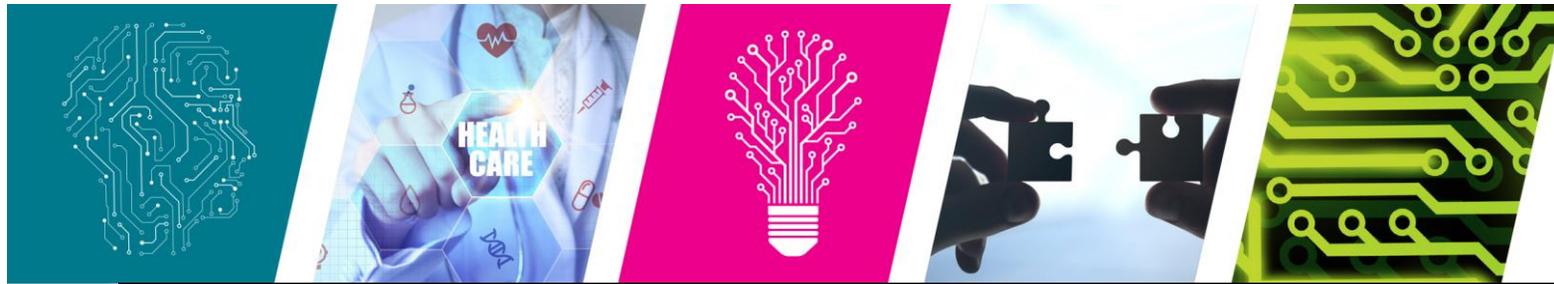
<p>Kanjee, 2016³²</p>	<p>Teleophthalmology screening program – alternative to in-office examination through use of remote evaluation of fundus photographs (Mydriatic 7 standard field stereoscopic fundus photography) in addition to counselling patients on improved diabetic control</p>	<p>Type 2 diabetes patients Trained nurses perform the teleophthalmological examinations</p>	<p>Cost-effectiveness estimated by comparing the cost of running the tele-ophthalmology program compared with the cost of screening the same volume of patients in-office. Average savings per tele-ophthalmology examination was \$1007. Telemedicine 74% more cost-effective than in-office screening – represents direct savings to the healthcare system, not yet factoring in economic benefits inherent to the reduction of vision loss screening may be particularly useful in geographically isolated areas, commonly found in Canada - Manitoba</p>
<p>Nguyen, 2016²⁸</p>	<p>Telemedicine-based DR screening program in Singapore (SiDRP)</p>	<p>Trained technicians/nurses in primary care settings assess retinal photographs Retinal images taken by nurse, transmit to reading centre, images graded by a centralized team of trained and accredited technicians, reports transmitted back within 1 hour, and referrals are made by the doctors during the same visit</p>	<p>Telemedicine program had significantly lower costs (cost savings of S\$174/person) while generating similar QALYs compared to physician-based model Present value of future cost savings associated with telemedicine model is S\$29.4 million over a lifetime horizon</p> <ul style="list-style-type: none"> - Costs less to grade a DR image under SiDRP compared to family practice model - High specificity of SiDRP means less over-referrals to hospitals – saving costs for consultation at the hospital, time, travel - Patients with mild DR grade under FP model unnecessarily sent to hospital, generating additional costs - Returning another day for referral letter under FP model involves additional time and travel
<p>Kloek, 2018²⁴</p>	<p>Blended physiotherapy: physio sessions and an online application are integrated (e-Exercise)</p>	<p>Patients with osteoarthritis of hip/knee</p>	<p>Intervention and medication costs significantly lower in e-Exercise compared to usual physio. But total societal costs (costs related to osteoarthritis, irrespective of who paid for it) and healthcare costs (visits after the intervention period, as well as their total number of visits to a general practitioner, massage therapist, alternative therapist, or medical specialist) did not differ between two groups. E-exercise cannot be seen as cost effective in comparison with usual physiotherapy</p>



