REAL-TIME VIRTUAL SUPPORT

LEARNING HEALTH SYSTEM

THE UNIVERSITY OF BRITISH COLUMBIA
Department of Emergency Medicine
Faculty of Medicine

YEAR-END REPORT 2022/2023

The Real-Time Virtual Support logo was designed by Doug (Bear) Horne, the son of master carver Doug Lafortune from Tsawout First Nation and Kathleen Horne from Pacheedaht First Nation. Doug grew up in the Tsawout community and, since early childhood, has been immersed in Coast Salish art, learning from his father, uncles and family members who have generously shared their knowledge and expertise with him. He has dedicated over 25 years to creating Coast Salish art in various forms.

There is meaning behind the logo created by Bear. Hummingbirds symbolize messengers, healers, and peace. They also help guide and support us through challenges. The sun, meanwhile, represents life-giving abundance with warmth—a provider of healing energy and peace.

We gratefully acknowledge the BC Ministry of Health and the Rural Coordination Centre of BC as the primary funders of the RTVS LHS Evaluation. We also gratefully acknowledge additional financial and in-kind support from Michael Smith Health Research BC, BC Emergency Medicine Network and UBC Department of Emergency Medicine.

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Cover Photo: Takla Lake Frozen by John Pawlovich.

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LIST OF ABBREVIATIONS

BC	British Columbia
C2C	Consultation to Conversation
CATe	COVID Antiviral Treatment e-team
CEA	Cost-Effectiveness Analysis
CHARLiE	Child Health Advice in Real-time Electronically
CHSA	Community Health Service Area
CIHR	Canadian Institutes of Health Research
CIMD	Canadian Index of Multiple Deprivation
D-CEA	Distributional Cost-Effectiveness
ED	Emergency Department
EF	Evaluation Framework
ETWG	Evaluation Technical Working Group
FN	First Nations
FNHA	First Nations Health Authority
FNvDoD	First Nations Virtual Doctor of the Day
FNvSUPS	First Nations Virtual Substance Use and Psychiatry Service
FTE	Full-Time Equivalent
FY	Fiscal Year
GI	Gastrointestinal
GP	General Practice (or Practitioner)
HA	Health Authority
HCP	Healthcare Provider End Users
HDPBC	Health Data Platform BC
HEiDi	HealthLink BC Emergency iDoctor-in-Assistance
LHS	Learning Health System
MaBAL	Maternity and Babies Advice Line
MD	Medical Doctor
MOA	Medical Office Assistant
MoH	Ministry of Health
MRP	Most Responsible Provider
MSP	Medical Services Plan
NP	Nurse Practitioner

PDSA	Plan-Do-Study-Act
PNW	Pacific Northwest
PPRSS	Provincial Prescription Renewal Support Services
RCCbc	Rural Coordination Centre of BC
ROCCi	Rural Outreach in Critical Care and Internal Medicine
RRFNI	Rural, Remote, and First Nations and other Indigenous peoples and communities
RTVS	Real-Time Virtual Support
RUDi	Rural Urgent Doctor in-aid
SIM	Simulations
SSP	Specialized Service Providers
SUP	Substance Use and Psychiatry
VCC	Virtual Care Coordinator
VP	Virtual Provider
Y2Y	Year-to-Year

EXECUTIVE SUMMARY

The Real-Time Virtual Support (RTVS) network has made significant progress in meeting the challenge of providing province-wide access to timely, culturally appropriate virtual physician services. Leveraging the network and rapid data, to knowledge, to practice cycles of the RTVS learning health system, this year's report features an evaluation based on a framework built from the quintuple aim. Notable accomplishments in the ability to shift the distribution of access to healthcare were observed, along with positive reports from RTVS providers about their work experience and ability to provide culturally appropriate care. Coupled with positive workforce recruitment and retention statistics and favorable indicators of health system integration, the RTVS network has provided a strong foundation for addressing some of BC's most pressing health system needs.

The RTVS network was launched initially in April 2020 as a partnership between the First Nations Health Authority, the BC Ministry of Health, and the Rural Coordination Centre of BC with the shared goal of providing timely access to culturally appropriate physician services and fostering ongoing systems learning around the quintuple aim. This report marks the third year of the partnership, noting significant expansion in the number of services provided and clients served. We report on four client-facing pathways that directly connect patients with healthcare providers and three peer-to-peer pathways supporting staff working in remote and rural areas. Collectively, RTVS has served over 136,000 clients since its inception, and over 60,000 individuals accessed at least one of the pathways in fiscal year 22/23; there was a strong and growing demand for all RTVS pathways. The network was staffed by over 260 virtual physicians representing more than 15 medical disciplines. RTVS addresses three of BC's most pressing health concerns: access to urgent and primary care, connecting patients with physicians specializing in substance use and psychiatry. The goals of providing culturally safe care were actioned through the network-wide delivery of 202 hours of cultural safety training to staff. Two of the peer-to-peer pathways demonstrated the ability to provide access to physician services for population members with socioeconomic disadvantages. Consistency in measuring ongoing progress in training and outcomes from culturally safe care provision was a challenge across the network, as was the documentation of characteristics of healthcare providers within the network. Further challenges to be addressed within the RTVS learning health system will further an understanding as why there has been rapid adoption of RTVS services in some geographic areas but not others. This year's report includes an assessment of the healthcare costs and cost-sharing profiles between patients and their families for individual pathways, creating the initial building blocks for ongoing economic evaluations of RTVS services through the learning health system governance.

> "…One of the nurses here last week -- she's a retired nurse from here who had worked for 30 years at the same clinic, where they [nurses] worked alone, by themselves, for two weeks at a time…We had to call RTVS last week with her and she was just flabbergasted…She almost couldn't comprehend how "at the touch of a button" we had a physician there -- a competent, friendly, compassionate physician. To me now [RTVS] is just our "day-to-day". We are always using [RTVS] services. It was good to get a reminder of how greatly improved our access is. [RTVS has] been a life changing thing here."
>
> HCP End User Interview #17

In this regard, RTVS plays an important role in mitigating financial inequities arising from travel costs patients pay out of pocket to attend in-person medical appointments. Knowledge from RTVS has been mobilized this year via two peer reviewed publications, one CIHR grant, and a documentary telling the RTVS story with over 6,300 views recorded to date.

Kwadacha in Winter by Rebecca Tallman and Dustin Richard “Kwadacha is a community of the Tsek’ene Nation. Kwadacha means “white water” in the Tsek’ene language. Kwadacha is located 570 km north of Prince George at the confluence of the Fox, the Kwadacha, and Finlay rivers in the Rocky Mountain Trench. This photo of the Finlay River was taken by Michelle Kwon, a practice consultant with the Rural and Remote Practice Team from the First Nations Health Authority. The photo was shared with permission from the community.”

Real-Time Virtual Support in BC

Highlights and Impacts FY 22/23

Launched in April 2020, Real-Time Virtual Support (RTVS) services and pathways have undergone significant development and expansion, continuing to advance equitable and inclusive healthcare access for the people of British Columbia. RTVS has provided on-demand clinical support to healthcare providers in underserved communities, particularly those facing resource limitations. Fiscal year 22/23 saw the continued growth and development of a provincial Learning Health System (LHS), which facilitated the rapid generation of insights, sharing of knowledge, and implementation of evidence-based improvements.

RTVS Evaluation Objectives

ACCESS

RTVS provides timely and equitable access to care and collegial support for patients and healthcare providers.

FEATHER

RTVS provides high-quality culturally safe care to First Nations and other Indigenous peoples and their family members and supports care closer to home.

FUNNEL

RTVS provides patients multiple points of entry to the health system and connects patients to longitudinal, patient-centered, primary care.

FIRE DEPARTMENT

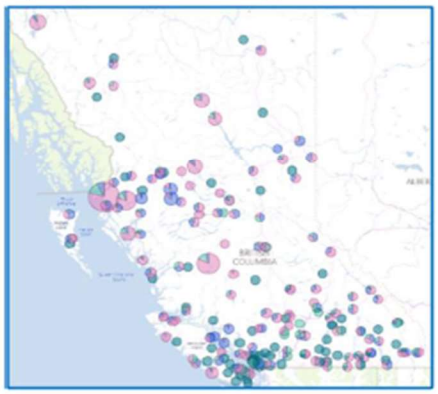
RTVS enhances capacity among RTVS VPs and rural, remote healthcare providers through non-clinical activities and conducts outreach to rural, remote, and First Nations and other Indigenous communities.

BALANCE

RTVS ensures both efficient and equitable distribution of services and activities, considering costs and outcomes, while also maintaining the goal of the Safety Net for equitable access.

RECRUITMENT & RETENTION

RTVS supports healthcare providers across various disciplines, in serving rural, remote, First Nations and other Indigenous peoples and communities.



RTVS encounter volumes FY22/23

Advancing access to physician services

RTVS supported **60,000+** Clients

RTVS provides access to **15** medical disciplines

RTVS engaged **260+** virtual physicians

Pathways Built on Strong Partnerships

Peer-to-Peer Number of Encounters

CHARLiE	MaBAL	RUDi
Child Health Advice in Real-time Electronically	Maternity and Babies Advice Line	Rural Urgent Doctor in-aid
1,182	605	4,636

One Key Learning and Finding from FY 22/23 Evaluation Report

RTVS peer-to-peer pathways reached 57% of the edge communities in BC

Client-Facing Pathways Number of Encounters

FNvDOD	FNvSUPS	HEiDi	CATe
First Nations Virtual Doctor of the Day	First Nations Virtual Substance Use and Psychiatry Service	HealthLink BC Emergency i- Doctor-in-Assistance	COVID Antiviral Treatment eteam
11,707	1,952	45,895	10,101

We gratefully acknowledge the BC Ministry of Health and the Rural Coordination Centre of BC for being the primary funders of the RTVS LHS Evaluation. We also gratefully acknowledge additional financial and in-kind support from Michael Smith Health Research BC, BC Emergency Medicine Network and UBC Department of Emergency Medicine.

1. INTRODUCTION

This report summarizes findings specified by the RTVS-LHS FY22/23 evaluation framework. The framework builds upon the domains and metrics collaboratively defined through the engagement of an evaluation technical working group, including the Ministry of Health (MoH), First Nations Health Authority (FNHA) and Rural Coordination Centre of BC (RCCbc). Findings are organized by evaluation domain, metrics and, where possible/appropriate, presented for all relevant pathways. Where feasible, the findings are disaggregated by age, sex, region and fiscal year (FY20/21, FY21/22, and, when available, FY22/23). Qualitative findings are drawn from 45 interviews with RTVS Healthcare Provider End Users (HCP End Users) and virtual providers (VPs) to support findings and illustrate the impact and experience of RTVS through stories and case examples that illustrate the domains (**Appendix 4**). This comprehensive approach allows for assessing the key objectives and facilitates continuous improvement. The goal of this program is to provide timely and efficient medical support to rural, remote, and First Nations and other Indigenous peoples in British Columbia (BC), while leveraging technology to bridge gaps in access,-enhance patient and program results, and foster cultural safety and humility throughout.

2. SERVICE DELIVERY TO RURAL, REMOTE, FIRST NATIONS AND OTHER INDIGENOUS COMMUNITIES

More than 600,000 individuals live in rural or remote communities with over 290,210 population members in British Columbia self-identifying as First Nations, Inuit, and/or Métis peoples. Rural, remote, First Nations and other Indigenous community members face unique challenges in accessing culturally appropriate healthcare services attributed to geographic reasons and systemic issues with health service delivery, including racism in healthcare. Any program in this area must be prepared to address, and measure progress on ongoing challenges such as an estimated 10-year difference in life expectancy between Canada's Indigenous population members compared with non-Indigenous members [1]. The array of RTVS services, including CHARLiE (pediatrics), MaBAL (maternity care), and RUDi (rural emergency care) pathways, effectively cater to the varied needs of rural and remote communities. Some RTVS offers targeted services, ensuring timely emergency medical assistance, focusing on maternity care by providing virtual access to midwives to bridge gaps in prenatal and postnatal services and addressing complex care needs through connections with specialized physicians and multidisciplinary teams. Overall, these tailored RTVS services aptly match the needs of rural and remote regions, using virtual platforms to deliver indispensable healthcare expertise and support.

> *"…the thing to me that stands out…is…the **culturally sensitive trauma informed compassionate care** and how much that's emphasized and…the non-judgmental support for rural communities. It just doesn't exist in any other format. I think that's one of the huge successes that really should be carried on and you know brought to…other forums…And that's what makes RTVS and RCCbc very different than what's provided now."*
>
> *RUDi Virtual Provider Interview #9*

Takla Lake at Sunset by John Pawlovich

3. IMPROVING ACCESS TO HEALTHCARE

Since April 2020, Real-Time Virtual Support services have enabled patients to receive healthcare services remotely, provided decision support for rural and remote providers, and improved access to healthcare services in areas where they are often limited. The use of virtual care offers a unique option to provide timely and appropriate care to equity-deserving communities. RTVS is a collaborative partnership of organizations, including the BC MoH, RCCbc, the Joint Standing Committee on Rural Issues, FNHA, and UBC Digital Emergency Medicine. This partnership brings together various stakeholders, including healthcare professionals, citizens/patients, health administrators, decision-makers, and technology experts to develop and implement innovative virtual care solutions.

4. EVALUATION METHODOLOGY

The RTVS-LHS evaluation uses mixed methods to assess progress on the RTVS program objectives, integrating quantitative and qualitative sources from surveys, interviews, service data, and linked administrative data. This allows us to assess the effectiveness of the program in keeping with the LHS approach: rapid analysis of data-driven, patient-centered outcomes and to meet the quintuple aim—improve patient experience, population health outcomes, reduce health systems costs, enhance staff well-being, and improve equity in the distribution of access to RTVS.

5. SCOPE

- The learning health systems outcomes continue to guide the RTVS evaluation, and new measures were incorporated into the evaluation framework FY22/23.
- The balance domain represents economic analysis that will enable the gathering of real-world evidence to inform resource allocation decisions, striking a balance between efficiency investments and meeting equity objectives for RTVS.
- Findings are limited to pathways that have been in service for at least one quarter in FY22/23 (April 1, 2022, through March 31, 2023). Where possible/available, we report on metrics derived from FY22/23 encounter data for these pathways, noting limitations related to the availability of the data.
- Findings derived from Health Data Platform BC (HDPBC)-linked data. These findings are only relevant for encounters recorded during the first two years of RTVS's implementation (FY20/21

and FY21/22) and for the HEiDi, CHARLiE, MaBAL, and RUDi pathways. Metrics derived from aggregate encounter data are in scope this year for the two FNHA pathways: First Nations Virtual Doctor of the Day and First Nations Virtual Substance Use and Psychiatry Service (FNvDoD and FNvSUPS)

Takla First Nation during Winter by John Pawlovich

6. FINDINGS

6.1. ACCESS DOMAIN

RTVS supports patients and healthcare providers in accessing care/collegial support in a timely and equitable manner.

6.1.1. RTVS pathways are available province-wide

This year, RTVS supported nine pathways serving clients (patients and their families) directly or through peer-to-peer support for healthcare providers in rural, remote, First Nations and other Indigenous communities (Figure 1). There were four peer-to-peer pathways—CHARLiE (pediatrics), MaBAL (maternity care), RUDi (rural emergency care), ROCCi (internal medicine)--and five client-facing pathways: FNvDoD (culturally safe virtual physician for clients served by the First Nations Health Authority), FNvSUPS (culturally safe care services for addictions and physiatry specialists provided by the FNHA), HEiDi (emergency physician and triage nurse call line), CATe (rapid access to antiviral prescriptions), and PPRSS (Provincial Prescription Renewal Support Services). In addition, there were several Quick Reply pathways (specialist support to providers) and the C2C (consultation to conversation) program providing three-way conversations between patients, specialist service providers, and family physicians. The RTVS pathways collectively served more than 60,000 clients this year through a network staffed by more than 260 providers representing at least 15 medical disciplines within the immediate RTVS network. This year's reporting includes pathways in operation for at least one quarter in FY22/23 (i.e., the PPRSS and ROCCi pathways were excluded) and had the required data available for reporting.

The RTVS network brings together over 260 providers from 15 different medical disciplines.

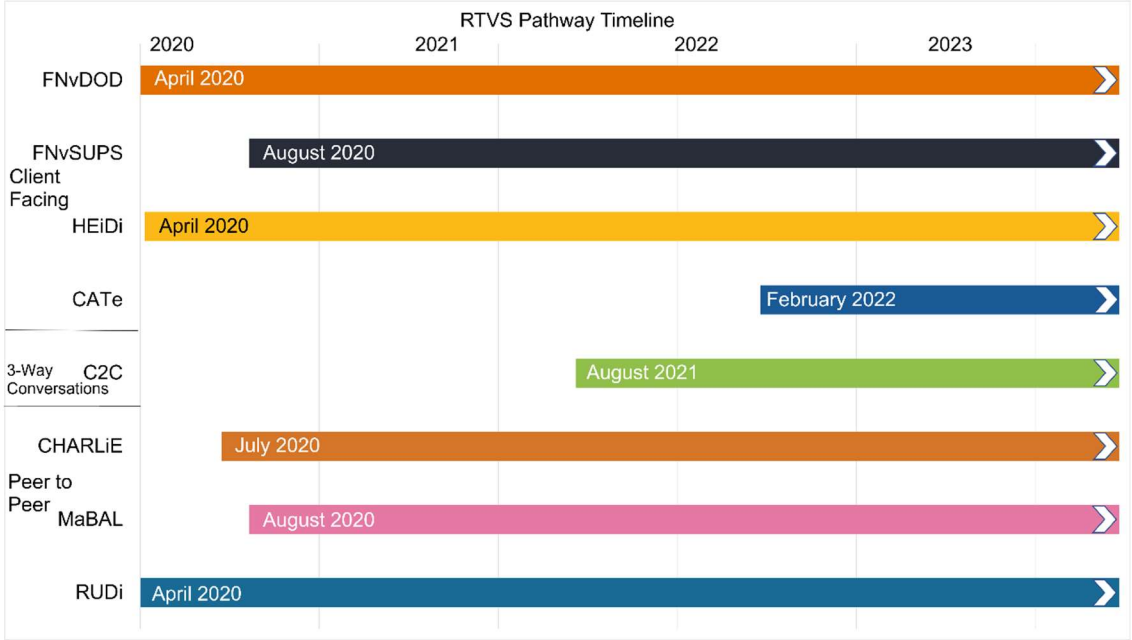


Figure 1: Pathways reporting data for FY22/23 evaluation

During the initial year of the RTVS network (FY20/21), over 30,000 unique patients used an RTVS service at least once. Despite the post-pandemic return to in-person healthcare visits, the number of RTVS clients increased in the following years. In FY21/22, 45,000 unique clients accessed one of the pathways. This included the antiviral prescription service (CATe), launched in FY21/22 to provide direct access to antiviral drugs for people who are at an elevated risk of COVID-19 complications due to their age or social factors. In FY22/23, an estimated 61,000 unique clients accessed at least one of the pathways. An estimated 5,700 distinct clients have accessed multiple RTVS pathways since the network's inception. Most users accessed the client-facing lines, and each pathway was used by all five health authorities. Overall, the mean age of most RTVS clients was lower than that of the provincial population (i.e., in 2021, 43.1 was the provincial average; 42.2 for males and 43.9 females) and clients of RTVS were more likely to be female than male (Table 1). The demographic of clients served by the RUDi peer-to-peer line was the exception with a gender-balanced distribution, and CATe and RUDi were more likely to provide urgent care to an older age demographic. CHARLiE clients were more likely to be male and had a lower age due to the nature of the pediatrics support service. Over 30percent of calls to HEiDi were for pediatric clients. Further demographic information may be found in Appendix 3.

RTVS provided virtual care for more than 61,000 clients across all five geographic health authorities in FY22/23.

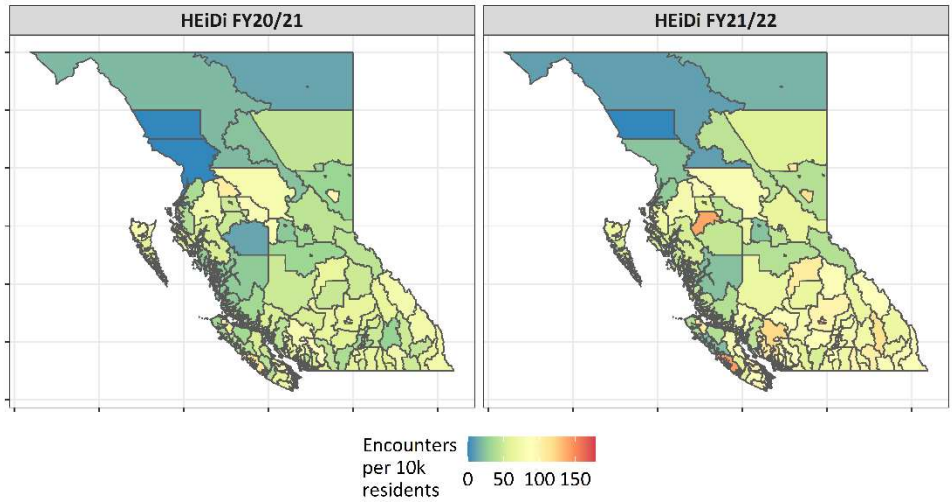
Table 1: Demographic characteristics for FY22/23

	Client-Facing*				Peer-to-Peer*		
	FNvDoD	**FNvSUPS**	**HEiDi**	**CATe**	**CHARLiE**	**MaBAL**	**RUDi**
N (clients)	4,282	545	43,353	9,763	871	296	2,677
Sex, female	2,837 (65.9%)	377 (69.2%)	26,463 (61.0%)	5,624 (57.6%)	295 (33.9%)	197 (66.6%)	1,220 (45.6%)
Missing	Masked	0	0	4 (0.04%)	227 (26.1%)	23 (7.8%)	314 (11.7%)
Age, mean (SD) years.	40 (19)	35 (12)	34.7 (26.6)	63 (17)	4.9 (5.9)	37.3 (21.8)	46.4 (22.4)
Age group, years* **							
0-14	437 (10.2%)	Masked (<11)	13,027 (30.0%)	13 (0.1%)	747 (85.8%)	42 (14.2%)	235 (8.8%)
15-64	3,415 (79.4%)	535 (98.2%)	22,479 (51.9%)	4,444 (45.6%)	59 (6.8%)	206 (69.6%)	1,715 (64.1%)
65+	450 (10.5%)	Masked (<11)	7,842 (18.1%)	5,306 (54.3%)	0	34 (11.5%)	664 (24.1%)
Missing	0	0	Masked (< 10)	0	65 (7.5%)	14 (4.7%)	83 (3.1%)
Health Authority							
Fraser	483 (11.3%)	51 (9.4%)	14,904 (34.4%)	2,695 (27.6%)	13 (1.5%)	Masked (< 10)	Masked (< 10)
Interior	1,463 (34.2%)	96 (17.6%)	7,084 (16.3%)	1,575 (16.1%)	62 (7.1%)	36 (12.2%)	323 (12.1%)
Northern	858 (20.0%)	171 (31.4%)	2,165 (5.0%)	283 (2.9%)	323 (37.1%)	120 (40.5%)	1220 (45.6%)
Vancouver Coastal	323 (7.5%)	54 (10.0%)	8,759 (20.2%)	2,202 (22.6%)	51 (5.9%)	15 (5.1%)	57 (2.1%)
Vancouver Island	1,027 (24.0%)	115 (21.1%)	9,263 (21.4%)	2806 (28.7%)	32 (3.7%)	10 (3.4%)	178 (6.7%)
Missing/Other	128 (3.0%)	58 (10.6%)	1,178 (2.7%)	202 (2.1%)	390 (44.8%)	108 (36.5%)	892 (33.3%)

*Only fully implemented (i.e., pathways in service for >3 months prior to the end of the 2022 calendar year are included due to data availability and variability in start-up characteristics.
**Counts less than 11 (FNvDoD/FNvSUPS) or 10 (all others) are censored to minimize reidentification risk.
***Client counts (percentages) by 10-year age groups are provided in Appendix 3 for HEiDi, CATe, CHARLiE, MaBAL, and RUDi.

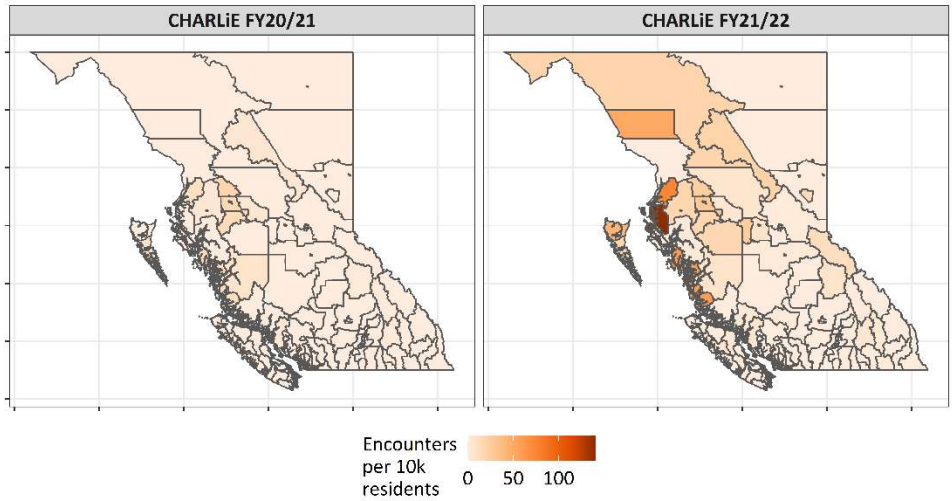
Northern Health Authority clients accounted for most calls to the peer-to-peer pathways. Between FY20/21 and FY21/22, the number of encounters per 10,000 residents increased in Northern, Central Coast and Vancouver Island-based community health service areas (CHSA) (Figure 2). The expansion of the RTVS pathways was observed from the percentage of rural and remote, urban geographies. As of FY21/22, 99 percent of all CHSAs in the province had accessed HEiDi; the service was considered fully adopted in FY20/21. Over the FY20/21-FY21/22 interval, CHARLiE, MaBAL and RUDi were steadily adopted in rural and urban CHSAs across the province. Rapid adoption rates for CHARLiE, MaBAL, and RUDi were observed in remote Northern CHSAs. In FY21/22, HEiDi expanded to reach more than 94 percent of all remote CHSAs in BC and 100 percent of all rural CHSAs; MaBAL reached 81 percent of all remote and 39 percent of all rural CHSAs, CHARLiE reached 69 percent of all remote and 44 percent rural, and RUDi reached 94 percent remote, 72 percent of all rural CHSAs in the province. CATe users were primarily from the Vancouver Coastal and Vancouver Island regions, with 2,829 (28 percent of total clients) clients accessing the service from rural, remote and First Nations and other Indigenous communities (RRFNI). 5,695 (58 percent) of all CATe users that met the criteria as being clinically extremely vulnerable and 9,151 (93 percent) were fully vaccinated.

HEiDi



Access to HEiDi expanded in Northern and Vancouver Island CHSAs.

CHARLiE



Access to CHARLiE increased in Rural Prince Rupert, Nisga'a, Northern and Central Coast CHSAs.

MaBAL

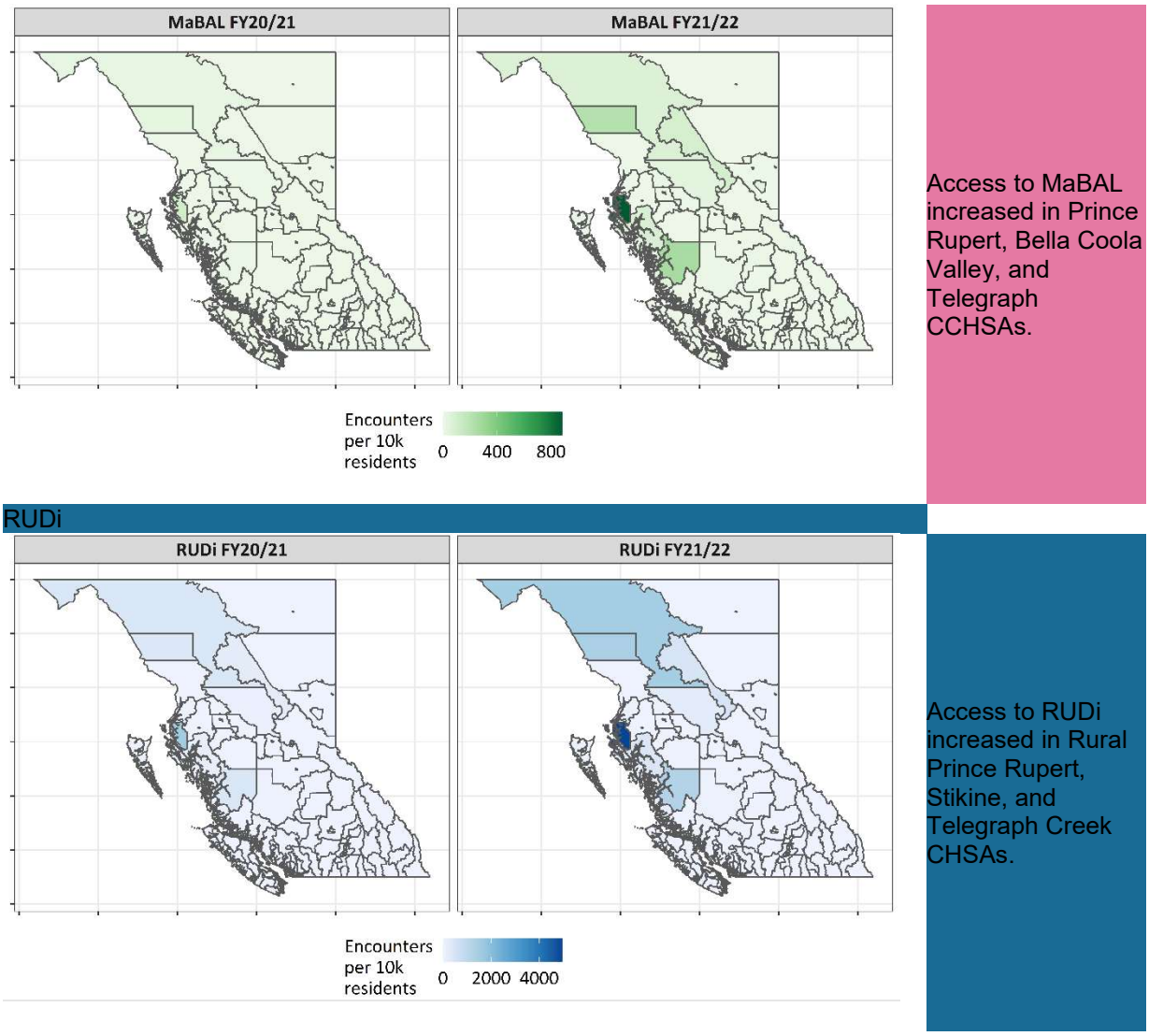


Figure 2: Encounters by RTVS pathway per 10,000 CHSA residents in FY20/21 and FY21/22

6.1.2. RTVS provides collegial support for isolated providers in RRFNI communities

RTVS addresses the challenge of isolation experienced by healthcare providers in RRFNI communities by facilitating rapid, bi-directional information sharing across multiple team members and clinical contexts. Through virtual connectivity with RTVS peers in other regions, providers in RRFNI communities can discuss cases, seek advice, and share knowledge with colleagues, ultimately improving the quality of care and reducing professional isolation. The RTVS peer pathways aim to provide instant access to HCP End Users in RRFNI communities. Most HCP End Users spoke of the quality of VPs as a strength of RTVS. VPs were described as good communicators, friendly, helpful, and non-judgmental, exemplifying the supportive “call a friend” ethos of RTVS:

> *"Yeah, definitely my confidence is improved. And my sense of personal safety at work. You know...I'm not going to be alone with some scenario that is out of my league..."*
>
> *HCP End User Interview #3*

With its collegial support and promotion of knowledge-sharing, RTVS supports the retention and recruitment of healthcare providers in RRFNI communities. Interviews with the HCP End Users of the peer-to-peer pathways suggest that RTVS has achieved its goal of providing kind, unjudgmental collegial support. When asked to discuss the benefits of RTVS in terms of their own experience, HCP End Users often described its strengths in providing clinical reassurance and collegial support where they may not usually have such support working in relative isolation:

> *"…it [RTVS] sort of embodies the culture of what medicine should be more like. Like people are very friendly, nobody makes you feel stupid, like you feel comfortable to ask all the questions you need to ask."*
>
> *HCP End User Interview #8*

We recognize that in many cases, the "edge" communities are a legacy of the larger colonial project that has created ongoing inequities in access to care and related health outcomes. While many First Nations communities are on the "edges" of care, their people and territories have been, are, and always will be the "centres" for their inextinguishable rights and title, as well as their distinct Indigenous ancestry, language, and cultural heritage. The RTVS collaborative began to rapidly implement and safely deliver virtual emergency support to these equity-deserving communities in BC – establishing a direct and impactful response to long-standing inequities by removing barriers to care and peer support. In this response, high-priority communities were identified, characterized by their geographic rurality, remoteness in terms of isolation from regular service centers, and cost of transportation and governance in health service delivery (**https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/gdx/rural-and-remote-covid-19-response-framework.pdf)**. The term "community" in this report is used to describe areas with distinct

> *"...having the opportunity to go chat with...[a] friendly colleague and somebody who has the experience and knowledge who has been there...to review a case with you and reassure you...it really builds your confidence, helps you navigate the system and ultimately provides the best possible care for the patients who are in remote areas and it can save them like a trip, which in our case would be a two hour drive on an icy road to Prince George."*
>
> *HCP End User Interview #19*

geography, population density, and service delivery features. Early in the development of the program, the RTVS Collaborative identified priority communities with a stated goal of using virtual care to improve equity of access to physician services in rural BC especially for rural First Nations and other Indigenous communities and particularly these areas. The collaborative identified 147 "edge communities" needing reliable access to physician services. In defining and evaluating the use of RTVS in these edge communities, we simultaneously recognize that the definitions of communities come from within, most accurately defined by the people, their neighbours and agreements for sharing the land and its resources.

The RTVS peer-to-peer pathways were accessed by 118 distinct communities in FY22/23 (79 accessed CHARLiE, 74 MaBAL, and 101 RUDi). The communities most frequently accessing the pathways were Port Simpson/Lax Kw'alaams, Anahim Lake/Ulkatcho First Nation, Kitkatla/Gitxaala Nation, Atlin/Taku River Tlingit First Nation, and Hartley Bay/Gitga'at. These five communities are considered “A” medically isolated communities under the provincial Rural Subsidiary Agreement. Of the 147 edge communities listed by RCCbc, the peer-to-peer pathways supported 84 (57 percent) of them – compared to 75 (51 percent) in FY21/22 – suggesting that RTVS is improving its coverage of communities at the “edge of care” in BC. The map below shows the communities accessing at least one of the peer-to-peer pathways in FY22/23 and highlights the edge communities supported. These communities are spread across many different First Nations and other Indigenous communities and territories, and this is only one method to describe these communities.

