# Table of Contents

Summary .................................................................................................................................................. 5

Introduction ........................................................................................................................................... 8
The BC context .................................................................................................................................... 8
COVID-19 pandemic and the role of Real-Time Virtual Support ......................................................... 8

Real-Time Virtual Support pathways .................................................................................................... 9
Patient-facing pathways ....................................................................................................................... 10
Peer-to-peer pathways .......................................................................................................................... 11
New and emerging pathways ................................................................................................................ 11

The Imperative for Evaluation ............................................................................................................. 12
Objectives of this evaluation .............................................................................................................. 12
Overall evaluation approach ............................................................................................................... 13
Methods for the 90-Day Report ......................................................................................................... 14
Characterizing the RTVS pathways ...................................................................................................... 15

Findings ................................................................................................................................................ 15
First Nations Virtual Doctor of the Day (FNVDdD) .............................................................................. 15
HealthLink BC Emergency iDoctor in-assistance (HEiDi) ................................................................. 18
Rural Outreach Support (ROSe) ........................................................................................................ 22
Rural Urgent Doctor in-aid (RUDi) ...................................................................................................... 24
RTVS Stakeholder and Policymaker Interviews ................................................................................ 26

Discussion .......................................................................................................................................... 31
Collaboration and Community of Practice ....................................................................................... 31
Pulling it all Together: Guiding Metaphors ....................................................................................... 32

Continuing the Work .......................................................................................................................... 34
Persistent gaps to address in the health system .................................................................................. 34
Advancing culture change .................................................................................................................. 35
On the immediate horizon .................................................................................................................. 35
Next steps in the evaluation ................................................................................................................ 35

Acknowledgements .......................................................................................................................... 37
Bibliography .......................................................................................................................................................................................... 37

Appendices .......................................................................................................................................................................................................................... 38
Evaluation Framework ......................................................................................................................................................................................... 38
Evaluation Timeline ............................................................................................................................................................................................ 42
Data Collection Tools .......................................................................................................................................................................................... 43
HEiDi Cost Minimization Analysis ............................................................................................................................................................... 46

List of Figures

Figure 1: Partnership Pentagram + model for RTVS ................................................................................................................................. 10
Figure 2: Overview RTVS Pathways and their relation to patients, providers, and each other .................................................... 11
Figure 3: Anticipated long-term impacts of RTVS pathways ...................................................................................................................... 13
Figure 4: Number of weekly virtual consultations provided by FNVDoD ............................................................................................. 16
Figure 5: Breakdown of FNVDoD patients by age and gender .................................................................................................................. 16
Figure 6: Daily and cumulative call volumes for HEiDi ............................................................................................................................................ 19
Figure 7: ROSe monthly virtual consultation numbers ............................................................................................................................ 22
Figure 8: RUDi cumulative virtual consultation numbers .................................................................................................................... 24
Figure 9: The three guiding images of RTVS: safety net, funnel, and fire station ............................................................................. 32

List of Tables

Table 1: Interview participants .................................................................................................................................................................. 14
Table 2: Summary of RTVS pathways and support provided ........................................................................................................... 15
Summary

In response to the COVID-19 pandemic, Real-Time Virtual Support (RTVS) has been rapidly implemented since March 2020. The BC Emergency Medicine Network and UBC Digital Emergency Medicine unit, funded by the Joint Standing Committee on Rural Issues (JSC) at Doctors of BC and guided by an advisory Committee composed of members from the stakeholder organizations, undertook a First 90-day (F90D) evaluation of the RTVS initiative. The evaluation aimed to determine whether the progress made matched with the intended vision of RTVS in addressing the COVID crisis and beyond. We interviewed 18 stakeholders involved in establishing this RTVS system and collected data from all RTVS pathways to generate this report, including 22 health provider participants and community end-users.

Stakeholders spoke of RTVS filling three key gaps in the healthcare system to address COVID challenges and beyond, with special attention to the rural and remote contexts in delivery of emergency care:

1) Establishing a safety net to support patients virtually with just-in-time access, high quality, and personalized urgent care services;
2) Cooperatively funnelling the various publicly-funded health system pathways in which patients enter, including RTVS, towards primary care attachment with family physicians and primary care networks; and
3) Building a health system fire station to not only offer services to address urgent cases anywhere in BC, but also support health providers, engage communities, and build capacity to improve coordination of care through knowledge exchange and enhancing rural healthcare providers’ quality of life and clinical confidence.

The foundational principles that frame the establishment and work of RTVS are:

➔ Equity of access to high quality care services to support the most vulnerable communities and patients in BC.
➔ Connecting patients and providers to timely and relevant education and resources.
➔ Success and rapidity of establishing RTVS is attributable to a strong foundation of pentagram+ partnerships and trust, established over a long period before the pandemic.

Our F90D evaluation was able to highlight these collaborative relationships, core values, and collective vision shared by our partners and how new services were quickly implemented. We further explored the future vision and how RTVS can be scaled-up, integrated into the broader health system, and expanded to new specialist services.

Four RTVS pathways were established in this quarter: First Nations Virtual Doctor of the Day (FNVDoD) and HealthLink BC Emergency iDoctor in-assistance (HEiDi) are patient support pathways; Rural Urgent Doctor in-aid (RUDi) and Rural Outreach Support group (ROSe) are peer-to-peer health provider support pathways.
Four RTVS Pathways: Key Findings and Highlights

<table>
<thead>
<tr>
<th>FNVDoD</th>
<th>HEiDi</th>
<th>RUDi</th>
<th>ROSe</th>
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<tbody>
<tr>
<td>• 26 Virtual Physicians</td>
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<td>• 117 consults provided</td>
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</tr>
<tr>
<td>• 3,640 hours of patient support offered</td>
<td>• 2,592 hours of patient support offered</td>
<td>• 2,184 hours of peer support offered</td>
<td>• 2,184 hours of peer support offered</td>
</tr>
</tbody>
</table>

- **FNVDoD**: 2,469 virtual encounters took place, with 684 being direct patient consultations by physicians, and 1,786 being services offered to patients by traditional healers, cultural support, nursing, health directors, and treatment centre support staff.

- **HEiDi**: 5,447 virtual encounters took place with 811 callers: 68% of callers were triaged away from needing to visit Emergency Departments or Urgent Primary Care Centres within 24 hours, and 15% were recommended to visit ED immediately, streamlining callers towards appropriate ED usage.

- **RUDi**: 117 virtual encounters took place, reaching 22 unique BC rural communities including many First Nations and remote nursing stations, addressing over 40 medical problems. The rise by 3.5 times in volume between May and June 2020 demonstrated a rapid uptake of interest and usage.

- **ROSe**: 92 virtual encounters took place, with 67% using telephones and 33% via videoconferencing at bedside, providing real-time support to the management of critically ill patients throughout BC.

**FNVDoD/RUDi**: Connecting remote BC communities

**FNVDoD**: Providing culturally safe care in place

**RUDi/ROSe**: Critical and emergency care support in high-impact cases

**HEiDi**: 68% of patients diverted from seeking care within 24 hours

**Culture change**: Normalizing “call a friend” mentality

**Peer-to-peer education and simulations for rural providers**

**NEW pathways for virtual specialist care support**

**RTVS connects patients to community care**
Patients in all RTVS pathways that provided feedback via interviews or surveys were overwhelmingly satisfied with their virtual consultation experience, particularly noting their relief at being able to quickly access care from their home via patient-facing pathways and having expertise to support them in their critical health crises via peer-to-peer support pathways.

For Indigenous patients, RTVS helps reduce historical healthcare inequities by providing culturally safe care virtually.

Rural and remote healthcare providers reported reduced professional isolation, increased confidence with RTVS as part of their toolkit, and increased willingness to practice in low-resource settings - factors positively contributing to health professional recruitment and retention.

A cost minimization analysis was conducted with HEiDi patient volume, suggesting a health system cost minimization of $347,086 and a societal cost minimization of $1,645,130 over the first quarter.

Our F90D evaluation provides strong, initial evidence that RTVS is providing timely, equitable access to care for all British Columbians and on-demand, clinical support to vulnerable healthcare providers working in low-resource communities throughout BC. At the time of writing, three additional RTVS pathways have been deployed to address pediatric, maternal/newborn, mental health and addictions needs in BC. Thus, our evaluation concludes that RTVS is well-positioned to continue demonstrating value to stakeholders and can be sustainable for the long-term.
Introduction

The BC context

British Columbia is a geographically large province at 944,735 km², but has a relatively small population, estimated at 5,120,184 residents in 2020, mostly clustered in urban centres and otherwise distributed in communities separated by great distance. Fourteen percent of BC residents live in rural communities, generally defined as a community with less than 1,000 residents. These demographics reflect the potential difficulty in delivering patient-centred healthcare to all BC residents, as well as adequately preparing and supporting healthcare providers that practice in rural and remote settings. Further, there are 203 First Nations in BC, with healthcare services provided by both their regional Health Authority and the First Nations Health Authority. Indigenous patients need culturally safe, tailored, and accessible care while addressing historical injustices outlined by the Truth and Reconciliation Commission.

Gaps in rural, remote, and Indigenous healthcare exist across Canada. A disproportionately smaller number of physicians practice in rural areas and residents of rural communities have poorer health and access to healthcare professionals. While BC has a robust system for emergency patient transport, a recent report found that rural BC patients spend an average of $2,234 on out-of-pocket costs when needing to travel out of their community for a health issue. The Review of Family Medicine Within Rural and Remote Canada, notes that more than 15 years ago “the First Ministers of Health set a target that by 2011 at least 50 per cent of Canadians should have access to an appropriate primary care provider 24/7 regardless of where they live.” This target continues to not be met. In short, patients in rural, remote, and Indigenous communities do not have equitable access to healthcare in Canada.

For healthcare providers (physicians as well as nurses at remote stations) working in the isolated professional environment that is rural healthcare, urgent care cases can amplify feelings of being alone, overwhelmed, and unsupported. Family physicians’ fear of working in a rural emergency room can detract clinicians from practicing in rural locations, compounding the health disparities experienced by patients in non-urban communities across the province. With 80% of hospital admissions in Canada originating from urgent care, real-time virtual support (RTVS) services for urgent healthcare issues can address the acute need of supporting vulnerable healthcare providers in BC.

