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Clare Koning

Fraser Health, British Columbia, Canada

Brigitte Friesen

Fraser Health, British Columbia, Canada

Justin Daigle

Fraser Health, British Columbia, Canada

Anita Ytsma

Fraser Health, British Columbia, Canada

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Recommended Citation

Koning C, Friesen B, Daigle J, Ytsma A. Virtual cardiac rehabilitation: A rapid shift in care delivery in response to the COVID-19 Pandemic. *Patient Experience Journal*. 2022; 9(1):205-211. doi: 10.35680/2372-0247.1592.

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Cover Page Footnote

Acknowledgements: Adinet Lock from Cipher Health Communications Consulting (CipherHCC) for editorial review This article is associated with the Innovation & Technology lens of The Beryl Institute Experience Framework (<https://www.theberylinstitute.org/ExperienceFramework>). You can access other resources related to this lens including additional PXJ articles here: http://bit.ly/PX_InnovTech

Virtual cardiac rehabilitation: A rapid shift in care delivery in response to the COVID-19 Pandemic

Clare Koning, *Fraser Health, British Columbia, Canada, clarekoning@cipherbcc.com*

Brigitte Friesen, *Fraser Health, British Columbia, Canada, brigitte.friesen@fraserhealth.ca*

Justin Daigle, *Fraser Health, British Columbia, Canada, justin.daigle@fraserhealth.ca*

Anita Ytsma, *Fraser Health, British Columbia, Canada, anita.ytsma@fraserhealth.ca*

Abstract

Cardiac rehabilitation is an integral part of recovery from a critical cardiac life event. This preventative strategy involves exercise rehabilitation, education, lifestyle modification, and self-management coaching – preparing patients for lifelong changes. Prior to the COVID-19 pandemic, these activities were supervised by clinicians in-person, on hospital grounds, and in large groups. However, due to pandemic regulations in Canada imposed in March 2020, all in-person group activities were restricted. Within the first two months of the pandemic, almost half of cardiac rehabilitation services in Canada closed and half of their employees were deployed to other areas. To continue to provide patient care and ensure high-quality patient experience and recovery, cardiac rehabilitation services in Fraser Health, British Columbia rapidly transitioned to exclusively virtual methods of care delivery. Two years later, we are still providing this virtual model of care. This case study reflects on the experience of virtual care delivery of cardiac rehabilitation by participants and health providers. It outlines the process, the challenges, and the outcomes experienced with shifting to a new standard of care. The virtual participation rates showed a slight increase, with a significant reduction in time to access care, and increased adherence to the rehabilitation program. Overall patient satisfaction and provider experience continue to be positive. The consensus is that cardiac rehabilitation should not be optional, even during a global crisis.

Keywords

Patient experience, patient-centered care, patient engagement, healthcare, quality of care

Case Description and Overview

Cardiac rehabilitation is a critical component of secondary and tertiary prevention. These cardiac recovery programs contribute positively to participants¹⁻⁵ health outcomes and the quality of health system care delivery.³ It is a safe and cost-effective way to increase quality of life,^{4,6-9} decrease premature mortality,^{1,10} and decrease cardiac risk factors.¹¹ It has also been shown to improve recovery from a cardiac event^{6,12-14} while reducing readmission rates in cardiac patients.^{6,15} Yet even with the overwhelming benefits, cardiac rehabilitation programs are often not well attended; largely due to geographical barriers.^{4,16} Some researchers have reported that more than two-thirds of patients referred for cardiac rehabilitation do not attend or drop out early.^{17,18}

During the COVID-19 pandemic, access to cardiac rehabilitation was further limited. All group activities were restricted, social events were cancelled, and community recreation centres were closed.^{19,20} These restrictions necessitated a rapid adoption of virtual care delivery to improve cardiac health through rehabilitation. While this was a forced change, there was a significant improvement

in patient attendance and adherence with the new virtual program compared to the previous in-person program.

Fraser Health has four publicly funded, multidisciplinary, cardiac rehabilitation programs located at acute care centres across a region servicing a population of 1.8 million. These cardiac rehabilitation programs include a comprehensive series of education classes and supervised exercise sessions spanning 8 to 12 weeks. The goal is to equip and empower participants with the knowledge and skills to continue their cardiac recovery journey after completing the acute rehabilitation phase. The total capacity for cardiac rehabilitation in Fraser Health is approximately 1300 patients per year, while the total population demand is estimated at closer to 14 000 patients annually.²¹ Meeting this demand is challenging and compounded by the vast geographical area serviced by Fraser Health. During the pandemic, a virtual solution was the only option to manage the rapid growth in need for cardiac rehabilitation and ensure continued access to health care services.