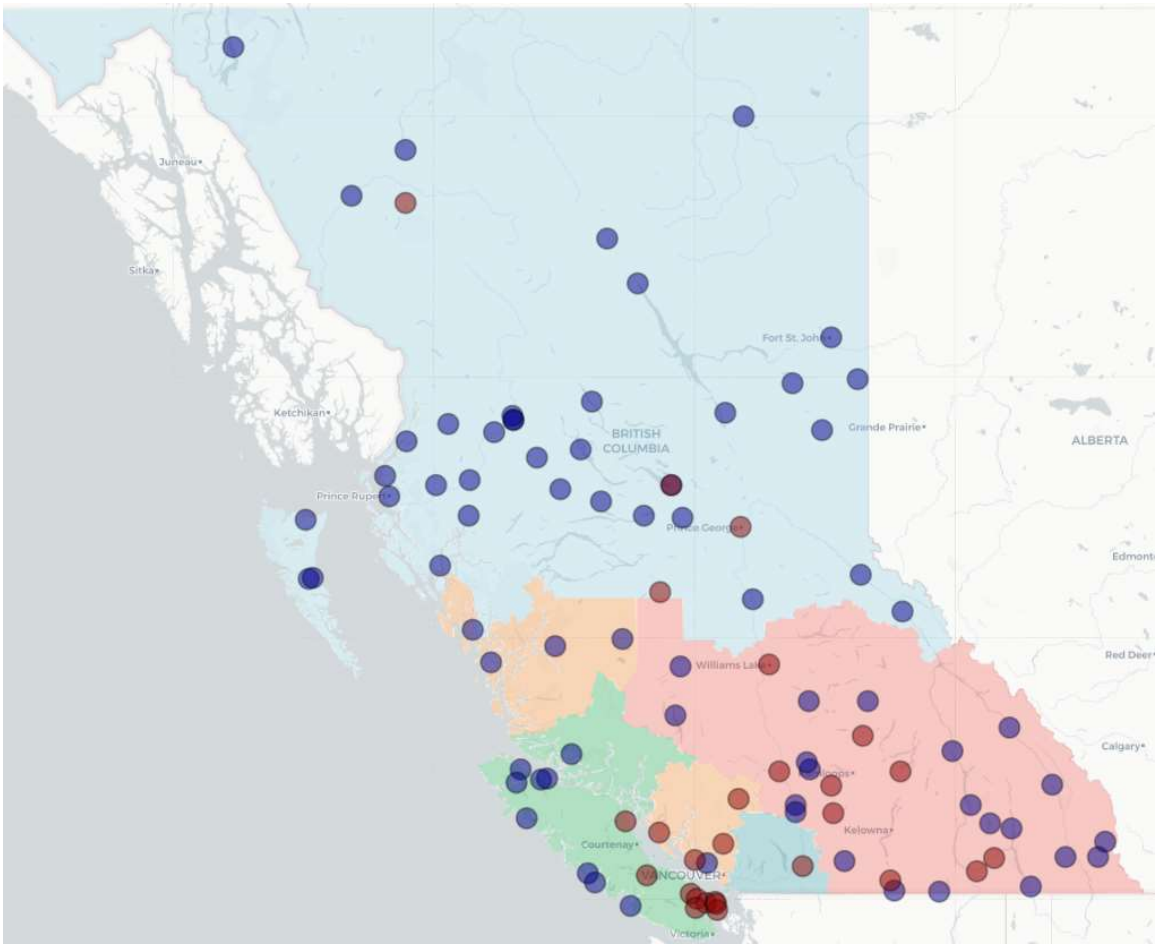
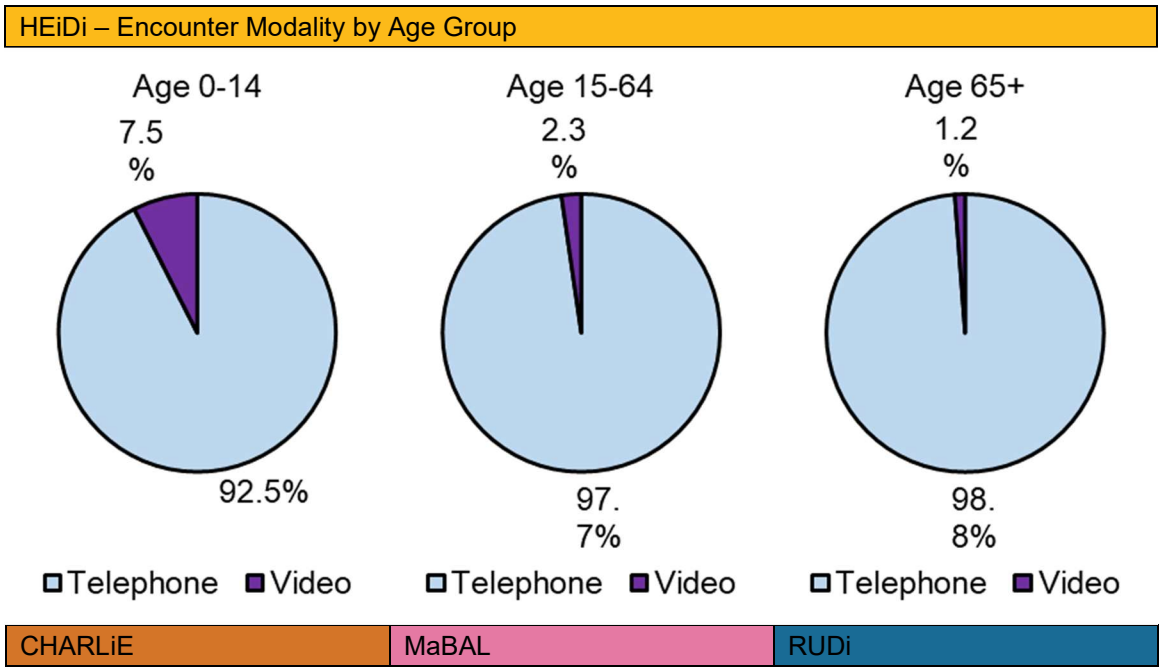


Figure 3: Map of the 118 RRFNI communities accessing at least one of the peer-to-peer pathways in FY22/23. Blue circles indicate “edge” communities; red circles indicate all other communities

6.1.3. RTVS supports multiple modes of contact

All the RTVS pathways supported either telephone or video-based encounters, with the peer-to-peer pathways also offering text communications. Flexibility was observed in the modality used and the proportions differed for support to different pathways (Figure 4). Encounters delivered by the CHARLiE pathway were provided over video 38 percent of the time. When modality findings were disaggregated by age and sex, younger patients were more likely to use video as a call modality. Among HEiDi users, pediatric populations (ages 0-14) were three times more likely to be served with video calls, suggesting that video communication is preferred or required in serving this age group. The findings imply that RTVS improves accessibility by enabling providers to connect with patients who are either limited in verbal communication or in guardianship.



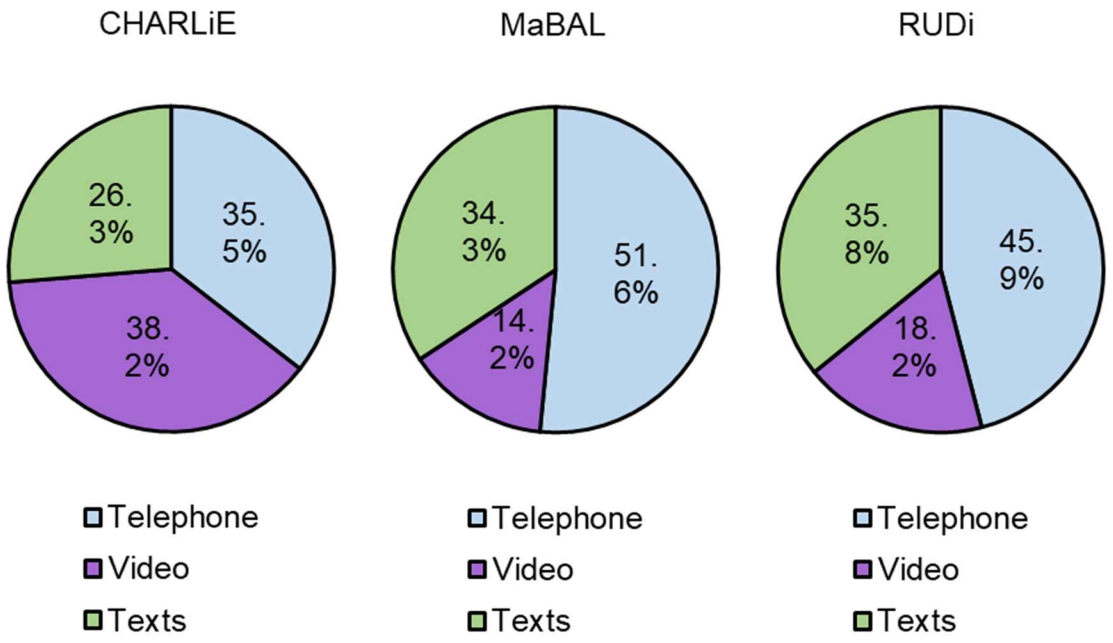


Figure 4: Encounter and call modality among HEiDi age groups and peer-to-peer pathways

When asked about the usefulness of video for assessing pediatric patients, VPs indicated that it was instrumental in observing behavior as an alternate form of communication with patients:

> *"So, having the video to be able to see what the child's doing. I don't need to be able to see little freckles on their hand. I just need to see, is this child bouncing around the room or is this child collapsed in a heap? And in that sense, the video is quite useful."*
>
> *HEiDi Virtual Provider Interview #1*
>
> *"...I would always rather speak with somebody by video, whether or not I even see the patients but connecting by video really gives a better quality of care than phone."*
>
> *CHARLiE Virtual Provider Interview #10*

Service delivery issues attributed to technological limitations were a source of frustration for providers in rural and remote areas. When asked about how technology impacted their ability to engage in virtual care, some HCP End Users in rural/remote areas expressed those technological issues continued to be a source of frustration citing technology outages and disruptions:

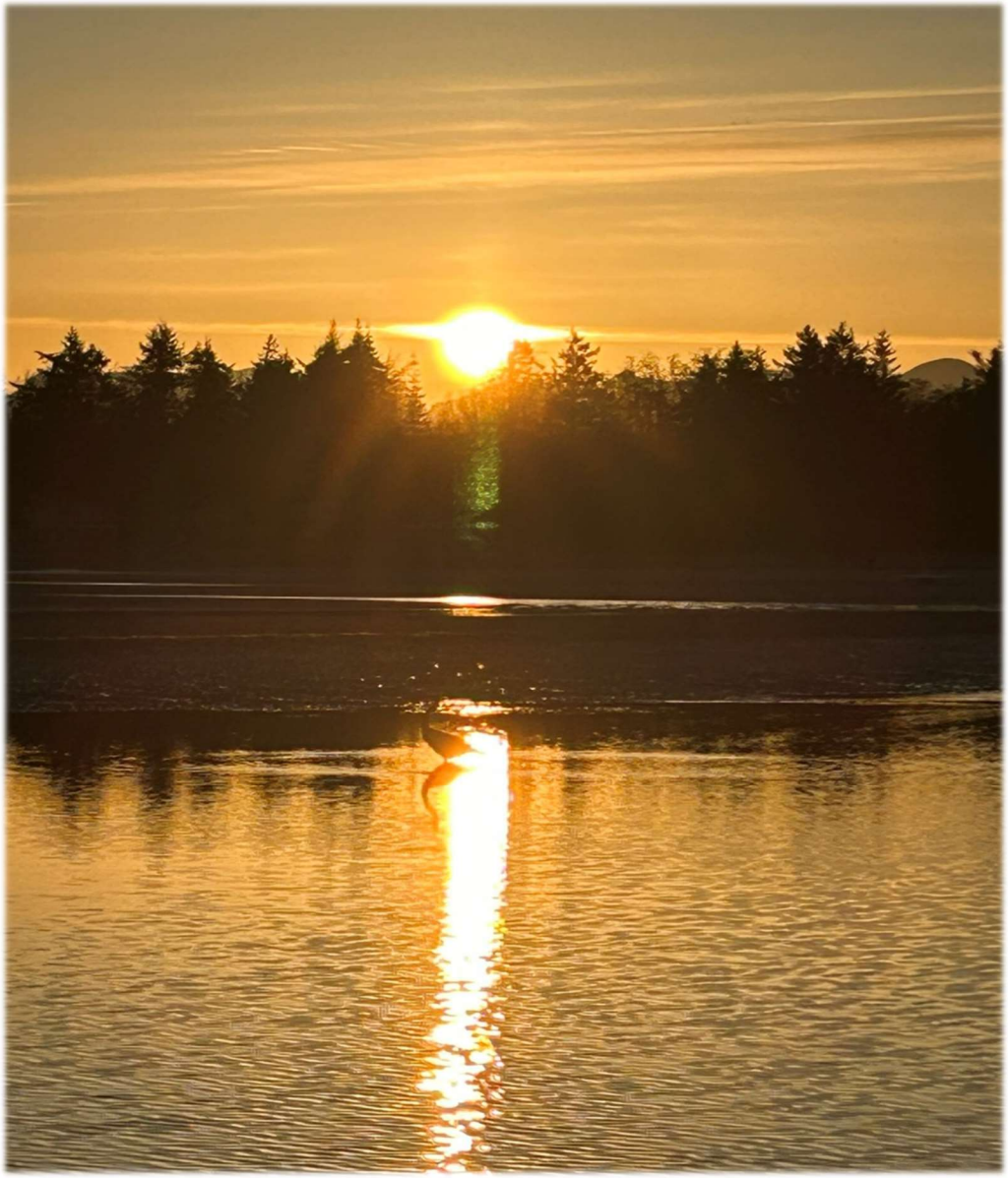
> *"I think the only pitfall or negative thing has been the technology, part of it that's been at times challenging...especially when we're running a code and it's a bit spotty and it's hard to like hear what we're telling them or vice versa in those moments is where the Zoom call just drops...that can be frustrating but I think that just applies to any technology in general."*
>
> *HCP End User Interview #9*
>
> *"...in the [more remote] nursing stations the internet is so poor that unfortunately the Telehealth Carts don't work..."*
>
> *HCP End User Interview #13*

Despite challenges HCP End Users appreciated the ease of use, especially of the zoom interface:

> *"It's so easy, even with my poor internet...it's been invaluable to me."*
>
> *HCP End User Interview #14*

Surges in demand for peer-to-peer services can create significant challenges for providers, especially when call lines are running over capacity. When call volumes exceed provider capacity, RTVS calls *spill over* to another line, meaning VPs from another pathway answer those "spillover" calls (e.g., a MaBAL VP answers a call for RUDi). Spillover calls accounted for 59/2420 (2 percent) of calls to CHARLiE; 117 of the 1671 calls to MaBAL (7 percent), and 651/15433 calls to RUDi (3 percent) in FY22/23.

> *"...as a maternity care provider on one of my first shifts...I picked up a call...so someone was stabbed...nobody else from RUDi was around but you're...put in that position to answer a call that takes you back to like your residency training."*
>
> *HCP End User Interview #14*



Sunset at Kye Bay Beach, part of the land cared for by the Sathloot (‘sath-loot), Sasitla (sa- ‘seet-la), Ieeksen (eye- ‘ick-sun), Xa’xe (‘ha-hey) and Pentlatch tribes that are now part of the K'ómoks First Nation by Sonya Cressman

6.1.4. RTVS can be quickly accessed by patients and providers

Of all callers waiting for HEiDi, 89 percent (40,756 of 45,633 total encounters) were received in under an hour; the benchmark goal for the program and the median wait time was 10 minutes (Figure 5). This result indicates that RTVS meets the objective to ensure that pathways can be quickly accessed by patients and providers. Less than one percent of all HEiDi encounters were formally cancelled after referral to a virtual provider (VP) and most calls lasted between 21-38 minutes.

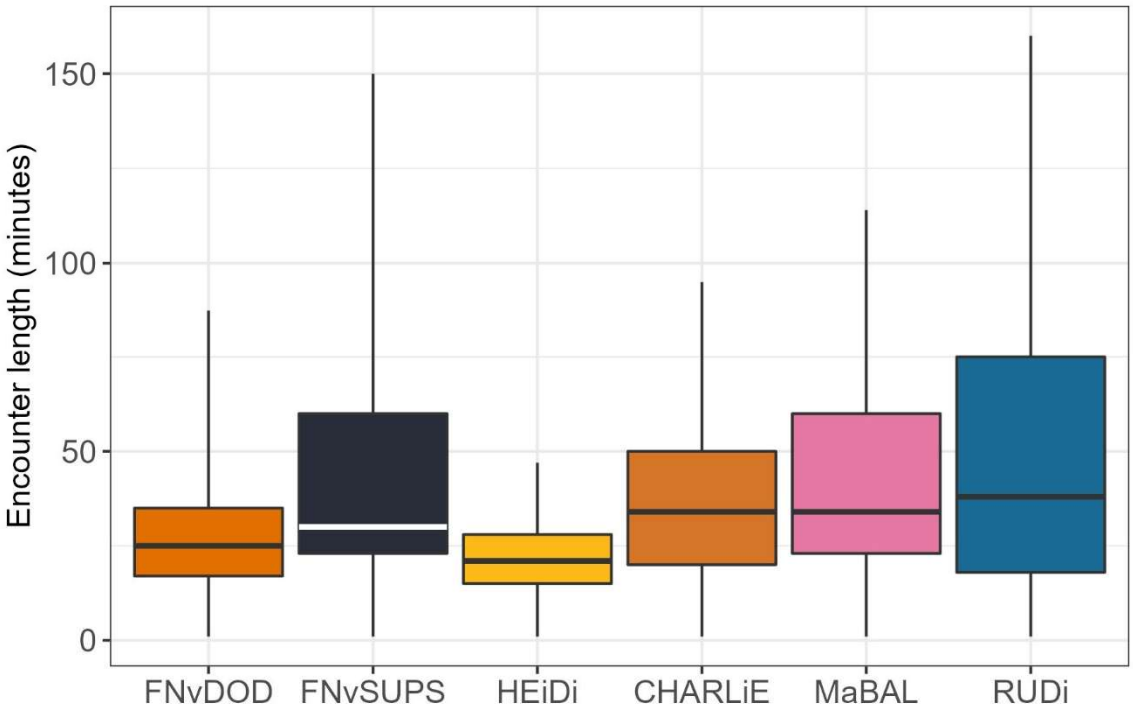


Figure 5: Median encounter length by RTVS pathway

The launch of the CATe pathway in FY21/22 leveraged the HEiDi workflow to embed pharmacist reviews and call-backs to rapidly prescribe antivirals for members of the population with increased risk of complications from COVID-19. Organizational learnings from CATe have further informed the establishment of the PPRSS pathway in 2023.

RTVS VPs discussed access to timely care for patients across the province and access to specialists, and the implications of having more time to deliver high-quality care because of RTVS:

> *"...I now feel like I have the time to just consult for a lot of things that I would never have called for before. So, it's not just...the timing issue, there's also a quality of care that has significantly improved."*
>
> *HCP End User Interview #17*

FNvDoD VPs described the role that RTVS plays in improving access to services due to bridging difficult geography and distance, and underscored the importance of enabling access through offering culturally safe care no matter where the patient is geographically situated. The timeliness of accessing physician support was also discussed frequently by HCP End Users as a revolutionary innovation to the way care is provided to remote and rural communities. Prior to the availability of RTVS, patients needing to see a specialist might have to wait for a locum to be scheduled, or travel for hours sometimes in winter or other unsafe driving conditions:

"There isn't a psychiatrist available, or sometimes…a locum will fly in occasionally…and vehicle access getting to a clinic that has a psychiatrist is going to be quite a significant barrier...It's just really satisfying to help a lot of very remote rural patients across the province that are hours and hours from any in-person facility or specialist and it's just amazing to be able to help them in real-time."

FNvSUPS Virtual Provider Interview #19

6.1.5. RTVS uses services as intended within the specific health service area

In support of the RTVS objective to use services as intended within the specific health service area, HEiDi providers served callers for gastroenterology, respiratory and musculoskeletal as the main reasons for calling the service (Figure 6).

HEiDi

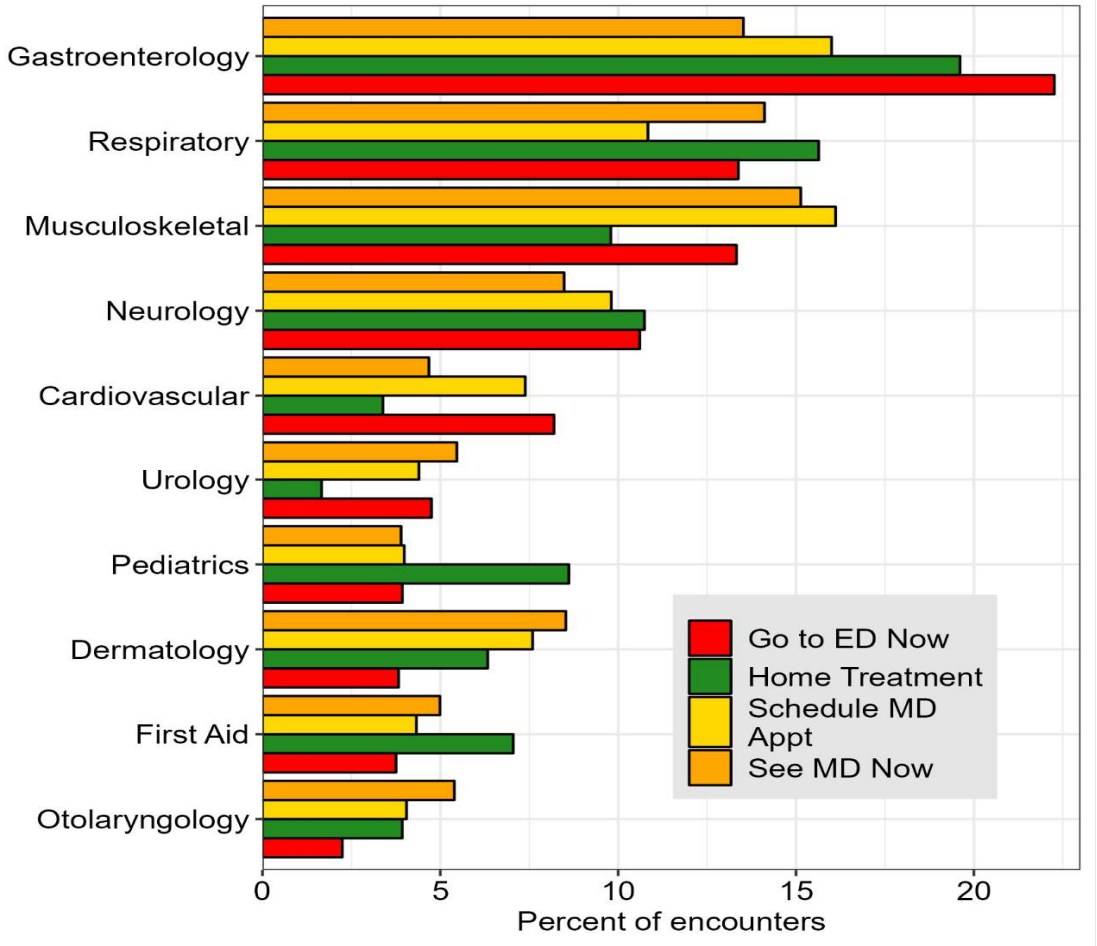


Figure 6: Percentage of client health concerns by physician disposition for HEiDi FY22/23

Chief concerns among the peer-to-peer pathways were to support patients with viral and urinary tract infections, and withdrawal from alcohol use, however, information about the patient health concerns for the peer pathways was limited by missing data (Figure 7).

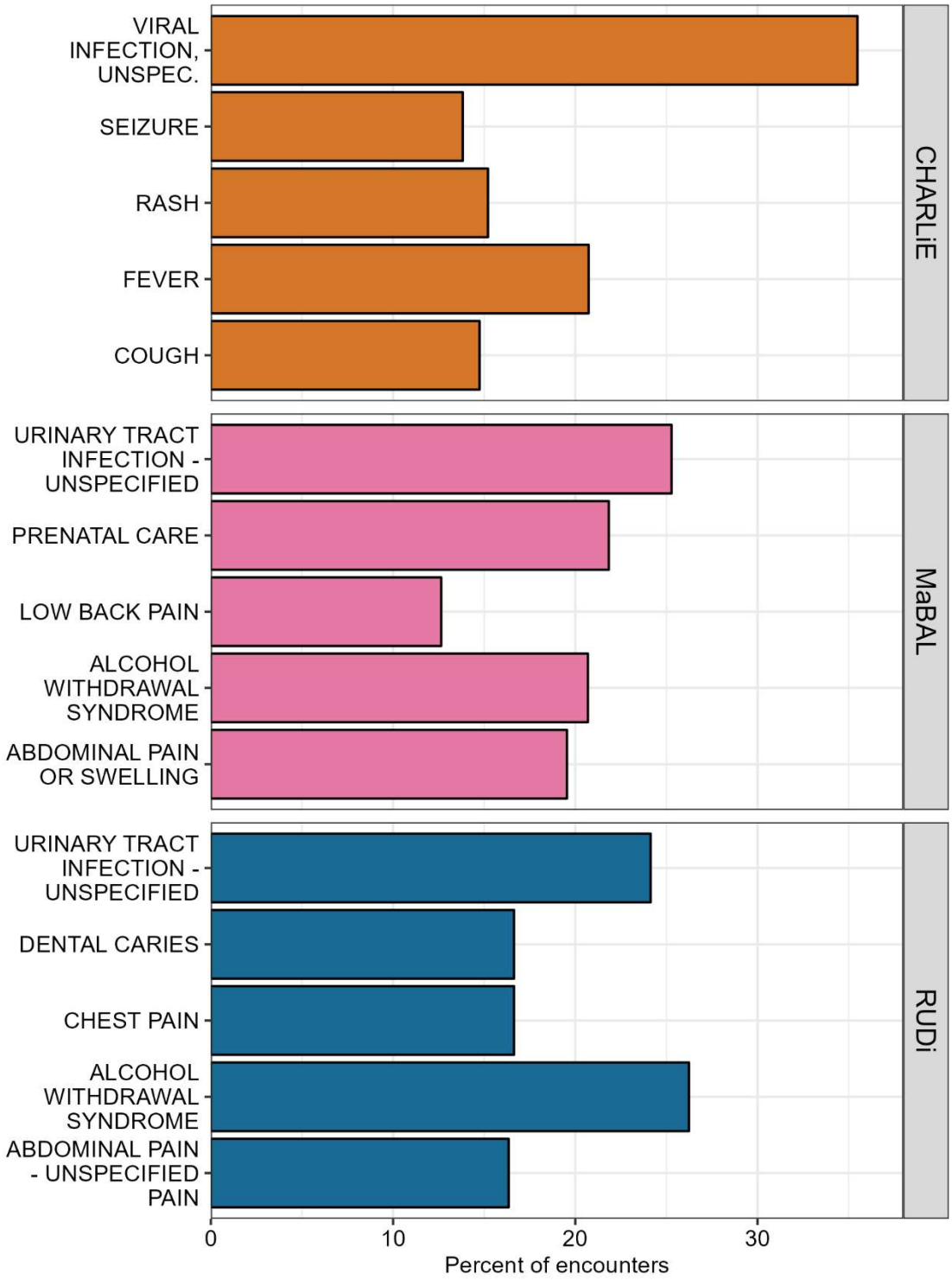


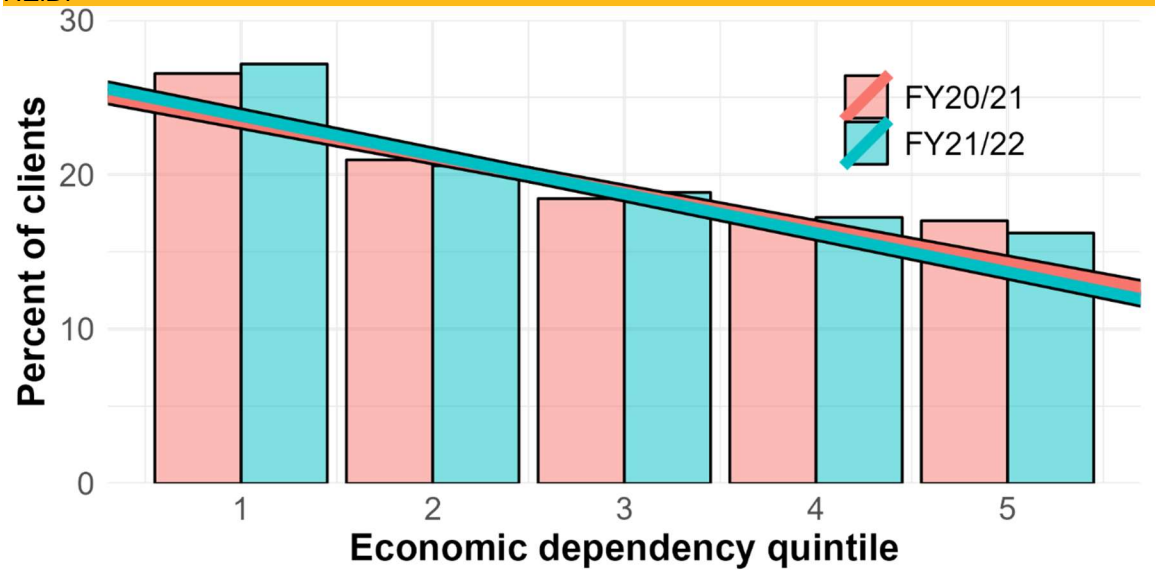
Figure 7: Chief health concerns among the CHARLiE, MaBAL, and RUDi for FY22/23

6.1.6. RTVS pathways have improved access to virtual emergency and urgent care

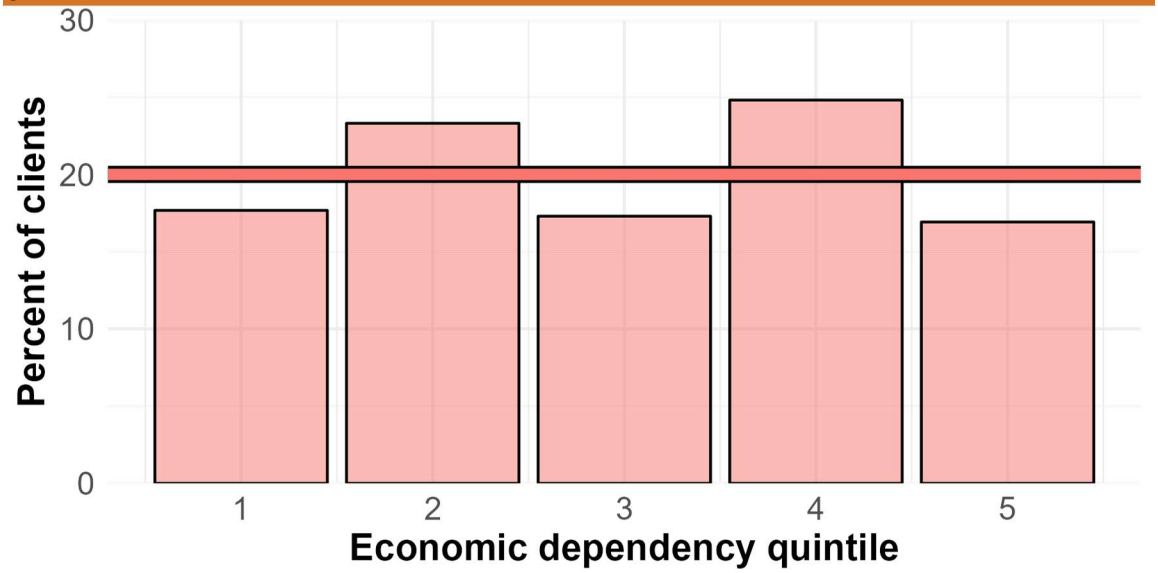
The HDPBC offers client information by economic dependency groupings – a composite measure of income, labor force participation, employment, and government transfers [2]. There was a strong representation of RTVS clients from the most disadvantaged economic dependency quintile; in fact, MaBAL and RUDi served more clients in the most disadvantaged group than the least disadvantaged group. There are, however, limitations on the interpretation of these findings related to the use of the economic dependency measure itself, which does not reflect ethnocultural knowledge, a key objective for the access domain goals of the RTVS-LHS. The economic dependency index may, however, serve as a useful indicator towards understanding the success of RTVS in meeting its equity objectives, specifically relating to improving access to virtual emergency and urgent care. There was a high rate of missing data for CHARLiE in FY21/22 and future evaluations will consider distributions of access across other deprivation indices (residential instability, situational vulnerability, and ethno-cultural composition).

Using the economic dependency quintiles and percentage of clients accessing as the outcome, we can calculate the slope of index of inequality (SII) for each pathway and fiscal year. Further, for higher volume pathways (i.e., HEiDi and RUDi), we can additionally disaggregate findings by age, sex, and health authority. Positive SII values reflect more disadvantaged clients accessing the pathway and negative values reflect more advantaged clients accessing the pathway. The figure below indicates the distribution of access to RTVS arranged by economic dependency quintiles in order of most to least advantaged. The slope of the line across the groups is used to calculate the SII values by pathway and fiscal year in Figure 8. In the disaggregated analysis, HEiDi shifted to distribution of access to the least advantaged economics dependency groups on Vancouver Island, Northern Health and for individuals above age 65.