COVID-19 pandemic and the role of Real-Time Virtual Support

In British Columbia, there has been a decades-long push to develop innovative, virtual health services to address long-standing gaps in our healthcare system. An original and primary motivator for integrating virtual care is that, in many rural, remote, and Indigenous communities across the province,
family physicians and primary care teams provide services to patients with limited support and resources. Additionally, for complex or urgent cases, finding solutions to avoid transporting patients out of their community is paramount, as road conditions, weather, geography, and the burden on patients and their families disproportionately impacts those in rural, remote, and Indigenous communities. The COVID-19 pandemic has thrown healthcare system gaps into stark relief, and has exacerbated challenges. Two such examples are the disruption and closure of local health services in First Nations communities and overwhelming nurses at HealthLink BC’s 8-1-1 telephone service with surging volume of callers. The Canadian Institutes of Health Research (CIHR) have identified virtual care as one of seven key priority areas for health services and policy research to address such gaps.7

During the pandemic, nearly half of Canadians have used a telehealth/virtual service to access healthcare for their illness or condition, with patient satisfaction very high (79% satisfaction rate or greater) for these methods.8 Relatedly in the USA, there has been a large shift in both consumer and provider interest in virtual health services.9 Together, these trends indicate an unmet need and that people are increasingly expecting and wanting new virtual options for their health needs, as these on-demand technologies become more available.

The COVID-19 crisis is a disruptor and accelerator, causing rapid changes in the healthcare system, from technology deployment to a shift in privacy considerations. Concerning virtual care in BC, this has led to the accelerated development and implementation of multiple RTVS pathways to address various needs on the ground in communities and across regions. These RTVS pathways are underpinned by strong foundations of trust and partnerships, such as those embodied by the Virtual Health and Wellness Collaborative for Rural and First Nations BC (“the Collaborative”), as well as integrity, advocacy, and a pioneering spirit, which have paved the way for the rapid evolution and expansion of RTVS in response to the pandemic. In less than one month (March to April, 2020), four RTVS pathways were deployed in BC, with another already running and other specialty services coming online. COVID-19 has demonstrated that, almost overnight, changes can be made in how healthcare is delivered and how healthcare professionals can enable each other.

**Real-Time Virtual Support pathways**

In response to the aforementioned healthcare system gaps and the COVID-19 pandemic, several RTVS pathways have been formally deployed since April 2020 to address specific needs. Each RTVS pathway and the broader RTVS initiative is firmly underpinned by key partnerships and foundational collaborations (Figure 1). These relationships have been developed over many years, if not decades in some cases, and have culminated in the deployment of the pathways.
Patient-facing pathways

The aims of the two patient-facing RTVS pathways can be briefly summarized as: to increase patient equity and access to timely, necessary care, thus improving patient-centered continuity of care and linkage to existing primary care networks. The two patient-facing pathways are:

1. **First Nations Virtual Doctor of the Day (FNVDoD):** launched April 1, the FNVDoD pathway provides any Indigenous person in BC access to scheduled consultations with a Virtual Physician (VP). The service runs seven days per week from 8:30am-4:30pm, is supported by several Medical Office Assistants (MOA), and is divided so that one VP is available per Health Authority.

   “There is a need for timely medical access for patients from rural and remote areas, especially for Indigenous people. Traveling great distances to see a physician can be challenging. Seeing physicians that don’t share the same values can affect the therapeutic relationship.” – Virtual Physician, FNVDoD

2. **HealthLink Emergency iDoctor in-assistance (HEiDi):** launched April 6, HEiDi saw the integration of VPs into the standard telephone call flow for HealthLink BC’s 811 Nursing Services. BC residents calling 811 and triaged with a “yellow” disposition (i.e., “seek care within 24 hours”) can be referred immediately to a VP for a virtual consultation and additional clinical advice. VPs are available 10:00am-10:00pm daily, with six VPs taking six-hour shifts over the course of the day, plus an additional VP conducting follow-up consultations if clinically recommended or for quality assurance purposes.
Peer-to-peer pathways

The aims of the two peer-to-peer RTVS pathways can be briefly summarized as: to support rural, remote, and Indigenous practitioners in their local communities, thereby decreasing isolation and stress, improving practitioner recruitment and retention, and strengthening interprofessional and collegial relationships. The two peer-to-peer support pathways are:

1. **Rural Outreach Support group (ROSe):** intensivists and critical care specialists are available 24/7 by Zoom, mobile app, and phone to support rural healthcare providers looking for a consultation, second opinion, or ongoing virtual support for patients.

2. **Rural Urgent Doctor in-aid (RUDi):** launched April 1, physicians with emergency medicine and rural experience are available 24/7 by Zoom and phone to support rural healthcare providers with generalist medical problems, as well as education and simulation opportunities.

![Real-Time Virtual Support (RTVS) Pathways](image)

**Figure 2: Overview RTVS Pathways and their relation to patients, providers, and each other**

New and emerging pathways

BC healthcare providers and stakeholders have also recognized the need for further specialist support provided under the RTVS umbrella. During this reporting period, a Dermatology RTVS pathway has been available to provide rural/remote clinicians with access to specialist virtual support with diagnosis,
acuity, treatment, and referrals for dermatological cases. As of July 1, a dedicated pediatrics pathway for urgent cases has been live (CHARLiE, Child Health Advice in Real-time Electronically). In the near future, RTVS pathways for maternity (MaBAL, Maternity and Baby Advice Line), rheumatology, and addictions/mental health will become available. As these pathways emerge, they will be included in the formal evaluation of RTVS and future reports.

The Imperative for Evaluation

This report contains findings from the first 90 days (F90D) of RTVS implementation post-onset of the pandemic. In this section, we outline the overall evaluation vision and strategy for RTVS, and provide a brief description of the specific methods applied for this F90D report.

Equitable access to care remains an issue across BC’s rural, remote, and Indigenous communities. The new RTVS pathways use virtual technologies to connect rural communities with enhanced resources and expertise usually available in urban centres. While the Collaborative is mandated to use virtual technologies to support patients’ access to care in BC, evaluation is critical. Over the course of the first year of implementation, we intend to demonstrate the cost-effectiveness and degree to which RTVS addresses gaps in access and care through rigorous evaluation of technology and implementation, and thus represents a worthwhile long-term investment.

Health professional-led RTVS has made great impacts across the province. We have already seen this is the case of ROSe (Rural Outreach Support group), a group of intensivists and critical care specialists providing 24/7, on-demand, virtual support to their rural peers across BC. ROSe is an expansion of a past virtual care initiative (Critical Outreach and Diagnostic Intervention, CODI) and has been running for two years. Access to RTVS is able to react to emergent needs, potentially supporting infection control and “flattening the curve” during the COVID-19 crisis. Using virtual appointments (thereby diverting patient travel) achieves the goals of both maintaining timely, large-scale patient care and services while supporting physical distancing. Additionally, it has reduced healthcare strain during this time of crisis. RTVS also has the potential to make long-term system impacts as a sustainable, normalized model of care for non-urban patients in BC. This evaluation is the first step toward demonstrating evidence of RTVS benefits and impacts, understanding adoption and normalization, and establishing an enduring longitudinal evaluation framework to contribute to a deeper understanding of the benefits and impacts and support continuous quality improvement (CQI).

Objectives of this evaluation

To support the Collaborative in:

1) The ongoing innovation and validation of existing, new, and expanded RTVS pathways;
2) Evaluation for agile quality improvement in a rapidly evolving context; and
3) Establishing and amplifying a foundation of evidence for current and future RTVS implementation, adoption, and sustainment in BC and beyond.

![Figure 3: Anticipated long-term impacts of RTVS pathways](image)

**Overall evaluation approach**

We are conducting a biphasic evaluation with an enduring one-year outcomes evaluation. The overarching evaluation framework is based on the Quadruple Aim assessing impact on: health outcomes; patient experience of care; healthcare provider experience; and cost factors in healthcare delivery. For this initial report, we are considering the “first 90 days” (F90D) of the RTVS initiative (i.e., Quarter 1), from April 1 to June 30, 2020. We conducted an early process evaluation and analysis that examines the rapid change in RTVS’s role in system change, its collaborative deployment, and adoption upon the foundation of partnerships and relationships. This F90D analysis provides a rigorous, systematically documented organizational case study, which provides practical evidence to inform ongoing implementation and future expansion. This evaluation functions not only to document evidence and make improvements, but also to foster engagement, adoption, and capacity building.

The evaluation will document core metrics within and across pathways. Individual pathways will have unique contributions and merit unique approaches but contribute to collective impact. Reflecting the “Pentagram Partnership+” model, the evaluation will use a participatory approach and be responsive to constituents’ needs and diverse perspectives. It will support implementation and use a mixed-
method approach to address complex adaptive health systems. We anticipate the following long-term impacts summarized in Figure 3 above.

**Methods for the 90-Day Report**

We used a mixed-methods approach to address complexity and combine measurement with systematically captured experiences and narratives to illuminate key 90-day outcomes. For this report, we have prioritized collecting key informant interviews with predetermined participant groups: key stakeholders in the RTVS pathways and partner organizations; policymakers at the provincial level and regional health organizations; a broad sample of virtual physicians and other providers working on each pathway; and a broad sample of end-users of each pathway. These perspectives will inform the iterative development of the RTVS pathways and are analyzed concurrently with critical quantitative metrics to develop strong narratives for overall RTVS findings and within-pathway findings. Table 1 provides a summary of the participant groups interviewed for this first evaluation period; as the evaluation continues for the next year, these numbers will expand and also include “follow-up” interviews with participants (thus allowing us to investigate evolving versus sustained perspectives/experiences). For detailed methods please see the Appendix.

<table>
<thead>
<tr>
<th>RTVS Pathway</th>
<th>Participant Group</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNVDDoD</td>
<td>Stakeholders</td>
<td>Complete (n=2)</td>
</tr>
<tr>
<td></td>
<td>Virtual Physicians</td>
<td>Complete (n=6)</td>
</tr>
<tr>
<td></td>
<td>MOAs</td>
<td>Complete (n=1)</td>
</tr>
<tr>
<td>HEiDi</td>
<td>Stakeholders</td>
<td>Complete (n=2)</td>
</tr>
<tr>
<td></td>
<td>Virtual Physicians</td>
<td>Complete (n=4)</td>
</tr>
<tr>
<td></td>
<td>Nurses/VMOAs</td>
<td>Complete (n=3)</td>
</tr>
<tr>
<td>ROSe</td>
<td>Stakeholders</td>
<td>Complete (n=1)</td>
</tr>
<tr>
<td></td>
<td>Virtual Physicians</td>
<td>Complete (n=3)</td>
</tr>
<tr>
<td></td>
<td>End-users (providers)</td>
<td>Complete (n=2)</td>
</tr>
<tr>
<td>RUDi</td>
<td>Stakeholders</td>
<td>Complete (n=2)</td>
</tr>
<tr>
<td></td>
<td>Virtual Physicians</td>
<td>Complete (n=3)</td>
</tr>
<tr>
<td></td>
<td>End-users (providers)</td>
<td>Complete (n=3)</td>
</tr>
<tr>
<td><strong>Other Policymakers &amp; Other Stakeholders</strong></td>
<td>Complete (n=11)</td>
<td></td>
</tr>
<tr>
<td><strong>Total Participants Interviewed</strong></td>
<td>n=40(^1)</td>
<td></td>
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</tbody>
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\(^1\) A small number of participants may be counted in multiple cells, e.g., a physician working on two RTVS pathways or an end-user that calls both ROSe and RUDi.
Characterizing the RTVS pathways

Table 2 below lays out the extent of the services provided by the four selected RTVS pathways from April through June 2020, and provides information about the scope of activities to contextualize the findings that follow.