Practice, Process, and Program Development

Within the first two months of the pandemic, almost 50% of cardiac rehabilitation services in Canada closed and half of their employees were deployed to other areas.^{22,23} In contrast, Fraser Health's cardiac rehabilitation services at all four sites transitioned almost seamlessly from 100% in-person to 100% virtual cardiac rehabilitation services by quickly adopting Zoom-facilitated education and supervised exercise classes. This strategy was in alignment with Fraser Health's Virtual First approach, supported by leadership teams, and facilitated via the health authority approved Zoom platform.

Patient and provider experiences were significantly impacted during COVID-19. Obvious challenges included uncertainties with human resources, service provision restrictions, staff deployments, and staff vacancies. There was also a sense of hesitancy in the patients and providers to access virtual health options due to technical and privacy concerns.^{24,25} Despite this, the cardiac rehabilitation specialist teams felt that they had a responsibility to their patients to continue the programs. They felt that closing the services would send a message that cardiac rehabilitation was optional, rather than an essential component of cardiac recovery.

However, there was no road map to guide patients or providers on how the new virtual model of care should be delivered, or what tools were needed. Leading the wave of change with little formal structure to guide it was risky. This forced the swift development of clinical protocols and guidelines that included virtual visit processes and pathways, virtual emergency protocols, online educational materials, and steps to ensure the protection of health information. There were further concerns with the inability to monitor patients during exercise sessions (blood pressure, blood sugar, heart rate, symptoms, and cardiac rhythm). In traditional cardiac rehabilitation, these physiological parameters were evaluated before exercise, could be initiated during exercise, and emergency response could be summoned if there are adverse symptoms reported during a session. This was not possible in virtual exercise sessions and necessitated a strategy to inform the patient and provider of the inherent limitations with this care delivery model and provide alternate options and pathways to trigger an emergency response. Participant self-management and monitoring became much more important.

Participants were provided with instructions to check blood sugar levels before exercise, stop exercising if alarming symptoms were experienced, and ideally have a family member present during virtual exercise sessions. Patients were provided with tracking sheets to record vital signs, exercise type and duration. This required self-documentation and self-management; tasks that were

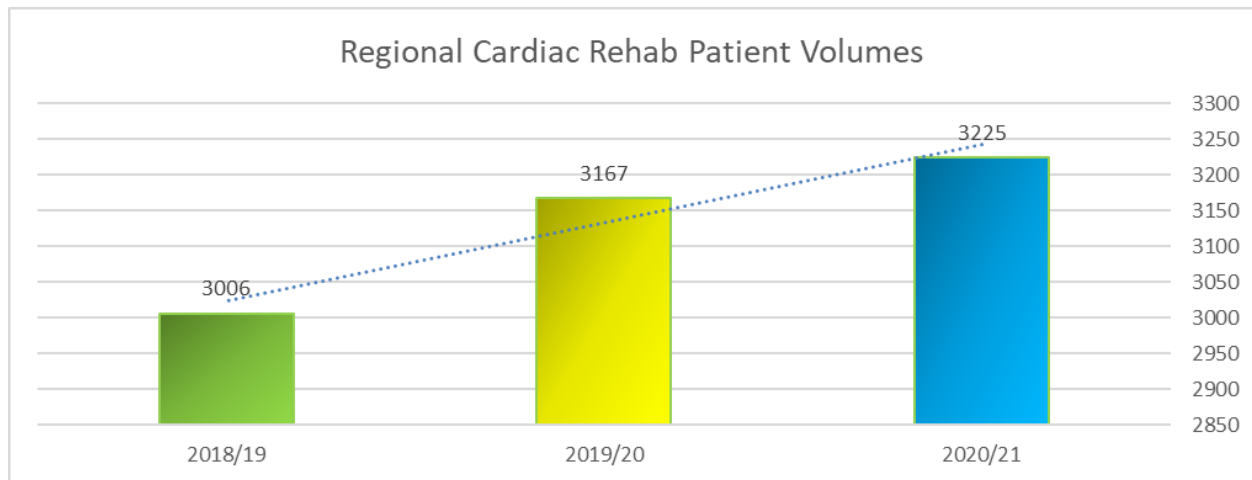
previously done by the healthcare provider. Clinically, assessing the risk associated with exercise and the level of effort on an exercise machine became less important with virtual cardiac rehabilitation delivery. The focus was now on previous medical history, the current state of health, perceived rate of exertion, and self-reported exercise capacity as an indicator of ability. The virtual supervised exercise classes were also redesigned to target lower impact strength and balance training using equipment readily available in the home.