HEiDi



CHARLiE*



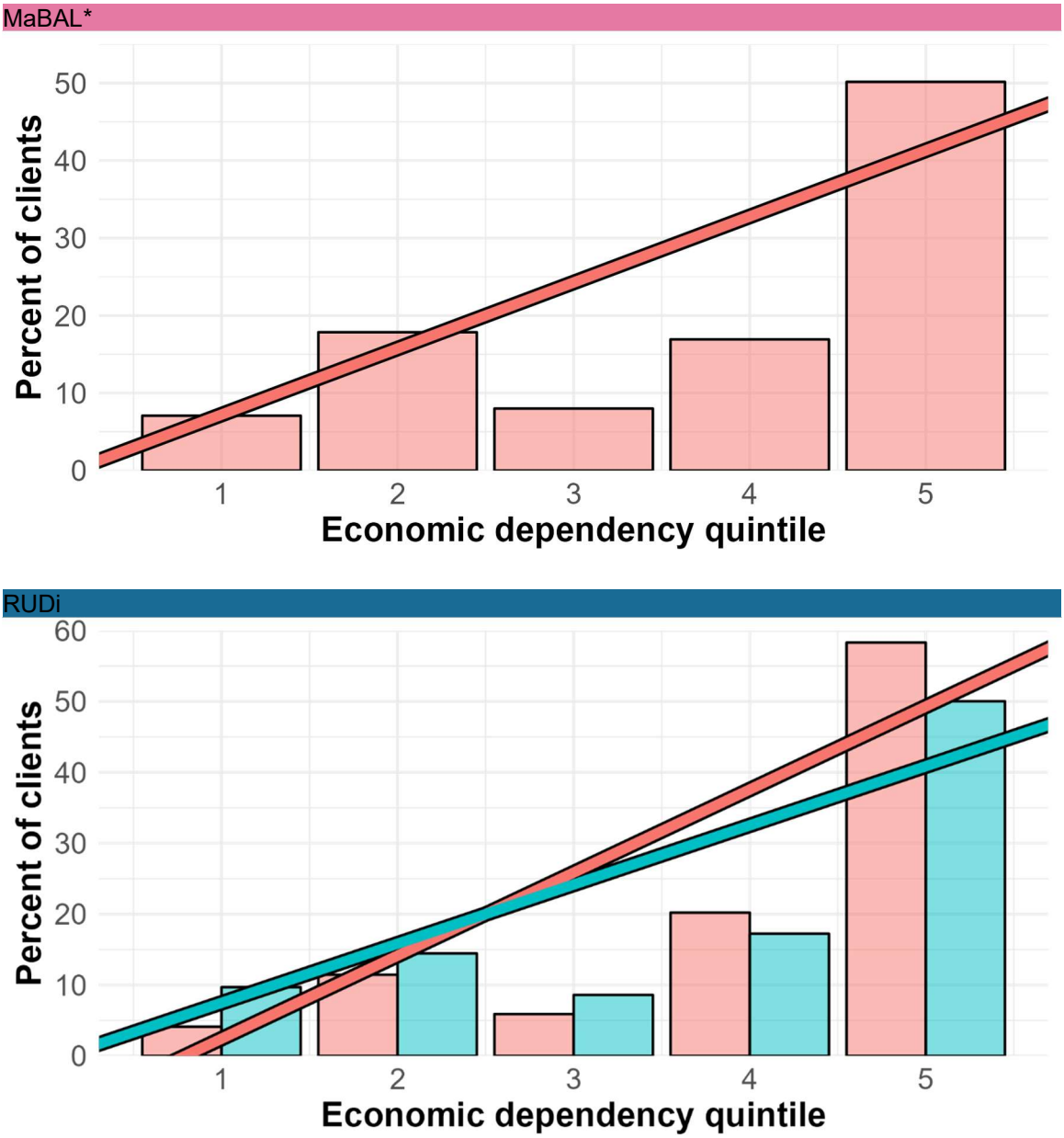


Figure 8a: Distribution of client access based on economic dependency quintiles. Note: 1 = least disadvantaged; 5 = most disadvantaged. *FY20/21 data are excluded for CHARLiE and MaBAL due to censoring low counts

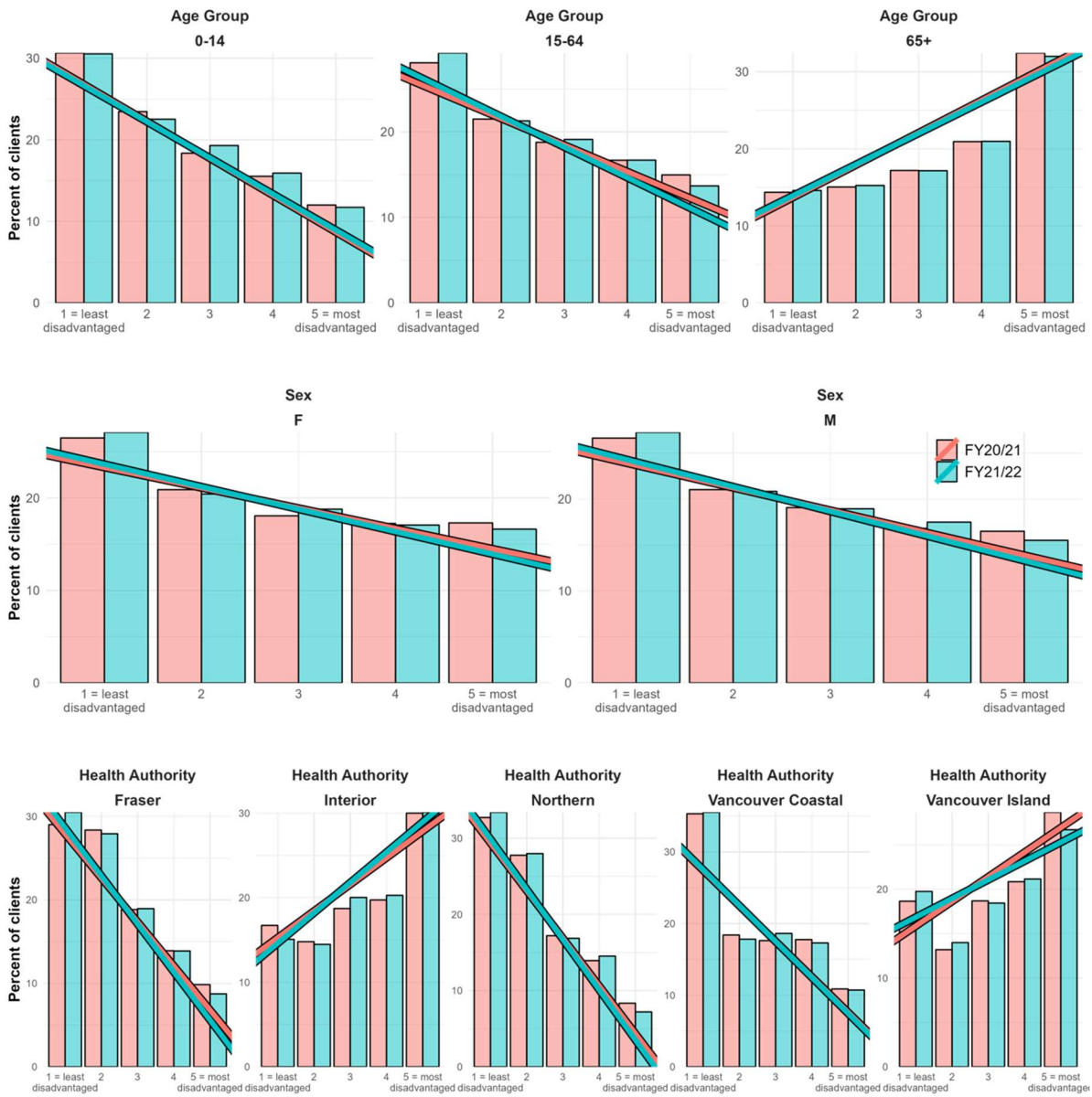


Figure 9b: Slopes of index of inequality (SII) for access to HEiDi across economic dependency quintiles for each pathway and disaggregated by age, sex, and health authority where possible

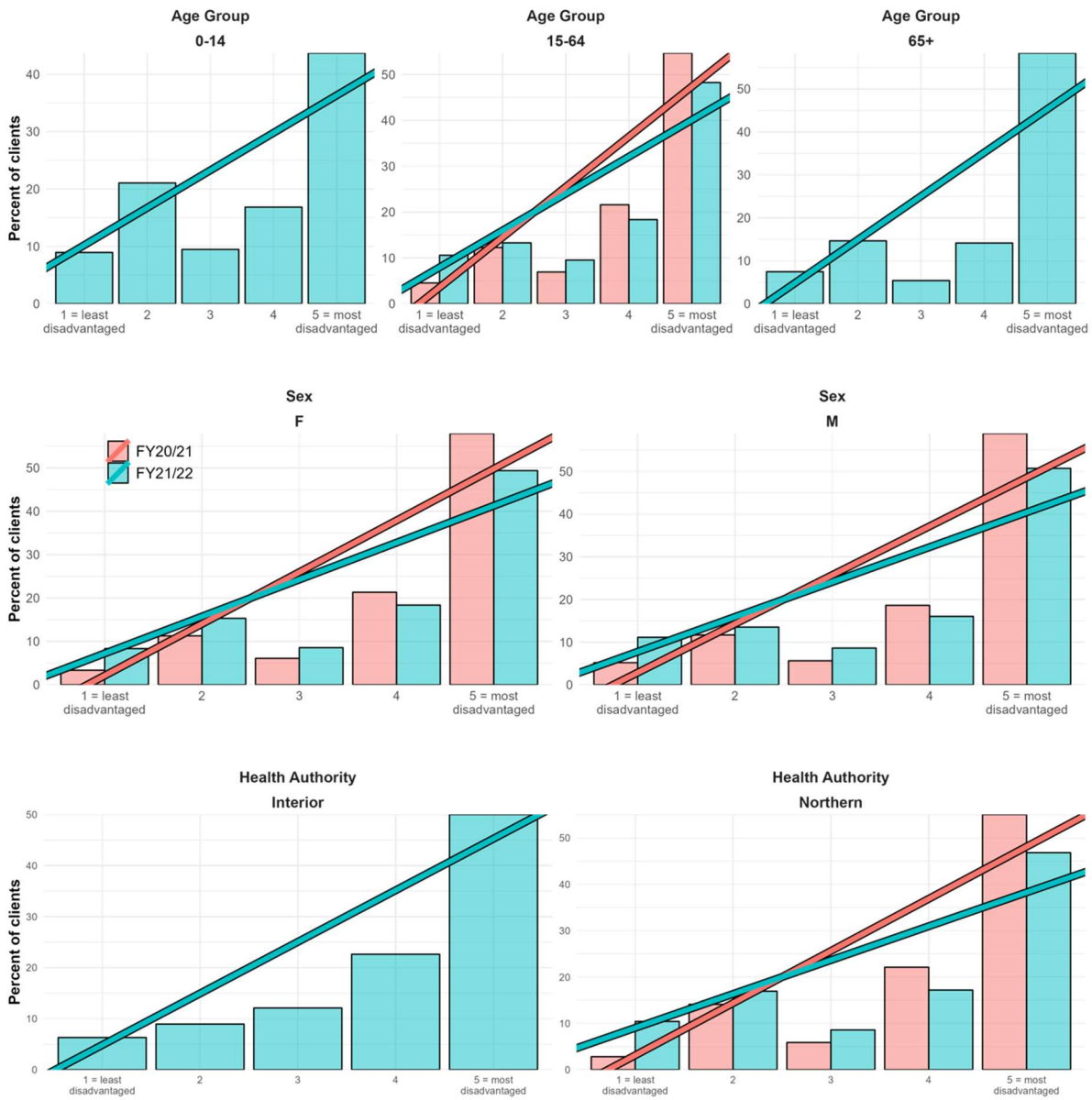


Figure 10c: Slopes of index of inequality (SII) for access to RUDi across economic dependency quintiles for each pathway and disaggregated by age, sex, and health authority where possible

6.1.7. C2C: Consultation to Conversation

TOWARDS IMPROVING ACCESS AND COORDINATION THROUGH RURAL CONNECTIONS

In FY22/23 the Consultation to Conversation (C2C) model continued with the overarching goal to enhance access and care coordination in rural areas. The model leverages virtual care coordinators (VCCs) to facilitate three-way video-enabled calls between patients, primary care providers, specialists, and/or specialized service providers (SSPs) (Figure 9). The focus this year was to integrate the service into clinical practice in rural Divisions of Family Practice. A total of 10.5 VCC full time equivalent (FTEs) were distributed across nine rural Divisions of Family Practice that

participated in the C2C program for FY22/23. One nurse practitioner described the instrumental role of the VCCs:

> *"The Virtual Care Coordinator has been instrumental to our success…Having a person to support us in this way has reduced anxiety, provided supports and has demonstrated to us where virtual care currently is as well as where it can go."*
>
> *Nurse Practitioner C2C Participant*

There were notable successes, challenges, and opportunities for improvement and learning from the C2C program this fiscal year. By the end of FY22/23, seven divisions were retained in the program. The two withdrawing divisions cited capacity constraints as the reason not to participate in FY23/24. This year, VCCs dedicated significant efforts to building relationships.

> *"The success of these engagements is due to the built relationship between the providers and their teams. We acknowledge the effort both clinics have made to integrate patients into in-person space, so they have fewer barriers to accessing care for out-of-town specialists and services."*
>
> *Virtual Care Coordinator*

This involved engaging with primary care providers, clinics, specialists, SSPs, and patients to foster primary care engagement. Additionally, they conducted workflow assessments and evaluated the adoption and knowledge of technology amongst patients and providers. Furthermore, VCCs offered personalized support to primary care providers, specialists, SSPs, and patients who expressed interest in implementing three-way video-enabled conversations when appropriate. This effort aimed to promote integration between primary care and specialists/specialized services.

Patients indicated the most interest in working towards, trialing, or taking part in a three-way call when compared to providers, specialized service providers (SSPs), and specialists (See Figure 10). VCCs also reported SSPs having a higher interest than specialists in taking part in three-way video consultations, with many similar SSPs (e.g., RNs, social workers) sharing interest across different Health Authority regions of the province.

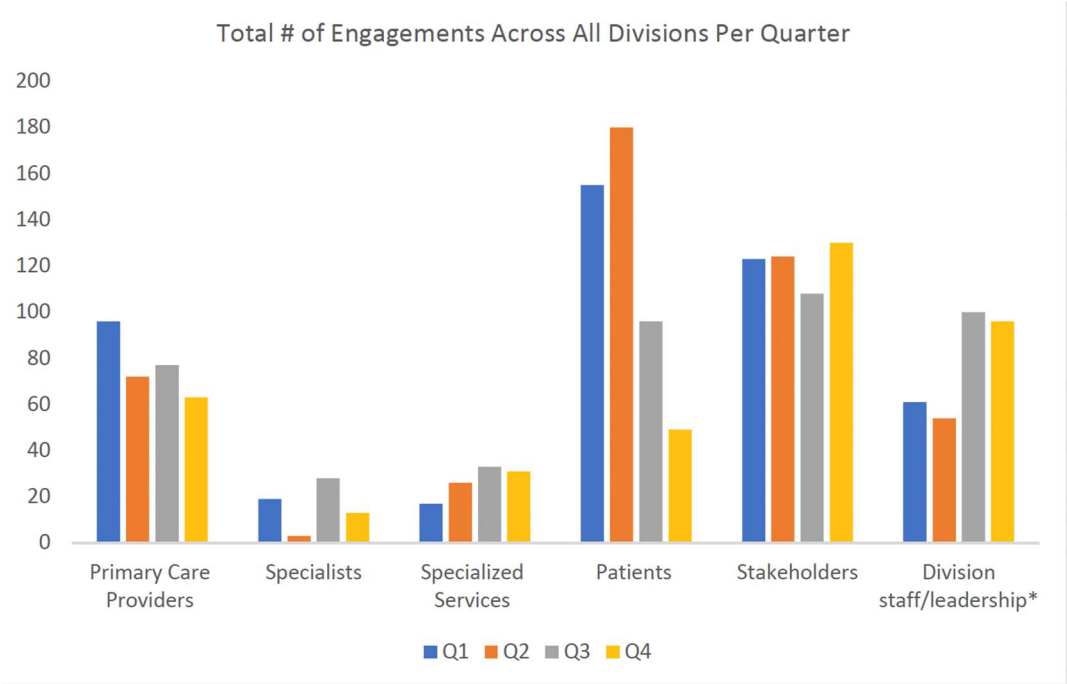


Figure 11: Engagements across all divisions per quarter

VCCs and Divisions conducted assessments involving providers, clinics/clinic staff, and/or patients, employing readiness, practice and workflow assessments or technical capability assessments. These efforts were directed at facilitating three-way audio or video calls. Following the assessments, support was given to the Divisions by the VCCs for the two-way video-enabled calls and/or three-way calls, along with one-on-one education, training, and trials with patients interested in taking part in this model. This enabled patients to independently access video-enabled calls, eliminating the need for assistance from clinics or providers. High interest was demonstrated by patients in working with VCCs to learn how to operate the virtual video call systems used by their clinics, and to take part in care-related three-way calls. They indicated a preference for video instead of audio when meeting with their providers and specialists/SSPs once they became accustomed to the virtual tools. Access to low-orbit satellite internet, like Starlink, was noted to facilitate three-way conversations with patients living in places without internet access, through portable hotspots.

> *"We have expanded our work to include low orbit satellite connectivity solutions to bring healthcare to patients living without internet access and who have difficulty with mobility, weather related travel challenges, etc. The model we've had success with is a nurse takes the LoS portable internet hotspot (StarLink) to the patient home, then connects with the physician or allied health professional via an iPad with Zoom. The nurse provides the physical assessment with the guidance of the physician virtually. Together they provide video enabled care in a more comprehensive manner than just a telephone call. Each of these appointments are three-way call appointments as patient, community nurse and virtual healthcare provider all work together to raise the level of care provided."*
>
> *Virtual Care Coordinator Lead*

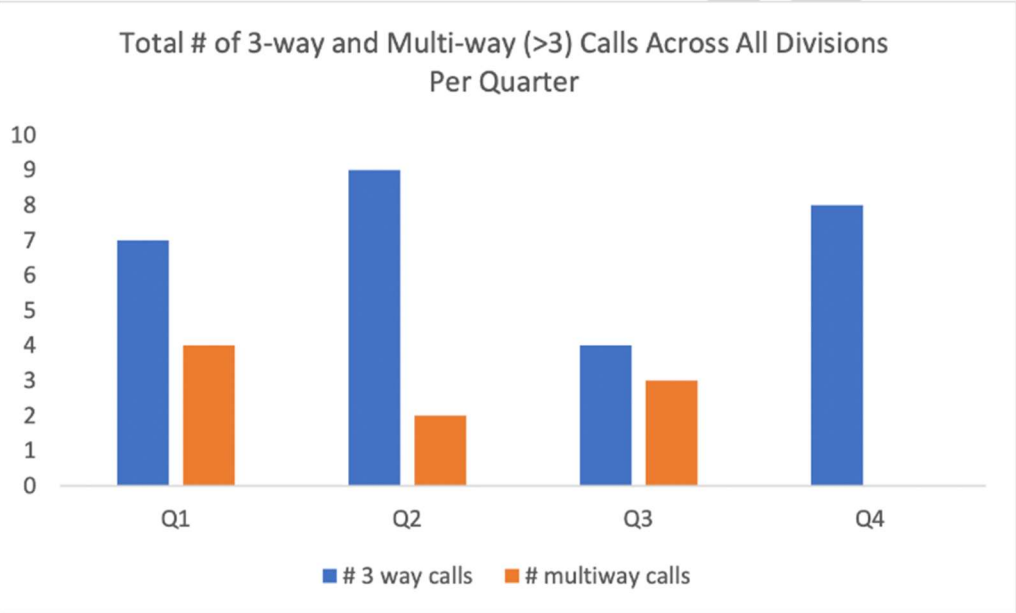


Figure 12: C2C calls per quarter

While there has been success with two-way and three-way video-enabled calls, there were also challenges. First, while VCCs made attempts to engage with specialists, they reported receiving feedback reflective of a resistance to change in the way specialists traditionally communicate (e.g., two-way audio calls). This may be due to a lack of understanding about the benefits that three-way calls can provide. In addition, many providers expressed difficulty finding adequate time to take part in, trial, or work towards the C2C model given the demands following the COVID-19 pandemic, and many operating with limited staff and colleagues within their communities. A challenge was the amount of time required to help onboard patients with video conferencing for the three-way calls. Lastly, some primary care providers (particularly, fee-for-service providers) experienced challenges with billing when using the older payment model.

Opportunities for learning and improvement were identified within the program including: 1) engaging clinical leads for the program (e.g., one specialist and one primary care provider); 2) incentives from the new longitudinal family practice payment model; 3) leveraging the C2C network; 4) identifying opportunities to more closely align/integrate the C2C program model within the RTVS family; and 5) leveraging the VCC Community of Practice CoP as a valuable resource for collaborative learning.

Key learning: Engage family medicine divisions as co-leads in FY23/24 and address the digital health literacy training needs for patients participating in the C2C program.

Forest Fire at Francois Lake by John Pawlovich

6.2. FEATHER DOMAIN

RTVS provides high-quality, accessible, closer to home culturally safe care to Indigenous clients and their family members.

6.2.1. RTVS provides access to culturally safe primary and specialty care

Culturally safe care is essential in British Columbia because it ensures that healthcare respects and acknowledges patients' unique identities and histories, fosters trust, and works towards reducing longstanding health disparities. Making sure that culturally safe care is accessible is crucial as it improves healthcare quality, strengthens relationships between patients and providers, promotes fair health outcomes, and creates an inclusive healthcare environment that benefits everyone. Given this imperative, efforts are being made by RTVS to enhance healthcare practices. Two client-facing RTVS pathways provide team-based culturally safe virtual care. First Nations Virtual Doctor of the Day (FNvDoD) provides family physician, nurse and allied health professional services to First Nations and other Indigenous clients and their family members who have limited or no access to a doctor. Some of the physicians staffing the service have Indigenous ancestry and all have comprehensive training in cultural safety and humility. The FNHA also provides culturally safe care for the psychiatry and substance use needs of First Nations and other Indigenous clients and their families through the First Nations virtual Substance Use and Psychiatry Service (FNvSUPS). The historic and ongoing impact of colonial policies, including the Indian Act, residential schools, the 60's and Millennial Scoop, and cultural suppression have deeply impacted the health and wellness practices of First Nations and other Indigenous peoples across Canada. The systemic discrimination of Indigenous people within the Canadian and BC health care system has impacted patient safety within the health care environment, leading to higher burden of chronic disease, mental illness and substance use and poorer health outcomes. Indigenous people who use drugs in British Columbia are 12.9 times more likely to die than all other Canadians [3]. Services designed specifically to meet the needs of this population are urgently needed. Both programs launched in FY20/21, serving more than 2,500 clients in the first year of service and approximately 5,000 unique clients in FY22/23. All First Nations and other Indigenous people living in BC are eligible for FNvDoD and FNvSUPS as are their family members, even if family members are not Indigenous. The First Nations pathways differ from the other RTVS pathways in the goals of service provision, care coordination and principles of delivery. These pathways meet the needs of First Nations and other Indigenous communities by incorporating traditional healing practices, cultural protocols, and community-based resources into

the care delivery process. The holistic well-being, through physical, mental, emotional, and spiritual interconnectedness is honored throughout the care delivery model used in the FNHA pathways. Cultural safety and humility are at the heart of care delivery, coordinating clients in their journey to obtain knowledge and the desired follow-up care. The FNHA-led pathways follow a care delivery model that is trauma-informed when needed and inclusive of a network of Elders and Indigenous wellness coordinators.

In FY22/23, the FNHA-led pathways provided the highest encounter-to-client ratio among all the RTVS pathways. Clients of the FNvDoD pathway had an average of 2.7 service contacts in FY22/23, the FNvSUPS mean use per client was 3.5 (Figure 11). One or two follow-up appointments after an initial appointment indicate that the services may have a role in bridging the gap to culturally safe care in the communities where FNHA clients live. Further, FNvSUPS also provides longitudinal care for clients unable to access resources in their communities.

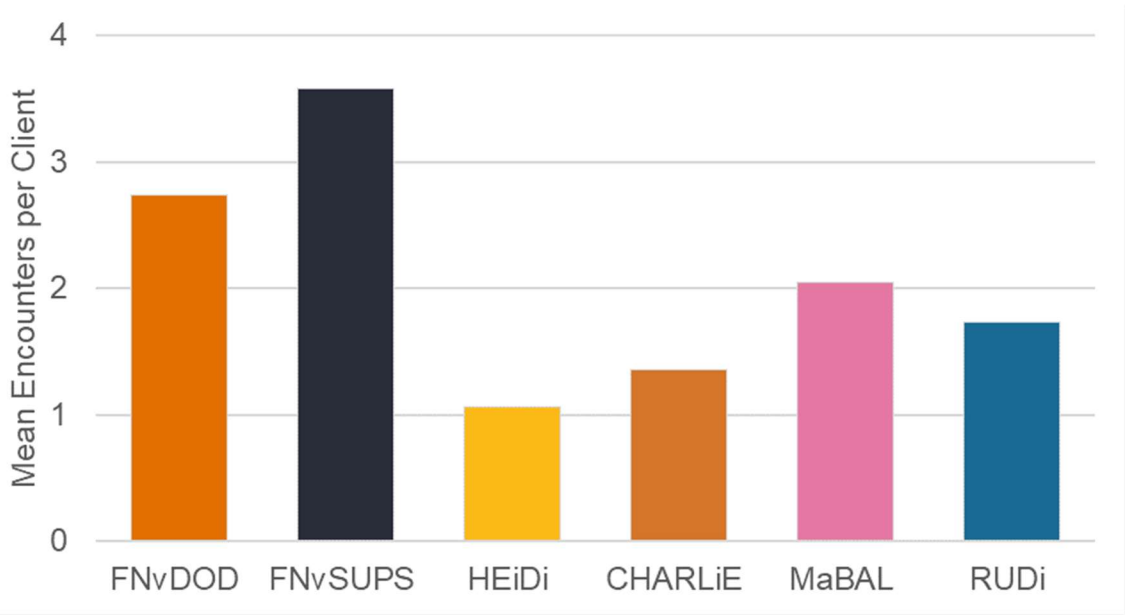


Figure 13: Mean encounters per client by RTVS pathway for FY22/23

The quality of care provided by FNvDoD was a motivating factor for the virtual physicians staffing the service, noting the value of providing options for virtual care that respect the client's dignity, is viewed as being paramount to the RTVS goal of providing culturally safe care:

> *"You [a patient] might have someone [a healthcare provider] you could go see but if you feel like your dignity is harmed, if you feel psychologically unsafe…then we're actually providing meaningful access even if there is physical access… We're building bridges, we're filling gaps and we're also being advocates.*
>
> *FNvDoD Virtual Provider Interview #18*

Key learning: Qualitative interviews with Indigenous providers and surveys with clients may help understand and learn from the context of care delivery, principals of practice and nature of the care relationships.

In FY22/23, the FNHA-led pathways provided nearly 15,000 virtual consults to First Nations Health Authority clients and their families (Table 2). Total physician encounters provided by FNvDoD was lower in FY22/23 compared to the previous year by 10 percent, while the number of encounters provided by FNvSUPS increased by 6 percent over the same interval. It is important to recognize that providers of the FNvDoD service relies on family physicians (some have Indigenous ancestry) and service providers note that the ability to staff the pathway has been impacted by the combined effect of family doctor shortages in BC [4] and underrepresentation and training of physicians who are Indigenous in the health services work force [5].

Table 2: Three-year encounter rates for the FNvDoD and FNvSUPS pathways

Pathway	Physician Encounters		
	FY20/21*	FY21/22	FY22/23
FNvDoD	5,456	13,042	11,707
FNvSUPS	715	1,817	1,952

*Reporting for FY20/21 is for a partial year of the initial service launched in August 2020.

Key learning: Interviews with FNHA pathway providers to gain an understanding about how healthcare provider capacity may be increased for these lines.

Of all clients served by FNvDoD in FY22/23, 86 percent had First Nations status and the remaining were either First Nations in the process of registration, family members of First Nations clients or status information was unknown. The proportion of Status First Nations clients was slightly lower for the FNvSUPS pathway (79 percent, Figure 12). However, there were slightly more where the status number was not provided. Data reporting for clients in both pathways was comprehensive with fewer than 5 percent of all data fields requested in the aggregated data being returned as missing or unknown.

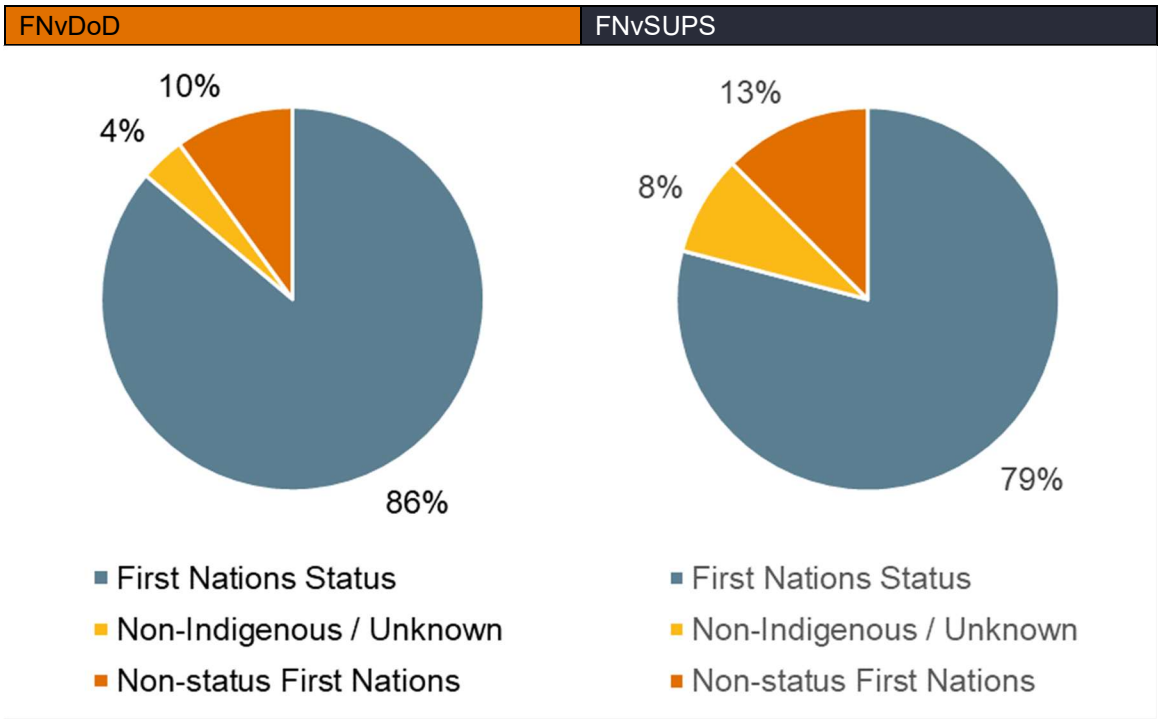


Figure 14: Access to the FNvDoD and FNvSUPS pathways by First Nations status

6.2.2. RTVS VPs provide culturally safe care and practices cultural safety and humility concepts through faculty development

First Nations and other Indigenous people in BC are exposed to multiple forms of racism, ongoing discrimination and bias when accessing health services [6]. Culturally safe care is important to create a safe environment of respect without racism and bias when accessing health services. Providing cultural safety and cultural humility training for all RTVS providers is a stated program objective and tangible response to the need to provide clients with access to culturally safe care. This year, through the RTVS Fire Department, 202 hours of cultural safety and humility training have been provided to the peer-to-peer and quick-reply providers. A multifaceted approach to cultural safety and humility training was adopted, integrating diverse training delivery methods, and involving VPs and peer-to-peer physician pathway leads to enhance the knowledge, awareness, and practice cultural safety, aligned with the Truth and Reconciliation Commission's Call to Action #23. Indigenous leadership spearheaded the training and facilitation efforts (Figure 13). Limited reporting across all pathways, missing information in the onboarding and cultural safety requirements for RTVS faculty onboarding presents a challenge for the RTVS-LHS to measure, report on and overcome.

Key learning: Share information about cultural safety and humility training practices and metrics across all pathways.