<table>
<thead>
<tr>
<th>FNVDoD</th>
<th>HEiDi</th>
<th>RUDi</th>
<th>ROSe</th>
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<tr>
<td>• 26 VPs</td>
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<td>• 22 VPs</td>
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<td>• 2,184 hours of peer support offered</td>
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</tr>
<tr>
<td>• 3640 hours of patient support offered</td>
<td>• 2,592 hours of patient support offered</td>
<td></td>
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VP = Virtual Physician

Findings

Findings are presented for each of the four pathways examined, starting with patient-facing pathways (FNVDoD, HEiDi), and moving on to the peer-to-peer pathways (ROSe, RUDi). For each pathway, we highlight (where applicable/available) quantitative metrics (e.g., call volumes) that demonstrate usage, present the themes highlighted during interviews with VPs and other participants, and share a patient or clinical case vignette that illustrates key elements of the pathway. Lastly, findings from the stakeholder/policymaker key informant interviews are presented.

First Nations Virtual Doctor of the Day (FNVDoD)

Operational highlights

Twenty-six VPs provided 684 consultations to Indigenous patients. Consultations were on average 20 minutes in length, but VPs spent up to 60 minutes with patients in order to develop rapport, take a full medical history, and listen to their concerns. A wide range of patients by gender and age group accessed FNVDoD for virtual consultations.
Interviews with VPs and virtual MOAs

“Equity lies in bringing balance back to healthcare people deserve” – Virtual Physician, FNVDOD

“The strengths of the service is that it has been created by Indigenous people for Indigenous people with the common goal of providing timely access to medical care in rural and remote communities in a culturally sensitive manner.” – Virtual Physician, FNVDOD

The participants interviewed represent a plurality of views and professional experience that reflect the wider group of VPs on the FNVDOD pathway. Each of the five geographical Health Authorities served by FNVDOD was represented. The VPs had a range of experience (1-30 years, little to a lot of previous virtual care/telemedicine experience) and most were GPs.
Providing timely access to culturally safe care in place

“People [are] able to dial one number and know that their care is being taken care of.” – Virtual Physician, FNVDooD

“Patients have been grateful for this type of medicine where they are finding access through a different means where they don’t need to travel great distances to be seen for something that might be able to be managed over the phone or [virtually].” – Virtual Physician, FNVDooD

Patient Vignette

Mary receives culturally safe care virtually

**Patient description:** Mary is an older woman who lives by herself in an urban area. For some time, she has been experiencing a chronic, undefined medical condition. She has previously been prescribed medications to address her symptoms, but these have not adequately addressed the underlying condition. While Mary has had access to a GP for regular primary care, recently their interactions have been strained and she feels that her GP has judged her and rushed through the last few visits. Thus, she was reluctant to visit again and, given the ongoing COVID-19 pandemic, was uneasy to attend an in-person visit with another provider. Over the next month, Mary’s condition deteriorated while remaining at home during the pandemic. She was visited by her daughter, who was concerned about her mother’s health. The daughter was aware of the First Nations Virtual Doctor of the Day service and suggested that her mother try it.

**Virtual consultation:** Mary called the FNVDooD service and spoke to a MOA in the morning. An appointment was scheduled so that Mary could see the virtual physician (VP) that same afternoon. Mary and the VP connected via Zoom video (Mary used her home computer). Through conversation, Mary shared her medical history, and described her symptoms, and the VP listened to and heard Mary’s concerns. The VP ordered bloodwork and an X-ray for Mary for the next day. Two days later, after receiving the test results, the VP called Mary back confirming a diagnosis of osteoporosis and prescribing appropriate medications.

**Outcome:** Mary and her daughter both felt relieved by the quick and easy process to see the FNVDooD VP. They felt less stress after receiving the follow-up call, hearing the confirmed diagnosis, and the treatment plan going forward. In a few short weeks, Mary was feeling in much better health and was able to engage in her usual activities with her family, including going camping.

The FNVDooD pathway fills a critical, existing healthcare gap by giving FN patients a dedicated virtual service to provide them with timely access to care. This seems to be especially relevant to patients without a usual care provider or for those requiring access outside of regular service hours, thus
addressing service gaps on weekends or after hours and clinic closures in some communities. A major strength/success of the pathway is that it is a service created by Indigenous peoples for Indigenous peoples, with key leadership from FNHA and strong support from partners. Pathway providers are an experienced, diverse, supportive group, who appreciate the importance of needing skills in cultural safety and humility, being empathic, flexible clinicians, open to continuous learning and collaboration, and understanding the remote, rural, and Indigenous care contexts.

**Enhancing existing care options**

“It is there to be a support, not to take over care already being provided.” – Virtual Physician, FNVDoD

VPs stressed the importance that they and the pathway are and should be seeking to enhance existing care options (an ‘extra layer’, complementary) and that FNVDoD does not replace local, existing services in communities. Most discussed the importance of linking patients back to their usual care provider for follow-up and longitudinal care and how the pathway could improve by better integration with family practitioners and supporting organizations (e.g., GPSC).

**Challenges and evolving pathway directions**

VPs noted that they have seen low call volumes in this initial phase and that some patients are unable or unwilling to do video consultations, thus limiting their ability to conduct a full examination. Some VPs also discussed seeing patients repeatedly use the service, even urban-based patients, who would likely have other options available.

Some contrasting views were expressed concerning the FNVDoD’s direction/evolution with respect to which patient populations to support and type of care to provide. One VP wanted the emphasis to be on providing access primarily to remote/rural First Nation patients, suggesting that the pathway still seems to be more of a walk-in clinic and serving patients who also have other care options. Another VP saw that, with his extensive local experience, he was able to help a variety of patients ‘navigate the system’ and link them to other providers.

“Very positive feedback from patients regarding the program so far and with this type of virtual care hopefully we can reach out to those who would otherwise not have tried to access assistance with their medical needs” – Virtual Physician, FNVDoD

**HealthLink BC Emergency iDoctor in-assistance (HEiDi)**

**Operational highlights**

HEiDi received 5,447 patient calls over 86 days of service. The service currently features six shifts of VPs from 10am-10pm, meaning 36 hours of VP support is available to patients calling 811, with an
additional VP conducting next-day follow-up consultations with patients where clinically necessary or for quality assurance purposes. 68% of HEiDi patients are downgraded from “seek care within 24 hours” to self-management at home or to schedule a follow-up within seven days with their usual care provider. Thus, patients are appropriately diverted away from unnecessary healthcare utilization.

“Excellent service and pleased to know it is there should I need it again. I spoke to a Registered Nurse and a Physician. Registered Nurse was very pleasant, listened well, summarized the information well, and gave good advice. The Physician was very caring, patient, very helpful and explained key factors very clearly and answered all my questions, as well as suggesting key points to share with my Family Doctor for follow-up soon.” – Patient, HEiDi

Preliminary cost minimization analysis
For HEiDi, we additionally conducted an initial economics analysis to determine the potential costs minimized over the three months of service. The HEiDi service costed approximately $435,106 (VPs’ wages, VMOAs’ salaries, and office manager’s salary). Based on 68% of patients being diverted by HEiDi

2 Red bars and dates denote when milestones of consecutive 1,000 calls were recorded
from visiting the ED or UPCC, we estimated that $782,192 in costs were avoided by the health system, leading to a net minimization of $347,086. Additionally, for rural or remote patients that would otherwise face out-of-pocket costs to address their health concern (i.e., travel, accommodation), we estimate that these patients accessing HEiDi avoided $1.3 million in societal costs. See the Appendix for more details concerning this analysis.

Interviews with VPs, Nurses, and virtual MOAs

“We are helping people navigate the medical system, which is especially complicated due to the pandemic since people are scared to visit the emergency department.” – Virtual Physician, HEiDi

“People have not had the ability to talk to a physician virtually. So the ability to make a difference, whether it’s avoiding a 4-hour ferry ride or a trip to the hospital, is rewarding.” – Virtual Physician, HEiDi

Participants highlighted how the addition of VPs to the 811 service has been critical helping BC residents navigate the health system and seek appropriate care during the pandemic. In many cases, VPs have been able to appropriately triage patients away from unnecessary in-person visits, by providing an “extra layer of support” to nurses’ dispositions, taking time to listen to patients’ concerns, and allay anxieties and provide reassurance.

Patient Vignette

Tim’s in-depth consultation and follow-up

**Patient description:** Tim is an older man living at home by himself. He has mobility issues and is reluctant to leave home without help. Recently, Tim has experienced some abdominal discomfort and other symptoms, but has been unable to see his primary care provider.

**Calling 8-1-1:** Tim called 8-1-1 to try and get more health advice about his condition. He was directed to a registered nurse, who assessed his symptoms and determined that he likely needed to “seek care within 24 hours.” As Tim’s condition was still undefined and the nurse felt his was a challenging case, they referred him to HEiDi to speak with a VP that same day. Tim accepted and was transferred to a VMOA, who took some additional information and told him that a VP would contact him within an hour.