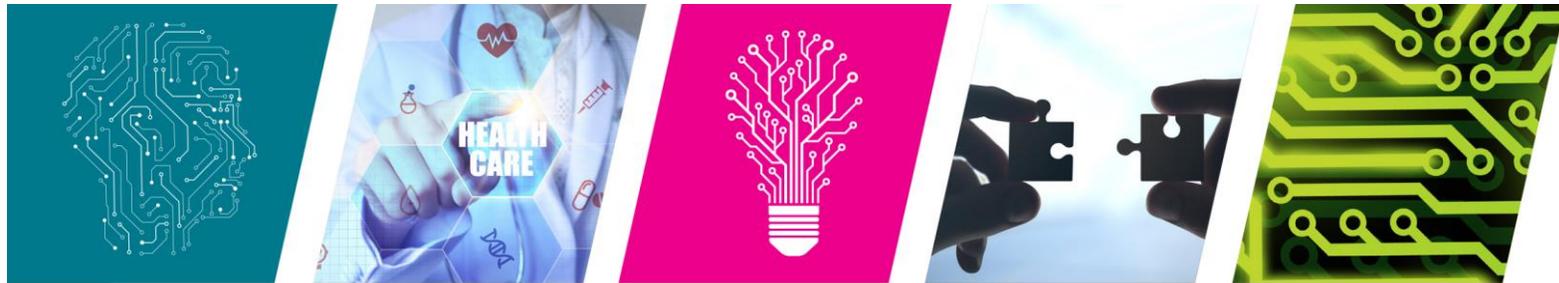
Hofer, 2016 ⁴⁵	Telemonitoring – identifies exacerbations in a timely manner such that hospitalizations can be avoided and healthcare costs reduced	Physicians and COPD patients	Telemonitoring as an add-on to standard treatment may be cost effective in Germany from a payer’s point of view But telemonitoring is not reimbursed by German statutory sickness funds
Stoddart, 2015 ¹⁹	Touch-screen telemonitoring equipment transmits data to clinical teams monitoring patients Provides clinician with more detailed and frequent information on patient symptoms/physiological measurements	Aging populations living with long-term COPD in UK	Total healthcare costs estimated over a 12-month period – avoiding hospital admissions? Not significantly different Telemonitoring not significantly more costly than usual care to NHS Costs associated with GP and nurse consultations higher in telemonitoring arm not cost-effective in the analysis performed.
Nelson, 2015 ²⁵	Telestroke enables specialists to visually assess patients in remote locations in a timely manner and has been shown to be effective in increasing tissue plasminogen activator usage	acute ischemic stroke patients	Costs and ICERS vary by stroke severity, it seems to be most cost-effective for severe strokes Also depends on proportion of telestroke implementation costs paid for by spoke or hub hospitals.
Cuperus, 2016 ²⁹	Non-pharmacological, non-surgical interventions (education, self-management, exercise, weight reduction) Face to face: multidisciplinary team of physiotherapists, nurse, dietician Telephone: individual telephone contact moments for monitoring, provided by rheumatology nurse and physiotherapist	Patients with generalized osteoarthritis on phone with by rheumatology nurse and physiotherapist	Economic evaluation from a societal perspective showed that a non-pharmacological face-to-face treatment program for patients with generalized osteoarthritis was more cost-effective than a telephone-based program –QALY significantly in favor of face to face group according to SF-6D, 60-95% chance that face to face program had better cost utility
Ellis, 2013 ⁴⁶	Telehealth services in Australia – reduce amount of travel required for people living in rural areas	Patients in rural/remote areas	Participants of survey in King Island, Australia paid for their own travel more than 70% of the time Took into consideration the vehicle, number of km travelled 134.64 tonnes of co2 equivalents associated with accessing health care for 12 months Further research is needed to determine how much of this could be reduced by telehealth.