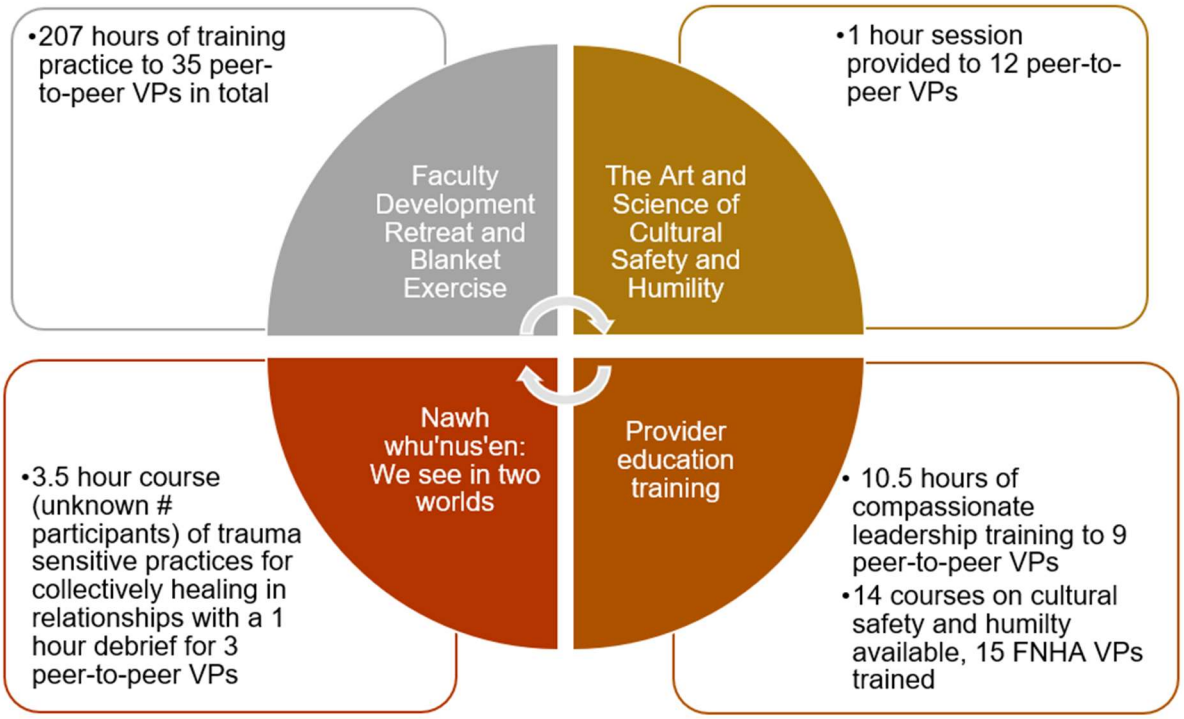
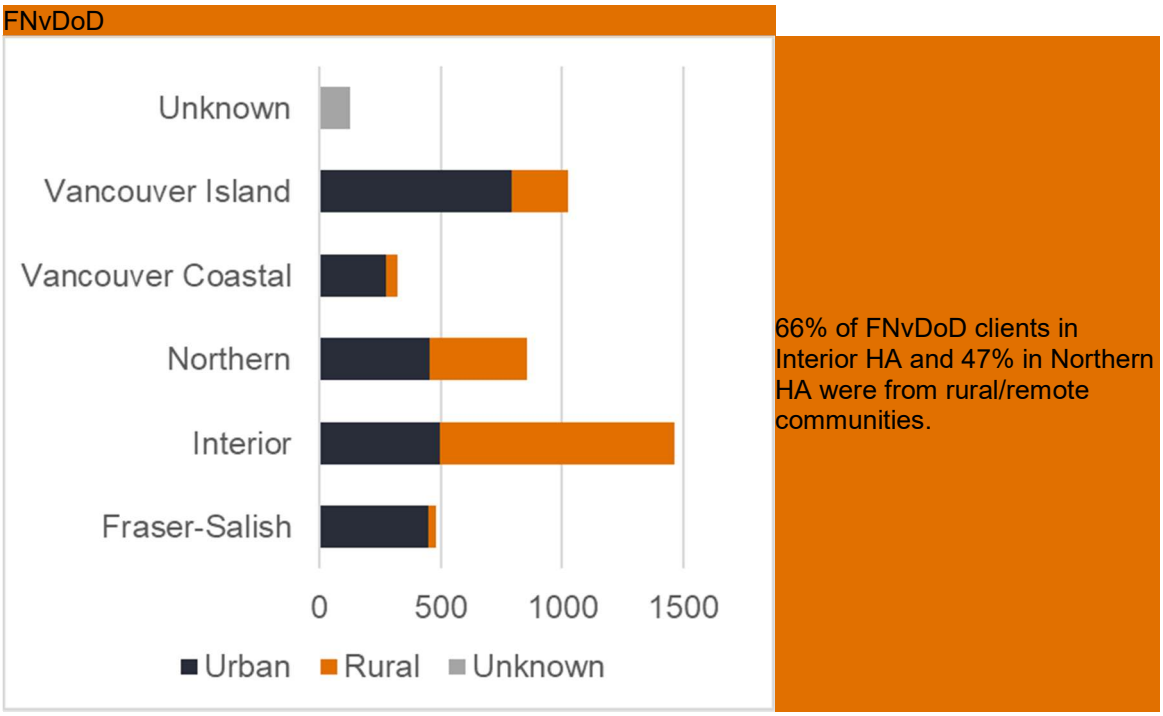


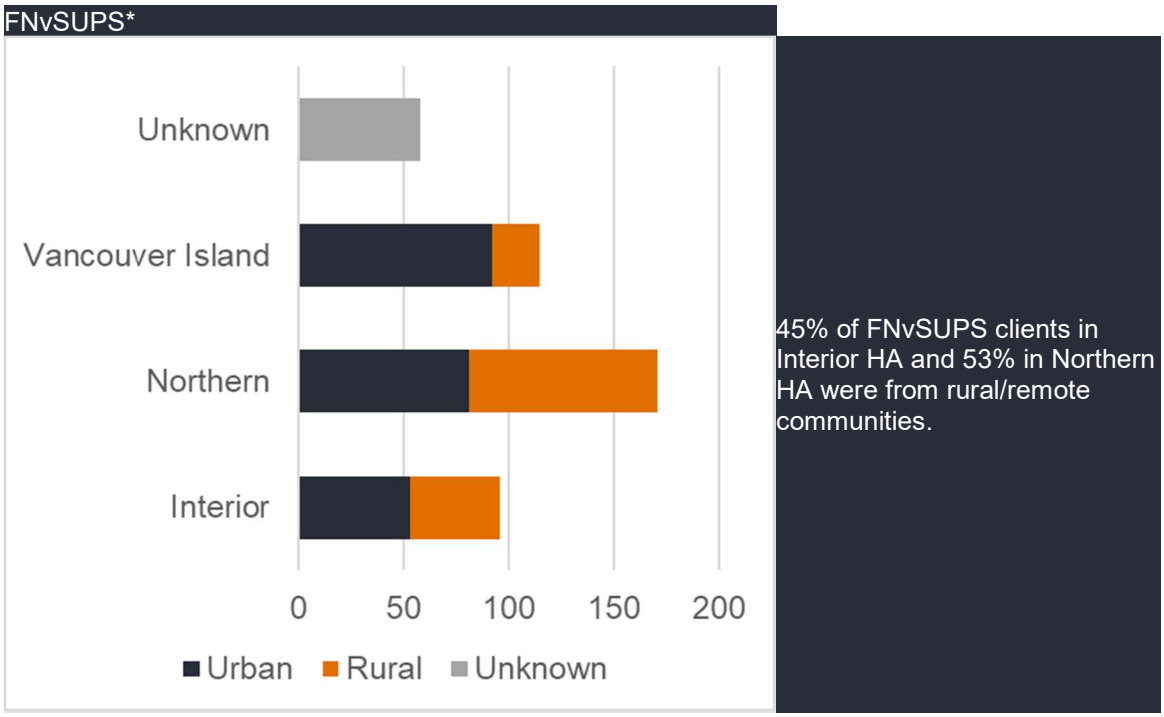
Figure 15: Cultural safety and humility sessions offered within the RTVS network of peer-to-peer and quick reply virtual providers in FY22/23

6.2.3. RTVS supports rural/remote First Nations and other Indigenous clients that may not have regular in-community health services

The three peer-to-peer RTVS pathways reported that more than 35 percent of the communities served are First Nations and other Indigenous communities (35.4 percent for CHARLiE, 41.9 percent for MaBAL, and 41.6 percent for RUDi). Overall, FNvDoD and FNvSUPS were effective in reaching clients in both urban and rural communities (Figure 14). **FNvDOD supported more rural clients in Interior and FNvSUPS supports slightly more rural clients in Northern, which are the health regions most frequently accessing the two pathways**. While the RTVS objective to reach rural and remote communities with these services has been met, it is noteworthy that there has also been success observed in uptake by First Nations clients in urban settings, where access to culturally safe care may be an additional challenge. One provider in an interview suggested that this finding may be due to the ability to access specialist services:

> *"We work a lot with rural Indigenous communities, but also a lot of urban communities where there's still lack of access to specialists."*
>
> *Virtual Provider Interview #14*





*Data for FNvSUPS Vancouver Coastal and Fraser-Salish regions are masked due to low counts.

Figure 16: Number of FNvDoD and FNvSUPS encounters by health region and rurality

The role of RTVS in meeting the objective of reaching RRFNI clients with these services in rural areas was demonstrated by strong representation or rural clients across both FN pathways. In interviews, FNvDOD virtual providers discussed access to timely care. Providers described the role of RTVS in improving access due to bridging difficult geography and distance.

> *"Historically we know that Indigenous sites have had very, very, very poor support and so this [RTVS] is just something we can do to give back to these communities to make sure that their standard of healthcare is where it should be at this point with the resources that they have."*
>
> *MaBAL Virtual Provider Interview #7*

6.2.4. Cultural safety competencies built into job descriptions, recruitment

Virtual provider involvement in the cultural safety and humility sessions was practiced by the RTVS training activities led by RCCbc. In the FNHA's Provider Education Initiative, providers were offered upskilling in both cultural safety and humility, and addictions care and safe prescribing. Of the 39 course completions by 21 providers, 14 courses fell under the umbrella of cultural safety and humility and the FNHA-led pathways hosted an Indigenous-led webinar style education event. Cultural safety components are embedded within provider meetings, and Elder Teachings are offered at provider meetings for the FNHA-led pathways. Planning has begun for the development of an ongoing curriculum for the FNHA-led pathways. This year's evaluation framework did not include a review of job descriptions and recruitment materials and not all pathways had information on cultural safety competencies available.

6.2.5. Recruitment and retention of Indigenous employees

The involvement of First Nations and other Indigenous peoples in the cultural safety and humility sessions was practiced by the RTVS training activities, indicating progress towards the RTVS LHS objective of improving recruitment and retention. RTVS pathways, however, fell short in their ability to report on the numbers for recruitment and retention of VPs with Indigenous ancestry. The current methods of recruiting VPs do not routinely collect data on the ancestry of providers; however, all RTVS partners and pathway leads have expressed that they recognize the importance of doing so. Concrete metrics to evaluate and measure improvements of representation in the healthcare workforce are however required for embodiment of this program objective. The RTVS network presents a unique opportunity to respond to the Truth and Reconciliation Call to Action #23, aimed at increasing the number of First Nations and other Indigenous professionals working in healthcare by reporting on metrics throughout the recruitment and retention process.

Key learning: Standardize the RTVS LHS evaluation reporting in 23/24 to ensure that the evaluation framework metrics support this program objective; implement an RTVS-wide method to collect routine data on providers in 23/24.

Salmon harvest at Takla Lake by John Pawlovich

6.3. FUNNEL DOMAIN

RTVS provides patients multiple points of entry to the health system and connects patients to longitudinal, patient-centered, primary care.

6.3.1. RTVS connects patients to further health services for follow-up care

In response to the pandemic lockdowns in March 2020, HEiDi and RUDi creatively disrupted the way urgent care is managed in BC. The services were initially launched as a rapid response to the urgent need to provide urgent care while safely diverting clients with low-acuity concerns away from travelling to emergency departments for in-person triage or being transported to tertiary centers when medical support staff at home could be involved. In 2022, a study conducted by RTVS-HEiDi authors showed that HEiDi could effectively redirect more than 60 percent of all 8-1-1 callers with low acuity concerns towards community or home-based care [7]. A recent article from our group investigated the concordance outcomes following a HEiDi call. Concordance was measured as visits registered to an emergency department (ED) or Medical Services Plan (MSP) provider following the recommendation made (disposition) at the end of the initiating virtual care consult. The study looked at trends for clients who receive a disposition to seek community or home-based care. The key findings were that concordance with the recommended treatment varied by age, sex, and region [8]. As part of the RTVS evaluation and reporting for HEiDi, the annual trends in concordance were observed over the FY20/21 and FY21/22 HDPBC reporting years.

Of the 4,751 who ended their HEiDi call with an urgent "go to ED now" disposition, 72.9 percent had a recorded ED visit within 24 hours in FY20/21 and a similar proportion were concordant in FY21/22 (72.1 percent) (Table 3). Over the FY20/21 to FY21/22 interval, there was an increase in the number of clients who were concordant with the orange category disposition to see an MD in 24 hours. The difference was more pronounced with concordance trends for clients who were recommended community-based care with a family physician (yellow and green disposition categories): Clients in FY21/22 were more likely to seek the recommended community follow-up within a week and clients who were disposed with the green category of simply staying at home and providing treatment there were less likely to do so in FY21/22.

Table 3: Number of HEiDi clients that follow the treatment recommended by the virtual physician

	Total	Disposition Category			
		Go to ED within 24 hours	See MD within 24 hours	Schedule an MD appointment within one week	Receive treatment at home
Number (%) of concordant clients in FY20/21	15628 (55.6%)	3465 (72.9%)	1485 (60.8%)	6095 (54.1%)	4583 (47.0%)
Number (%) of concordant clients in FY21/22	19422 (45.9%)	5186 (72.1%)	2744 (71.1%)	10631 (68.4%)	861 (5.5%)

These findings suggest that the community-based HEiDi outcomes are sensitive to externalities such as lock-down orders and post-pandemic health seeking behaviors. The trends observed offer the following insights towards the evaluation of HEiDi services: 1) Community-based concordance outcomes are sensitive to year-to-year externalities; while; 2) Urgent care concordance outcomes were robust to these externalities.

Key learning: Consider externalities such as annual changes in health service use behavior in future evaluations and gain a better understanding of the reasons for discordance.

6.3.2. RTVS connects "unattached" clients to primary care providers

Access to primary care is essential to the RTVS-LHS' overarching goals towards improving population health outcomes. HDPBC provides an indicator that can be used to identify patterns of increased/decreased visits with a single primary care provider. There are, however, limitations to the "attachment" indicator available in the HDPBC environment. The algorithm (see Appendix 2) flags three or more visits to the same primary care provider (family physician or nurse practitioner) or practice in the past one to 10 fiscal years. This indicator may be helpful in observing overall trends in care; however, it remains limited by the ability to measure ongoing relationships between clients and a single primary care provider.

It has been hypothesized that, given the positive health-seeking behavior of RTVS clients, an RTVS encounter will positively impact a client's subsequent service use with a single primary care provider. We used ">=3 visits with the same provider" as an indicator of subsequent service use as described above for clients, compared to their pre-RTVS status. For both FY20/21 and FY21/22, over 30

percent of clients who had a history of < 3 visits with the same provider converted to having >=3 visits with the same primary care provider in the following fiscal year (Table 4). This is a positive indication that RTVS supports clients' health-seeking behaviors; however, there is insufficient evidence to suggest a causal association with the overarching goal of having a positive role in improving client "attachment" to a primary care provider.

Table 4: Changes in client history of visits with the same primary care provider after an index RTVS encounter

FY21/22 Same provider Status	"Same provider" Status in Following Year*	HEiDi	CHARLiE	MaBAL	RUDi
"<3 visits with the same provider	Unique patients	5,720	81	52	400
	Converted to ">= 3 visits with same provider"	2,490 (43.5%)	34 (42.0%)	17 (32.7%)	121 (30.2%)
	Remained "<3 visits with the same provider"	3,230 (56.5%)	47 (58.0%)	35 (67.3%)	279 (69.8%)
Unknown/Missing Status	Unique patients	5,523	30	181	213
	Converted to ">=3 visits with the same provider"	2,574 (46.6%)	13 (43.3%)	90 (49.7%)	19 (8.9%)
	Remained "<3 visits with the same provider"	2,949 (53.4%)	17 (56.7%)	91 (50.3%)	194 (91.1%)
*Clients' "same provider" status in the following fiscal year was determined if the client had recorded at least 3 family medicine MSP claims with the same practitioner on different dates.					

6.3.3. RTVS pathways provide appropriate care for each concern/case

Interviews with HEiDi physicians underscore the need for clients to have a collaborative team member, especially in the moment of an urgent situation. Visits to the ED are often precipitated by anxiety and decisions are made under stress. Rapid access to a qualified individual may provide timely support to patients and their families in reducing their worry while also preventing an emotionally draining trip to the ED.

> *"Not diminishing the benefit for exhausted parents who are at home with their child. I think oh, God, I don't want to go into BC Children, which is just a petri dish and if we're not sick now we're going to be. Sure, that's important in the city as well, but it's even more important…for those rural people that are dreading that nighttime trip on an icy road to an emergency department that they maybe never been to before. It makes a difference everywhere, but I think it makes a proportionally larger difference when people are quite isolated."*
>
> *HEiDi Virtual Provider Interview #1*

Virtual providers consistently described the impact of RTVS pathways in improving patients' access to appropriate care for each individual concern or case. RTVS increased access to care that is responsive to patients' needs and their community contexts. Interview findings highlighted the value that RTVS brings in directing patients to person-centered care, considering the community context, emphasizing the importance of advocating for patients, and providing culturally safe care.

> *"In some cases, it's [RTVS] the only access…if you live in a really remote community where it's a sketchy boat ride or a sketchy drive or a helicopter ride, there is no other access. So, in some cases we are filling like a gap that has existed forever. In some cases, we are creating a new pathway that is a culturally safe pathway."*
>
> *FNvDoD Virtual Provider Interview #18*

Dr. Stephen Vallentyne walking to the Takla clinic during snowy morning by John Pawlovich.

6.4. BALANCE DOMAIN

RTVS services and activities are efficient and equitably distributed relative to their measured costs and outcomes.

New to this year's framework is the "balance" domain, developed to support advanced methods of economic evaluation in the future. Advanced methods include cost-effectiveness analysis (CEA) and distributional cost-effectiveness (D-CEA) that can measure balances between equity and efficiency objectives for RTVS. The evaluative goal this year was to build in the foundational elements of economic evaluation by characterizing costs examining patterns and cost drivers while providing a basis for examining cost variability time and year-to-year variability since service launch.

Method Summary

- Resource utilization rates * unit costs = total costs
- Average, per-patient costs calculated at 1-, 7-, 30-, and 90-day intervals for FY20/21 and FY21/22

Costs are from

Health systems perspective: (Hospital admissions, emergency department visits, physician appointments, and prescription drugs from HDP administrative data; virtual care costs were excluded)
Perspective of patient and families: (Calculated costs for travel, time, informal caregiving and out-of-pocket costs; based on secondary analysis from HDPBC data)

6.4.1. Health system costs

On a year-to-year basis, health system costs were lower over a 90-day period in FY21/22 than FY20/21 for clients of the HEiDi, CHARLiE, and MaBAL pathways and higher for RUDi. There were notable differences in the proportion of total health system costs for hospitalization across the pathways, RUDi clients had the highest proportion of inpatient admissions, common for the older age distribution for clients who use this service. Costs alone, however, do not reflect the benefits of improved health outcomes available to patients and their families through RTVS services. The total 90-day health system costs varied by pathway and the rate of increase in costs over time was also distinct for each pathway. However, any insights into the impact of RTVS services on costs requires a valid comparison group to provide meaningful interpretation.

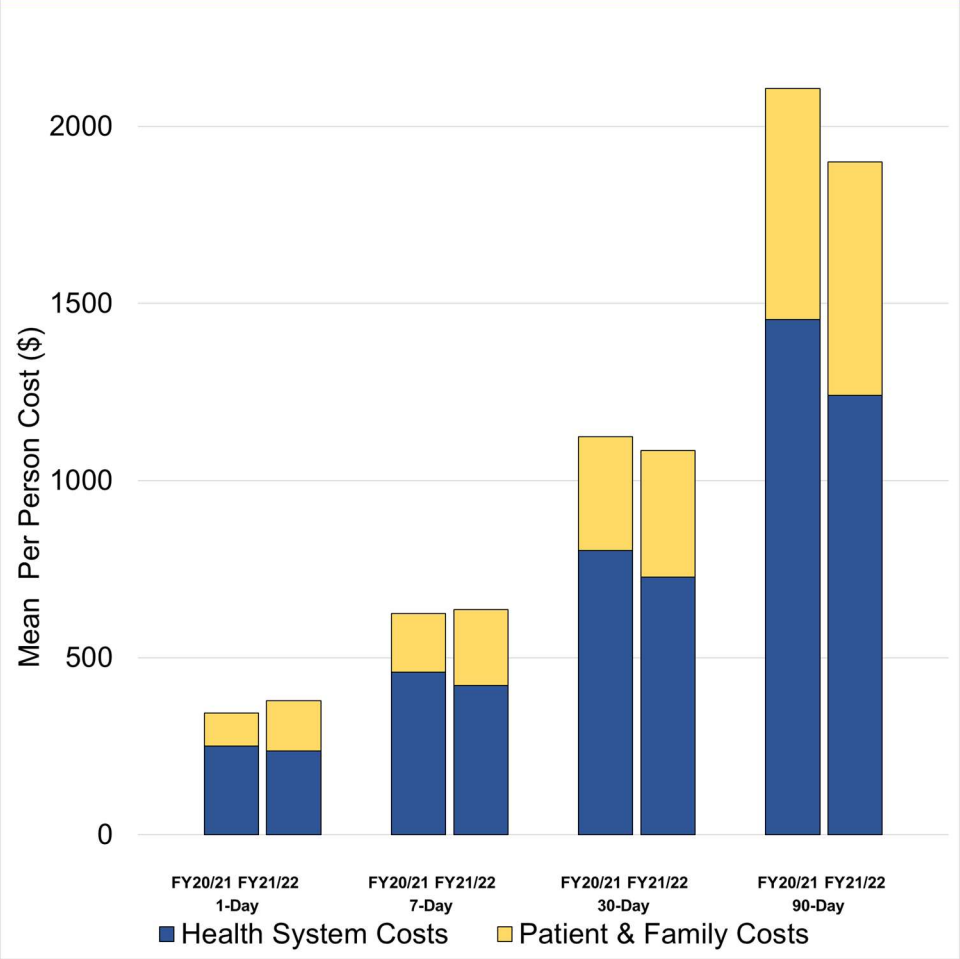
Key learning: Define a comparison group for each pathway with patients of similar demographic characteristics and are comparable from a decision-making perspective.

Table 5: Mean (SD) health system costs per client encounter by RTVS pathway and FY20/21 and FY21/22

	HEiDi		CHARLiE		MaBAL		RUDi	
Days after index encounter	FY20/21	FY21/22	FY20/21	FY21/22	FY20/21	FY21/22	FY20/21	FY21/22
1	$250 ($1,907)	$237 ($1,770)	$1,694 ($3,768)	$2,031 ($5,652)	$215 ($966) **	$762 ($3,958)	$493 ($2,094) **	$974 ($4,645)
7	$459 ($2,720)	$422 (2,432)	$3,379 ($8,761)	$2,549 ($6,667)	$476 ($1,244)	$1,070 ($4,320)	$902 ($3,212) **	$1,389 ($5,669)
30	$803 ($4,017)	$727 ($4,086) *	$3,629 ($8,901)	$3,000 ($7,581)	$1,857 ($4,951)	$1,679 ($5,822)	$1,446 ($4,905)	$1,902 ($7,267)
90	$1,454 ($6,005)	$1,241 ($5,782) *	$4,233 ($9,157)	$3,515 ($8,672)	$2,707 ($5,895)	$2,656 ($7,752)	$2,316 ($6,890)	$2,938 ($10,659)

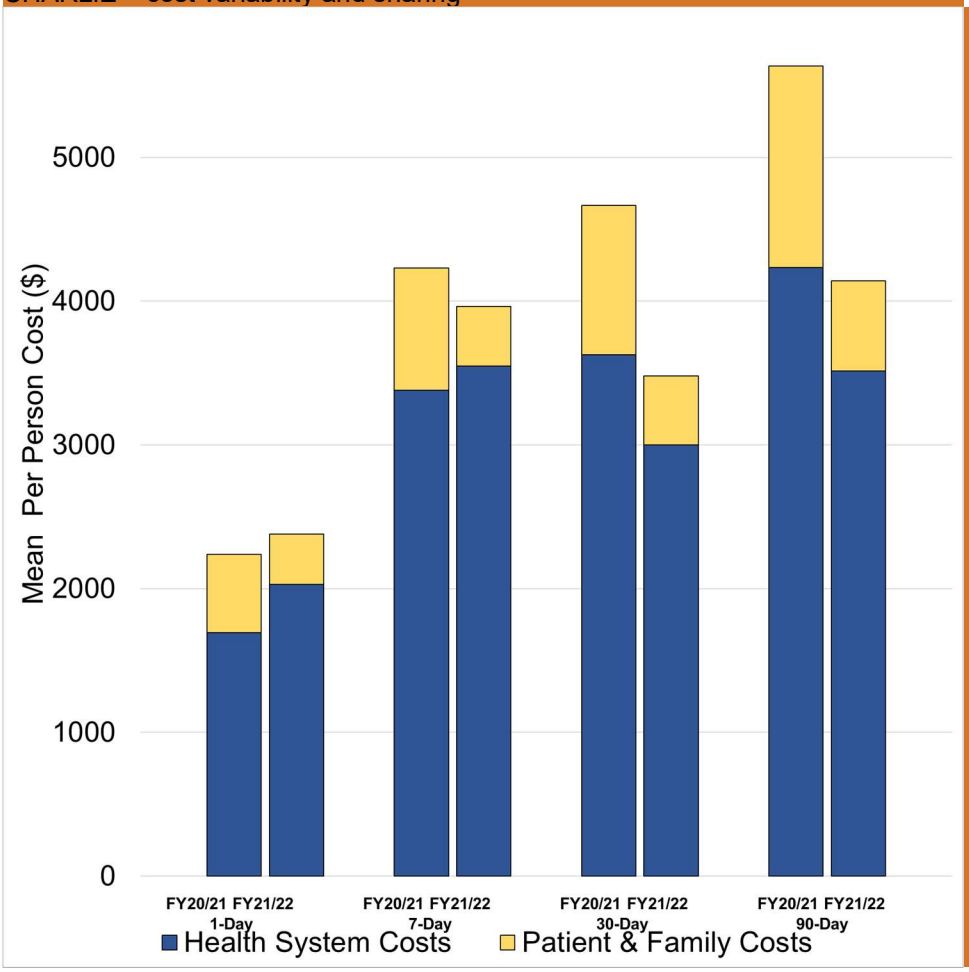
*Note: these values were significantly lower in FY21/22 than in FY20/21 ($p < 0.05$).
**Note: this value is significantly higher in FY21/22 than in FY20/21 ($p < 0.05$).

HEiDi – cost variability and sharing



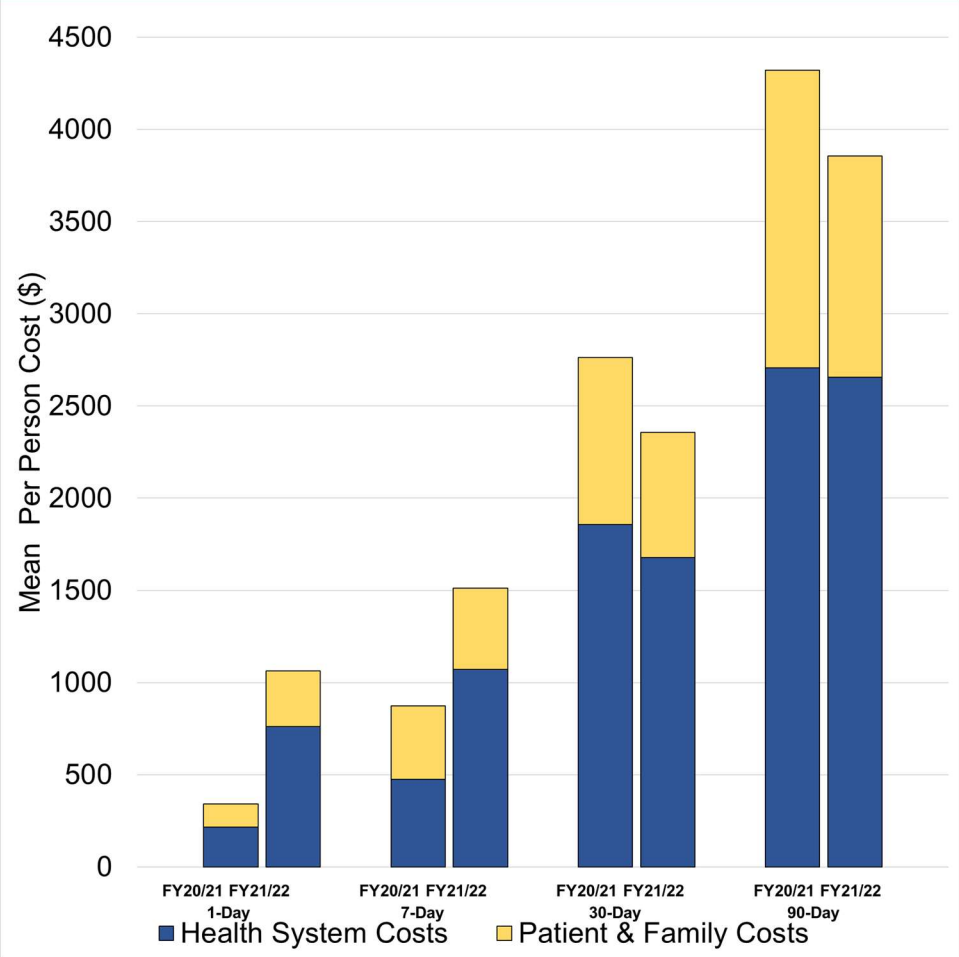
- Equal ratio of inpatient to outpatient service costs
- High proportion of costs due to ED use (compared to general population)
- Patient and families pay ˜$700 over 90 days

CHARLiE – cost variability and sharing



- High proportion of inpatient service use and costs
- High (Year-to-Year) Y2Y variability
- Stability relative to other pathways over the 1- to 90-day interval
- Patients and families pay over $900 over 90 days

MaBAL – cost variability and sharing



- Moderate proportion of inpatient service use and cost
- Y2Y variability (90 day)
- Variability observed over 1-90 days
- Patients and families pay over $1300 over 90 days

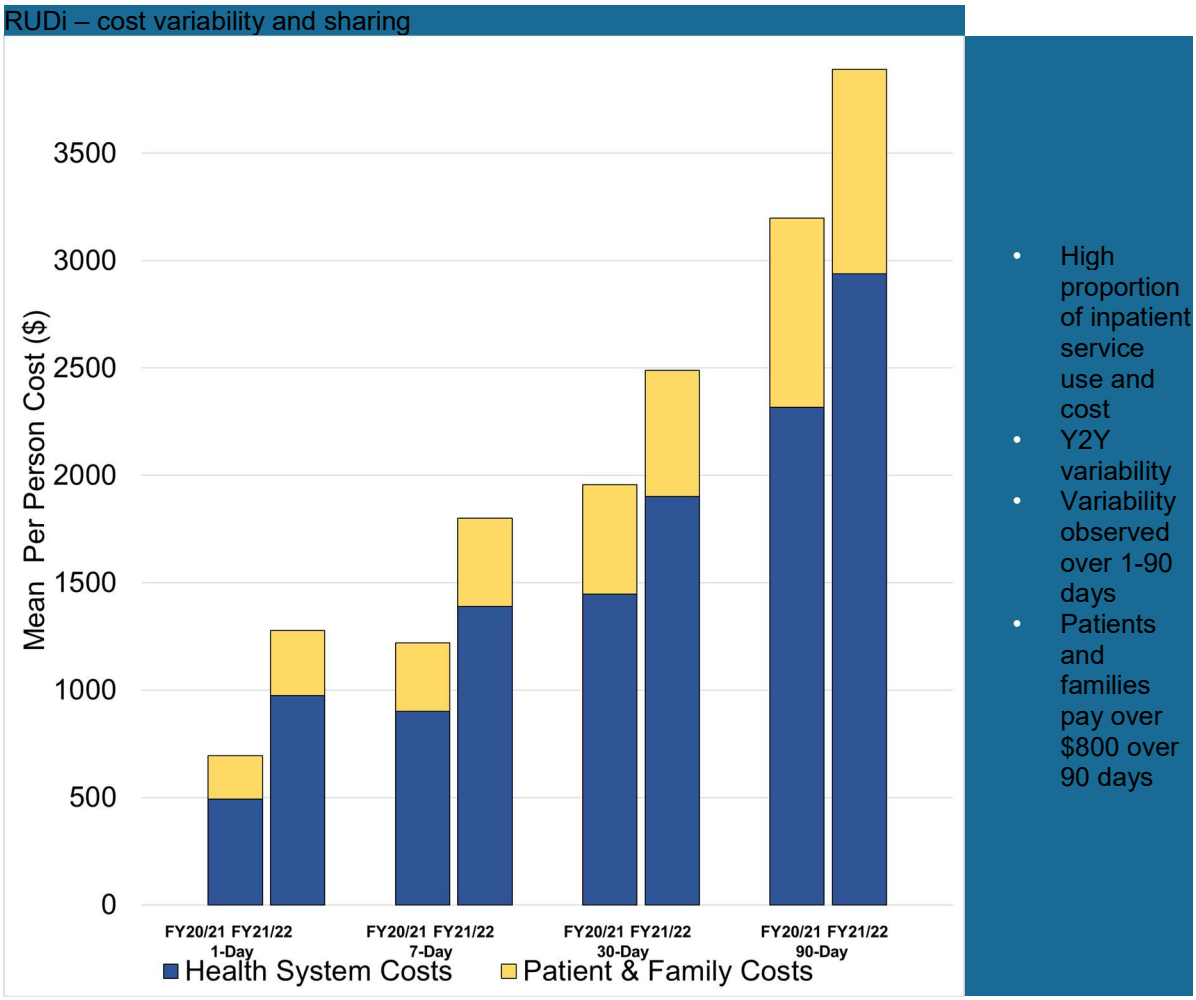


Figure 17: Cost breakdown for each pathway over 1, 7, 30, and 90 days

The cost analysis showed pathway-specific differences in resource utilization rates, per-patient costs, and year-to-year variability. Hospitalizations (inpatient admissions) were a cost driver for CHARLiE, and RUDi pathways, but less so for HEiDi and MaBAL. Limited data was available on the use of transport to arrive at the ED and the values presented do not reflect these costs nor the costs of virtual care provision. For some clients, ambulance arrival was indicated in the data. The data suggest that of all the RTVS clients who did go to the ED, between 12.1 percent and 44.6 percent travelled by ambulance, depending on the pathway (Table 6). The rate of ED visits per index encounter also varied across pathways and over the 90-day observation period following an index RTVS encounter.

Table 6: ED service use patterns for FY21/22

Indicator	HEiDi	CHARLiE	MaBAL	RUDi
Percent of ED visits where patient arrived by ambulance (90 days after index encounter)	12.1%	28.3%	39.2%	44.6%
ED visits per index encounter				
Day 1	0.39	0.34	0.09	0.17
Day 90	0.56	0.57	0.37	0.44

*This data is limited to ED visits that record ambulance arrivals.

In interviews, HEiDi VPs discussed the range of patients calls they receive, including those where they are able to reassure the patient that they should go to the ED. For others, ED visits can be safely diverted after exploring the situation with the patient during the call.

> *"…the nurse tells the patient 'you have to go to Emergency Department' and then I talk to them and explore the situation and decide that, no, actually they don't need to go…I always feel that's why we have this service."*
>
> *HEiDi Virtual Provider Interview #11*

Key learning: Separate, pathway-specific analyses of costs and outcomes are required to account for the distinct variations observed across different pathways.

6.4.2. Patient and family costs

Patients and their families pay to attend medical appointments through their out-of-pocket costs (e.g., travel, meals), informal caregiving and lost productivity from time spent not doing their paid or unpaid work. We developed a method to account for the portion of the total costs paid by patients and their support family (Appendix 3). When patient and family costs were considered, for a single ED visit patient paid $231 in the Northern Health authority to attend ED compared with patients in the Vancouver Coastal Health authority who pay on average $167 per ED visit. Travel costs alone can be much higher for patients in Northern BC compared to travel costs associated with attending ED in urban centers. The maximum was $290 for clients in the Mackenzie CHSA to travel to an ED, 30-times higher than the provincial median of $9 (IQR $26). The amount paid to use virtual health service was substantially lower than in-person visits and more similar across regions in the province, suggesting that RTVS plays an important role in addressing inequities in financial hardship that may be associated with accessing care. Accounting for the distribution of total costs that are borne by patients and their families is a significant aspect to consider in forthcoming evaluations. The impact on a patient's non-subsistence income (i.e., the amount left over after meeting the basic cost of living) may be higher in areas with lower mean income. This relates to the role that universal health

systems have in offsetting the high cost of illness; suggesting that for some individuals, receiving in-person care may be more expensive and introduce financial hardship if time, travel, and informal caregiving costs are considered.

Key learning: Include costs paid by patients and their families in economic evaluations of RTVS.