Beyond the clinical challenges, the patients and providers soon discovered technological challenges too. The standard health authority computer equipment, not commonly used for video calls, had very poor audio and video output that required upgrading with many add-on and integrated devices, like wide-angle cameras, audio pucks, and headsets to improve the quality and experience for the provider and patient. In addition, not all cardiac rehabilitation areas had large screen televisions for group exercise sessions, which necessitated an investment to allow for closer monitoring of exercise form and technique with groups of up to 10 virtual participants. Furthermore, to ensure patient privacy and security of health information, clerical workload doubled to meet the standards required to securely conduct virtual visits in a health authority.

Participant experience in transitioning to the virtual platform had challenges too. The Zoom connection required a suitable device and stable internet with a WiFi or data plan that could support video calls of up to an hour several times a week. Early on, clinicians spent hours coaching and instructing patients on how to install and use Zoom, but comfort levels were low for some, and others did not have a suitable device to use Zoom. These participants were given the option of home-based self-managed exercise plans. These plans are designed to facilitate continued recovery that is self-driven with regular follow-up telephone calls by clinicians. The teams soon realised that more options were needed to fit the varied levels of comfort participants had with technology and virtual sessions.

Measurable Outcomes

As the pandemic progressed, utilization of the public virtual platform increased and participants became more comfortable, with attendance at most centres improving. Regionally, despite the pandemic, there was a slight increase (1.8%) in cardiac rehabilitation patient registrations when compared to the previous two years, see Figure 1. While low, this is still of importance considering the global crisis, competing priorities, limited

Figure 1. Regional Cardiac Rehabilitation Registration Volumes

awareness of virtual rehabilitation programs, and unreliable access to the internet or WiFi for many participants. Some cardiac rehabilitation centres did lose participants, this was noted most significantly in the rural coverage areas in Fraser East, while others gained numbers in urban areas, like South Surrey. Overall, the volume of patients attending virtual classes continued to increase into 2021.

Participants were also more likely to attend all the sessions in the virtual education and exercise series, whereas, before the pandemic, no shows and cancellations were more common. This increased adherence was noted at all centres, with fewer no-shows and cancelled appointments recorded. In the virtual sessions, family participation also increased. Family, who previously would not be able to attend in-person, could now join Zoom classes from anywhere, even during their workday or via mobile phone. This may have contributed to the increased adherence and attendance rates.

All Fraser Health cardiac rehabilitation programs offer non-Zoom home-based/self-managed cardiac rehabilitation in addition to Zoom-based virtual sessions. However, when given the option, more than 60% of enrolled participants at one centre (Peach Arch) chose Zoom sessions.

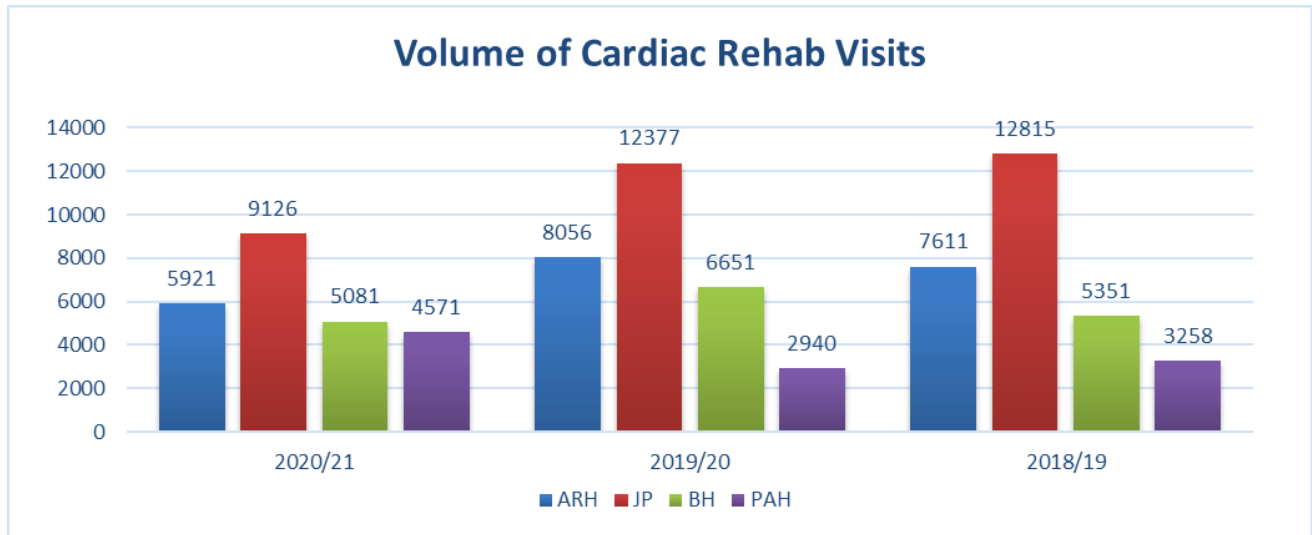
Peace Arch Hospital (PAH) cardiac rehabilitation centre was the first health authority setting to deliver comprehensive virtual video exercise rehabilitation services in British Columbia, and one of the first in Canada. At this site, attendance rates of supervised Zoom exercise classes are on average 80%, far exceeding that of traditional cardiac rehabilitation attendance mentioned in the published literature.^{15,18} Similarly, Jim Pattison (JP) Outpatient Care and Surgical Centre saw a 40% increase in exercise attendance rates when compared to 2019, and