**Consultation and support provided:** The HEiDi VP quickly called Tim back and had a 20-minute phone consultation with him. The VP assessed Tim’s condition further, probed him more about his symptoms, and determined that Tim’s condition was very likely more serious. The VP strongly advised Tim to immediately go to his local hospital’s ED. The next day, the VP conducting follow-up consultations contacted Tim. While Tim was initially reluctant to go to the ED for what he believed were non-urgent symptoms, he ultimately did and was subsequently admitted to the ICU. The attending physician told Tim that his condition would have quickly worsened if he had not sought in-person care.
“From the perspective of the emergency physician, often times you may think ‘why is someone visiting an emergency department?’ But when you talk to someone over the phone you realize how many of them absolutely do not want to be going to an emergency department for their issues even though they should be going. It’s a chance to have different insight on how people think and make decisions. It’s interesting to see different perspectives. You understand the decision-making process on how to access emergency care and it’s interesting to see the other side of things” – Virtual Physician, HEiDi

Many VPs spoke of how their time speaking with patients has been rewarding in several senses, one of them being able to learn about patient perspectives and reasons for certain healthcare utilization during the pandemic. Further, VPs discussed the importance of taking time to speak with each patient, justifying their worries, and how the virtual consultations could be an opportunity to provide education around self-management and pandemic-related issues (e.g., COVID-19 symptoms, self-isolating procedures).

“[HEiDi] opened my eyes to virtual health and what it could do for communities and individuals” – 8-1-1 Nurse

Nurses and VMOAs spoke about the value of their role with the integrated VP service: with nurses being able to refer patients to an “additional layer of clinical support,” while VMOAs acted as “middle-men or organizers” to ensure patient calls progressed smoothly and problem-solved issues. VPs, Nurses, and MOAs reported that the rapid implementation of the services presented challenges, but people approached with a good attitude and problem-solved together. Participants noted that adjustments are continuously being made to the service and operations-focused feedback is valued. Other challenges included managing patient expectations for the virtual consultations, such as VPs being unable to prescribe or order lab tests. Finally, participants discussed a broader issue of how HEiDi could provide better continuity of care for patients with more integration with other health services.

Patient Feedback

“I felt very comfortable speaking with the physician over the phone. I wouldn’t hesitate to use this service should I or a family member require medical advice in the future.” – HEiDi Patient

As a routine part of the follow-up consultations, VPs ask patients to indicate their satisfaction with the HEiDi service: 98% of patients report being ‘extremely’ or ‘very satisfied’ with HEiDi. As of early June, HLBC has also launched an online, anonymous patient survey to collect further feedback. Preliminary findings suggest patients are very satisfied with the consultation process and are providing suggestions for improvement (e.g., expanding the service for non-English-speaking patients).
“A lot of patients need in-person care and this program will help streamline what exactly can be managed over the phone versus what cannot be managed over the phone.” – Virtual Physician, HEiDi

Rural Outreach Support (ROSe)

Operational highlights

ROSe VPs have conducted 92 peer consultations through June 28; 67% are telephone consultations and 33% are Zoom consultations. VPs have been available for 2,184 consecutive hours since April 1 to provide peer-to-peer support.

Figure 7: ROSe monthly virtual consultation numbers

Interviews with VPs and rural end-users

“The biggest lesson that I have learned out of this is that the manner in which you provide that support is so important; being non-judgmental, being accepting of the fact that the people you are dealing with might not have access to the same resources, the same expertise. That’s probably the most valuable part out of this – being able to build a comfortable relationship with the people on the other side and having them trust that you’re going to sit with them and do your very best to help them through it and building that trust in sequential fashion.” – Virtual Physician, ROSe
“A lot of cases that have turned out much better than they would have if we hadn’t been involved in helping our colleagues through it.”
– Virtual Physician, ROSe

The three VPs interviewed all emphasized that, while call volumes for the ROSe pathway were low, the pathway was impactful and demonstrated value in other ways, chiefly in assisting with high-impact cases. VPs noted that, with their support, they can help keep patients in their communities for treatment, thus avoiding unnecessary transport, which is particularly important during the pandemic.

“The value of ROSe should not be measured through volume, but through the difference it makes to patients and physicians when it’s needed, like a trauma surgeon who isn’t always working but provides critical support when needed.” – Virtual Physician, ROSe

The simple fact that the ROSe pathway exists and critical care support is available on-demand has positively impacted rural practitioners. Participants stated that they are seeing a “huge benefit” to rural/remote communities as physicians are now more willing to practice there or do a locum, with ROSe helping to address their professional isolation. VPs also mentioned the importance of possessing knowledge of transport logistics in BC and connecting with other intensivists and specialists, both of which they can leverage while providing virtual support in critical care cases.

“Personally, if I deal with any case, whether it’s an emergency case or a dermatology case or a psychiatry case, the moment I realize I have to call a specialist in, I already feel frustrated or anxious because I know what to expect. I know what kind of help you can expect in those kind of cases. [RTVS] significantly decreases the stress and anxiety and the frustration in getting help. That changes your whole way of practicing, your quality of life as a person, and just being able to share the responsibility as well. You feel like sharing the decision-making process with somebody who knows it a little better than you.” – Rural Physician, ROSe/RUDi End-user

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Clinical Case Vignette

**Dr. A remotely manages a patient with cardiac arrest**

**Case description:** A woman presented to a rural health centre with a massive overdose of beta blockers, appearing seriously ill and quickly progressing to cardiac arrest.

**Consultation and support provided:** The attending physician contacted ROSe within a few minutes of the patient’s arrival. Over the phone for nearly one hour, the ROSe VP was able to consult on managing the cardiac arrest, including administering large doses of insulin and calcium. The patient returned to spontaneous circulation and was then transferred to a regional hospital. The ROSe VP was informed the next day that the patient had awoken and was in good condition with no significant neurological damage.
As one end-user and rural physician stated, having ROSe (plus RUDi and the Dermatology pathway) available increases his confidence and comfort in managing complex cases. Even though speaking with a ROSe VP may not change the outcome for his patient, it is still important to “have a second set of eyes” while managing unstable patients and be able to “widen his differential.”

For that hour [on the] case, it was like we were in that room with that patient and with that team of people and it was really nice...Can’t ask for anything more with that kind of support.” – Virtual Physician, ROSe

Rural Urgent Doctor in-aid (RUDi)

Operational highlights

RUDi VPs have conducted 101 peer consultations; 80% are clinical consultations and 20% are test or education/simulation consultations. VPs have been available for 2,184 consecutive hours since April 1 to provide peer-to-peer support. VPs have provided support to 22 unique communities in BC, including many First Nations communities and remote nursing stations. Similarly, VPs have reported supporting their rural colleagues in over 40 different types of medical problems.

![Figure 8: RUDi cumulative virtual consultation numbers](image)
Interviews with VPs and rural end-users

“These calls were all from RNs and were all very appropriate - I felt like I was able to add to patient care.” – Virtual Physician, RUDi

Clinical Case Vignette

Dr. G finally reaches out to a friend for support

Case description: A 9-year-old boy presented with priapism at a rural walk-in clinic, accompanied by his parents. The local GP contacted the pediatrics and urology departments of their regional hospital, but they were unable to accept the patient or provide clinical advice. The GP then contacted BC Children’s Hospital, who advised conducting a blood test. The GP also contacted PTN to arrange the transfer of the patient to BCCH.

Virtual consultation: After receiving the blood test results, the GP made several calls searching for further advice. They eventually called RUDi and a video consultation was established with the VP on-shift. The RUDi VP advised and guided the GP on conducting multiple procedures, which was both informative for themselves and other local healthcare staff supporting, plus “unbelievably time-saving” to have guidance on dosages and timing.

Consultation and support provided: While the local GP treated the patient, the RUDi VP spoke virtually with the patient’s parents and counselled them on the clinical decision-making process and actions being taken, which helped relieve their immediate anxieties. The RUDi VP then consulted directly with the Vancouver-based specialists that would be receiving the patient, thus saving the local GP time and ensuring the BCCH team was prepared for the patient’s arrival. The local GP noted that, in a future case, they could have asked the RUDi VP to also contact the Patient Transfer Network, thus allowing them more “hands-on time” with the patient.

RUDi VPs spoke of their work being rewarding, especially in terms of providing direct support to rural colleagues when needed. They discussed how each call, even “test” calls where a nurse or resident might reach out to say ‘hello’ and try out the call-flow, helped break down old barriers and fears and replace it with the “call a friend” mentality.

“Had the initial call then some more research on my part and two more calls to delineate a treatment plan so that the patient was safely cared for within their community.” – Virtual Physician, RUDi

Another rewarding aspect of the work is the diversity in calls, whether it is where rural end-users are located, the type of medical problem, or the steps VPs need to take to provide support. VPs are committed to providing empathic, non-judgmental support to their peers, which means that VPs are
not simply answering clinical questions or quickly prescribing a certain procedure, but spending time to provide a comprehensive “over the shoulder” set of supports for each situation. This may mean walking through the clinical resources and tests immediately available to the rural caller, relying on their past experience and expertise to recommend alternative procedures, and working as if they are “in the room” to organize other staff, speak with the patient’s family, and contact PTN and the receiving physician if the patient needs to be transferred.

“I’m excited that this exists and plan to use it further in the future.” – End-user, RUDi

Similar to ROSe above, end-users of RUDi clearly spoke of the importance of having this type of on-demand virtual support available to them, with positive impacts on their comfort and confidence practicing in rural settings, managing complex patients, and their sense of professional isolation.

“I spent probably a half hour on the phone trying to get a hold of different people to help her, and nobody even said, ‘do this in the meantime’ or offered any help. They just shut the door and said we cannot help you. That’s when [we] decided to call the RUDi doc.” – Rural Physician, RUDi End-user

RTVS Stakeholder and Policymaker Interviews

In this section, we present findings from interviews with RTVS stakeholders (see Table 1). We interviewed leads of RTVS pathways, policymakers, and senior health administrators concerned with virtual care and its role in the health system. The subsections that follow present major themes from these interviews and represent topics deemed central by the participants to the foundational aspects of RTVS and the pathways.

Core values and collective vision that underpin RTVS in BC

RTVS stakeholders and providers, with longstanding relationships and legacy of collaboration over the past two decades, have rapidly coalesced around a common set of goals at the outset of the pandemic. These common goals underpin the values of RTVS to provide both patient-centred care and support to rural practitioners. RTVS leaders have recognized the urgency in advancing virtual care initiatives during the pandemic and spoke to their commitment of needing to continue to provide high quality care during this time.

Further, all stakeholders emphasized that strong, trusting relationships were the cornerstone for allowing them to rapidly move forward together. Stakeholders and policymakers highlighted a critical network of leaders and organizations that have either partnered in the past or quickly forged new connections. Over time, stakeholders and partners have worked together to develop trust, integrity, and mutual respect, all of which continue today and allow for ongoing, honest conversations about the state of RTVS and being able to “own the successes and failures” together.
One strong, common subtheme emerging from interviews with the VPs across the pathways was the need for the services to be run and care provided by the ‘right’ group of clinicians. This was evident as many participants stated that the clinician groups were consciously selected, with a focus more on compassion, empathy, and a non-judgemental attitude over high clinical expertise. Many VPs emphasized other important qualities for clinicians, including: being open-minded and open to continuous learning; having at least a good understanding of low-resource contexts and rural/remote/Indigenous communities; and working with a collaborative spirit to deliver team-based care and support their colleagues.