6.4.3. Virtual care costs

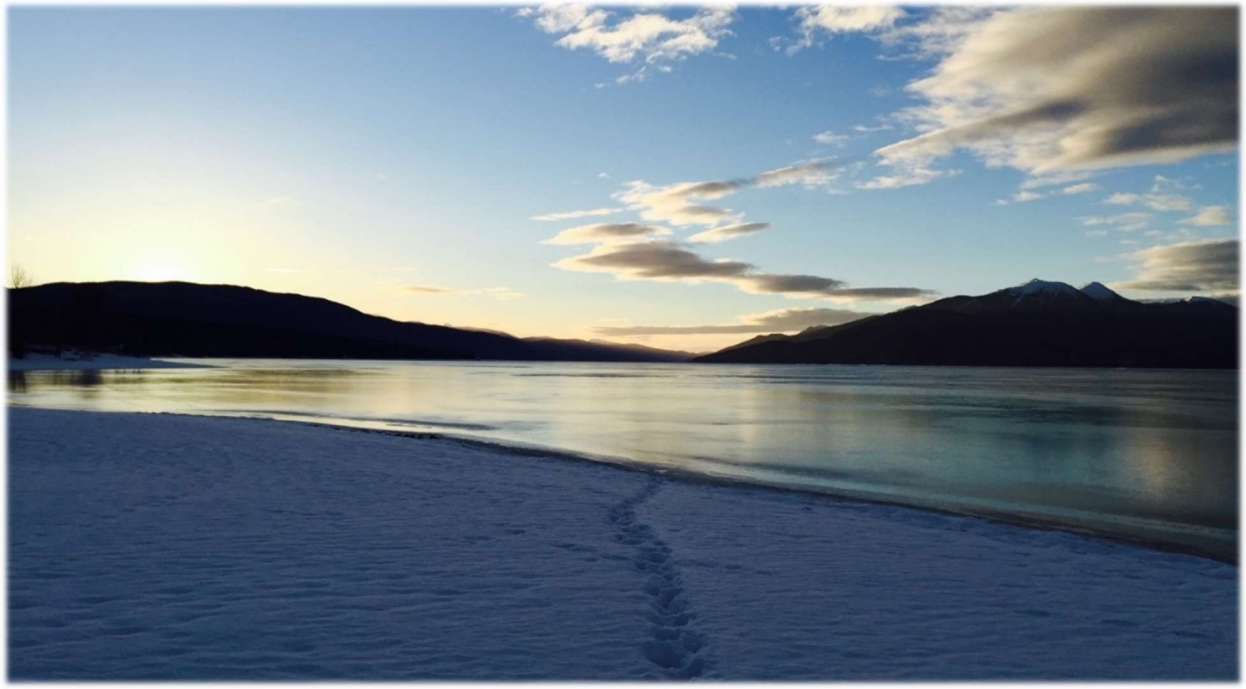
Through the RTVS network, we asked all partners to provide a comprehensive list of potential cost items. Table 7 is the framework for a total cost inventory that will support more detailed economic evaluations in the years ahead. The per-client cost of providing virtual care may be better understood by a common language and broadly encompassing approach, inclusive of the following potential cost items:

Table 7: Inventory of potential cost items for virtual care

Cost group	Sub-unit	Notes
VP provision	Physician consultation, virtual	Economies of scale (i.e., shift sharing across pathways) Estimate FTE needed per call based on call groups.
	Medical director (MD)	
	Assistant medical director (MD)	
	Medical administration advisor (MD)	
	Quality improvement director (MD)	
	QI advisor	
	VP training	Initial onboarding and ongoing training
	Nursing staff per call	
	Technology lead	
	Special advisor to evaluation	
	VCS medical office assistant	
	Other medical leadership	
Videoconferencing	Zoom	
	Teams	
Data	Storage	
	Licensing	
	PACs/IMITS	
	Connectivity	Starlink for remote sites
Equipment	Phones, iPads	iPads that are deployed (RCCbc, HA, divisions of Family Practice)
Travel and time	VCC office visits	Travel and meetings with FP and SP (example, C2C)

Key learning: Seek individual inputs to the virtual care cost framework across all pathways with detailed engagement, refine this list and populate it with information on unit costs for each pathway in FY23/24.

The roadmap to economic evaluation in the FY23/24 year ahead includes 1) defining the policy alternatives; 2) stating the desired RTVS outcomes and the scope of economic evaluation for each RTVS pathway; 3) undertaking a matching exercise to accurately compare the policy alternatives for each pathway; 4) collecting patient-level utility measures for measuring quality adjusted life-years (a required standard for economic evaluation that for comparison of multiple policy alternatives in CEA); and 5) co-defining the equity objectives for future D-CEA evaluations.



Valentine's Day Sunrise at Takla Lake by John Pawlovich

6.5. FIRE DEPARTMENT DOMAIN

RTVS engages in non-clinical activities to build capacity for both RTVS VPs and rural/remote healthcare providers, as well as engaging in outreach to rural, remote and Indigenous communities.

6.5.1. The RTVS FD offers education sessions for both VPs and HCPs across a range of topics

This year, the RTVS Fire Department (FD) offered educational and capacity building sessions for all peer-to-peer pathways in four target areas:

The RTVS Fire Department provided over 800 hours of community engagement activities in FY22/23, with more than 500 hours on faculty development, 202 on cultural safety and humility training, over 80 simulation hours and some community outreach. Compared with the year prior, RTVS provided similar support in terms of faculty development and outreach, slightly fewer simulation sessions and more cultural safety sessions. The Fire Department in the year prior however, included a general education category, which was not reported in FY22/23 (Table 8). There was an overall decrease due to fewer meetings for CATe preparation, ROSe's discontinuation, and MaBAL meetings changed to once per month.

Table 8: Fire Department initiatives year-to-year

	Hours of training	
	FY21/22	FY22/23
Faculty Development	677	559
Outreach	36	35.25
Simulation Sessions	125	82.75
Cultural Safety	84	202
Education	81	0
Total	1003	879

Key learning: Standardize Fire Department reporting on one case report form for the RTVS network.

6.5.2. The RTVS FD supports VPs' and HCPs' clinical and non-clinical skills

The Fire Department is an essential component of the RTVS program, serving as the connecting arteries fostering peer-to-peer connections and providing a viable route for continuous quality improvement among RTVS VPs. Any provider who joins the network as an HCP end-user or client can be assured that they are engaging in a network that is committed to positive, mutually respectful relationships. HCP end users who engaged in non-clinical activities in FY22/23 shared that they benefited through gaining opportunities to share knowledge with their colleagues.

> *"That's one of the advantages of having a group like that is the shared knowledge is that people say, what do you guys do if 'X' and people come up with all these suggestions, that you think 'I'd never even thought of that'…People throwing in stuff [such as] 'hey, have you tried this' and to me that was one of the most valuable sessions. I find when I can attend them, the educational session is very useful."*
>
> *CHARLiE Virtual Provider Interview #10*

The contributions the RTVS Fire Department made to an expanding team of physicians and providers across the province are recognized at the workforce level. Providers report a sense of connection, psychological safety, and a feeling of belonging to a community of practice, thanks to the Fire Department's efforts. Embedding simulations (SIMS) into medical education allowed for a legacy of learning for the growing healthcare provider workforce serving rural, remote, and First Nations and other Indigenous communities across the province.

> *"I [am] a big kind of SIM enthusiast, not just to learn and kind of practice but it's a way to build resilience in a team and connection and psychological safety, community...then involving RTVS in those SIMS makes sense because they've become part of our team...otherwise you won't even think to call them but then if you do call them it becomes kind of like how do I zoom in...and what is it that you can do for me..."*
>
> *HCP End User Interview #15*

Sunset at Takla Lake by John Pawlovich

6.6. RECRUITMENT AND RETENTION DOMAIN

RTVS supports existing and new healthcare providers across different medical disciplines serving rural, remote and Indigenous communities.

6.6.1. Rural healthcare providers are recruited and retained

Most of the RTVS pathways reporting on the recruitment and retention indicators had more physicians at the end of FY22/23 compared with the start. Two of the three partner organizations were not able to report on recruitment and retention indicators this year; however, all partners expressed an interest in having a simple case reporting system that is clearly defined and regularly monitored across all RTVS pathways (Table 9). Of the reporting peer-to-peer pathways, only CHARLiE lost more providers than were retained. Partners in the RTVS network explained that the new fee-for-service payment schedule for virtual care in pediatrics has been a challenge in incentivizing providers to this pathway.

Table 9: Physician recruitment and retention

Pathway	Same (retained)	New (recruited)	Left (attrition)	Number of VPs as of March 31, 2023
FNvDoD	Not available	Not available	Not available	33*
FNvSUPS	Not available	Not available	Not available	14*
HEiDi	Not available	Not available	Not available	125*
CATe	Not available	Not available	Not available	29*
CHARLiE	12	2	5	14
MaBAL	12	3	1	15
RUDi	25	5	3	30

*A virtual provider (VP) may work in multiple pathways; a VP is counted if they picked up at least one shift during the fiscal year and were retained as of March 31, 2023.

Key learning: Develop and implement a method with partner organizations to harmonize and routinely collect comparable data on recruitment, retention, and attrition.

Most VPs interviewed as part of this evaluation discussed how their personal passions for working in RRFNI communities, network, and the flexibility of RTVS work contributed to their recruitment and retention, as illustrated by a VP who serves in both CATe and RUDi pathways:

> *"...Almost exclusively I've worked in the North as well as some parts in the Interior...I've served First Nations communities as well...I've always had a feeling that I actually wanted to do more in terms of support and reaching out but it's difficult because a lot of these communities are isolated. I have a limited amount of time...so where to spend [that] time most productively, and I found that RTVS likely the best spot to do that. You can [be] anywhere and you're able to support... First Nations communities as well as other rural providers, predominantly nursing stations with isolated providers looking after members who are quite vulnerable in our society...that's why I'm involved."*
>
> *RUDi/CATe Virtual Provider Interview #24*

In describing the strengths of RTVS, VPs pointed out that working with RTVS provided a supportive community of practice. Further, they described RTVS and pathway leadership as supportive and effective. These were often described as contributing factors to their retention:

> *"...when you sign in for a shift with HEiDi...you've actually got some friends around so it doesn't feel so lonely as I expected virtual support to feel...Everybody's on the Zoom, and chatting back and forth, which is really nice, and you feel supported with that. With RUDi it's similar...Everybody is really supportive and helpful, and I don't find it too intimidating as a newer person into emergency medicine."*
>
> *RUDi/HEiDi Virtual Provider Interview #2*

Interviews with the HCP End Users of the peer-to-peer pathways suggest that RTVS also supported the retention and recruitment of healthcare providers working in RRFNI communities. When asked to discuss the benefits of RTVS in terms of their own experience, HCP End Users described its strengths in supporting providers' retention and recruitment:

> *"...having CHARLiE is a huge benefit for Midwives in a rural community...I feel like if I didn't have CHARLiE available I would really consider whether I want to practice in a rural community or not because I would probably feel unsafe in some situations or just like I don't have the resources I need and that's not safe for me professionally or for my patients."*
>
> *HCP End User Interview #3*

Takla First Nation during Winter by John Pawlovich

7. LEARNING HEALTH SYSTEMS

7.1. RTVS-LHS DASHBOARD

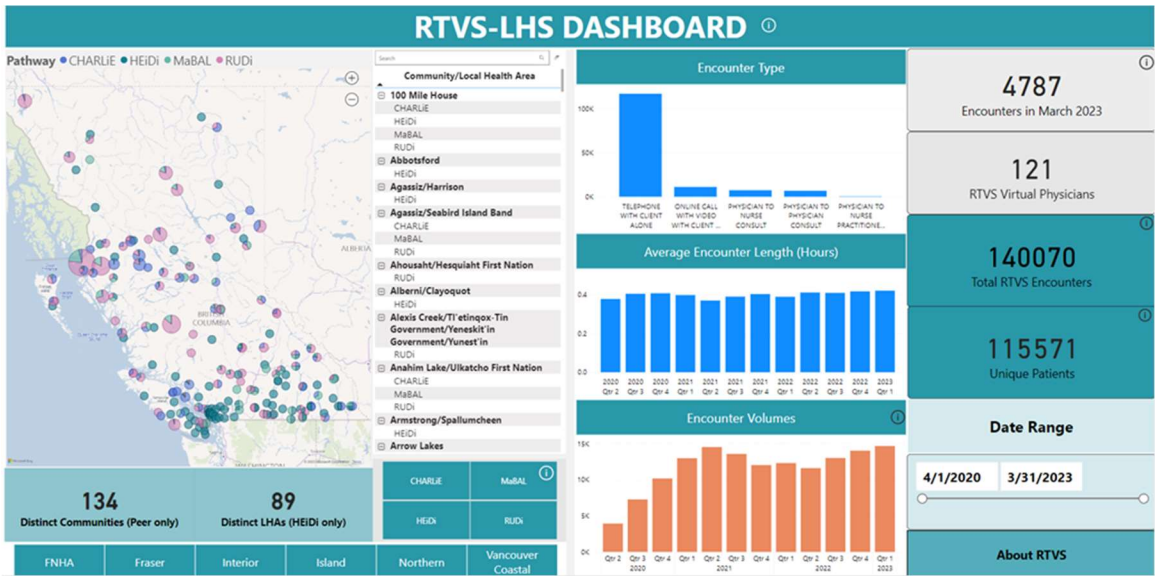


Figure 18: RTVS-LHS interactive dashboard screenshot

The RTVS-LHS interactive dashboard is intended to be a source for updated reporting on implementation metrics. **Access the Dashboard by clicking this link.**

7.2. RTVS PARTNERSHIP AND SUSTAINABILITY

7.2.1. Partnership survey

With over 200 healthcare providers, health policymakers, administrators, and evaluation scientists across the province, the RTVS-LHS partnership is characterised by its diversity and geographic representation. The network grew from longstanding partnerships and convened with a purpose in response to the COVID-19 pandemic. RTVS has not only continued in the post-pandemic years but has continued to expand its reach. Over 97 percent of all communities in the province have used at least one RTVS service. The network is united by a shared interest in improving access to health services and outcomes for patients and families in rural, remote, and First Nations and other Indigenous communities and across BC. The core functioning of the partnership depends on the people underpinning the day-to-day operations.

In FY21/22, we evaluated the strength and quality of relationships across the changing RTVS network at the time, finding agreement from network members that this connection is made on a positive foundation with expressed concern about maintaining momentum post-pandemic in FY22/23. In recognition of the need for evaluation not only of the RTVS-LHS outcomes, but the people and governance within, we developed a short survey asking partnership members about their experience working within the RTVS-LHS network this year. The survey was administered April 1-15 in early FY23/24. Of the 34 core partners invited, only 13 completed the survey, likely due to the timing of the survey near the end of the fiscal and reporting years. Survey respondents expressed appreciation for support for the network through an underlying ethos of engagement, honesty, and collaboration throughout FY22/23.

"I have witnessed respectful and honest dialogue that lifts up the strengths and contributions of all partners while being able to honestly name challenges."

– Survey respondent

Figure 19: Word cloud of partnership survey responses

The tone and language used to describe the network were positive among those who responded. When asked about their hopes for RTVS, survey respondents expressed these not only in terms the

partnership itself but also in its impact on clinical practice and the health system in its entirety (Table 10).

Table 10: Partners' hopes for RTVS

Within RTVS Partnership	Practice Level	System Level
• Continued growth, expansion, and enhancement • Remaining flexible and adaptive to emerging priorities • Sustained funding for services • Strengthening the governance model • Sharing findings, learning, and stories • Maintaining a humanistic approach	• Advocacy and awareness for rural, remote communities • Prioritization for culturally safe care and work environment • Incorporation of patient input at all levels • Improved access for underserved, marginalized • Continued collaboration with transport	• Integration and coordination of services within RTVS • Integration of RTVS within the health system • Standardization of videoconferencing across virtual care in BC • Continued innovation for rural service models • Demonstrate support for FNHA-led primary care transformation

Partners' concerns (summarized in Table 11) were centred on RTVS's position in an ever-evolving learning health system. Partners described the risk of RTVS becoming fragmented unto itself as it grows and the risk of burnout of RTVS providers and staff as internal challenges. Externally, challenges within the health system and limited integration of RTVS with the system were listed as top concerns.

Table 11: Partnership concerns

Within RTVS Partnership	Practice Level	System Level
• Having sufficient capacity for program governance and administration • Fragmentation within RTVS • Managing change in the context of evolving partnerships • Ensuring equitable partnerships	• Maintaining innovation in the operationalization phase • Lack of expansion to additional clinical services • Addressing enduring transport challenges • Sustainability of RTVS providers and staff	• RTVS not being well integrated into health system • Intermittent and non-stable funding, loss of funding

7.2.2. Knowledge mobilization

The RTVS network advanced national and international knowledge in public sector virtual services. Recent publications include a health services research study published from the HEiDi pathway (DOI: https://doi.org/10.9778/cmajo.20220196). This study utilized HEiDi encounter data and HDPBC-linked data to investigate patient service use and outcomes following physician advice. Methods used in this early study informed methods utilized in this RTVS evaluation.

Key learning: Supplementation of BC's 8-1-1 service with an assessment from a virtual physician safely reduces the overall proportion of callers advised to seek urgent in-person visits.

A manuscript that recounts the development and implementation of RTVS during its first year of implementation during the pandemic has been published in the Healthcare Management Forum (DOI: https://doi.org/10.1177/08404704231183177). Evaluation findings and learnings from the first year of RTVS programmatic implementation are shared, along with implications for future implementation and evaluation.

Key learning: RTVS is unique in its partnership-based, grass-roots approach to service delivery. Early successes have laid the foundation for current and future refinement and growth.

A manuscript on the experience and clinical utility of the "RTVS safety net" describing RUDi and virtual overnight coverage in Dawson Creek was submitted to the Journal of Medical Internet Research. In August 2023, it was accepted for publication by the Journal of Medical Internet Research (pre-print available at http://doi.org/10.2196/preprints.45451).

Key learning: Rapid co-development and implementation of virtual solutions can be leveraged with existing partnerships and mutual trust between RTVS and rural ED to ease pressures of physician shortage, particularly during COVID-19. By establishing new and modified clinical workflows, RTVS provides a safety net for rural patients and providers challenged by burnout. This case study provides learnings to be implemented to serve future rural, remote, and Indigenous communities in crisis.

International recognition for the "Edge of Care" video has been received as an acclaimed knowledge mobilization strategy from the network.

Key learning: "The Edge of Care" video mobilized knowledge, with over 6,300 views as of January 2024.

In addition, RTVS-LHS investigators have been successful in a CIHR grant application aimed at improving care coordination through the development of methods in economic evaluation and predictive modelling.

Various peer-reviewed abstracts of RTVS-LHS work have been accepted for presentation at provincial and national conferences: UBC Emergency Medicine Research Day; BC Quality Forum; and eHealth 2023. RTVS-LHS supported and approved seven proposals for in-depth pathway evaluation projects put forward by RTVS pathway leaders and members. These are currently underway, and the evaluation team provides consultation and support to the project teams to facilitate alignment with the RTVS-LHS evaluation framework. The pathway proposal process and projects exemplify the participatory and capacity building goals of evaluation and extend knowledge translation.

7.3. QUINTUPLE AIM

- Improve the Health of Populations:
    - FNvDOD and FNvSUPS increased access to care for rural/remote First Nations and other Indigenous clients in Northern, Interior, and Island regions.
    - HEiDi has expanded coverage to reach clients in more than 94 percent of the community health service areas in the province.
    - RUDi, CHARLiE, and MaBAL supported 57 percent of the 147 high-priority, edge communities.
    - The RTVS network harnessed the ability to rapidly launch a new pathway (CATe) in response to external demands for COVID-19 prescriptions.

- Enhance the Patient Experience:
    - Peer-to-peer pathways supported the retention/recruitment of providers in rural and remote First Nations and other Indigenous (RRFNI) communities.
    - For HEiDi, 89 percent of all clients waited less than one hour to speak to a physician.
    - Virtual providers (VPs) indicated that video was instrumental in assessing pediatric patients and observing behavior as an alternate form of communication.

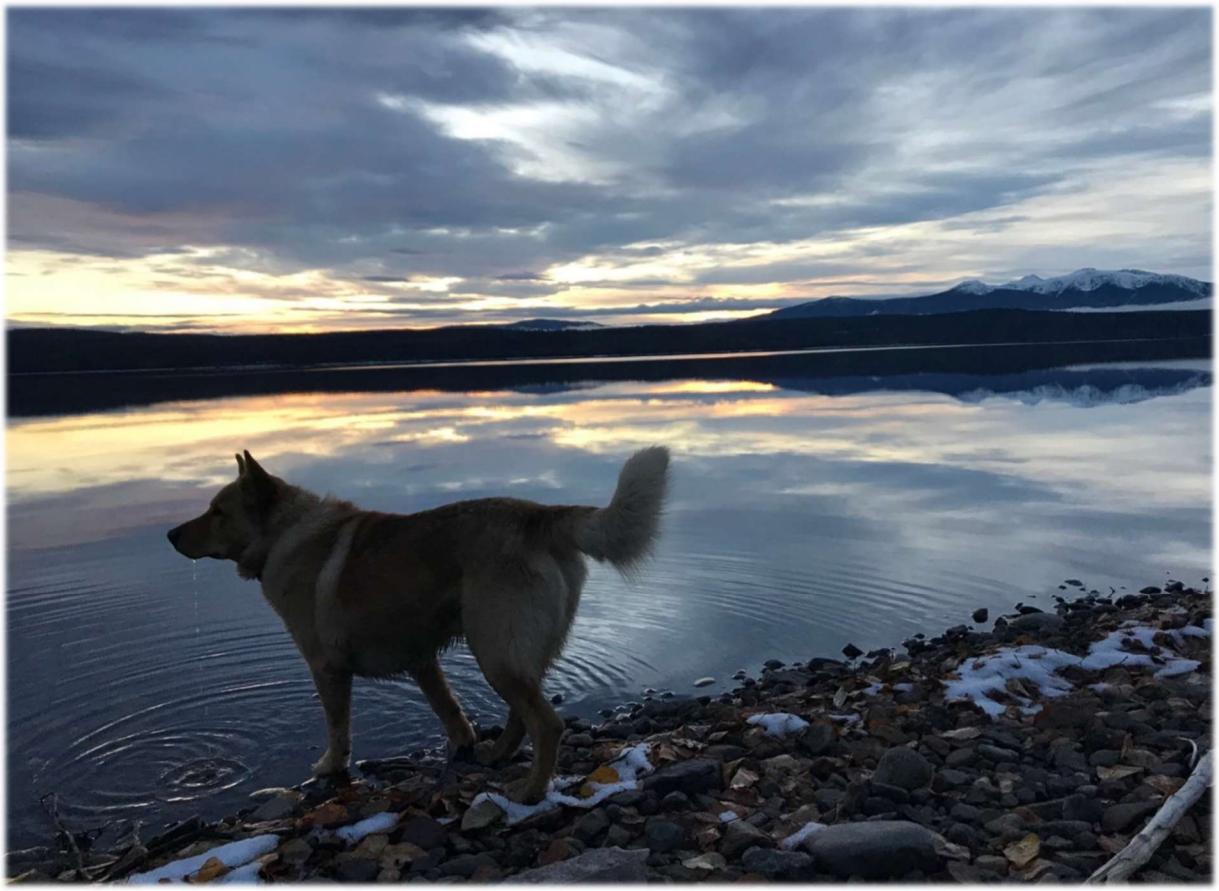
- Reduce Costs:
    - Economic evaluation methods were applied, including cost analysis framework and resource utilization rates.
    - Health system costs varied slightly over the fiscal years.
    - Pathway-specific differences in resource utilization rates and per-patient costs were observed.

- Improve the Work Life of Health Care Providers:
    - Peer-to-peer providers unanimously reported feeling safe and supported when seeking help in caring for their clients.
    - Health care providers found peer-to-peer pathways to be relevant to their workplaces and effective in reducing isolation by providing peer-to-peer support.

- Equity:
    - RUDi and MaBAL show signs of improving the distribution of access across social groups.
    - HEiDi shifted the distribution towards more equitable access among seniors and clients in specific health authority regions.

    - Clients in rural and remote areas may face inequities in the distribution of financial protection due to the need to travel for care.

- Learning Health Systems Lens:
    - Leveraging the network to facilitate connections, such as C2C inclusion of a primary care physician.
    - Standardize reporting for recruitment and retention for all RTVS pathways.
    - Additional questionnaires about the representation of healthcare providers for all RTVS pathways, including ethnicity, gender, and age distribution.
    - Automate data collection for RTVS communications modality.
    - Engage with patients in a comparative economic analysis and publish the findings.
    - Build periodic partnership reflection and review into standing meetings.
    - Improve survey response rates by modifying delivery for ease and requesting specific open-ended responses from pathway leads.



Dog taking a drink at Takla Lake by John Pawlovich.

8. LEARNINGS AND FINDINGS

The following table outlines the learning and findings extracted from the evaluation report for the fiscal year 22/23. These valuable insights are poised to serve as actionable insights that can inform strategic decisions and guide tangible improvements. They offer a foundation upon which effective measures can be taken to enhance the program's performance and align it more closely with its intended goals. These insights will provide valuable guidance for the evaluation process in FY23/24.

Table 12: Summary of key learnings and findings from the report

Core objective	Key findings	Learnings for the RTVS-LHS
Expanded access to RTVS pathways across BC province	• The RTVS Network brings together over 260 providers from 15 different medical disciplines. • Bridging healthcare divides through accessible virtual care serving more than 61,000 clients across BC in FY22/23 • FNvDOD and FNvSUPS increased access to care for rural/remote First Nations and other Indigenous communities and clients in Northern, Interior, and Island regions. • HEiDi has expanded coverage to reach clients in >94% of the community health service areas in the province. • RUDi, CHARLiE and MaBAL supported 57% of the 147 high-priority, edge communities.	• Leveraging the network to facilitate connections, example C2C inclusion of a primary care physician. • There is a need to gain a better understanding about why some RTVS services were rapidly adopted in some areas and why there is slower uptake in others.
RTVS provides collegial support for isolated provider/providers in RRFNI communities	• Peer-to-peer pathways supported the retention/recruitment of providers in RRFNI communities. • Collection of data from client-facing pathways was incomplete and inconsistent. This could be standardized in future reports, with data on provider representation and cultural safety training. • Health care providers reported finding peer-to-peer pathways RTVS to be relevant to their workplaces and effective in reducing isolation by providing peer-to-peer support.	• Standardize reporting for recruitment and retention for all RTVS pathways to match the quality of reporting provided by the peer-pathways. • add additional questionnaires about representation of healthcare providers for all RTVS pathways, noting ethnicity when possible (*i.e.* not identifiable) and the gender and age distribution of virtual providers.
RTVS supports multiple modes of contact	• When asked about the usefulness of video for assessing pediatric patients, virtual providers (VPs) indicated that it was instrumental to observe behavior as an alternate form of communication with patients • Video, text and telephone messaging modalities were used for peer-to-peer communications • Findings from the C2C program note digital health accessibility	• Automate data collection to minimize the need for manual video reporting and improve the ability to monitor the modality of RTVS communications in the future. • Discuss accessibility options in areas where digital health literacy training is needed.

	challenges to using RTVS in the targeted regions.	
RTVS can be quickly accessed by patients and/or providers	• Peer-to-peer providers unanimously report feeling safe and supported when asking for help in caring for their clients • For HEiDi, 89% of all clients waited less than one hour to speak to a physician. • RCCbc has responded to call surges, technology limitations and other disruptions to service delivery by providing satellite broadband, iPads and volume mitigation. • The RTVS network harnessed the ability to rapidly launch a new pathway (CATe) that included pharmacists, in response to external demands for COVID-19 prescriptions	• Continue to monitor and benchmark client wait times and spillover to other pathways • Understand the reasons for call volume surges and consider ways to prepare and respond. • The findings are limited to missing data on call wait times due primarily to technological limitations of video conferencing software and data sharing agreements
RTVS uses services as intended within the specific health service area	• The First Nations pathways, FNvDoD and FNvSUPS provided access to culturally safe care for First Nations and other Indigenous clients and their families for two of the most pressing health concerns in British Columbia: primary care; and substance use and psychiatric needs • RUDi and MaBAL are increasingly being used to provide overnight coverage as most responsible provider (MRP) for physicians in communities situated at the edge of care. • HEiDi services redirected >60% of all urgent calls to community or home-based care.	• Follow-up of post-encounter outcomes and concordance with the recommended treatment
RTVS pathways have improved access to virtual emergency and urgent care	• RUDi and MaBAL show signs of improving the distribution of access across social groups by serving more clients in the highest priority, least advantaged group. • HEiDi shifted the distribution towards more equitable access among seniors and clients in the Vancouver Island and Interior health authority regions.	• Continue to report on the distribution of access to RTVS lines with CMID as a socioeconomic status indicator • Develop an income-based proxy for CMID with partnership from data analysts at FNHA to be able to report on the distribution of access for FNvDoD and FNvSUPS in the absence of FNHA client data.

		• Disaggregate all findings by age, sex and region to monitor changes in the slope index of inequality over time using economic dependency and CMID groupings
Health system costs	• Foundational elements of advanced economic evaluation methods were provided this year, including and understanding of costs, resource utilization rates and cost analysis framework that includes the perspective of patients and their families. • Health system costs varied slightly over the FY20/21 to FY21/22 interval. • There were pathway-specific differences in resource utilization rates and per-patient costs. • RTVS clients and their families pay between $200-$400 per month on average to receive health services. • Hospitalizations (inpatient admissions) were cost drivers for CHARLiE, and RUDi pathways, but less so for clients of HEiDi and MaBAL, which had a higher proportion of outpatient costs. • The rate of post-encounter increase in costs was different for each pathway. • Economic evaluations need to define the appropriate policy alternatives and comparison groups for each individual pathway.	• Clients in rural and remote areas may face inequities in the distribution of financial protection provided, due to the need to travel for a long time to receive care. Key learnings in this area will come from accurately defining policy alternatives within the RTVS partnership. • Starting with HEiDi, a data-driven approach to defining comparison groups will be an important first step towards advanced methods of economic evaluation, including cost-effectiveness analysis. • Using the distribution of access to RTVS may help define and measure progress on the equity objectives of RTVS, in balance with objectives for program efficiency. • Economic hypotheses need to be considered on a pathway by pathways basis.
Expand and nurture the RTVS partnership	• Important knowledge mobilization activities have been realized this year including two peer reviewed journal articles, a new CIHR grant to improve care coordination and the launch of the acclaimed “Edge of Care” video, already reaching over 35,000 viewers. • A partnership survey was developed with fewer than 50% of all invited responding. • Respondents reported positive experience with the RTVS network; hope for continued growth, expansion, and	• Engage with patients in a comparative economic analysis and publish the findings. • Build in periodic partnership reflection and review into standing meetings to collect this type of learning throughout the year. • Improve response rates for a partnership survey by modifying it for ease of delivery. Potentially request pathway leads

	enhancement, and advocacy for rural, remote, First Nations and other Indigenous communities; and concerns about sustainability of funding, and integration into the health system.	answer specific open-ended questions.

Overlooking Takla Lake by John Pawlovich

9. APPENDICES

APPENDIX 1. RTVS-LHS

Table A. 1. Updated evaluation framework

RTVS-LHS Evaluation Framework Metrics for 2022/2023 reporting (RTVS-EF, version 2.0)

 Access (Safety Net): RTVS supports patients and healthcare providers in accessing care/collegial support in a timely and equitable manner			
Question	Objective	Metric	Pathway(s) involved
What is the operational capacity of RTVS pathways?	RTVS pathways are available province-wide	Number of Pathways	All RTVS pathways combined
		Number of VPs per pathway	Each RTVS pathway
		Number of RTVS specialty/disciplines covered by RTVS pathway	Each RTVS pathway
		Total Number of virtual encounters or calls	Each RTVS pathway
		Mean and median call length	Each RTVS pathway
		Service hours of pathways (daily VP availability)	Each RTVS pathway
		Number/Length of service closures due to planned down-time*	Each RTVS pathway
		Number/Length of service closures unplanned down-time	Each RTVS pathway
		Number of spillover calls to partner pathways	Peer-support pathways
		Number of encounters per VP per shift*	i) FNHA pathways will be from aggregate data in 22/23* ii) All other pathways will be from MOIS
		Call volume per VP shift*	Each RTVS pathway

	RTVS pathways support multiple modalities of contact	Number of encounters/calls by modality (video/telephone/SMS/email/fax)	HEiDi and peer-support pathways
		Modality by patient age, sex, and region*	HEiDi
Are patients able to access timely care virtually?	RTVS pathways can be quickly accessed by patients and/or providers	Mean and median wait times between RTVS encounter request to start of encounter, frequency distribution, standard deviation,	HEiDi FNHA pathways will be in 23/24
		Number of calls with wait times over 1 hour	HEiDi
		Number of calls on hold that ended before being received/connected to service	HEiDi
		Number of calls that ended before VP sign-off	HEiDi
		Number of patients accessing RTVS by region, rurality, and attachment status	i) FNHA pathways will be based on interviews with providers for 22/23) *, some rurality indicators available but not region, limited information on attachment in aggregated FNHA data ii) All other pathways, from KDR/MOIS and HDPBC with limitations on the attachment variable
	RTVS pathways support care as intended within the specific health service area*	Number & types of concerns/cases/urgency per pathway	i) FNHA pathways (data may be extracted by physician-entered codes, however with limited accuracy) * ii) FNHA pathways; RUDI,

			CHARLiE and MaBAL provider stories from interviews iii) all other pathways will use MOIS, KDR and HDPBC linked data
Has RTVS increased access to virtual emergency and urgent care?	RTVS pathways improve access to virtual emergency and urgent care*	Annual ratio of virtual: in-person ED visits (by age, sex, and region)	HEiDi
Are patients across BC accessing RTVS?	RTVS pathways are available and accessed by patients in rural, remote, First Nations and other Indigenous peoples and communities in BC	Percentage of Rural and Remote Urban geographies per HA and BC total that has accessed the service at least once in the last	i) Each RTVS pathway ii) FNHA pathways will be from aggregate data in 2022/2023 and may be characterized by rurality rather than geography* ii) All other pathways will be from HDP
		Percentage of RR and URB geographies and BC total that has accessed the service at least once in the last year AND had accessed in the previous term	
		Demographics of patients accessing RTVS, rates of access/population/geographic region (CHSA, LHA, HSDA, HA)	i) FNHA pathways will be from aggregate data in 2022/2023 and limited to HA regional reporting*
Are providers able to access on-demand support?	RTVS pathways flexibly support local or time-limited-service disruptions or specific community need	Number of geographic areas where RTVS provides services	Peer-support pathways

Does RTVS flexibly respond to community-specific ED needs?	RTVS support communities/facilities with virtual emergency coverage	Number of communities/facilities where RTVS provides virtual ED coverage	Peer-support pathways
Does RTVS support a wide range of HCP needs?	RTVS pathways are flexible and can meet a wide range of HCP needs	HCP-reported experience/satisfaction of virtual, collegial support	Peer-support pathways from interviews
 Co-ordination of Care (Funnel): RTVS provides patients multiple points of entry to the health system and connects patients to longitudinal, patient-centered, primary care.			
Question	Objective	Metric	Pathway(s) involved
Are patients referred to appropriate follow-up care for their health concerns?	RTVS connects patients to further health services for follow-up care.	Number of patients with recorded service use following an RTVS encounter, in concordance with the recommended follow-up	HEiDi
Are patients connected to longitudinal, team-based, patient-centered care for their health needs?	RTVS attaches patients to family providers.	Number of (unattached) patients accessing RTVS multiple times	Peer and HEiDi pathways using MOIS/KDR and linked HDPBC data.
Are patients able to access the appropriate care virtually?	RTVS pathways provide appropriate care for each concern/case	RTVS virtual encounter directs patients to care that is responsive to person-centered needs and their community context for in-person service when needed	i) HEiDi (interviews) ii) FNHA pathways (from aggregated data and/or interviews)
 Culturally Safe Care (Feather) RTVS provides high-quality culturally safe care to First Nations and other Indigenous clients and their family members and supports care closer to home.			
Question	Objective	Metric	Pathway(s) involved

Are First Nations and other Indigenous clients able to access culturally safe care virtually?	RTVS provides access to culturally safe primary and specialty care.	Number of First Nations and other Indigenous clients accessing each pathway	FNHA pathways only
	RTVS provides timely access to culturally safe care.	Wait time between request & encounter for First Nations and other Indigenous clients	FNHA pathways only
	RTVS VPs provide culturally safe care.	Number of VPs with cultural safety training	Each RTVS pathway
Does RTVS support First Nations and other Indigenous clients in accessing care closer to home?	RTVS supports rural/remote First Nations and other Indigenous clients that may not have regular in-community health services.	Number of rural/remote First Nations and other Indigenous clients accessing each pathway, by region, age, and sex.	FNHA pathways only
		Number of rural/remote First Nations and other Indigenous clients accessing peer to peer support	Peer to peer pathways
To what extent are providers serving excellent standards of culturally responsive as well as clinically competent virtual services?	RTVS pathway provides culturally safe training and ongoing skills development	Number of providers participating in cultural safety training, gaining accreditation, or improving their portfolio of cultural safety training in other ways	Each RTVS pathway*
	Cultural safety competencies built into job descriptions, recruitment, and ongoing human resources management/performance	Percentage of First Nations and other Indigenous peoples involvement in orientation processes*	Each RTVS pathway*
	Recruitment and retention of First Nations and other indigenous employees*	Percentage of First Nations and other indigenous providers*	Each RTVS pathway*
		Retention rate for First Nations and other indigenous providers*	Each RTVS pathway*
Does RTVS address cultural safety and humility?	RTVS practices cultural safety and humility throughout (through faculty development)	Information on local First Nations and other Indigenous peoples and community's governments and protocols included	Each RTVS pathway*
		Cultural safety and humility concepts practiced through faculty development	Each RTVS pathway*

Building Capacity and Relationships (Fire Department):

RTVS engages in non-clinical activities to build capacity for both RTVS VPs and rural/remote healthcare providers, as well as engaging in outreach to rural, remote, and First Nations and other Indigenous peoples and communities.