<p>Henderson, 2013¹⁷</p>	<p>Intervention participants received a package of telehealth equipment and monitoring services for 12 months in addition to standard health and social care services available in their area</p> <p>Telemonitoring – patients transmit data on their vital signs for real time monitoring Telephone support as well</p>	<p>Patients with chronic conditions (diabetes, etc)</p>	<p>Low probability that telehealth is a cost-effective addition to standard support and treatment for people with long-term conditions based on health and social costs and outcomes after 12 months with reference to NICE’s recommended WTP threshold of E30,000 per QALY</p> <p>Total cost for telehealth group higher than for usual care</p>
<p>Naversnik, 2013¹⁶</p>	<p>e-Health service (improvehealth.eu) to support depression care, telepsychiatry</p> <p>Offers active patient engagement and collaborative care management by combining web- and mobile-based information and communication technology systems and access to care managers</p>	<p>Depressed patients</p>	<p>Cost-effectiveness of the eHealth service was favourable because of low cost and high efficacy of the intervention compared to usual care</p> <p>Low ICER</p>
<p>Johnston, 2004⁴⁷</p>	<p>Tech transfer to improve specialist skills while reducing burden of disease Teleophthalmology – between UK and South Africa</p> <p>Telemedicine as a means of communicating and learning between practitioners in richer and poorer countries</p>	<p>Specialist skills imparted to local practitioners to improve health of local population</p>	<p>Technology transfer project is cost-effective in reducing burden of the eye disease, practitioners in South Africa now learned novel procedures to help future patients improve cost-effectiveness</p> <p>Low average age of patients contributed to the disability adjusted life years (DALY) averted</p>
<p>De la Torre, 2004³¹</p>	<p>Telemedicine</p>	<p>Small/rural sites in Arizona</p>	<p>Cost for telemedicine for half the sites were more than costs for face to face diagnosis when volume of telemedicine services was low Telemedicine may therefore not be cost-effective for providing medical specialists for underserved communities especially if underutilized</p>

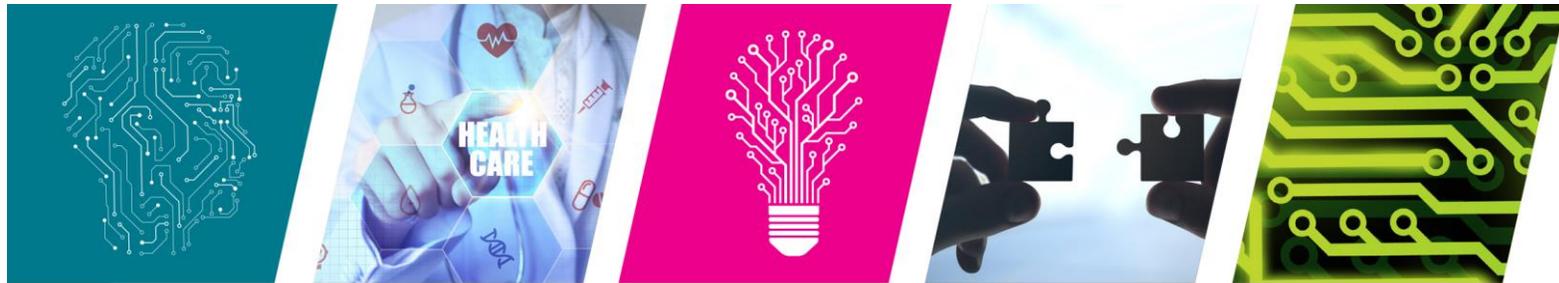


<p>Henderson, 2014¹⁸</p>	<p>Second-generation telecare in addition to standard support and care</p> <p>Telecare equipment used in the trial can be mapped to four broad functions: monitoring functional status (e.g. pendant, chair occupancy sensors), home security (bogus caller buttons, property exit sensors) and home environment (heat sensors, flood detectors), and facilitating the telecare package through 'stand-alone' devices that do not send alerts to the monitoring centre (big button telephones, key safes)</p>	<p>People with social care needs UK</p>	<p>Cost-effectiveness acceptability curves indicated that the probability of cost effectiveness at a willingness-to-pay of £30,000 per QALY gained was only 16% while QALY gain in the intervention group was similar to that for controls, social and health services costs were higher. Second-generation telecare did not appear to be a cost-effective addition to usual care</p>
<p>Brown-Connolly 2014²⁶</p>	<p>Mobile retinal screening program, BMI measuring scale, cholesterol, system for biomarkers and HgB, etc.</p>	<p>General population</p>	<p>Screening programs are cost-effective and provide value in preventive health efforts. Broad use of screening programs should be considered in healthcare redesign efforts. Community-based screening is an effective strategy to identify health risk, improve access, provide motivation to change health habits, and improve physical status while returning significant value.</p>



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