Factors that enabled the rapid deployment of RTVS pathways

“COVID exposes many patients to the risk of lacking knowledge or the most up-to-date knowledge about COVID. Even health professionals lack knowledge. We are all learning about the disease. But for patients, it’s particularly unsettling…the safety net of RTVS provides them with the health professionals that can support them in their knowledge-seeking and also healthcare that is specific to them. Should I get tested for COVID? Am I sick enough to go into hospital? Should I isolate in quarantine?” – Stakeholder

Stakeholders, policymakers, and other participants all touched on the “perfect storm” that the COVID-19 pandemic created. As mentioned above, it motivated leaders to quickly coalesce around common goals and then rapidly develop and deploy the RTVS pathways to meet the goals and healthcare needs. Many spoke to the pandemic as being a “positive disruptor” or “rapid accelerator,” enabling leaders to embrace change and implement new virtual services, thus breaking down long-standing barriers and hopefully impacting the health system in a long-term, positive manner.

Early wins and successes

“If there is a patient in a rural community, how can we use the knowledge that we’ve so far accumulated in an urban community to work with our rural colleague to support the management of this patient? RTVS provides a safety net for these patients” – Stakeholder

Participants spoke of trailblazing efforts by key RTVS leaders, individuals that helped pioneer workflows and technology utilization or break down traditional barriers that would otherwise prevent providers from working virtually. Similarly, stakeholders have noted the importance of securing funding early on, as well as working with policymakers to advance proposals and develop new compensation models. Finally, stakeholders have reached out to build relationships across communities, especially between rural and urban to improve support when needed.

“The results and success is based on relationships that have been built. Not just readiness, but building understanding and respect, having communities recognize that this is a model that they support” – Stakeholder
Stakeholders spoke enthusiastically about the amount and nature of collaboration that they experienced working with each other and partners to develop the RTVS pathways. With the pandemic, it was as if “the boat is sinking and all hands are on deck to help,” that leaders saw the need to break down barriers between groups and their “professional silos.” Many partner organizations and key leaders were recognized for their important work. Stakeholders also described how much of the collaboration occurred behind the scenes and had occurred over time: taking a relationship-based approach and compassionate way of dealing with things to establish a solid “network of trust that has been built up over time.”

**Where does RTVS fit?**

Defining where RTVS is best situated to address health system needs was a common theme across interviews with stakeholders, policymakers, and VPs. While the details and challenges differed for each pathway, there was a shared sense that the vision and objectives of RTVS need to evolve and align with other services. While this overlaps with the theme of ‘long-term sustainability’ below, it is important to highlight here as an important issue to inform ongoing implementation and changes to the RTVS pathways.

A number of VPs across the pathways discussed concerns about where their RTVS pathway fit in, both in the sense of within the RTVS umbrella as well as within the wider healthcare system. Speaking to the former issue, one ROSe VP was concerned with their being multiple pathways potentially providing the same types of care, thus introducing a barrier to adoption as rural providers may be confused about which pathway to call for support. This contrasted with the previous period when CODI was available, which was a single service that any rural provider could access for different types of support. Speaking to the latter issue, most FNVDoD VPs discussed the need for the pathway to further evolve and better integrate within the primary care services currently existing in communities. They viewed the pathway as having more of a ‘walk-in clinic atmosphere’ and needing to develop to provide access to care for more vulnerable Indigenous individuals living in remote/rural BC communities.

**Ongoing issues with technology**

Part of the success of RTVS is due to leveraging technology-enabled care. However, several historical and ongoing challenges across the pathways are because of problems with the technology used (primarily Zoom and the MOIS EMR). Many VPs have highlighted their frustration at times dealing with technological issues while trying to provide virtual consultations. We see that one common theme here is that the technology currently used for RTVS was not designed for the pathways’ purposes. For example, prior to the COVID-19 pandemic, Zoom was not widely used and did not have a healthcare version. We see that there has been and is still a lot of adaptation and problem-solving from both our technology users (i.e., VPs) and the developers, trying to find a middle ground for the version of
technology that is usable for our purposes, robust, and reliable. Fortunately, many daily and long-term challenges have been mitigated by strong technological support that is widely available to VPs.

Another point raised by policymakers is having RTVS, a government-supported initiative, keep pace with virtual health solutions from private companies. While this issue is larger than simply keeping up with technology innovations, it does reflect the fact that RTVS is technology-agnostic and will need to regularly assess other technology options that can improve patient-centred care and support for rural practitioners. Finally, there is the need for further consideration of the lack of broadband infrastructure in some BC communities, leading to access inequities, and how RTVS can help alleviate rather than exacerbate this ‘digital divide.’

Harnessing stakeholder input and advice to guide RTVS toward sustainability

“We have an opportunity to support [Primary Care Networks], we can support what’s happening in communities locally by being a single point of contact, providing people with access to info and facilitate their connection back into the community.” – Stakeholder

Stakeholder and policymaker interviews allowed us to document several important concepts and recommendations to guide ongoing implementation, improvement, and evolution. These include the need for:

- Further integration with existing health services to support patient-centred care
- Establishing a RTVS governance model
- Continuing the healthcare “culture change” that we have witnessed/experienced
- Providing “hard data” to demonstrate value of RTVS
- Carrying out wider, “compassionate” promotion of RTVS across BC

Stakeholders widely spoke to the RTVS pathways being a complementary suite of virtual services to existing healthcare options, however, they noted the need for continued integration of RTVS with other services to better realize our common goals. Integration of RTVS with services (such as the Patient Transport Network, Primary Care Networks, and others) will enable providers to support the longitudinal care of patients, connecting them back to their usual care provider, and have a solid position in the “continuum of care” options that patients want and need today. This idea of integration also extended to improving support for rural practitioners: RTVS can be woven into existing education, mentorship, and simulation channels for medical students and residents so that reaching out for virtual support can become a standard part of their “clinical toolkit.” Additionally, some stakeholders and policymakers touched on how BC could be a global leader for its advocacy and integration of virtual care into the existing healthcare system.
Sustainable funding, governance model for the organization...how it reports and who it reports to...a structure that people externally understand and trust, to manage the physical and reporting capabilities.” – Stakeholder

Stakeholders stated the importance of accountability; that a structure needs to be in place to guide RTVS and ensure that the pathways are reporting to the right internal and external people, so that leaders can correct course if we are going in the “wrong direction.”

“We need a culture change about how people reach out for support, lowering the threshold for actually talking to one another, shared decision-making” – Stakeholder

The theme of culture change emerged clearly in our findings with reference to the flurry of interest in and need for virtual care strategies to anticipate and meet healthcare needs during the pandemic. The critical idea was that we must build on the rapid adoption and continue to advance the culture change through collaboration, lest we fall back into our “old habits.” As one end-user stated, there seems to be limited awareness of RTVS in some rural/remote communities, with these rural providers “stuck in their pathway” and accessing “resources they already know about.” Thus, there seems to be a strong impetus to see this culture change spread across BC to reach as many as possible and get otherwise late-adopters aware of RTVS.

“We have to really demonstrate with hard data to show that everything we are doing means something to the community, to the health of people in BC.” – Stakeholder

Stakeholders, policymakers, and some VPs spoke to the importance of long-term evaluation, which will be critical for RTVS’s long-term success, funding, and sustainability to demonstrate tangible value of the pathways. In more specific terms, participants recommended showing each pathway’s "operational efficiency or capacity” and its call volumes, as important indicators of value for money. Other suggestions included showcasing the pathways’ positive impacts during the pandemic, thus establishing their value if there is a resurgence in COVID-19 cases or a future health crisis/pandemic. And others suggested metrics looking at indirect costs, such as avoiding transport of patients or cases where RTVS VPs provide a correct disposition.

Participants also stressed the importance of balancing the “hard data” with “stories across the spectrum” to highlight the “intangible values” of RTVS. This includes stories that bring to life the experiences of patients, providers, students and residents, Health Authority administrators, and First Nations communities. Systematically collected qualitative data present a comprehensive, coherent narrative of the RTVS experience - enabling us to “scrutinize ourselves” and continue to look at the pathways through a quality improvement lens. Finally, one important observation was that RTVS in the pandemic context is “valuing the most important people in the healthcare partnership: patients and communities,” and we will need to continue considering problems from their perspective.
“[I] still see many [providers] who are scared of this... technology...You need to take them by the hand and show them to push this button and talk to the doctor...We’re so used to getting negative responses on the other side of the line, that there’s still work to do...[we] need to build relationships.” – Rural Physician, RTVS End-user

A final theme discussed here was around uptake of RTVS pathways by mid- to late-adopters of virtual services. Several stakeholders mentioned that rural providers may still feel fear or anxiety reaching out to another health professional for support, which can be overcome by ensuring every RTVS VP provides compassionate, non-judgmental support from the outset of any consultation. There are also rural providers “stuck in their pathway” or “old habits,” who are still unwilling to try RTVS – these providers could be reached by continuing to build relationships with communities and their existing health services, as well as showcasing RTVS’s value. Finally, while RTVS has spread into some very remote locations of BC, there are still areas with little or no awareness, thus there is a need to promote RTVS outside of our existing networks and find other channels of distribution.

Discussion

This “first 90 days” (F90D) RTVS evaluation has highlighted important collective impacts, pathway successes and challenges, and the critical values, vision, and partnerships underpinning pathway development and deployment. The successes of the RTVS pathways are a reflection of the long-standing partnerships and advocacy. Continued growth, sustainability, and adoption will rely on these enduring partnerships, plus ongoing relationship-building with new partners underpins expansion of new pathways. RTVS coalesces around common goals of supporting rural providers and bringing care equity to patients in rural, remote, and First Nation communities. Together, the RTVS pathways have advanced patient-centred care by increasing timely, equitable access during the pandemic, as well as supporting vulnerable rural/remote healthcare providers in diverse ways (see Summary Infographic).