Question	Objective	Metric	Pathway(s) involved
Does the RTVS FD provide a range of educational opportunities to support providers?	The RTVS FD offers education sessions for both VPs and HCPs across a range of topics.	Number and type of educational sessions offered by RTVS	Each RTVS pathway
		Number and type of VPs attending sessions	Each RTVS pathway
		HCP/VP reported satisfaction of FD sessions	Each RTVS pathway
Does the RTVS FD build capacity for VPs and RRI HCPs?	The RTVS FD supports VPs' and HCPs' clinical and non-clinical skills.	CME credits given	All RTVS pathways
To what extent are providers in rural, remote, and First Nations and other Indigenous peoples and communities across the province aware of and know how to access the program?	The RTVS FD supports VPs' and HCPs' clinical and non-clinical skills.	How many encounters/HCP per geographic area are accessing peer-support pathways?	Peer-support pathways

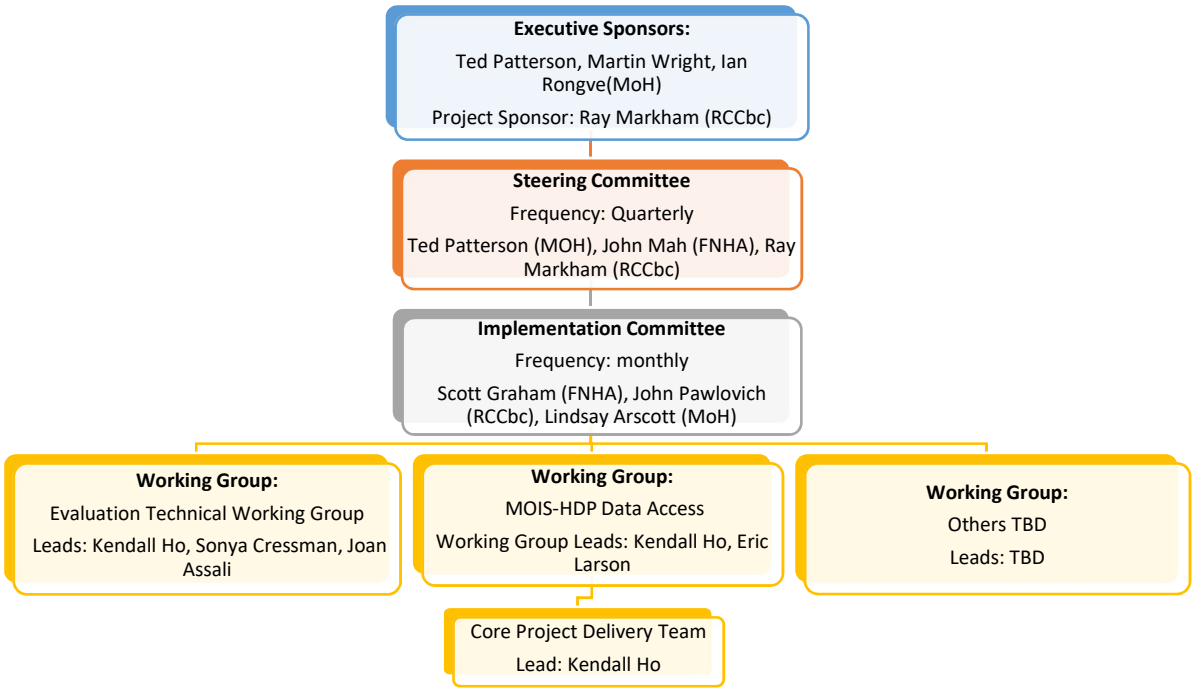
Efficiency (Balance):
RTVS services and activities are efficient and equitably distributed relative to their measured costs and outcomes. Cost-effectiveness is balanced with the goal of Safety Net: to achieve equitable access to RTVS.

Question	Objective	Metric	Pathway(s) involved

What is the cost of operating RTVS?	To understand the cost of operating each RTVS pathway	Identify key proposed costs items for virtual care provision	Each RTVS pathway
What are the costs associated with RTVS service use?	Describe the total health system costs associated with service utilizations following an RTVS encounter	Total health systems cost for 1, 7, 30 and 90 days after an index RTVS encounter for yearly comparisons	Each non-FNHA pathways in 22/23
What is the impact of RTVS on societal costs?	To understand how RTVS affects costs to patients and their families	Length of time for virtual encounters for patient and provider time costs	Each RTVS pathway
		Total time, travel and informal caregiving costs paid by patients and their families to attend virtual care versus ED/FM visits for 1,7, 30 and 90 days after an index RTVS encounter	Each non-FNHA pathways
How does RTVS impact healthcare utilization?	To understand how RTVS affects in-person ED/UPCC utilization (can be positive or negative)	Number of ED visits per caller within 1,7,30 and 90 days after an index RTVS encounter for yearly comparison	Each non-FNHA pathway
	To understand how RTVS affects in-person Ambulance use (can be positive or negative)	Number of patients arriving to ED by ambulance	Each non-FNHA pathway
	To understand how RTVS affects use of transport (can be positive or negative)	Number of patients transported	Each non-FNHA pathway
Recruitment and Retention: RTVS supports existing and new healthcare providers across different medical disciplines serving rural, remote, and First Nations and other Indigenous peoples and communities.			
Question	Objective	Metric	Pathway(s) involved
Does RTVS improve professional workplace environment for recruitment of rural healthcare providers?	Rural healthcare providers are recruited	Recruitment rates across pathways	Each RTVS pathway

Does RTVS improve retention of rural healthcare providers?	Rural healthcare providers are retained*	Retention rates across pathways	Each RTVS pathway
	Learning Health Systems: RTVS achieves social accountability through the principals of a pentagram plus partnership		
Question	Objective	Metric	Pathway(s) involved
Has the RTVS partnership achieved social accountability?	All stakeholders come together and agree on a path forward	Responses to partnership survey*	All RTVS pathways represented by implementation and evaluation technical working group members
How does RTVS support the development of virtual care in health system Transformation?	To document and establish a quadruple-aim LHS model	Number of federal grants received	How does RTVS support the development of virtual care in health system transformation?
Domain to be included in future iterations			
	Integration: RTVS pathways connect patients to timely, episodic specialist care.		

Governance structure/committee structure



APPENDIX 2. HDPBC-LINKED DATA: METHODS AND FINDINGS

Overview

This document aggregates and presents findings for each Health Data Platform BC (HDPBC)-linked metric for the RTVS-LHS 2022-23 year-end evaluation report. Findings are organized by evaluation domain and metric and, where possible/appropriate, presented for all relevant pathways (HEiDi, CHARLiE, MaBAL, and RUDi) and separately by fiscal year (FY20/21, FY21/22). Specific limitations or assumptions made during the analysis are noted in each subsection, as applicable.

Methods in brief

RTVS Encounters

RTVS encounters are recorded in an electronic medical record (EMR) by RTVS providers and staff. The peer pathways record encounters in the MOIS EMR, while HEiDi records in both MOIS and HealthLink BC's KDR system. For fiscal years 20/21 and 21/22 (April 1, 2020, through March 31, 2022, corresponding to two years of RTVS operating), all patient encounters were extracted from the EMR databases. The extracted data were imported to the secure HDPBC environment.

HDPBC Linkage

Within the HDPBC, RTVS encounters can be linked using patients' Personal Health Number (PHN) to administrative databases. The following HDPBC databases were linked:

- Client Roster: patient demographics, attachment, and home geography. Home geography can be linked to the Canadian Indices of Multiple Deprivation to determine economic dependency quintiles.
- Chronic Disease Registry: if a patient has one or more of the 25 categories of chronic diseases.
- Medical Services Plan: fee-for-service claims, e.g., family medicine, specialist, and lab tests.
- National Ambulatory Care Reporting System: emergency department visits.
- Discharge Abstract Database: hospital admissions.
- PharmaNet: prescription drug costs.

Additional data cleaning and quality controls were performed to ensure high confidence in the PHN-based linkages and rates of resource utilizations observed. Encounters missing a PHN were removed from further analysis.

Encounters vs. Patients

For each unique patient (PHN), we determined the "index" RTVS encounter within a 90-day period, with any repeat, post-index encounters within that timeframe being counted as "additional" encounters. As we are linking and calculating resource utilization rates over a 90-day period, this indexing method ensures that post-encounter utilizations are not counted multiple times. This method accounts for the interconnectedness of the peer pathways (e.g., spillover encounters from RUDi to MaBAL), however, we are unable to determine which peer pathway the encounter was originally for.

The table below indicates the total number of index encounters, additional encounters, and unique patients included in the analysis by pathway and fiscal year.

		HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Total index encounters	29556	56	31	621
	Additional encounters	953	13	18	323
	Unique patients	29111	56	31	563

FY21/22	Total index encounters	44349	399	349	2052
	Additional encounters	1403	71	205	1081
	Unique patients	43486	393	336	1780

Disclaimer and Notes

The data, findings, and interpretation presented here do not reflect the views of the HDPBC personnel or Data Stewards/Contributors. The RTVS encounter data and HDPBC administrative data analyzed are limited to the date of collection and amount of follow-up data available since service inception. Thus, it is likely that numbers will shift as the underlying data are updated and interpretations should be made with some degree of caution. Also, any cell sizes of counts less than 10 patients (excluding zero) have been censored to minimize re-identification risk.

Access domain findings

Number of patients accessing RTVS by region, rurality, and attachment status

The following metrics have been calculated on a per patient (PHN) basis, not on a per encounter basis (i.e., a patient may have multiple encounters per fiscal year). This ensures that repeat/high-use patients are not skewing the numbers.

	Health Authority	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Fraser	10635 (36.5%)	0	0	< 10
	Interior	4653 (16.0%)	< 10	< 10	35 (6.2%)
	Northern	1608 (5.5%)	43 (76.8%)	26 (83.9%)	425 (75.5%)
	Vancouver Coastal	6313 (21.7%)	< 10	< 10	89 (15.8%)
	Vancouver Island	5865 (20.1%)	< 10	0	< 10
	Unknown/Missing	37 (0.1%)	0	0	< 10
FY21/22	Fraser	15585 (35.8%)	< 10	14 (4.2%)	26 (1.5%)
	Interior	6759 (15.5%)	20 (5.1%)	26 (7.7%)	190 (10.7%)
	Northern	1979 (4.6%)	205 (52.2%)	206 (61.3%)	1198 (67.3%)
	Vancouver Coastal	10172 (23.4%)	26 (6.6%)	63 (18.8%)	221 (12.4%)
	Vancouver Island	8884 (20.4%)	13 (3.3%)	16 (4.8%)	95 (5.3%)
	Unknown/Missing	110 (0.3%)	125 (31.8%)	11 (3.3%)	50 (2.8%)

Rurality is derived from the Community Health Service Area (CHSA) urban-rural class and dichotomized. There are originally 7 urban-rural levels: metropolitan, medium urban, large urban, and small urban (collapsed into 'urban'); and rural hub, rural, and remote (collapsed into 'rural'). Note, patients' CHSA corresponds to their home geography, which is not necessarily where they accessed care.

	Rurality	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Rural	4461 (15.3%)	42 (75.0%)	27 (87.1%)	484 (86.0%)
	Urban	24559 (84.4%)	14 (25.0%)	< 10	77 (13.7%)
	Unknown/Missing	91 (0.3%)	0	0	< 10
FY21/22	Rural	5967 (13.7%)	192 (48.9%)	249 (74.1%)	1322 (74.3%)
	Urban	34663 (79.7%)	76 (19.3%)	76 (22.6%)	408 (22.9%)
	Unknown/Missing	2856 (6.6%)	125 (31.8%) *	11 (3.3%)	50 (2.8%)
*Data for the CHARLiE pathway are limited by availability of rurality and attachment fields for pediatric populations in the administrative data.					

Attachment Status is derived from two variables already included in the HDPBC administrative data. The original variables are flags for if a patient is attached to a family provider or a family practice, both of which are calculated following a Ministry of Health algorithm. We have collapsed these two variables into a single Attachment Status variable representing >=3 same provider visits.

	Attachment Status	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Attached	23299 (80.0%)	43 (76.8%)	22 (71.0%)	369 (65.5%)
	Unattached	4593 (15.8%)	12 (21.4%)	< 10	146 (25.9%)
	Unknown/Missing	1219 (4.2%)	< 10	< 10	48 (8.5%)
FY21/22	Attached	32243 (74.1%)	160 (40.7%)	225 (67.0%)	1167 (65.6%)
	Unattached	5720 (13.2%)	52 (13.2%)	81 (24.1%)	400 (22.5%)
	Unknown/Missing	5523 (12.7%)	181 (46.1%)	30 (8.9%)	213 (12.0%)
*Data for the CHARLiE pathway are limited by availability of rurality and attachment fields for pediatric populations in the administrative data.					

Attachment (>3 same provider visits) Status Disaggregated by Health Authority

Attachment status was further disaggregated by Health Authority and fiscal year for HEiDi and RUDi, given their relative larger sample sizes.

HEiDi

	Attachment Status	Fraser	Interior	Northern	Vancouver Coastal	Vancouver Island
FY20/21	Unique patients	10635	4653	1608	6313	5865
	Attached	8568 (80.6%)	3816 (82.0%)	1246 (77.5%)	5053 (80.0%)	4613 (78.7%)
	Unattached	1727 (16.2%)	621 (13.3%)	295 (18.3%)	926 (14.7%)	1023 (17.4%)
	Unknown/Missing	340 (3.2%)	216 (4.6%)	67 (4.2%)	334 (5.3%)	229 (3.9%)
FY21/22	Unique patients	15585	6758	1979	10171	8883
	Attached	11627 (74.6%)	5192 (76.8%)	1438 (72.7%)	7479 (73.5%)	6505 (73.2%)
	Unattached	2103 (13.5%)	727 (10.8%)	302 (15.3%)	1198 (11.8%)	1388 (15.6%)
	Unknown/Missing*	1855 (11.9%)	839 (12.4%)	239 (12.1%)	1494 (14.7%)	990 (11.1%)
*Note, rates of missing attachment data are higher than expected for FY21/22, likely due to the linked HDPBC data not being updated for all patients.						

RUDi

	Attachment Status	Fraser	Interior	Northern	Vancouver Coastal	Vancouver Island
FY20/21	Unique patients	< 10	35	425	89	< 10
	Attached	< 10	27 (77.1%)	272 (64.0%)	61 (68.5%)	< 10

	Unattached	< 10	< 10	107 (25.2%)	28 (31.5%)	< 10
	Unknown/Missing	< 10	< 10	46 (10.8%)	0	0
FY21/22	Unique patients	26	190	1198	221	95
	Attached	19 (73.1%)	138 (72.6%)	774 (64.6%)	164 (74.2%)	69 (72.6%)
	Unattached	< 10	36 (18.9%)	291 (24.3%)	48 (21.7%)	17 (17.9%)
	Unknown/Missing*	< 10	16 (8.4%)	133 (11.1%)	< 10	< 10
*Note, rates of missing attachment data are higher than expected for FY21/22, likely due to the linked HDPBC data not being updated for all patients.						

Annual ratio of virtual: in-person ED visits (by age, sex, and region)

Total number of virtual encounters per pathway to the total number of ED visits per fiscal year (note, ED visits can occur before or after the RTVS encounter). For example, for HEiDi for FY20/21, there were a total of 30371 encounters. For the unique patients recording those HEiDi encounters, they also recorded 47669 total ED visits during FY20/21. This corresponds to a ratio of 30371:47669 (1.6 ED visits per encounter). Note, where patients are missing demographic information, they have been excluded from the sub-tables below.

Overall

	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	1.57	1.82*	5.00*	2.31
FY21/22	1.40	0.64	0.97	0.95

Age group

	Age Group	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	0-14 years	0.91	1.90	0.75	0.41
	15-64 years	1.67	1.17	5.52	2.56
	65+ years	2.15	n/a	6.25	2.43
FY21/22	0-14 years	1.11	0.58	0.22	0.31
	15-64 years	1.42	1.56	1.06	1.02
	65+ years	1.82	n/a	1.15	1.05

Sex

	Sex	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Female	1.58	1.27	3.85	2.01
	Male	1.53	2.46	11	2.74
FY21/22	Female	1.40	0.65	0.72	0.89
	Male	1.39	0.65	1.45	1.01

Health Authority

	Health Authority	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Fraser	1.84	n/a	n/a	20.30

	Interior	1.09	4.75	5.00	3.40
	Northern	0.88	1.44	1.92	1.94
	Vancouver Coastal	1.45	1.25	20.70	1.71
	Vancouver Island	1.76	6.00	n/a	17.80
FY21/22	Fraser	1.70	1.50	1.21	2.56
	Interior	0.90	1.70	0.66	1.17
	Northern	0.96	0.61	1.17	0.86
	Vancouver Coastal	1.27	0.63	2.00	0.80
	Vancouver Island	1.50	2.31	1.12	1.99

Percentage of Rural and Remote, Urban geographies per HA and BC total that has accessed the service at least once in the last year

Remote, rural, and urban geographies were determined using the CHSA urban-rural class, collapsed into the three categories as follows: metropolitan, medium urban, large urban, and small urban (collapsed into 'urban'); rural hub and rural (collapsed into 'rural'); and remote (no change). Note, CHSA is derived from each patient's home geography, not necessarily where they accessed care.

	Health Authority	Rurality	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	Fraser	Remote (n=0)	--	--	--	--
		Rural (n=6)	100%	0	0	0
		Urban (n=37)	100%	0	0	3 (8%)
	Interior	Remote (n=1)	100%	0	0	1 (100%)
		Rural (n=28)	100%	4 (14.3%)	1 (4%)	11 (39%)
		Urban (n=12)	100%	0	0	4 (33%)
	Northern	Remote (n=11)	9 (82%)	3 (27%)	5 (45%)	8 (73%)
		Rural (n=21)	100%	8 (38%)	6 (29%)	14 (67%)
		Urban (n=8)	100%	4 (50%)	1 (13%)	7 (88%)
	Vancouver Coastal	Remote (n=2)	100%	2 (100%)	1 (50%)	2 (100%)
		Rural (n=7)	100%	1 (14%)	0	2 (29%)
		Urban (n=36)	100%	1 (3%)	1 (3%)	6 (17%)
	Vancouver Island	Remote (n=2)	100%	0	0	0
		Rural (n=20)	100%	0	0	3 (15%)
		Urban (n=27)	100%	1 (4%)	0	5 (19%)
	British Columbia	Remote (n=16)	14 (88%)	5 (31%)	6 (38%)	11 (69%)
		Rural (n=82)	100%	13 (16%)	7 (9%)	30 (37%)
		Urban (n=120)	100%	6 (5%)	2 (2%)	25 (21%)
FY21/22	Fraser	Remote (n=0)	--	--	--	--
		Rural (n=6)	100%	1 (17%)	1 (17%)	2 (33%)
		Urban (n=37)	100%	3 (8%)	9 (24%)	17 (46%)
	Interior	Remote (n=1)	100%	0	1 (100%)	1 (100%)
		Rural (n=28)	100%	11 (39%)	9 (32%)	17 (61%)
		Urban (n=12)	100%	6 (50%)	4 (33%)	11 (92%)
	Northern	Remote (n=11)	10 (91%)	9 (82%)	8 (73%)	10 (91%)
		Rural (n=21)	100%	16 (76%)	15 (71%)	19 (91%)
		Urban (n=8)	100%	5 (63%)	6 (75%)	8 (100%)
	Vancouver Coastal	Remote (n=2)	100%	2 (100%)	2 (100%)	2 (100%)
		Rural (n=7)	100%	2 (29%)	1 (14%)	6 (86%)
		Urban (n=36)	100%	6 (17%)	7 (19%)	17 (47%)
	Vancouver Island	Remote (n=2)	100%	0	2 (100%)	2 (100%)
		Rural (n=20)	100%	6 (30%)	6 (30%)	15 (75%)
		Urban (n=27)	100%	3 (11%)	6 (22%)	16 (59%)
	British Columbia	Remote (n=16)	15 (94%)	11 (69%)	13 (81%)	15 (94%)

		Rural (n=82)	100%	36 (44%)	32 (39%)	59 (72%)
		Urban (n=120)	100%	23 (19%)	32 (27%)	69 (58%)

Percentage of RR and URB geographies and BC total that has accessed the service at least once in the last year AND had accessed in the previous term

This metric compares data from FY21/22 to FY21/22.

- For HEiDi, 217 of 218 CHSAs accessed the service in both years. In FY21/22, one remote CHSA accessed HEiDi that had not accessed in FY20/21. Of the 218 CHSAs in BC, one has not accessed HEiDi in either FY20/21 or FY21/22.
- For CHARLiE, one urban CHSA accessed the service only in FY20/21. However, six remote, 23 rural, and 18 urban CHSAs accessed the service in FY21/22 but not in FY20/21. Growth was primarily seen for the remote Northern CHSAs and rural Northern and Vancouver Island CHSAs.
- For MaBAL, one rural CHSA accessed the service only in FY20/21. However, seven remote, 26 rural, and 30 urban CHSAs accessed the service in FY21/22 but not in FY20/21. Growth was seen across remote and rural CHSAs in BC (except for Fraser HA).
- For RUDi, four rural and two urban CHSAs accessed the service only in FY20/21. However, four remote, 33 rural, and 46 urban CHSAs accessed the service in FY21/22 but not in FY20/21. Growth was seen across all CHSA types in BC.

Demographics by Fiscal Year

Note, the “Attachment” variable below represents >=3 same provider visits.

HEiDi

	FY20/21 (n = 29,111)	FY21/22 (n = 43,486)
Sex, female	18390 (63.2%)	27092 (62.3%)
Missing	0	< 10
Age, mean (SD), years	35.7 (24.6)	37.3 (23.9)
Age group, years		
0-14	6723 (23.1%)	10713 (24.6%)
15-64	17852 (61.3%)	26228 (60.3%)
65+	4534 (15.6%)	6534 (15.0%)
Missing	< 10	11 (0.0%)
Attached	23299 (80.0%)	32243 (74.1%)
Missing	1219 (4.2%)	5523 (12.7%)
Rural/remote	4461 (15.3%)	5967 (13.7%)
Missing	91 (0.3%)	2856 (6.6%)
Health Authority		
Fraser	10635 (36.5%)	15585 (35.8%)
Interior	4653 (16.0%)	6758 (15.5%)
Northern	1608 (5.5%)	1979 (4.6%)
Vancouver Coastal	6313 (21.7%)	10171 (23.4%)
Vancouver Island	5865 (20.1%)	8883 (20.4%)
Missing	37 (0.1%)	110 (0.3%)
Chronic disease present	16345 (56.1%)	23220 (53.4%)
Economic dependency quintile		
1 – least deprived	7695 (26.4%)	11025 (25.4%)
2	6073 (20.9%)	8353 (19.2%)
3	5346 (18.4%)	7651 (17.6%)
4	4953 (17.0%)	6993 (16.1%)

5 – most deprived	4932 (16.9%)	6584 (15.1%)
Missing	112 (0.4%)	2880 (6.6%)

CHARLiE

	FY20/21 (n = 56)	FY21/22 (n = 393)
Sex, female	30 (53.6%)	160 (40.7%)
Missing	0	21 (5.3%)
Age, mean (SD), years	5.0 (6.1)	5.0 (6.1)
Age group		
0-14	50 (89.3%)	359 (91.3%)
15-64	< 10	27 (6.9%)
Missing	0	< 10
Attached	43 (76.8%)	160 (40.7%)
Missing	< 10	181 (46.1%)
Rural/remote	42 (75.0%)	192 (48.9%)
Missing	0	125 (31.8%)
Health Authority		
Fraser	0	< 10
Interior	< 10	20 (5.1%)
Northern	43 (76.8%)	205 (52.2%)
Vancouver Coastal	< 10	26 (6.6%)
Vancouver Island	< 10	13 (3.3%)
Missing	0	125 (31.8%)
Chronic disease present	< 10	34 (8.7%)
Economic dependency quintile		
1 – least deprived	< 10	47 (12.0%)
2	21 (37.5%)	62 (15.8%)
3	< 10	46 (11.7%)
4	14 (25.0%)	66 (16.8%)
5 – most deprived	< 10	45 (11.5%)
Missing	0	127 (32.3%)

MaBAL

	FY20/21 (n = 31)	FY21/22 (n = 336)
Sex, female	26 (83.9%)	223 (66.4%)
Age, mean (SD), years	35.4 (21.8)	39.1 (22.4)
Age group		
0-14	< 10	44 (13.1%)
15-64	23 (74.2%)	240 (71.4%)
65+	< 10	52 (15.5%)
Attached	22 (71.0%)	225 (67.0%)
Missing	< 10	30 (8.9%)
Rural/remote	27 (87.1%)	249 (74.1%)
Missing	0	11 (3.3%)
Health Authority		
Fraser	0	14 (4.2%)
Interior	< 10	26 (7.7%)
Northern	26 (83.9%)	206 (61.3%)
Vancouver Coastal	< 10	63 (18.8%)
Vancouver Island	0	16 (4.8%)
Missing	0	11 (3.3%)
Chronic disease present	19 (61.3%)	205 (61.0%)
Economic dependency quintile		

1 – least deprived	< 10	23 (6.8%)
2	< 10	58 (17.3%)
3	< 10	26 (7.7%)
4	< 10	55 (16.4%)
5 – most deprived	14 (45.2%)	163 (48.5%)
Missing	0	11 (3.3%)

RUDi

	FY20/21 (n = 563)	FY21/22 (n = 1780)
Sex, female	330 (58.6%)	910 (51.1%)
Age, mean (SD), years	44.6 (22.1)	45.2 (23.0)
Age group		
0-14	61 (10.8%)	202 (11.3%)
15-64	378 (67.1%)	1183 (66.5%)
65+	124 (22.0%)	395 (22.2%)
Attached	369 (65.5%)	1167 (65.6%)
Missing	48 (8.5%)	213 (12.0%)
Rural/remote	484 (86.0%)	1322 (74.3%)
Missing	< 10	50 (2.8%)
Health Authority		
Fraser	< 10	26 (1.5%)
Interior	35 (6.2%)	190 (10.7%)
Northern	425 (75.5%)	1198 (67.3%)
Vancouver Coastal	89 (15.8%)	221 (12.4%)
Vancouver Island	< 10	95 (5.3%)
Missing	< 10	50 (2.8%)
Chronic disease present	401 (71.2%)	1203 (67.6%)
Economic dependency quintile		
1 – least deprived	23 (4.1%)	167 (9.4%)
2	64 (11.4%)	249 (14.0%)
3	33 (5.9%)	148 (8.3%)
4	113 (20.1%)	297 (16.7%)
5 – most deprived	326 (57.9%)	862 (48.4%)
Missing	< 10	57 (3.2%)

Rates of access/population/geographic region (CHSA)

For each pathway and for each fiscal year, the total number of encounters (index plus additional) were counted for each CHSA.

HEiDi

CHSA	Health Authority	Fiscal Year	Number of Encounters	Number of Encounters per 10,000 Residents
Langford/Highlands	Vancouver Island	2021	677	178
Downton Victoria/Vic West	Vancouver Island	2021	507	162
Gabriola Island	Vancouver Island	2021	65	161
Oaklands/Fernwood	Vancouver Island	2021	355	158
James Bay/Fairfield	Vancouver Island	2021	484	151

View Royal	Vancouver Island	2021	152	146
West Coast	Vancouver Island	2021	79	143
Mount Pleasant	Vancouver Coastal	2021	468	143
Quadra/Swan Lake	Vancouver Island	2021	339	140
Houston	Northern	2021	48	139

CHARLiE

CHSA	Health Authority	Fiscal Year	Number of Encounters	Number of Encounters per 10,000 Residents
Prince Rupert Rural	Northern	2021	18	141
Nisga'a	Northern	2021	14	75
Central Coast	Vancouver Coastal	2021	< 10	59
Telegraph Creek	Northern	2021	< 10	50
Haida Gwaii Norther	Northern	2021	< 10	43
Smithers Town Centre	Northern	2021	18	29
Terrace City Centre	Northern	2021	34	28
Smithers Rural	Northern	2021	19	28
Fraser Lake	Northern	2021	< 10	24
Chetwynd	Northern	2021	< 10	24

MaBAL

CHSA	Health Authority	Fiscal Year	Number of Encounters	Number of Encounters per 10,000 Residents
Prince Rupert Rural	Northern	2021	113	882
Bella Coola Valley	Vancouver Coastal	2021	71	265
Telegraph Creek	Northern	2021	13	218
Prince Rupert Rural	Northern	2020	14	109
Mackenzie	Northern	2021	41	93
Kitimat	Northern	2021	68	75
Stikine	Northern	2021	< 10	68
Central Coast	Vancouver Coastal	2021	< 10	40
Fort St. James North	Northern	2021	17	37
Telegraph Creek	Northern	2020	< 10	34

RUDi

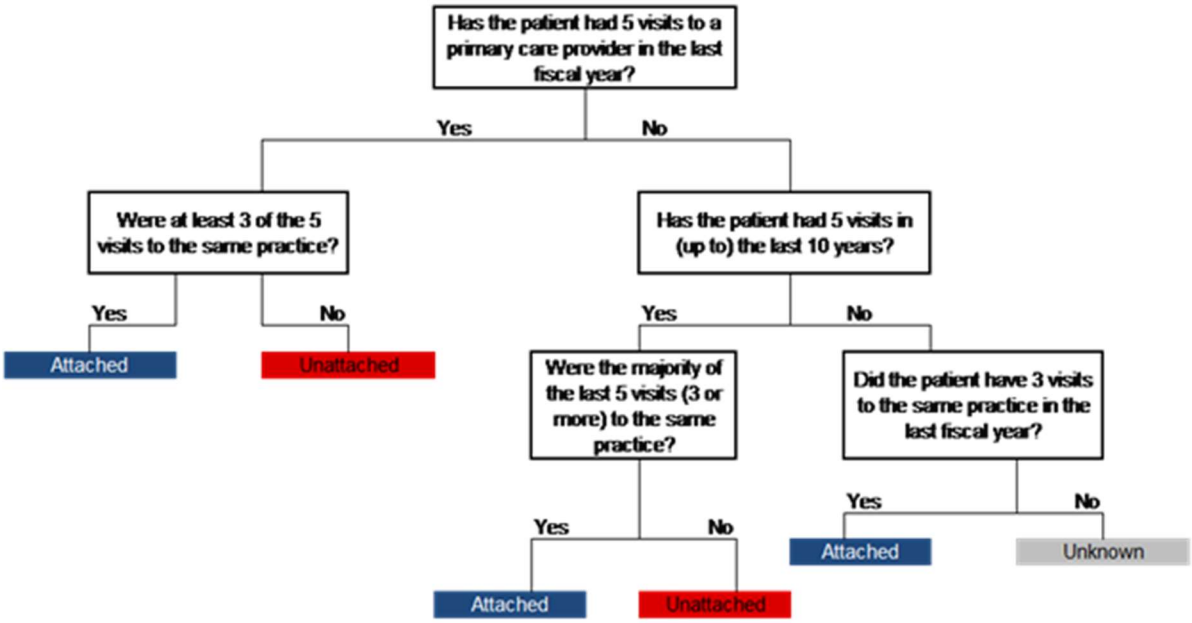
CHSA	Health Authority	Fiscal Year	Number of Encounters	Number of Encounters per 10,000 Residents
Prince Rupert Rural	Northern	2021	635	4957
Prince Rupert Rural	Northern	2020	202	1577
Stikine	Northern	2021	153	1481
Telegraph Creek	Northern	2021	83	1395
Bella Coola Valley	Vancouver Coastal	2021	324	1210
Mackenzie	Northern	2021	206	467
Bella Coola Valley	Vancouver Coastal	2020	114	426
Stikine	Northern	2020	43	416
Kitimat	Northern	2021	375	413
Telegraph Creek	Northern	2020	23	387

Funnel domain findings

Number of patients with recorded service use following an RTVS encounter, in concordance with the recommended follow-up

This metric is calculated for HEiDi only, as HEiDi physicians provide a follow-up care recommendation to patients (i.e., disposition) and this is captured in the HEiDi data. Following our previous work, we calculate concordance based on a patient's service use in the following 7 days (e.g., if a HEiDi patient is advised to "Go to ED now", they are concordant if they record an ED visit in the next seven days). For the dispositions "See MD now" and "Schedule MD appointment," patients were determined to be concordant if they recorded any type of MSP fee-for-service Family Medicine claim. For "Home treatment," patients are concordant if they do not record any ED visit, MSP fee-for-service claim, or hospitalization.