“Without the pre-existing partnership work, and trust, and development of virtual care in the province, we would never be in the position to do what we have done.” – Stakeholder

Collaboration and Community of Practice

Real-time virtual support is a story of human relationships and resources, making use of simple, scalable technologies to extend care and support across geographical, contextual, and temporal divides. We are at the threshold of leveraging a wealth of thoughtful work with solid promise to extract quality and efficiency from our healthcare system. How RTVS responded to the COVID crisis is scalable to address other urgent and longstanding healthcare gaps. RTVS stakeholders and providers are demonstrably responsive and proactive to the virtual care landscape in BC. As noted above, an exciting development is the emergence of new specialty RTVS pathways that address specific care gaps. The
CHARLiE pathway has been live since July 1, providing 24/7, on-demand peer-to-peer support to providers faced with urgent pediatric cases. In August, the FNVD0D pathway will expand to include a dedicated Mental Health and Addictions stream for Indigenous patients. A maternity pathway (MaBAL) launched in August, while a rheumatology pathway is developing.

Similarly, UBC Continuing Professional Development program is closely working with RTVS to seamlessly accredit providers for these new skills, such as Point-of-Care UltraSound (PoCUS). Other areas of program expansion include greater mentorship opportunities, further discussions amongst partners to develop novel pathways, and a pediatric first-call program for northern BC communities.

One important observation here is that RTVS has expanded beyond the original vision and has moved in unforeseen directions. In other words, RTVS has stimulated innovations and helped realize long-time ideas, while also rapidly reacting to newly-surfaced needs experienced by providers and patients.

Interviews with stakeholders and VPs, plus observations during meetings and of Slack channels, revealed that interprofessional collaboration is a strong theme throughout RTVS and within each pathway. This is exemplified by VPs working on particular pathways; for example, FNVD0D VPs have called RUDi, ROSe, and the Dermatology line for additional support and help managing complex cases. Or, RUDi VPs have connected with ROSe for further intensivist support. Additionally, each pathway has a strong community of practice (COP), featuring both regular meetings for pathway leaders, VPs, and support staff, plus Slack channels for more informal and impromptu discussions. Dialogues and conversations within these COPs centre around clinical practice, practical matters, education and evaluation, and building relationships/collegiality, all of which contribute to shared insights/learnings, being able to ask and provide help in real-time, and building a repository of diverse resources.

Pulling it all Together: Guiding Metaphors

Findings from this integrative analysis of key informant interviews and other data sources have surfaced three images, which can guide further discussion and insights.

Figure 9: The three guiding images of RTVS: safety net, funnel, and fire station
The Safety Net and Funnel – Support and Coordination

“Virtual care does not necessarily change management of patient, but helps create the extra layer of a safety net.” – Virtual Physician, HEiDi

The first two guiding images are most clearly demonstrated by the FNVDoeD and HEiDi pathways. The safety net, illustrating patient equity and access to care, is integral to both; these patient-facing pathways provide an easily accessible service during a public health emergency. Furthermore, FNVDoeD helps increase healthcare equity for Indigenous patients that have faced historical injustices and may presently experience culturally unsafe care options. For example, FNVDoeD can address Indigenous patients’ fears around visiting the hospital or ED due to systemic and historical racism.

“Our goal is not to provide the ongoing longitudinal care, it’s to provide the timely access to clinical expertise and then to bridge the gap and make the connection into the community.” – Stakeholder

The funnel represents appropriate healthcare utilization by patients and how RTVS can link patients back to their usual care provider or primary care network. A key feature of these patient-facing pathways, and highlighted in the interviews above, is that VPs actively encourage patients to seek follow-up care with their usual care provider where appropriate. VPs recognize that RTVS is not a replacement of existing services, but an enhancement and complementary, meant to integrate with local options and fill identified care gaps. HEiDi, particularly, as part of a patient triaging service, assists patients in determining the best course of action for their health issue. Thus, VPs need to consider where patients are located and what services may be available to them currently. Together, these pathways help reduce chaotic, fragmented services, preserve ED capacity, and reflect how primary care networks underpin patient-centred care within our health system.

Further, in BC, many of the 104 hospitals part of the Emergency Medicine Network are in rural/remote communities. Many patients living in these communities rely on these EDs or UPCCs for their primary care. Thus, RTVS can address issues concerning attachment and primary care for these vulnerable patients; by giving every BC resident the ability to access primary care seven days per week with expanded service hours, hence decreasing reliance on their ED/UPCC for non-urgent concerns and avoiding unnecessary travel. Similarly, RTVS helps bridge the rural-urban divide and integrate clinical knowledge, by enabling specialists to virtually support their peers in low-resource, remote settings.

The Fire Station – Emergent and ongoing support function

“I think we have a lot of work to do in that fire station philosophy: supporting, mentoring, coaching those very vulnerable, new-to-practice clinicians in addition to providing the peer-to-peer support when they need it in a clinical context” – Stakeholder
A significant portion of the value and impact provided by the RUDi and ROSe pathways stems from their **fire station** work: they are not solely putting out fires reported to them (i.e., providing clinical peer-to-peer support), but have diverse functions and regularly do province-wide community engagement activity. These diverse operations include:

- Providing education and mentoring opportunities to VPs working on these pathways (e.g., an experienced provider helping a newcomer or resident acculturate to the virtual care context).
- Organizing simulations and continuing professional development for rural/remote healthcare providers that are RTVS end-users (e.g., Point-of-Care Ultrasound simulations and credits).
- Reaching out to new rural/remote communities that may have not heard of RTVS, thus raising awareness of these pathways and expanding professional and community networks.

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**Continuing the Work**

**Persistent gaps to address in the health system**

On a final note in this section, our evaluation has not only highlighted the valuable reach and impacts of RTVS, but also the needs of patients and providers in BC that are still unaddressed. One example of this within RTVS is HEiDi and the issue of VPs prescribing medications: while patients can call 8-1-1 and see a VP within one hour, the VPs are careful not to prescribe medications and in essence become the patient’s doctor. It is very important that the role is clear for HEiDi VPs, to help direct the patient to the most appropriate care and advise on home remedies and observation. Thus, while HEiDi can help serve some of the walk-in-clinic functions that patients might have accessed pre-pandemic, it cannot provide prescriptions. HEiDi VPs are filling an urgent need to fill a gap to help patients who have no other option to understand their condition and how urgently they need further assessment and care.

From the technology perspective, there is still a **digital divide** in BC in 2020. A lack of broadband infrastructure and connectivity in rural, remote, and Indigenous communities means that healthcare inequities are difficult to address for some of the most vulnerable citizens and providers. RTVS can help address this issue by providing a low-barrier point-of-access (i.e., patient or peer consultations via landline), however, this precludes the use of a video consultation, a modality which could mean the difference between a patient being treated within their community or having to be transported for more specialized care and face out-of-pocket costs. **RTVS cannot independently address the digital divide, but we can help advance this issue by advocating for a concerted effort from our partners, communities, and at different levels of government.**
Advancing culture change

RTVS is part of and contributing to culture change in health service delivery. This culture change can be seen in two senses: Patients (rural and urban) want and expect more care and advice options, especially with widespread availability of on-demand technology solutions. And, very importantly, rural providers want and need greater collegial support to boost their clinical confidence and reduce their professional isolation by being part of an expanded care team. This latter perspective is matched by the RTVS stakeholders and VPs on the peer-to-peer pathways, who understand the complexity and difficulty of working in low-resource, isolating settings and are motivated to support their colleagues. Thus, RTVS is not only situated within a wider context of health system transformation, but is actively normalizing this new virtual care landscape and associated attitudes. Further work is needed on this theme to sustain the culture change and prevent “old habits” from resurfacing, but already we see rural providers adopting this “phone a friend” mentality, which leads to downstream benefits for rural recruitment and retention.

“Probably the greatest threat to survival of the pathways is reverting back to an old culture, an old way of doing things, because its territory that people understand, feel more comfortable with.” – Stakeholder

“The culture has to change; so that the physicians in those situations start to normalize calling when they have a question.” – Stakeholder

On the immediate horizon

There are also immediate or near-future changes to make throughout the first year of RTVS. This involves making implementation and operational updates within pathways (e.g., reinstating the use of the MOIS EMR for RUDi and ROSe VPs, or solidifying the clinical prescribing policy for HEiDi). Another important activity is the development of a governance model, which is starting now in the form of a governance working group. Additionally, peer-to-peer RTVS pathways are continuing their fire station functions with education, accreditation, community engagement, and the formation of a simulation working group to advance this work.

Next steps in the evaluation

This evaluation of RTVS has been participatory, developmental, and collaborative: an integral aspect is therefore knowledge translation (KT) and dissemination of interim findings to stakeholders and policymakers. Concurrently, with the evaluation we take the opportunity to collect stakeholder feedback and integrate it into our evaluation approach.

In our next phase of data collection, we will continue to interview key informants from each pathway (including emerging ones). This will allow us to build a cohesive narrative within each pathway to
showcase its value to VPs and different types of end-users, as well as an overarching narrative of the collective impact of RTVS in BC.

In October or November 2020, we will share an interim report detailing the six-month reach and impact of RTVS. A one-year evaluation of RTVS will conclude 31 March 2020, and we will subsequently prepare a summative report of RTVS and outcomes. Throughout these reporting periods, we will continue our KT activities and engaging stakeholder and policymakers to incorporate their views and perspectives.

Real-time virtual support has been a missing part of our health system for some time. The implementation of several specific service pathways has been accomplished and early evaluation demonstrates their success. We expect further evaluation to extend the evidence that robust RTVS is an essential part of our health system in BC, addressing issues of equity and quality care.
Acknowledgements

We are incredibly grateful to all of the stakeholders and providers working on the RTVS pathways, whose clinical contributions underpin this evaluation. We especially thank the many participants that directly contributed to this report and its findings. We are also grateful to the end-users of the RTVS pathways: the patients in BC who have accessed these services for their medical care and the healthcare practitioners that have reached out for support.

Bibliography


Appendices

Evaluation Framework

An evaluation framework was collaboratively developed to achieve these overarching objectives:

- Assess impact on patient outcomes, patient and health professional experience, and value of healthcare delivery
- Contribute to understanding of the process of introducing virtual care into routine usage

The framework includes both outcomes and process evaluations. The following sections outline both in turn, along with associated evaluation questions, indicators, data collection methods, short term outcomes, and anticipated long-term impact. This framework is intended to be adapted iteratively to be inclusive of pathways.

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Author(s)</th>
<th>Description of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dec 5, 2019</td>
<td>Helen Novak Lauscher</td>
<td>Created</td>
</tr>
<tr>
<td>2</td>
<td>January 26, 2020</td>
<td>Helen Novak Lauscher</td>
<td>Updated for distribution</td>
</tr>
<tr>
<td>3</td>
<td>February 27, 2020</td>
<td>Helen Novak Lauscher</td>
<td>Minor corrections</td>
</tr>
<tr>
<td>4</td>
<td>March 12, 2020</td>
<td>Helen Novak Lauscher</td>
<td>Updated based on working group input</td>
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<tr>
<td>5</td>
<td>April 8, 2020</td>
<td>Helen Novak Lauscher</td>
<td>Updated w/RTVS Evaluation Advisory meeting</td>
</tr>
<tr>
<td>6</td>
<td>July 29, 2020</td>
<td>Helen Novak Lauscher</td>
<td>Updated committee members</td>
</tr>
</tbody>
</table>

Evaluation Advisory Members

- Don Burke
- Leslie Carty
- Jim Christenson
- Scott Graham
- Kendall Ho
- Megan Hunt
- Ray Markham
- John Pawlovich
- Jon Rabeneck
- Alan Ruddiman
- Sandra Sundhu
- David Wensley

UBC Digital Emergency Medicine team is engaged to facilitate this evaluation: The team includes Kurtis Stewart, Ivjot Samra, Elsie Wang, and Helen Novak Lauscher. Evaluation contact: Dr. Helen Novak Lauscher, helen.nl@ubc.ca.
<table>
<thead>
<tr>
<th>Aim</th>
<th>Evaluation Questions</th>
<th>Indicators</th>
<th>Data Collection Methods</th>
<th>Anticipated Long Term Impact</th>
</tr>
</thead>
</table>
| Health of Population    | How has the real-time virtual support service impacted health outcomes for residents of the participating communities? Did users find the service beneficial for supporting their own (if patient) or patient's (if provider) care? | 1. Provider rating of availability/timeliness of emergency services  
2. Provider perception/account of improved clinical outcomes  
3. Patient reported outcome/related to case  
4. Provider and patient rating of patient safety including prevention of risks associated with rural population (e.g.) winter travel  
5. Equity of services to rural patients  
6. Wait time for services/timeliness of care | Administrative data/logging of usage (proportion of virtual care encounters vs total encounters)  
Surveys/ in-depth interviews (perception of providers/ patient self-report where possible and appropriate) | Improved health outcomes |
| Patient Experience      | To what extent did the service impact the patient experience of care?                   | 1. Acceptability of virtual care (patient rating, and provider perceptions of patient experience)  
2. Improved experience of care (patient reported)  
3. Quality of virtual care (provider perceptions of patient experience )  
4. Patient rating of overall satisfaction with virtual care | Provider in-depth interviews (perceptions of patient experience)  
Patient surveys and in-depth interviews where possible/ appropriate including patient case description/narrative | Improved patient safety  
Improved patient experience of care  
Increased access to care in community  
Reduced time to receive care |
| Healthcare Provider Experience | To what extent did the service impact the experiences of healthcare providers?  
What were the participants' experiences with virtual care?  
To what extent was the service | 1. Provider rating of overall satisfaction with virtual care  
2. Provider rating of satisfaction with collegial support  
3. Provider rating of their own comfort with virtual care  
4. Provider rating of impact of service on quality of care  
5. Provider description of impact on access to clinical support  
6. Provider description of impact on collaboration between and among providers/members of care team | Case logs and (where applicable) in-app post call ratings  
In-depth Interviews/ narratives  
System and use survey  
Ethnographic documentation | Reduced feelings of isolation/anxiety of rural healthcare providers  
Increased confidence of rural healthcare providers |
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<tbody>
<tr>
<td><strong>incorporated into the healthcare provider’s practice?</strong></td>
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<tr>
<td>How do participants describe overall/important learnings?</td>
</tr>
<tr>
<td><strong>7. Provider rating of acceptability of using virtual care for communication with other providers/with patients</strong></td>
</tr>
<tr>
<td><strong>8. Provider rating of usability of technology and procedures</strong></td>
</tr>
<tr>
<td><strong>9. Provider description of perceptions and experiences of normalization of virtual care</strong></td>
</tr>
<tr>
<td><strong>10. Provider description of experience and process of &quot;learning&quot; wrt virtual care usage</strong></td>
</tr>
<tr>
<td><strong>11. Provider description of experience of sharing learning/and supporting others in the use of virtual care</strong></td>
</tr>
<tr>
<td><strong>12. Provider description of most significant practice change</strong></td>
</tr>
<tr>
<td><strong>13. Provider increase comfort/reduction of anxiety</strong></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>Cost and Sustainability</strong></th>
<th><strong>1. Set up costs and ongoing costs of technologies</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>2. Person hours (volunteer/paid) in implementing systems, education, mentorship around virtual care</strong></td>
</tr>
<tr>
<td></td>
<td><strong>3. Number and types of cases (utilization)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>4. Number and types of health professionals involved</strong></td>
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<tr>
<td></td>
<td><strong>5. Volume of utilization of different platforms (diversity of utilization)</strong></td>
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<tr>
<td></td>
<td><strong>6. Report/description of cost savings for patient (i.e., travel, loss of work hours) by patient/provider</strong></td>
</tr>
<tr>
<td></td>
<td><strong>7. Report/description of transfers saved via provider account</strong></td>
</tr>
<tr>
<td></td>
<td><strong>8. #connections/endpoints</strong></td>
</tr>
<tr>
<td></td>
<td><strong>9. Duration of usage by clinician (per case)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Administrative data/logs</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Provider surveys/interviews</strong></td>
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<td></td>
<td><strong>Stakeholder focus groups</strong></td>
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<table>
<thead>
<tr>
<th><strong>Cost and Sustainability</strong></th>
<th><strong>Increased access to timely advice and support</strong></th>
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<tbody>
<tr>
<td></td>
<td><strong>Increased physician satisfaction</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reduction in anxiety for rural providers</strong></td>
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<td></td>
<td><strong>Improved recruitment to and retention in rural practice</strong></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Cost and Sustainability</strong></th>
<th><strong>Increased use of technology at point of care</strong></th>
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<tbody>
<tr>
<td></td>
<td><strong>Reduced cost associated with transfer</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Decrease in patient “out of pocket” costs</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Decrease cost to the health system</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Improved recruitment to and retention in rural practice</strong></td>
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</table>
## Process Evaluation

<table>
<thead>
<tr>
<th>Key Evaluation Question</th>
<th>Example Questions for Elaboration</th>
<th>Data Collection Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent has this project been implemented as planned?</td>
<td>Was the project implemented as planned? Please explain. What accomplishments were experienced?</td>
<td>Provider interviews/project team</td>
</tr>
<tr>
<td></td>
<td>What enablers contributed to successful implementation? E.g., training, educational resources, supports?</td>
<td>interviews/focus group</td>
</tr>
<tr>
<td></td>
<td>What challenges/barriers were experienced? Describe important lessons learned. Were lessons shared? In what way? Where?</td>
<td>Project Charter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meeting Minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Process documentation</td>
</tr>
<tr>
<td>To what extent did partners/stakeholders work collaboratively to achieve project goals?</td>
<td>What was the nature of collaboration? What types of networking and relationship development occurred? What categories of stakeholders were involved in the process? (Including patients, students, residents, etc.) What formal and informal bodies/networks/linkages were integral? What resources and services were provided and who provided them? To what extent do participants have a common understanding of project goals? To what extent are processes in place to keep partners informed and motivated? How were work and evaluation plans developed?</td>
<td>Partner interviews/focus groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project Charter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meeting minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Process documentation</td>
</tr>
<tr>
<td>What is required for the service to continue and grow?</td>
<td>How might new features of the service rolled out over time? What economies of scale may be realized? What would need to be in place for scaling up? To other jurisdictions? Other clinical applications? What are the types of support needed? Who needs to be involved?</td>
<td>Provider/stakeholder interviews/focus groups</td>
</tr>
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## Evaluation Timeline

<table>
<thead>
<tr>
<th>Task</th>
<th>Timeframe</th>
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<tbody>
<tr>
<td>Consolidation of framework</td>
<td>April 2020</td>
</tr>
<tr>
<td>Establishment of advisory and working groups</td>
<td></td>
</tr>
<tr>
<td>Finalization of evaluation tools and procedures</td>
<td></td>
</tr>
<tr>
<td>Establish reporting and QI cadence</td>
<td></td>
</tr>
<tr>
<td>&quot;1st 90 days&quot; report to document rapid deployment, early success</td>
<td>Present to committee July 2020</td>
</tr>
<tr>
<td>KT and publication of report for engagement</td>
<td>Finalize Sept 2020</td>
</tr>
<tr>
<td>Ongoing data collection, analysis and internal data sharing</td>
<td>Oct 2020</td>
</tr>
<tr>
<td>Mid-term report (to end Sept 2020)</td>
<td></td>
</tr>
<tr>
<td>Ongoing data collection, analysis and internal data sharing</td>
<td></td>
</tr>
<tr>
<td>Integrative analysis</td>
<td></td>
</tr>
<tr>
<td>KT, multisectoral knowledge sharing and publication</td>
<td></td>
</tr>
<tr>
<td>Full final report (to end March 2021)</td>
<td>April 2021</td>
</tr>
</tbody>
</table>
# Data Collection Tools

## Interview Guides

| Stakeholder Interview Guide | - What is your history and involvement with real time virtual support (RTVS)  
- What is the core value of real time virtual support?  
- What factors enabled the rapid development and deployment of the pathways?  
  - What strengths are evident in its current state?  
  - What challenges do you see/foresee?  
- What stakeholders are and have been involved?  
- What has your role/experience been in this journey? What unique and critical factors has your organization contributed to this collaboration?  
- What is needed for virtual care pathways to continue and grow? What are the upcoming milestones at 90 days and at 6 months that need to be achieved to demonstrate continuing value to the health system?  
- Do you have an experience or story that you would like to share (past or present) that illustrates the impacts of real time virtual support? |
| Virtual Physician Interview Guide | - **Please tell me your level of agreement with the following statements [Scale of 1-5]**  
  - The initial training and orientation to the program and my role prepared me to begin work.  
  - I feel comfortable and satisfied with the technology used for this program.  
  - Organizational processes (e.g., scheduling, MOIS functionality) are clear and work well  
  - I am satisfied with the organizational and technical support I have received.  
  - I am satisfied with the regular virtual community of practice meetings  
- What virtual care pathway(s) are you involved in and how did you get involved? (Note: type of practice e.g., GP/SP), location, years of practice) What drew you to virtual care? **Probe: What contributions do you hope to make? What motivates you?**  
- From your perspective, what are the strengths and successes of the [RTVS] program? **Probe: Can you tell me about any benefits you’ve observed so far? For patients/family/community, etc.?**  
- What is your experience like so far? What has been the most rewarding/meaningful to you? **Probe: Can you share a memorable experience that you’ve had in this role? What stood out about it? Why was it memorable to you?**  
- From your perspective, what are the challenges of [INSERT PROGRAM HERE]? What challenges have you experienced?  
- What are areas of improvement you would suggest for [INSERT PROGRAM HERE]?  
- From your perspective, what qualities are important for a virtual physician to have/demonstrate?  
  - **From your perspective, how important are the following qualities in a virtual physician? [Scale of 1-5]**  
    - Kindness and empathy  
    - Clinical expertise  
    - Knowledge of rural and First Nations communities  
    - Experience in low resource practice settings  
    - Comfort with technology  
    - Cultural safety and humility  
    - Other (please specify)  
- From your perspective, what is needed for this service to continue and grow? **Probe: What types of supports are needed? Who needs to be involved? How do you see this program evolving?**  