MOH Attachment Algorithm



Number of unique unattached patients accessing RTVS in 2020 or 2021 who converted to attached in the following fiscal year

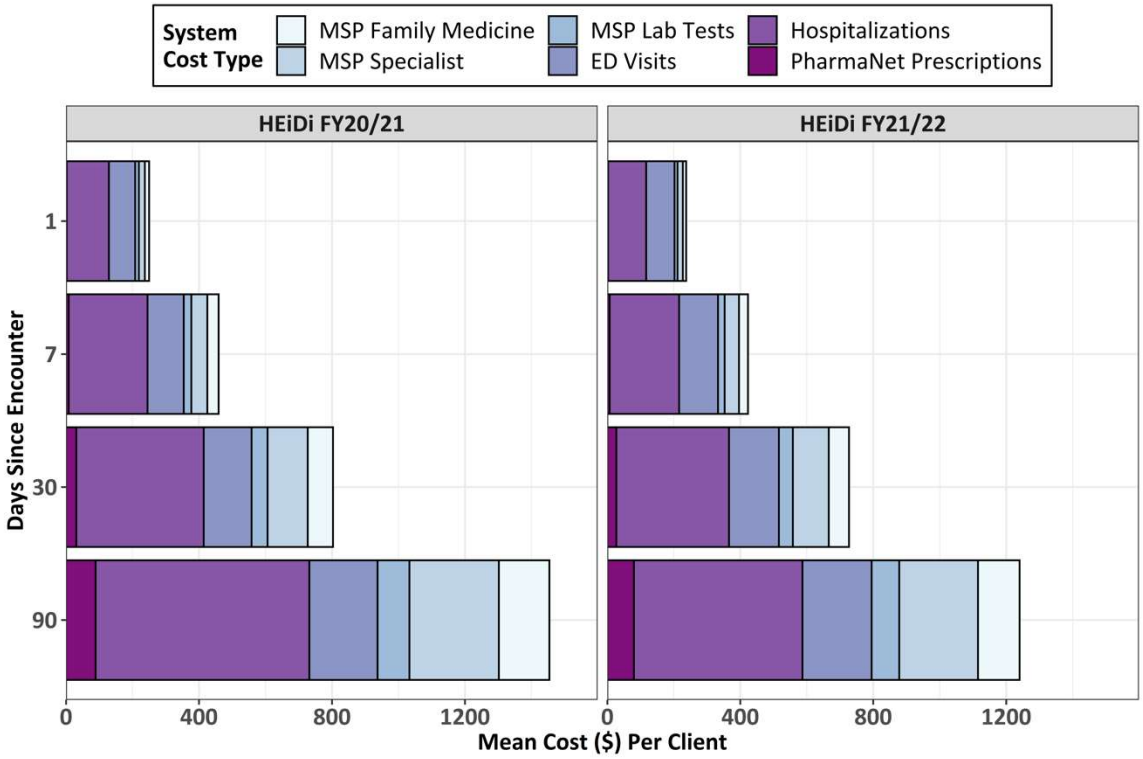
Limitation: Please note the limitations concerning the "attachment" indicator discussed in the main text, primarily how the indicator is a better reflection of episodic care with a primary care provider, rather than a true longitudinal care relationship with a client and provider.

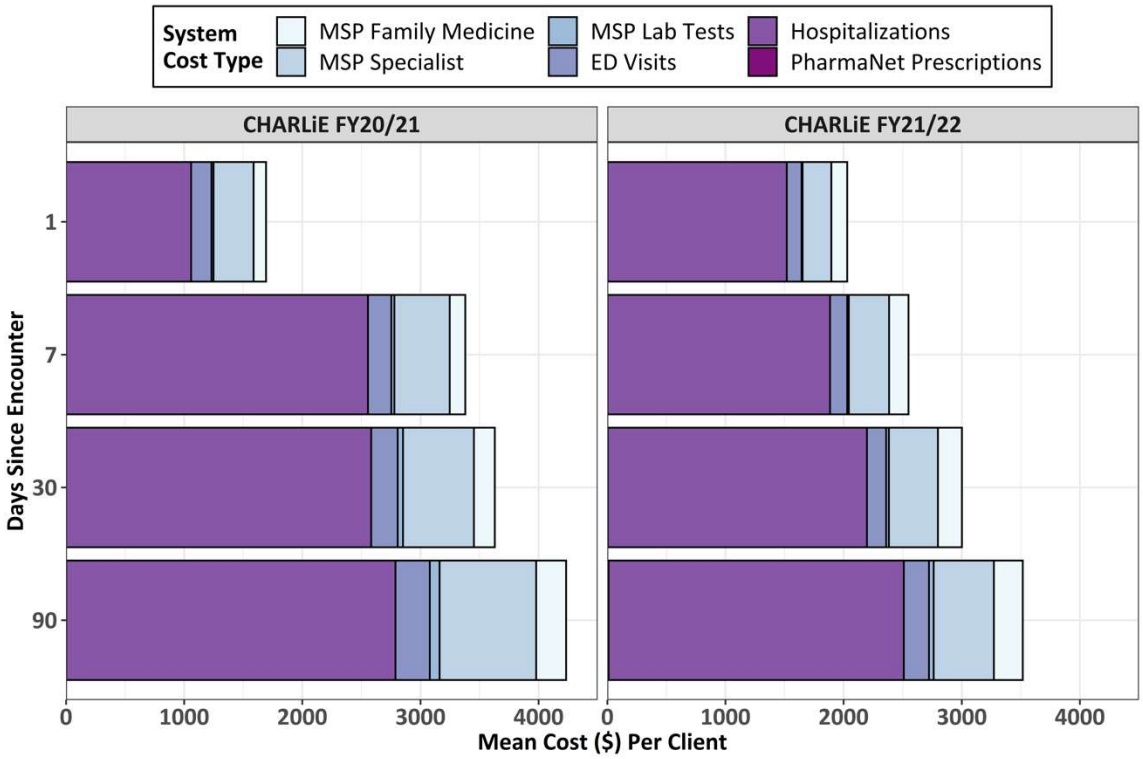
	Original "Attachment" Status	Conversion Status	HEiDi	CHARLiE	MaBAL	RUDi
FY20/21	"Unattached"	Unique patients	4593	12	< 10	146
		Converted to "attached"	1913 (41.7%)	< 10	< 10	46 (31.5%)
		Remained "unattached"	2680 (58.3%)	< 10	< 10	100 (68.5%)
	Unknown/Missing	Unique patients	1219	< 10	< 10	48
		Converted to "attached"	199 (16.3%)	< 10	< 10	< 10
		Remained "unattached"	1020 (83.7%)	< 10	< 10	47 (97.9%)
FY21/22	"Unattached"	Unique patients	5720	52	81	400
		Converted to "attached"	2490 (43.5%)	17 (32.7%)	34 (42.0%)	121 (30.2%)
		Remained "unattached"	3230 (56.5%)	35 (67.3%)	47 (58.0%)	279 (69.8%)
	Unknown/Missing	Unique patients	5523	181	30	213
		Converted to "attached"	2574 (46.6%)	90 (49.7%)	13 (43.3%)	19 (8.9%)
		Remained "unattached"	2949 (53.4%)	91 (50.3%)	17 (56.7%)	194 (91.1%)

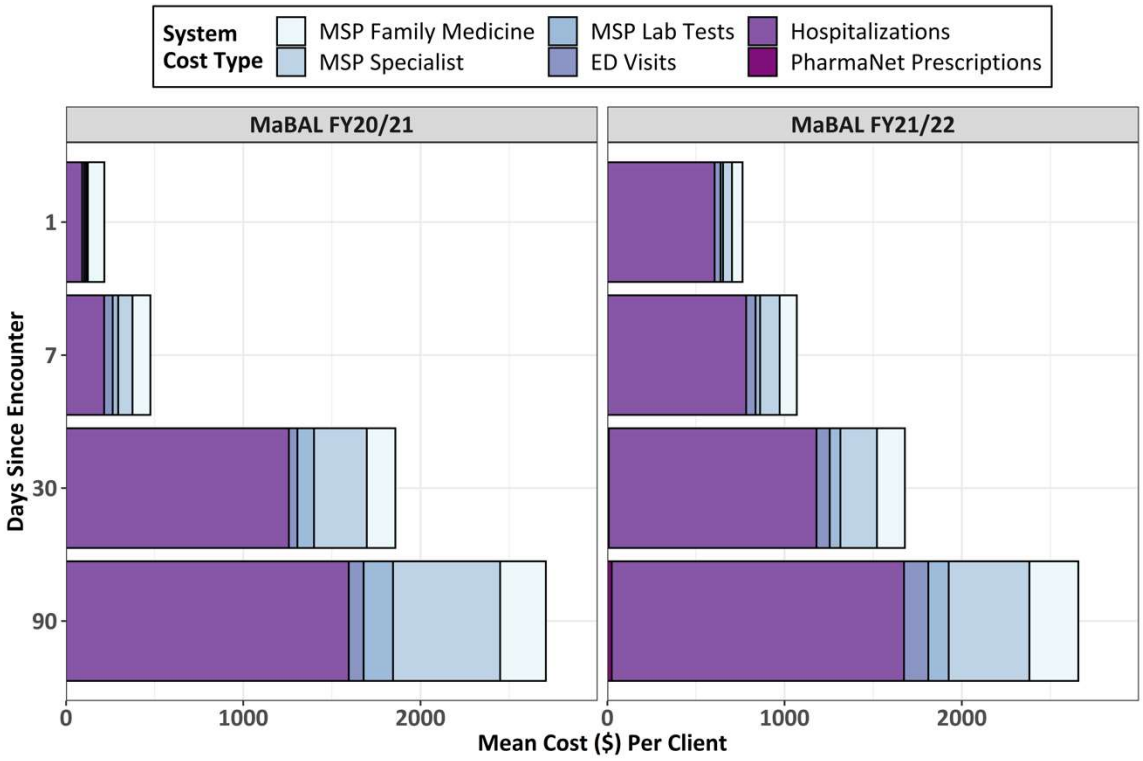
Balance domain findings

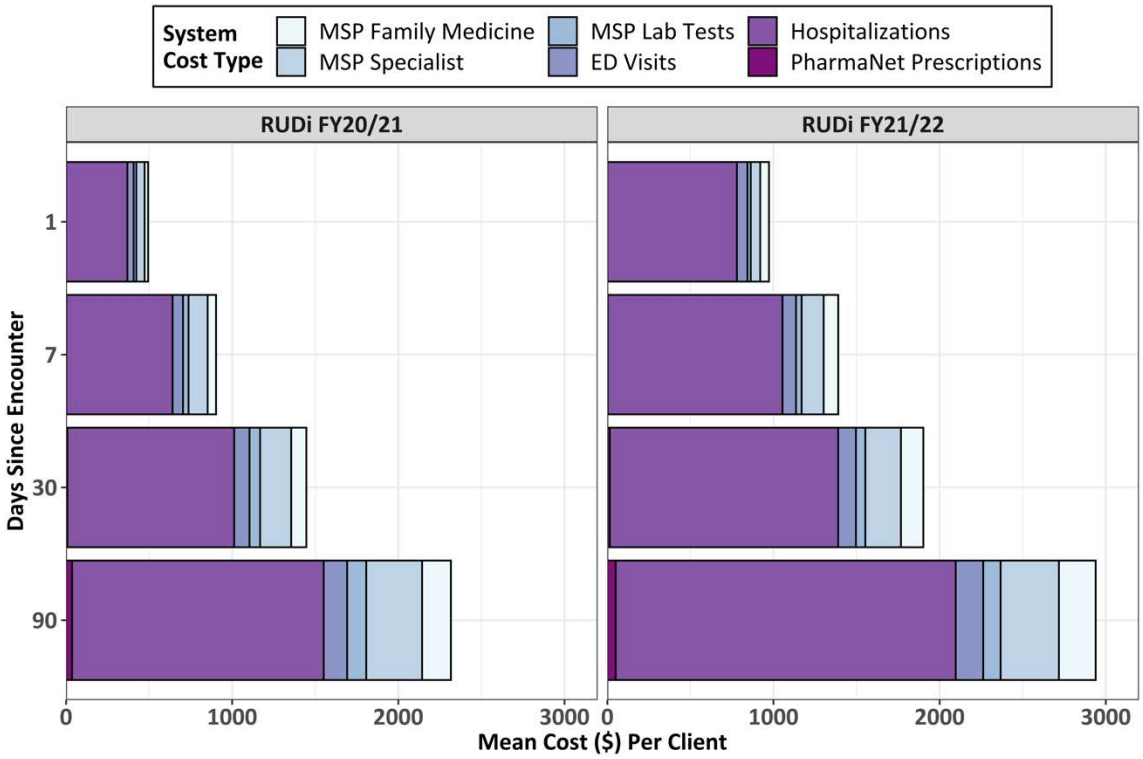
Total health systems cost for 1, 7, 30 and 90 days after an index RTVS encounter for yearly comparison reporting

For each index encounter, we linked the number of hospitalizations, ED visits, MSP fee-for-service claims (family medicine, specialists, lab tests), and PharmaNet prescription claims for each of the following one-, seven-, 30-, and 90-day periods. Each resource utilization was multiplied by its health system cost and totaled by each time period to determine the total post-encounter cost paid by the health system. Pre-2022-dollar values were adjusted to 2022 Canadian dollars where necessary using the Consumer Price Index annual percentage change for the healthcare services subcategory.



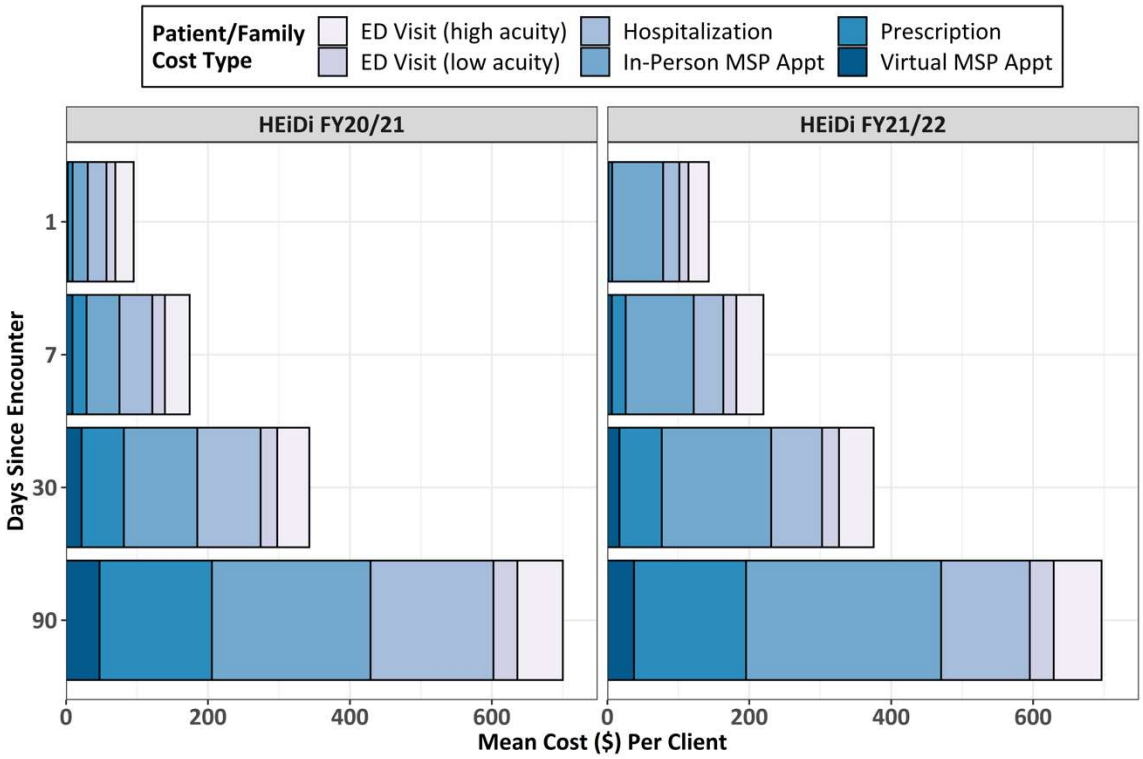

System Cost Type
MSP Family Medicine
MSP Specialist
MSP Lab Tests
ED Visits
Hospitalizations
PharmaNet Prescriptions
CHARLiE FY20/21
CHARLiE FY21/22
Days Since Encounter
1
7
30
90
0
1000
2000
3000
4000
Mean Cost ($) Per Client

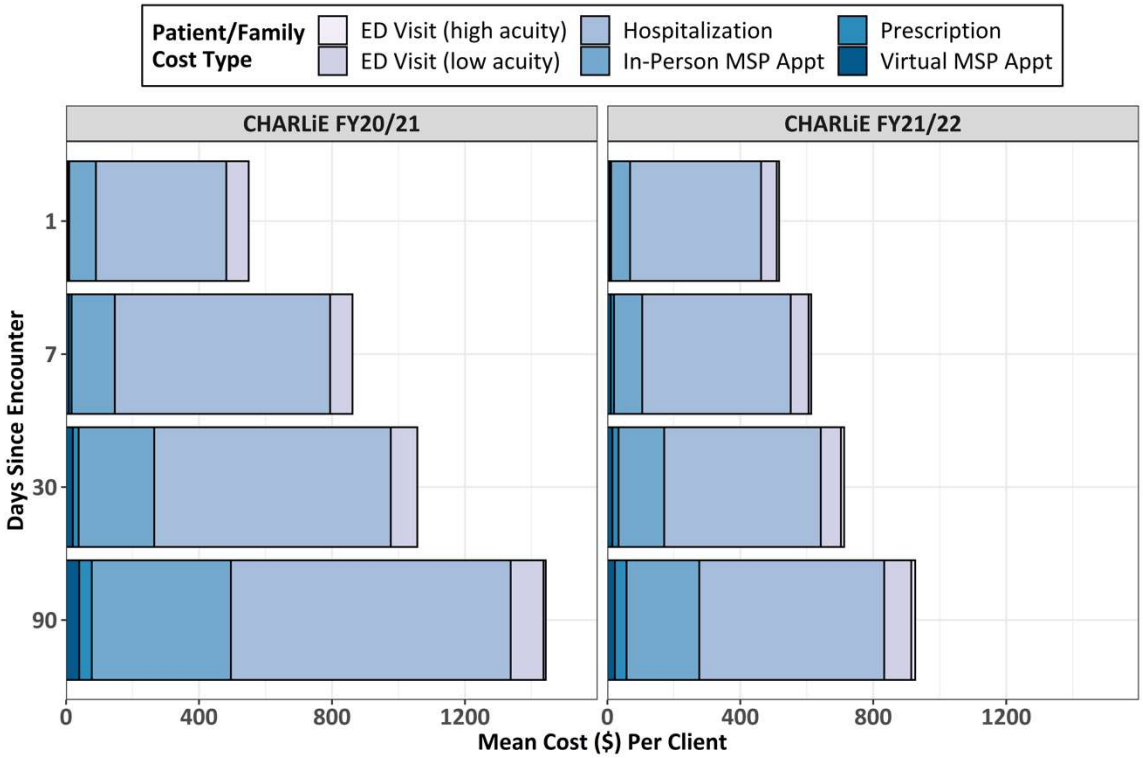

System Cost Type
MSP Family Medicine
MSP Specialist
MSP Lab Tests
ED Visits
Hospitalizations
PharmaNet Prescriptions
MaBAL FY20/21
MaBAL FY21/22
Days Since Encounter
1
7
30
90
0
1000
2000
Mean Cost ($) Per Client

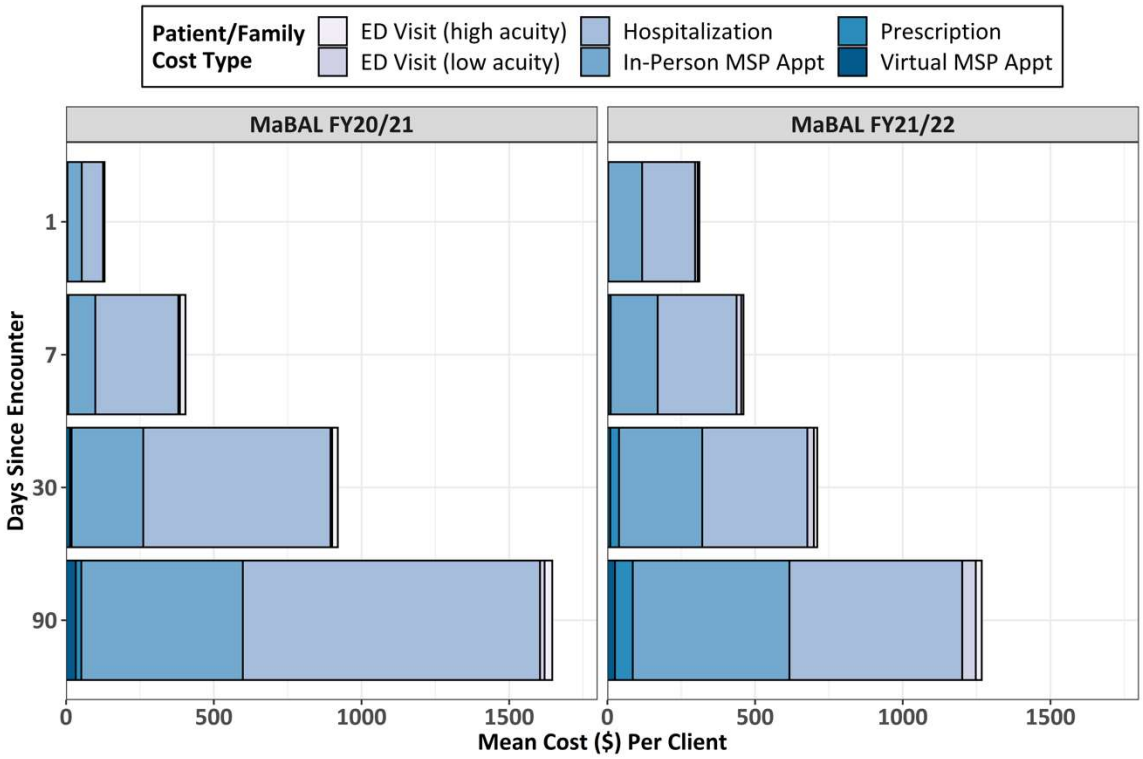


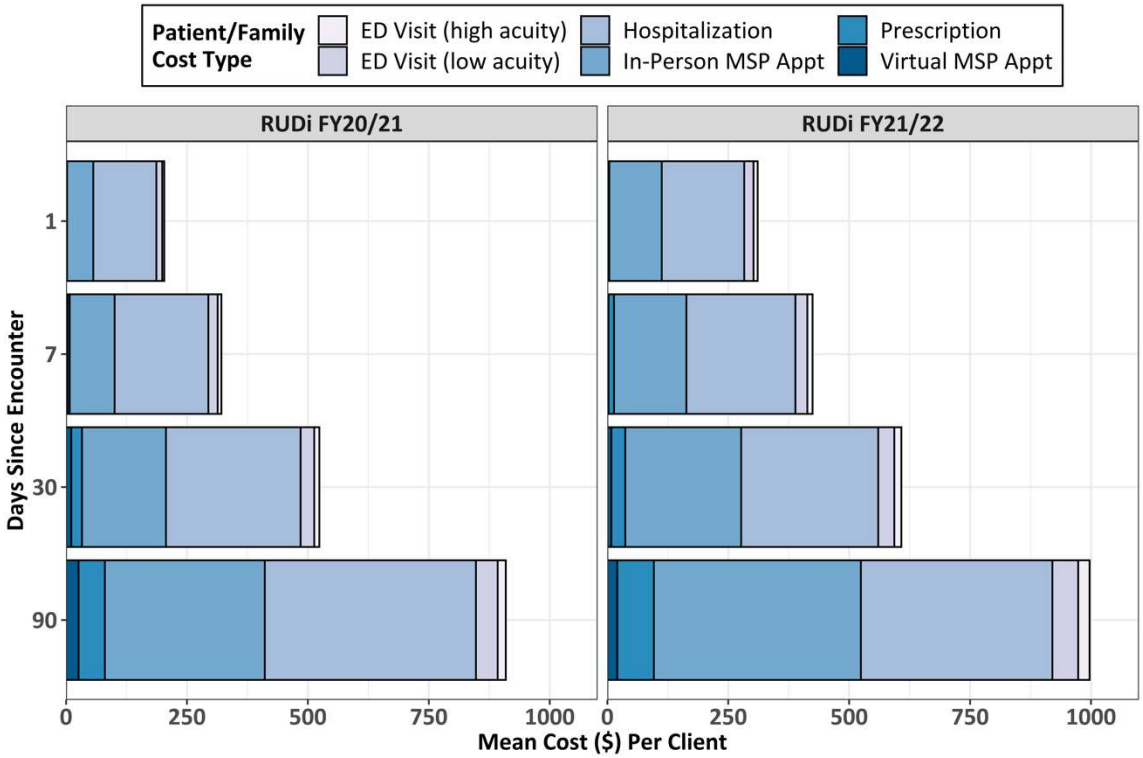
Total time, travel and informal caregiving costs paid by patients and their families to attend virtual care versus ED/FM visits for 1,7, 30 and 90 days after an index RTVS encounter

For each resource utilization following an index encounter, we calculated the cost paid by patients/families (i.e., what is not paid by the health system) for the one-, seven-, 30-, and 90-day periods following their index encounter. Patient/family costs were separately calculated by utilization type: hospital admission, high-acuity ED visit, low-acuity ED visit, in-person MSP claim, virtual MSP claim, and prescription costs not covered by PharmaCare. Patient/family costs were also separately calculated by health authority and age group, so any patient encounters missing these variables were omitted from this summary. Pre-2022-dollar values were adjusted to 2022 Canadian dollars where necessary.


Patient/Family Cost Type
ED Visit (high acuity)
ED Visit (low acuity)
Hospitalization
In-Person MSP Appt
Prescription
Virtual MSP Appt
HEiDi FY20/21
HEiDi FY21/22
Days Since Encounter
1
7
30
90
0
200
400
600
Mean Cost ($) Per Client


Patient/Family Cost Type
ED Visit (high acuity)
ED Visit (low acuity)
Hospitalization
In-Person MSP Appt
Prescription
Virtual MSP Appt
CHARLiE FY20/21
CHARLiE FY21/22
Days Since Encounter
1
7
30
90
0
400
800
1200
Mean Cost ($) Per Client


Patient/Family Cost Type
ED Visit (high acuity)
ED Visit (low acuity)
Hospitalization
In-Person MSP Appt
Prescription
Virtual MSP Appt
MaBAL FY20/21
MaBAL FY21/22
Days Since Encounter
1
7
30
90
0
500
1000
1500
Mean Cost ($) Per Client


Patient/Family Cost Type
ED Visit (high acuity)
ED Visit (low acuity)
Hospitalization
In-Person MSP Appt
Prescription
Virtual MSP Appt
RUDi FY20/21
RUDi FY21/22
Days Since Encounter
1
7
30
90
0
250
500
750
1000
Mean Cost ($) Per Client

Number of ED visits per caller within 1,7,30 and 90 days after an index RTVS encounter for yearly comparison

HEiDi

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ED visits	6307	8725	11473	16360
	Number of ED visits per index encounter	0.21	0.23	0.30	0.31
FY21/22	Number of ED visits	10161	13953	17985	24959
	Number of ED visits per index encounter	0.39	0.41	0.55	0.56

CHARLiE

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ED visits	26	30	34	44
	Number of ED visits per index encounter	0.46	0.54	0.61	0.79
FY21/22	Number of ED visits	135	156	176	229
	Number of ED visits per index encounter	0.34	0.39	0.44	0.57

MaBAL

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ED visits	< 10	< 10	< 10	< 10
	Number of ED visits per index encounter	--	--	--	--
FY21/22	Number of ED visits	32	50	71	129
	Number of ED visits per index encounter	0.09	0.14	0.20	0.37

RUDi

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ED visits	64	106	154	237
	Number of ED visits per index encounter	0.10	0.17	0.25	0.38
FY21/22	Number of ED visits	351	453	593	912
	Number of ED visits per index encounter	0.17	0.22	0.29	0.44

Number of patients arriving to ED by ambulance

Data on ambulance arrivals is available from the NACRS and DAD databases, but not from MSP. The subset of ED visits recorded in the NACRS and DAD were used to calculate this metric. Ambulance arrival was collapsed into a single binary yes/no variable (the original ambulance flag includes mode of transport).

HEiDi

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ambulance arrivals	424 (7.5%)	729 (9.5%)	1209 (12.0%)	2055 (14.4%)
	Number of ED visits with available data	5641	7683	10072	14288
FY21/22	Number of ambulance arrivals	590 (6.6%)	1039 (8.5%)	1614 (10.3%)	2645 (12.1%)
	Number of ED visits with available data	8899	12168	15691	21759

CHARLiE

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ambulance arrivals	< 10	< 10	< 10	< 10
	Number of ED visits with available data	12	16	16	19
FY21/22	Number of ambulance arrivals	21 (28.8%)	27 (31.4%)	29 (29.9%)	34 (28.3%)
	Number of ED visits with available data	73	86	97	120

MaBAL

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ambulance arrivals	0	< 10	< 10	< 10
	Number of ED visits with available data	0	< 10	< 10	< 10
FY21/22	Number of ambulance arrivals	14 (58.3%)	20 (54.1%)	25 (47.2%)	29 (39.2%)
	Number of ED visits with available data	24	37	53	74

RUDi

		1 Day	7 Days	30 Days	90 Days
FY20/21	Number of ambulance arrivals	29 (59.2%)	38 (48.1%)	48 (43.6%)	77 (46.1%)
	Number of ED visits with available data	49	79	110	167
FY21/22	Number of ambulance arrivals	157 (60.9%)	177 (54.1%)	211 (49.6%)	281 (44.6%)
	Number of ED visits with available data	258	327	425	630

APPENDIX 3. PARTNER DATA: METHODS AND FINDINGS

Overview

This document aggregates and presents findings for each call/encounter metric for the RTVS-LHS 2022-23 year-end evaluation report. Findings are organized by evaluation domain and metric and, where possible/appropriate, presented for all relevant pathways (FNvDoD, FNvSUPS, HEiDi, CHARLiE, MaBAL, RUDi, and ROCCI) for fiscal year 2022 (April 1, 2022, through March 31, 2023). Specific limitations or assumptions made during the analysis are noted in each subsection, as applicable.

Methods in brief

Data Sources

The metrics summarized here are collected through multiple sources by RTVS partners:

- MOIS electronic medical record (EMR) data: encounter notes entered by all virtual physicians across all pathways during their shifts.

- Shift sign-out form: both call and encounter characteristics entered by the peer-support VPs at the end of each shift. Collected by RCCbc.
- Knowledge-base Decision Record (KDR): encounter characteristics entered by HLBC staff (nurses, VCS) for the HEiDi pathway only. Encounter information from the HEiDi MOIS EMR is transferred to KDR. Note, every HEiDi MOIS encounter should correspond to an encounter in KDR. Where there are discrepancies, the KDR data is considered the primary source.

RTVS Encounters vs. Calls

This distinction is most relevant for the peer-support pathways, where VPs typically handle multiple calls/communications for each clinical encounter (e.g., a local healthcare provider may telephone/text/zoom call the RUDi VP multiple times for a single patient). Where appropriate, we have distinguished metrics related to calls vs. encounters. For HEiDi, where patients initially call 8-1-1, the terms “call” and “encounter” are used interchangeably.

Access domain findings

Number of VPs per pathway

	FNvDoD	FNvSUPS	HEiDi	CATe	CHARLiE	MaBAL	ROCCi	RUDi
Number of VPs	33	14	125	29	14	15	1	30

Total Number of virtual encounters or calls

Number of Encounters

Based on MOIS EMR data for peer pathways. Based on HLBC KDR data for HEiDi.

	FNvDoD	FNvSUPS	HEiDi	CATe	CHARLiE	MaBAL	ROCCi	RUDi
Number of encounters	11707	1952	45895	10101	1182	605	29	4636

CATe “Child” Encounters

Due to the CATe encounter process where patients may interact with multiple staff (VPs, MOAs, pharmacists), the data are organized as an overall “parent” encounter (representing all interactions) and separate “child” encounters (representing one interaction with a specific healthcare provider). During FY22/23, there were 10101 parent encounters which were associated with 30456 encounters. Of those, 20344 encounters were with a healthcare provider (VP, pharmacist, or clinical screener).

Number of Calls

For peer pathways only, using RCCbc’s shift sign-out data. Note, “calls” correspond to all communications that peer-support VPs receive during their shifts, including telephone calls, zoom calls, emails/texts, skipped/bounced calls, and outbound calls to local healthcare providers.

	CHARLiE	MaBAL	ROCCi	RUDi
Number of calls	2420	1671	83	15454

Mean and median Encounter length

Based on MOIS EMR data. For peer pathways, this is the difference of the appointment and discharge times. Where the discharge time was earlier than or the same as the appointment time,

these encounters were removed before calculating this metric. For HEiDi, only initial encounters were included (follow-up encounters were excluded).

	FNvDoD	FNvSUPS	HEiDi	CATe	CHARLiE	MaBAL	ROCCi*	RUDi
Mean (SD) encounter length, minutes	28.68 (17.99)	40.70 (26.65)	24.8 (30.9)	**	53.6 (89.1)	57.6 (86.2)	520.2 (181.9)	71.6 (100.5)
Median (IQR) encounter length, minutes	25 (17-35)	30 (23-60)	21 (15-28)	**	34 (20-50)	34 (23-60)	555 (519-603)	38 (18-75)
*Note, ROCCi was in start-up phase in FY2022 and only served a limited number of clients, thus these values should be interpreted cautiously. ** CATe values cannot currently be calculated with appropriate dataset								

Number of spillover calls to partner pathways

For peer pathways only, using RCCbc's shift sign-out data. Note, these are reported by VPs and indicate the number of "missed" calls (i.e., because they were on another call).

	CHARLiE	MaBAL	ROCCi	RUDi
Number of calls	59	117	0	651

Number of encounters per VP per shift

MOIS EMR

Note, these values for the peer pathways are estimates only, as we cannot identify specific shifts that span multiple calendar days in the MOIS EMR data.

	FNvDoD	FNvSUPS	HEiDi	CATe	CHARLiE	MaBAL	ROCCi	RUDi
Mean (SD) encounters per shift	4.2*	2.9*	7.8 (3.6)	**	2.1 (1.5)	2.1 (1.5)	4.8 (1.3)	3.6 (2.6)

Call volume per VP shift

For peer pathways only. Based on RCCbc's shift sign-out data. Note, values represent mean (SD).

	CHARLiE	MaBAL	ROCCi	RUDi
Mean (SD) calls per shift	3.3 (4.2)	4.4 (6.2)	11.9 (7.5)	12.4 (11.9)

Number of encounters/calls by modality (video/telephone/SMS/email/fax)

MOIS EMR

Base on MOIS EMR This metric was only calculated for HEiDi. While the peer VPs have the option of selecting encounter modality, this field is also used to distinguish whether the encounter was with a nurse, nurse practitioner, or physician. As only 2 percent of MOIS peer encounters indicated if they were video or telephone, we did not calculate this metric for the peer pathways.