## MOA/Nurse Interview Guide

| MOA/Nurse Interview Guide | - **Please tell me your level of agreement with the following statements [Scale of 1-5]**  
  - The initial training and orientation to the program and my role prepared me to begin work.  
  - I feel comfortable and satisfied with the technology used for this program.  
  - Organizational processes (e.g., scheduling, MOIS functionality) are clear and work well  
  - I am satisfied with the organizational and technical support I have received.  
- Tell me a bit about yourself and how you got involved in the [RTVS] program?  
- What lessons have you learned that stand out to you? From clients of the [RTVS] program? From coworkers? E.g., other MOAs, physicians?  
- From your perspective, what are the strengths and successes of the [RTVS] program?  
- What is your experience like so far? What has been the most rewarding/meaningful to you? |
**RTVS End-User Interview Guide**

- From your perspective, what are the challenges of the [RTVS] program? What challenges have you experienced?
- What are areas of improvement you would suggest for the [RTVS] program?
- From your observations, what is important for the client/patient/family to have a good experience?
- From your perspective, what is needed for this service to continue and grow? **Probe: What types of supports are needed? Who needs to be involved?**
- Is there anything you would like to add that you haven’t had a chance to share?

- **First, can you tell me a bit about your practice and the virtual care pathway(s) that you have used?**
  - What type of practice (e.g., GP, specialist, nurse)? How many years of practice?
  - Where do you practice? What type of community (e.g., rural, remote, Indigenous)?
  - RTVS pathways used: RUDi, ROSe, Dermatology, other specialty (maternity, pediatrics).
  - How often pathway(s) is used? Approximate number of times called (since April 1, 2020)?

- **Please tell me your level of agreement with the following statements (Scale of 1-5)**
  - The information or introduction to the RTVS pathway(s) prepared or encouraged me to use it in my practice
  - I feel that providers in rural communities are aware of these services/pathways
  - I feel comfortable and satisfied with the technology used for this program (e.g., Zoom video)
  - Calling the virtual pathway increased my comfort managing the patient(s)
  - Calling the virtual pathway positively affected the outcome for the patient(s)

- Can you characterize the reasons/types of cases for which you have used RTVS (e.g., RUDI, ROSe, etc.)?
- Can you think about one (or more) memorable case(s)?
  - What stood out about it? Why was it memorable to you?
  - What was the reason for the call? What happened? What was the outcome?
  - Without RTVS, what would you have normally done/what would have happened? (e.g., probe: Did this call change your mind whether to transfer this patient or not?)
  - Based on the call, will you make a change in the way you manage patients in similar situations? Please explain.
  - Is there anything else about this call that you would like to add?

- From your perspective, what are the strengths and successes of the RTVS Service?
  - Can you tell me about any benefits you have observed so far? For patients/family/community or yourself?

- From your perspective, what are the challenges of using the RTVS Service? For your regular practice?
  - What challenges have you experienced in trying to access virtual support?

- What are areas of improvement that you would suggest for the RTVS Service?
- What does having access to this type of service mean to you? Professionally/in your practice? For you personally? What does this type of service mean for your community as a whole?
- Overall, has your experience so far made you more favorable/neutral/less favorable of using virtual care for managing your patients?

- What qualities are important for a virtual care consultant to have? **Skills? Knowledge? Personal characteristics? Experiences? (Scale of 1-5)**
  - Kindness and empathy
  - Clinical expertise
  - Knowledge of rural and First Nations communities
  - Experience in low resource practice settings
  - Comfort with technology
  - Cultural safety and humility
  - Other (please specify)

- What types of supports are needed by you and other practitioners in your community? Are there particular clinical areas that are needed (e.g., Pediatrics, mental health, other)?
- Is there anything you would like to add that you have not had a chance to share? Any other comments or feedback?
<table>
<thead>
<tr>
<th>Surveys</th>
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<tbody>
<tr>
<td>RUDI Virtual Physician End-of-Shift Survey</td>
<td>- Date of Shift (MM/DD/YYYY)</td>
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<tr>
<td></td>
<td>- What type of calls did you provide and how many of each during your shift?</td>
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<td></td>
<td>- For the clinical call(s), what medical condition(s) did you support and what type of support did you provide? (Please list as applicable).</td>
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<td></td>
<td>- From which community or communities in BC did the provider(s) call you?</td>
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<tr>
<td>HEIDI Patient Survey</td>
<td>- Are you completing this survey for yourself or someone else?</td>
</tr>
<tr>
<td></td>
<td>- Before the 811 call with the virtual physician, what were you planning to do next?</td>
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<tr>
<td></td>
<td>- After the 811 call with the virtual physician, what do you plan to do next (or what did you do)?</td>
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<tr>
<td></td>
<td>- Is your planned action the recommendation by the 811 physician?</td>
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<td></td>
<td>- How likely are you to follow the 811 physician’s advice? (Scale of 1-10)</td>
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<td></td>
<td>- Was your call COVID-19 related?</td>
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<td>- Do you have a primary care provider (e.g., family doctor, nurse practitioner)?</td>
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<td></td>
<td>- Compared to before your 811 physician call, how is you anxiety after your call? (Level of anxiety scale of 1-10)</td>
</tr>
<tr>
<td></td>
<td>- The 811 physician was caring and kind. (Agreement scale 1-10)</td>
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<tr>
<td></td>
<td>- The 811 physician listened to me and understood my concerns (Agreement scale 1-10)</td>
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<tr>
<td></td>
<td>- Did you use video when speaking with the virtual physician?</td>
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<td></td>
<td>- Rate your overall satisfaction with the 811 physician call (Scale 1-10)</td>
</tr>
<tr>
<td></td>
<td>- Please rate your agreement with the following statements about the consultation process (Scale 1-5)</td>
</tr>
<tr>
<td></td>
<td>o The scheduled consultation time was convenient for me.</td>
</tr>
<tr>
<td></td>
<td>o The consultation started on time.</td>
</tr>
<tr>
<td></td>
<td>o The length of the consultation with the physician and time spent addressing my health needs was appropriate.</td>
</tr>
<tr>
<td></td>
<td>o The overall process was easy and worked well.</td>
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<td>- What is most important to you right now? (Select all that apply)</td>
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</table>
HEiDi Cost Minimization Analysis

Our preliminary analysis of HEiDi costs for the first 90 days is detailed in the table below. We calculated the total costs needed to provide the HEiDi service (VP wages, VMOA salaries, project/office manager salary). We estimated the costs saved by the health system from HEiDi VPs diverting patients away from ED/UPCC visits to treatment at home or seeing their usual care provider within one week. We also calculated the out-of-pocket costs potentially saved by rural patients who were re-triaged to green/black. We estimate that the total net system costs minimized by HEiDi for the first 90 days are $347,086 (annualized to $1,388,344). And the total societal costs minimized are $1,645,130 (annualized to $6,581,720).

<table>
<thead>
<tr>
<th>2020 Q1 – April 6 to June 30</th>
<th>Per hour/visit, other multiplier</th>
<th>$ Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIDI Service Expenses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April – June VP hours</td>
<td>2,592</td>
<td></td>
</tr>
<tr>
<td>Hourly VP wage</td>
<td>$145.00</td>
<td>$375,840.00</td>
</tr>
<tr>
<td>Virtual Medical Office Assistant salary</td>
<td>$46,676.00</td>
<td>$46,676.00</td>
</tr>
<tr>
<td>Project/Office Manager salary</td>
<td>$50,000.00</td>
<td>$12,500.00</td>
</tr>
<tr>
<td><strong>TOTAL EXPENSES</strong></td>
<td></td>
<td>$435,016.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System/Patient Costs Minimized</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of consultations (April-June)</td>
<td>5,447</td>
<td></td>
</tr>
<tr>
<td>Proportion of patients triaged from yellow to ‘black’/‘green’ (68% of 5,447)</td>
<td>3,704</td>
<td></td>
</tr>
<tr>
<td>Proportion of patients adhering to VP advice (98% of 3,704)</td>
<td>3,630</td>
<td></td>
</tr>
<tr>
<td>Proportion of rural patients (16% of 3,630)</td>
<td>581</td>
<td></td>
</tr>
<tr>
<td><strong>Out of pocket costs for rural patients (581 x $2,234)</strong></td>
<td></td>
<td>$1,297,954</td>
</tr>
<tr>
<td>Proportion of patients going to ED v. UPCC (assume 50% of 3,630 in each)</td>
<td>1815</td>
<td></td>
</tr>
<tr>
<td>Estimated ED cost avoided (1815 x $321.96 per visit)</td>
<td>$584,357</td>
<td></td>
</tr>
<tr>
<td>Estimated UPCC cost avoided (1815 x $109 per visit)</td>
<td>$197,835</td>
<td></td>
</tr>
<tr>
<td>Estimated health system cost avoided (estimated ED + UPCC costs avoided)</td>
<td>$782,192</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL COSTS MINIMIZED</strong></td>
<td></td>
<td>$2,080,146</td>
</tr>
<tr>
<td><strong>NET HEALTH SYSTEM COSTS MINIMIZED</strong></td>
<td>First 3 months</td>
<td>$347,086</td>
</tr>
<tr>
<td><strong>NET SOCIETAL COSTS MINIMIZED</strong></td>
<td>First 3 months</td>
<td>$1,645,130</td>
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<tr>
<td><strong>NET HEALTH SYSTEM COSTS MINIMIZED</strong></td>
<td>Annualized estimate</td>
<td>$1,388,344</td>
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<tr>
<td><strong>NET SOCIETAL COSTS MINIMIZED</strong></td>
<td>Annualized estimate</td>
<td>$6,581,720</td>
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</tbody>
</table>