	HEiDi (n = 45633)
Telephone	43,962 (96.3%)
Video	1,670 (3.7%)

Other/Missing	1 (< 0.1%)

As noted above, the modality field in MOIS is primarily used by the peer VPs to indicate whether the encounter was initiated by a nurse or physician. This information is summarized and displayed below.

	CHARLiE (n = 1181)	MaBAL (n = 605)	ROCCi (n = 29)	RUDi (n = 4489)
Nurse	143 (12.1%)	376 (62.1%)	0	3546 (79.0%)
Physician	981 (83.1%)	228 (37.7%)	29 (100%)	932 (20.8%)
Missing	57 (4.8%)	1 (0.2%)	0	11 (0.2%)

Peer Calls

Based on RCCbc's shift sign-out data for peer pathways only.

	CHARLiE	MaBAL	ROCCi	RUDi
Telephone	802 (35.5%)	757 (51.6%)	38 (55.1%)	6328 (45.9%)
Video	865 (38.2%)	208 (14.2%)	12 (17.4%)	2508 (18.2%)
Texts	595 (26.3%)	503 (34.3%)	19 (27.5%)	4936 (35.8%)

Modality by patient age, sex, and region (HA)

HEiDi only, based on MOIS EMR data combined with HLBC's KDR encounter data.

	0-14	15-64	65+	Missing
Telephone	12767 (92.5%)	22974 (97.7%)	8093 (98.8%)	< 10
Video	1041 (7.5%)	531 (2.3%)	98 (1.2%)	0
Other/Missing	0	< 10	0	385 (98.7%)

	Female	Male	Missing
Telephone	26953 (96%)	16886 (94.8%)	0
Video	880 (3.1%)	790 (4.4%)	0
Other/Missing	232 (0.8%)	144 (0.8%)	10 (100%)

	Fraser	Interior	Northern	Vancouver Coastal	Vancouver Island	Other/Missing
Telephone	15085 (95.5%)	7142 (95.7%)	2221 (96.1%)	8779 (95.2%)	9431 (96%)	1181 (93.4%)
Video	603 (3.8%)	248 (3.3%)	73 (3.2%)	368 (4%)	317 (3.2%)	61 (4.8%)
Other/Missing	112 (0.7%)	74 (1%)	18 (0.8%)	79 (0.9%)	80 (0.8%)	23 (1.8%)

Mean and median wait times between RTVS encounter request to start of encounter, frequency distribution, standard deviation, and interquartile range

HEiDi only, based on MOIS EMR data. Note, only initial encounters are used, as follow-up encounters typically take place the next day and thus the associated wait time would appear to be approximately 24 hours.

	HEiDi
Mean (SD) wait time, minutes	22.3 (28.8)
Median (IQR) wait time, minutes	10 (4-30)

Number of calls with wait times over 1 hour

HEiDi only, based on MOIS EMR data.

	HEiDi (n = 45633)
Number (%) of encounters with wait times 1 hour or less	40756 (89.3%)
Number (%) of encounters with wait times over 1 hour	4857 (10.6%)
Number (%) of encounters missing wait time	20 (< 0.1%)

Number of calls on hold that ended before being received/connected to service

For HEiDi only, based on HLBC's KDR data.

	HEiDi (n = 46077)
Number (%) of encounters cancelled	182 (0.4%)
Number (%) of encounters completed	45895 (99.6%)

For encounters that were cancelled, here is the breakdown of reasons based on KDR data. Based on these data, potentially 34 (< 0.1% of 46077) HEiDi calls were mistakenly ended before being connected to the VP. Cancelled encounters were removed from further analysis.

	HEiDi (n = 182)
Incorrect record	10 (5.5%)
No associated call	11 (6.0%)
No service required	135 (74.2%)
Unable to reach caller	13 (7.1%)
Reason missing	13 (7.1%)

Number of calls that ended before VP sign-off

This can be calculated for HEiDi only using the MOIS EMR data.

	HEiDi (n = 45633)
Number (%) of encounters that took place on the same day	45608 (99.9%)
Number (%) of encounters that took place on the next day	5 (< 0.1%)
Number (%) of encounters missing date/time	20 (< 0.1%)

Number & types of concerns/cases/urgency per pathway

HEiDi

Based on KDR data. Patients' primary health concern is recorded by 8-1-1 nurses using one of 23 categories. Patients' health concerns have been disaggregated by the nurses' initial disposition.

	Total (n = 45895)	ED now (n = 12020)	MD now (n = 29091)	Missing/Other (n = 4784)
Cardiovascular (Heart/Circulation)	2689 (5.9%)	1209 (10.1%)	1312 (4.5%)	168 (3.5%)
Dental/Mouth	467 (1%)	81 (0.7%)	326 (1.1%)	60 (1.3%)
Dermatology (Skin, Hair, Nails)	2900 (6.3%)	373 (3.1%)	2144 (7.4%)	383 (8%)
Diabetes	179 (0.4%)	52 (0.4%)	110 (0.4%)	17 (0.4%)
Endocrinology (Glands)	82 (0.2%)	18 (0.1%)	59 (0.2%)	< 10
First Aid	2409 (5.2%)	783 (6.5%)	1452 (5%)	174 (3.6%)

Gastroenterology (Digestive)	8487 (18.5%)	2255 (18.8%)	5290 (18.2%)	942 (19.7%)
Gynecology (Women's Reproductive)	1214 (2.6%)	280 (2.3%)	781 (2.7%)	153 (3.2%)
Hematology (Blood)	11 (0%)	< 10	< 10	< 10
Immunology	1518 (3.3%)	393 (3.3%)	1011 (3.5%)	114 (2.4%)
Infectious/Communicable Diseases	151 (0.3%)	24 (0.2%)	108 (0.4%)	19 (0.4%)
Musculoskeletal (Bone, Muscle, Joint)	5943 (12.9%)	1403 (11.7%)	4128 (14.2%)	412 (8.6%)
Neurology	4667 (10.2%)	1646 (13.7%)	2607 (9%)	414 (8.7%)
Obstetrics & Postpartum	1221 (2.7%)	327 (2.7%)	741 (2.5%)	153 (3.2%)
Oncology (Site-Specific Cancers)	23 (0.1%)	< 10	12 (0%)	< 10
Ophthalmology (Eyes)	1477 (3.2%)	294 (2.4%)	1069 (3.7%)	114 (2.4%)
Otolaryngology (Ear, Nose, Throat)	1697 (3.7%)	251 (2.1%)	1116 (3.8%)	330 (6.9%)
Pediatrics	2589 (5.6%)	497 (4.1%)	1830 (6.3%)	262 (5.5%)
Pharmaceutical (Medication)	49 (0.1%)	< 10	31 (0.1%)	11 (0.2%)
Psychology (Mental Health)	91 (0.2%)	28 (0.2%)	49 (0.2%)	14 (0.3%)
Respiratory	6242 (13.6%)	1687 (14%)	3678 (12.6%)	877 (18.3%)
Urology (Urinary Tract & Male Genitalia)	1652 (3.6%)	365 (3%)	1147 (3.9%)	140 (2.9%)
Wellness	135 (0.3%)	38 (0.3%)	81 (0.3%)	16 (0.3%)
Missing	< 10	0	0	< 10

Peer MOIS EMR

Patients' health concerns are available for the peer pathways in the MOIS EMR data. However, these data are not well-standardized and have several issues: the primary health concern variable has approximately 18 percent missing values; the secondary health concern variable has higher rates of missing data; these variables use two different disease classification systems (ICD-9, SNOMED-CT). Missing values for the primary concern variable can be supplemented using the free-text visit reason variable. The table below presents a rough count of the 18 most frequent health concerns recorded out of 1588 unique concerns entered.

	CHARLiE	MaBAL	ROCCi	RUDi
ABDOMINAL PAIN – RUQ	12 (1%)	0	0	0
ABDOMINAL PAIN - UNSPECIFIED PAIN	0	0	0	109 (2.4%)
ABDOMINAL PAIN OR SWELLING	0	17 (2.8%)	0	67 (1.4%)
ALCOHOL WITHDRAWAL SYNDROME	0	18 (3%)	0	175 (3.8%)
asthma	20 (1.7%)	0	0	0
Bowel perforation/obstruction	0	0	10 (34.5%)	
BRONCHIOLITIS	17 (1.4%)	0	0	0
CHEST PAIN	0	0	< 10	92 (2%)

COUGH	22 (1.9%)	0	0	61 (1.3%)
DENTAL CARIES	0	0	0	111 (2.4%)
fever	35 (3%)	0	0	0
PRENATAL CARE	0	19 (3.1%)	0	0
RASH - NONVESICULAR – UNSPECIFIED	33 (2.8%)	11 (1.8%)	0	0
RESPIRATORY TRACT, NOS	0	0	0	65 (1.4%)
seizure	21 (1.8%)	0	0	0
UPPER RESPIRATORY INFECTION - ACUTE - NOS	22 (1.9%)	0	0	0
URINARY TRACT INFECTION - UNSPECIFIED	0	22 (3.6%)	0	161 (3.5%)
VIRAL INFECTION, UNSPEC.	77 (6.5%)	0	0	56 (1.2%)
Missing	37 (3.1%)	36 (6%)	< 10	82 (1.8%)

Demographics of patients accessing RTVS

For peer pathways, this is based on MOIS EMR data. For HEiDi, this is based on a combination of MOIS EMR and KDR encounter data. For all pathways, these values were calculated on a per client basis.

CATe

	FY22/23 (n = 9763)
Sex, female	5624 (57.6%)
Missing	4 (0.04%)
Age, mean (SD), years	63 (17)
Age group, years	
0-14	13 (0.1%)
15-64	4444 (45.6%)
65+	5306 (54.3%)
Missing	0
Health Authority	
Fraser	2695 (27.6%)
Interior	1575 (16.1%)
Northern	283 (2.9%)
Vancouver Coastal	2202 (22.6%)
Vancouver Island	2806 (28.7%)
Missing/Other	202 (2.1%)

FNvDoD

	FY22/23 (n = 4282)
Sex, female	2837 (65.9%)
Missing	Masked
Age, mean (SD), years	40 (19)
Age group, years	
0-14	437 (10.2%)
15-64	3415 (79.4%)
65+	450 (10.5%)
Missing	0
Health Authority	
Fraser	483 (11.2%)
Interior	1473 (34.2%)
Northern	863 (20.0%)
Vancouver Coastal	325 (7.5%)
Vancouver Island	1030 (23.9%)
Missing/Other	128 (3.0%)

FNvSUPS

	FY2022 (n = 545)
Sex, female	377 (69.2%)
Missing	0
Age, mean (SD), years	35 (12)
Age group, years	
0-14	Masked
15-64	535 (98.2%)
65+	Masked
Missing	0
Health Authority	
Fraser	51 (9.4%)
Interior	96 (17.6%)
Northern	171 (31.4%)
Vancouver Coastal	54 (10.0%)
Vancouver Island	115 (21.1%)
Missing/Other	58 (10.6%)

HEiDi

Based on 45895 calls, 43353 unique patient charts were identified (based on the MOIS chart number). 385 call records were missing a chart number and thus excluded from this demographic summary.

	FY2022 (n = 43353)
Sex, female	26463 (61.0%)
Missing	0
Age, mean (SD), years	34.7 (26.6)
Missing	< 10
Age group, years	
0-14	13027 (30.0%)
15-64	22479 (51.9%)
65+	7842 (18.1%)
Missing	< 10
Health Authority	
Fraser	14904 (34.4%)
Interior	7084 (16.3%)
Northern	2165 (5.0%)
Vancouver Coastal	8759 (20.2%)
Vancouver Island	9263 (21.4%)
Missing	1178 (2.7%)

CHARLiE

	FY2022 (n = 871)
Sex, female	295 (33.9%)
Missing	227 (26.1%)
Age, mean (SD), years	4.9 (5.9)
Missing	65
Age group, years	
0-14	747 (85.8%)
15-64	59 (6.8%)
65+	0
Missing	65 (7.5%)
Health Authority	
Fraser	13 (1.5%)
Interior	62 (7.1%)
Northern	323 (37.1%)
Vancouver Coastal	51 (5.9%)
Vancouver Island	32 (3.7%)
Missing/Other	390 (44.8%)

MaBAL

	FY2022 (n = 296)
Sex, female	197 (66.6%)
Missing	23 (7.8%)
Age, mean (SD), years	37.3 (21.8)
Missing	14
Age group, years	
0-14	42 (14.2%)
15-64	206 (69.6%)
65+	34 (11.5%)
Missing	14 (4.7%)

Health Authority	
Fraser	< 10
Interior	36 (12.2%)
Northern	120 (40.5%)
Vancouver Coastal	15 (5.1%)
Vancouver Island	10 (3.4%)
Missing/Other	108 (36.5%)

RUDi

	FY2022 (n = 2677)
Sex, female	1220 (45.6%)
Missing	314 (11.7%)
Age, mean (SD), years	46.4 (22.4)
Missing	83
Age group, years	
0-14	235 (8.8%)
15-64	1715 (64.1%)
65+	644 (24.1%)
Missing	83 (3.1%)
Health Authority	
Fraser	< 10
Interior	323 (12.1%)
Northern	1220 (45.6%)
Vancouver Coastal	57 (2.1%)
Vancouver Island	178 (6.7%)
Missing/Other	892 (33.3%)

10-Year Age Groupings

	HEiDi	CATe	CHARLiE	MaBAL	RUDi
N (clients)	**43,353**	**9,763**	**871**	**296**	**2,677**
Age group, years					
0-9	11782 (27.2%)	< 10	653 (75.0%)	36 (12.2%)	167 (6.2%)
10-19	2490 (5.7%)	56 (0.6%)	141 (16.2%)	13 (4.4%)	169 (6.3%)
20-29	5630 (13%)	372 (3.8%)	< 10	55 (18.6%)	327 (12.2%)
30-39	6326 (14.6%)	739 (7.6%)	< 10	75 (25.3%)	367 (13.7%)
40-49	3860 (8.9%)	869 (8.9%)	< 10	21 (7.1%)	313 (11.7%)
50-59	3406 (7.9%)	1482 (15.2%)	< 10	26 (8.8%)	383 (14.3%)
60-69	3896 (9.0%)	2040 (20.9%)	0	35 (11.8%)	440 (16.4%)
70-79	3574 (8.2%)	2525 (25.9%)	0	12 (4.1%)	274 (10.2%)
80-89	1895 (4.4%)	1401 (14.4%)	0	< 10	130 (4.9%)
90+	489 (1.1%)	272 (2.8%)	0	< 10	24 (0.9%)
Missing	5	0	65 (7.5%)	14 (4.7%)	83 (3.1%)

Rates of access by Health Authority population

The table below indicates the number of encounters per 100,000 residents. Health Authority population estimates for 2021 were obtained from: https://bcstats.shinyapps.io/popApp/.

	FNvDoD*	FNvSUPS*	HEiDi	CATe	CHARLiE	MaBAL	ROCCi	RUDi
Fraser	24	3	800	141	1	0	--	1
Interior	176	12	900	194	11	9	0	83
Northern	285	57	768	99	177	107	8	855
Vancouver Coastal	26	4	744	183	4	2	--	7
Vancouver Island	118	13	1131	336	4	2	--	24

Feather domain findings

Number of First Nations and other Indigenous clients accessing each pathway

FNvDoD and FNvSUPS pathways only.

Pathway	Metric	FY20/21	FY21/22	FY22/23
FNvDoD	First Nations Status	2,319	4,533	3,689
FNvDoD	Non-First Nations and other Indigenous peoples and communities	16	56	57
FNvDoD	First Nations in the process for registration	111	374	430
FNvDoD	Unknown	89	157	106
FNvSUPS	First Nations Status	256	418	431
FNvSUPS	Non-First Nations and other Indigenous peoples and communities	Msk	Msk	Msk
FNvSUPS	First Nations in the process for registration	Msk	Msk	68
FNvSUPS	Unknown	13	36	Msk

Number of rural/remote First Nations and other Indigenous communities accessing peer to peer support

Based on RCCbc's shift sign-out data. Note, this method may not fully capture all First Nations and other Indigenous communities that have accessed the peer pathways, especially if they have been categorized as part of a larger non-First Nations or Indigenous community (e.g., Ashcroft). Note, the numbers indicate the count of unique First Nations and other Indigenous communities, and the percentage uses all communities as its denominator.

	CHARLiE	MaBAL	ROCCi	RUDi
Number of First Nations and other Indigenous communities (% of total unique communities)	28 (35.4%)	31 (41.9%)	4 (80.0%)	42 (41.6%)

Fire Department domain findings

Number and frequency of geographic areas accessing peer-support pathway

Peer pathways only. Based on RCCbc's shift sign-out data.

Number of unique communities accessing, overall and by health authority:

	CHARLiE	MaBAL	ROCCi	RUDi
Total	79	74	5	101
Fraser	1 (1.3%)	2 (2.7%)	0	1 (1.0%)
Interior	22 (27.8%)	22 (29.7%)	1 (20.0%)	30 (29.7%)
Northern	37 (46.8%)	31 (41.9%)	4 (80.0%)	40 (39.6%)
Vancouver Coastal	7 (8.9%)	4 (5.4%)	0	7 (6.9%)
Vancouver Island	10 (12.7%)	12 (16.2%)	0	20 (19.8%)
Missing/Other	2 (2.5%)	3 (4.1%)	0	3 (3.0%)

Balance domain findings

Length of time for virtual encounters for estimating patient and provider time costs

To calculate patient/family unit costs, we determined the length of time for an encounter in each service type. For ED and Hospitalization unit costs, we used the NACRS report on emergency department length of stay, published by CIHI. For the MSP fee-for-service unit costs, we used a combination of published studies on physician consult times and reports from organizations such as MediMap on mean clinic wait times. For virtual visit unit costs, we used data on average wait time and encounter duration for a HEiDi encounter, taken from the HEiDi section of the RTVS dashboard. We assumed that these times were constant across pathways and times for the analysis this year.

Service Type	Visit Time (Hours)	Wait Time (Hours)
MSP Fee-for-service	0.26	0.5
Emergency Department (CTAS I-III)	3.7*	
Emergency Department (CTAS IV-V)	2.4*	
Hospitalization	53.6*	
Virtual	0.35	0.27
*Note, the data source does not distinguish between wait and visit times.		

Number of patients transported

For peer pathways only. In the shift sign-out data, VPs indicate where their shift involved transport coordination for their patient encounters. Note, thus this metric only speaks to the number of shifts involving transport, not the number of calls or encounters handled.

	CHARLiE	MaBAL	RUDi
Total shifts	738	381	1245
Transport involved	89 (12.1%)	39 (10.2%)	406 (32.6%)

APPENDIX 4. QUALITATIVE METHODOLOGY: INTERVIEWS

RTVS 2022-23 Qualitative Interviews Data Collection and Analysis Plan

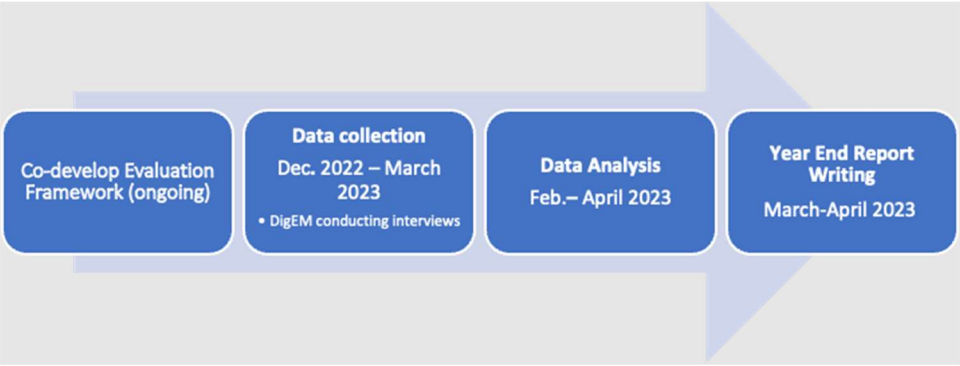
Purpose

RTVS evaluation uses a mixed methods approach with quantitative data collection and qualitative interviews/focus groups that allow us to comprehensively evaluate the RTVS outcomes. Through interviews conducted in 2022-23 we explored in depth to understand the experiences of healthcare providers (HCPs) accessing the RTVS services (HCP End Users) and the virtual providers (VPs) who staff the RTVS services/pathways. Partners in the RTVS Evaluation Technical Working Group (ETWG) were involved throughout to inform our process.

Timeline

Please see Figure 1 for a timeline for the RTVS interview collection, analysis, and reporting.

Figure 1. Timeline for qualitative interview data collection, analysis, and reporting



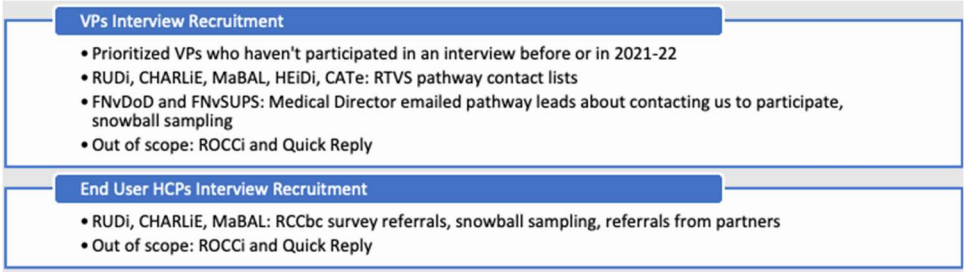
Interview Guides and Objectives

Semi-structured interview guides for VPs and HCP End Users (included in Appendix 5) were drafted based on the 2021-22 interview guides, and the objectives discussed with partners in the ETWG. Relevant metrics from the current evaluation framework were incorporated into the interview guides.

Recruitment

VPs and HCP End Users were recruited for the 2022-23 interviews. Interviews were conducted via Zoom, were 30-60 minutes in length, and were recorded for transcription. Patients will be included in the 2023-24 interviews after ethics approval is obtained, and stakeholders/partners were low priority due to the evolved governance structure and data collected through the year end survey. Figure 2 outlines the recruitment methods used for VPs and HCP End Users.

Figure 2. Recruitment methods used for VP and HCP End User interview participants



Participants

A total of 45 interviews were conducted including 25 VPs and 20 HCP End Users. Out of the 78 VPs contacted 32 percent participated in an interview, and 56 percent of the 36 HCP End Users contacted participated in an interview. Figure 3 provides further description of the VPs participating per pathway, and Figure 4 describes the HCP End Users clinical roles.

Figure 3. VP interview participants across RTVS pathways.

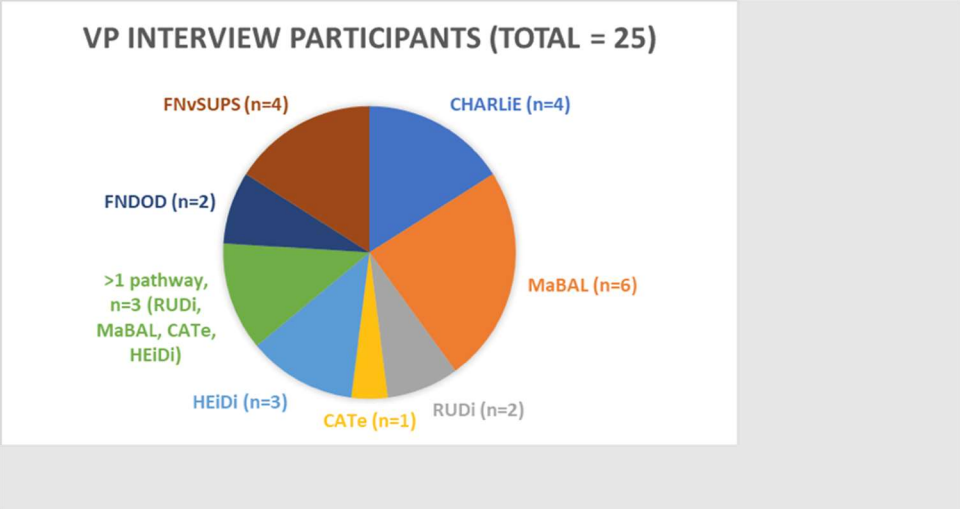
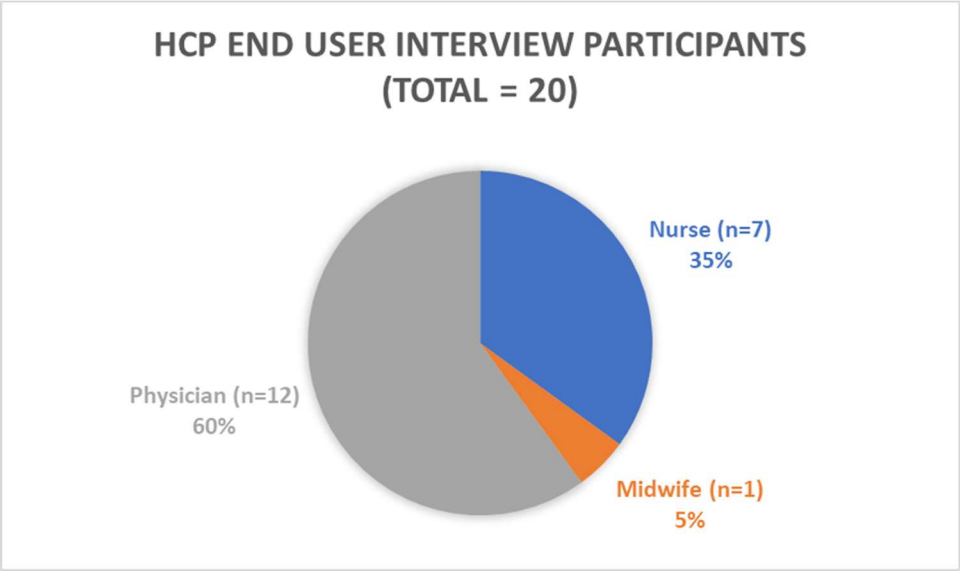


Figure 4. HCP End User interview participants summary of clinical roles.



Data Analysis

A data analysis working group was established to deliberate at various points during the analysis process, document the process, and to ensure alignment with the overall RTVS evaluation framework. Interviews were audio recorded and transcribed, and open coding was used to develop the codebook. Content analysis using the constant comparative method was used to draw themes

from the interviews. The team met over successive meetings to develop the VP and HCP End User Provider codebooks based on the coding of two VP and two HCP End Users transcripts coded separately by two team members. NVivo was used by five team members to code the remaining transcripts after the codebooks were established. We continued weekly meetings after our codebooks were established to discuss new codes added, develop the themes, and integrate findings into the overall report.

APPENDIX 5. QUALITATIVE DATA COLLECTION TOOLS: INTERVIEW GUIDES

Interview guide – healthcare provider end user (practitioners)

Thank you for making the time to speak with me. My name is _____ and I'm a researcher with Digital Emergency Medicine at UBC, and our team is working with RCCbc and partners helping with the evaluation activities for the Real-Time Virtual Support Services/Pathways (for example, CHARLiE or RUDi). We are interested in your experiences and perspectives as a health practitioner that has used one or more of these services/pathways to support your treatment of patients in your community. Your input will provide formative feedback to guide ongoing implementation, adjust over time, and document the experiences and impacts of RTVS.

Before we start, may I ask your permission to record the interview to ensure an accurate record for the evaluation? We will safely store and keep this information confidential and use only for evaluation purposes. Once transcribed, the audio recording will be deleted. Findings will be reported in aggregate and summaries will be shared with participants. Your participation is voluntary, so please feel free to skip any questions you do not want to answer, and end the interview at any time. If you are not familiar with the subject matter of any of the questions, please let me know and we will continue to the next question. This interview should take about 30 minutes, but I am happy to make it as long or as short as you would like.

Do you agree to take part in this interview process? Please indicate your agreement to take part, and to start the recording.

___Yes ____Yes, but do not record ___ No (end call)

**For Video Call Interviews: To aid our transcription after your interview, we would also like to turn on the Closed Captioning feature of Zoom. At any time in the interview you can ask me to turn off the Closed Captioning if you want. Do you agree for us to use the Closed Captioning feature?

Section A: Initial feedback

1. First, can you briefly tell me a bit about your practice?
    - 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, First Nations and other Indigenous communities)?
    - What are your usual or standard methods for getting clinical support (e.g., calling regional hospital or local GP)?

2. Can you tell me a bit about the Real-Time Virtual Support (RTVS) service(s) that you have used?

- RTVS virtual care pathways used: RUDi, ROCCi, CHARLiE, MaBAL, other?
- How often do you call the RTVS services/pathways? Do you recall approximately when you first used an RTVS service? Approximately when did you last use an RTVS service?

Section B: Experiences and Perceptions of RTVS

3. Overall, how would you describe your experience using RTVS (i.e., calling RUDi, CHARLiE, etc.)? Probe: How satisfied were you the quality of the support provided for managing your patients? Probe: What things contribute to your overall rating? Note to interviewer: probe for positives and negatives.

4. Can you tell me about the reasons/types of cases for which you have used RTVS (e.g., RUDI, CHARLiE, etc.)? Probe: please comment on the urgency of calls/cases

5. Can you share a memorable case from your time using RTVS?
- 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?
- Note to interviewer: Assuming the call/case described was a successful/positive experience, probe for: were there any aspects that could have been improved? Please describe.

6. Have you participated in any RTVS education or training sessions such as cultural safety, simulation, or other professional development? (fire department)
- If not: Can you, please describe any other education opportunities that have supported your RTVS work? Do you have any suggestions for educational sessions that may help support your RTVS work?
- If yes: Can you please describe which session(s) you participated in and your satisfaction with them? Probe: Suggestions for improvement?

7. From your perspective, what are the strengths and successes of RTVS? Probe: Can you tell me about any benefits you have observed so far? For patients/family/community or yourself? Has RTVS impacted your access to clinical support? Describe any elements that contributed to a successful RTVS consult experience?

8. From your perspective, what are the challenges of using RTVS? Probe: What challenges have you experienced in trying to access virtual support?

9. What are areas of improvement that you would suggest for the RTVS service(s)?

10. In what ways do you think RTVS or [pathway] supports you working in your community? Probe: Has your confidence or clinical skills been impacted

11. What other types of support could RTVS provide for you and other practitioners in your community? Probe: Are there particular clinical areas that are needed (e.g., mental health, other)?
12. To further inform our evaluation, is there another healthcare provider using an RTVS service that you would recommend we speak to gain further understanding? Probe: name and email

13. Is there anything you would like to share before ending the interview?

Thank you for your participation and for sharing your experiences!

Interview guide - virtual provider or virtual physician

Thank you for taking the time to speak with me. My name is [name] and I'm a researcher with Digital Emergency Medicine at UBC, and our team is working with RCCbc and partners helping with the evaluation activities for the Real-Time Virtual Support Pathways. We are interested in your experiences and perspectives as a physician working with RTVS and [specific pathway(s)]. Your input will provide formative feedback to guide ongoing implementation, adjust over time, and document the experiences and impacts of RTVS.

Before we start may I ask your permission to record the interview to ensure an accurate record for the evaluation? We will safely store and keep this information confidential and use only for evaluation purposes. Once transcribed, the audio recording will be deleted. Findings will be reported in aggregate and summaries will be shared with participants. Your participation is voluntary, so please feel free to skip any questions you do not want to answer, and end the interview at any time. If you are not familiar with the subject matter of any of the questions, please let me know and we will continue to the next question. This interview should take about 30 minutes, but we can make it as long or as short as you would like.

Do you agree to take part in this interview process? Please indicate your agreement to take part and to start the recording.

___Yes ____Yes, but do not record ___ No (end call)

**For Video Call Interviews: To aid our transcription after your interview, we would also like to turn on the Closed Captioning feature of Zoom. At any time in the interview you can ask me to turn off the Closed Captioning if you want. Do you agree for us to use the Closed Captioning feature?

Interview Questions

1. Tell me a bit about how and why you got involved in RTVS? What makes you stay? Probes: which pathways are you involved in? For how long? Possible probe, particularly if they have been involved for a long time: Has your involvement changed over time? If so, how?

2. Can you tell me more about the types/range of calls that you support during a shift?

Probes :

   a. For *non-Heidi* VPs: Please comment on the urgency of calls/cases.
   b. For All VPs (patient-facing or peer support): Please comment on the types of clinical cases (e.g., second opinion, chronic disease management, etc.)

3. Can you share a memorable case or two from your time as a RTVS provider? What happened? Probes: What stood out about this case and made it significant? What do you think would have happened without RTVS? Think about a case that was particularly successful/good outcome, as well as a case that stands out because it was particularly challenging. (Note to interviewer: probe for positive and challenging).

4. **FNHA VPs only (DoD and/or SUPS)**: From your experience, what is the approximate percentage/proportion of patients accessing the FNHA RTVS services [DoD and/or SUPs] that are attached to a regular healthcare provider? Can you describe situations/reasons that attached patients may access FNHA RTVS services [DoD and/or SUPs]?

5. From your experience, for patients living in rural, remote, or First Nations and other Indigenous communities how has RTVS impacted their access to healthcare? What examples can you describe? Probes: avoiding out-of-community travel? Increased access to specialists? HEiDi VPs: can also consider more generally RTVS's impact on patient access to healthcare outside the RRI community context

6. In what ways does RTVS or [pathway] support healthcare providers working in rural, remote, and First Nations and other Indigenous communities? What examples can you describe? Probes/examples: increased clinical confidence? Less professional isolation? HEiDi VPs: can also consider more generally how RTVS supports healthcare providers outside the RRI community context

7. Have you participated in any RTVS education or training sessions, such as cultural safety, simulation, or other professional development? (fire department)
   a. If not: Can you please describe any other education opportunities that have supported your RTVS work?
   b. If yes: Can you please describe which session(s) you participated in and your satisfaction with them? Probe: Suggestions for improvement?
   c. Do you have any suggestions for educational sessions that may help support your RTVS work?

8. From your perspective, what are the successes or strengths of RTVS or [pathway]? Probe: Describe any elements that enable successful RTVS consults?

9. From your perspective, what are the challenges of RTVS or [pathway]? What challenges have you experienced?

10. What areas of improvement would you suggest for RTVS? Are there changes you would suggest? Probe: feel free to mention any suggested changes, whether big or small....

11. What is needed for RTVS to be sustainable for the long-term? Probes/examples: a dedicated compensation model for physicians? More/different partnerships?

12. **FNHA VPs only (DoD and/or SUPS)**: To further inform our evaluation, is there another healthcare provider staffing the FNHA RTVS services [DoD and/or SUPS] that you would recommend we speak to gain further understanding? Probe: name and email

13. Is there anything else that you would like to share before ending the interview?

Thank you for your participation and for sharing your experiences!

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