Abbotsford Rehab Centre (ARH) saw a 22% increase in attendance rates for education classes. Abbotsford did note a decrease (18%) in the number of referrals for cardiac rehabilitation received in 2020 compared to 2019. On further investigation, it appears that many community physician offices had assumed that the rehabilitation programs were closed due to the pandemic, and so did not refer patients. With time, greater awareness has helped to steady referral numbers moving into 2021.

Of interest was a decline in patient visits (in-person, telephone, or virtual) even with the steady patient volumes. There were almost 6000 fewer cardiac rehabilitation patient visits regionally in 2020/21 when compared to the previous year 2019/20. All patient contacts are logged in an electronic medical record database. The decline could be due to the change in visit routine, with fewer follow up visits being logged for those participants choosing self-managed home-based care, see Figure 2. The volume of visits varied greatly between centres. Peace Arch, a more urban setting saw a 55% increase in visits, while Abbotsford, which covers the rural Fraser East area, saw a 27% decrease in visits when compared to the previous year.

With the reduction in visit volumes, the strain on overburdened programs was somewhat released, and centres were able to improve their wait times to access care. By improving efficiencies and releasing time to care, in 2021 these teams were exceeding the Canadian Cardiovascular Society (CCS) benchmark wait time of 30 days for cardiac rehabilitation entry after transitioning to virtual methods of care.^{26,27} See Figure 3. This has resulted in a significant reduction in time to access expert clinicians and start rehabilitative recovery after a critical cardiac event. Most notable is the time to access virtual exercise

Figure 2. The Volume of Patient Visits for all Regional Cardiac Rehabilitation Centres 2018/19 – 2020/21



Note: ARH: Abbotsford Regional Hospital, JP: Jim Pattison Outpatient Centre; BH: Burnaby Hospital; PAH: Peace Arch Hospital

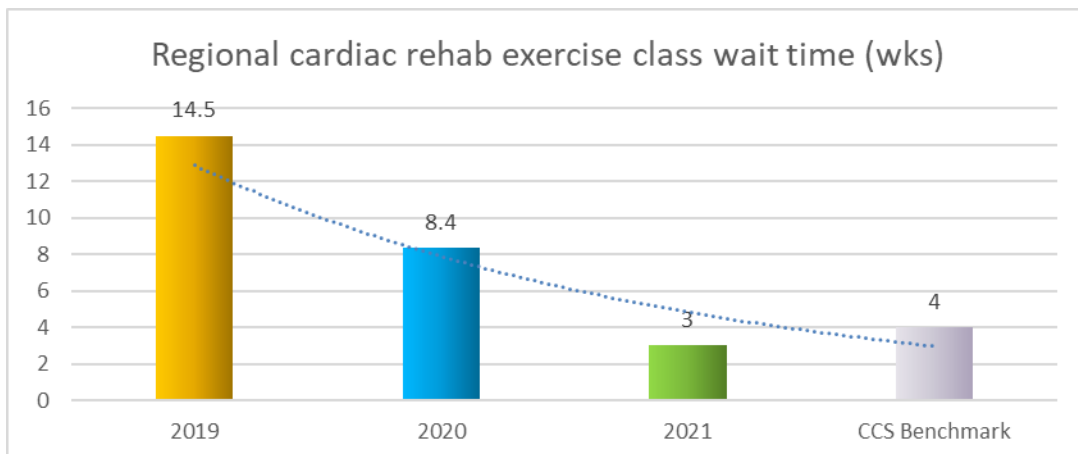
classes, which showed an 80% reduction compared to 2019 in-person exercise classes.

Fraser Health recommends that patients who have incurred a major cardiac event or cardiac surgery do not drive for 4 to 12 weeks, depending on physician orders. Many patients who are referred for cardiac rehabilitation do not have transportation or someone to drive them during their driving restriction period. This inadvertently delays the start of cardiac rehabilitation. Often, this delay exceeds the recommended 30 day wait time, effectively diminishing the benefit window gained by early initiation of education and supervised exercise. Virtual cardiac rehabilitation removed this barrier. The regional wait time to enter cardiac education classes in 2021 was less than a week and supervised exercise class wait time was reduced

from 14.5 weeks (pre-pandemic) to 3 weeks by going virtual as seen in Figure 3.

Social interaction and the ability to ask the clinicians questions during cardiac rehabilitation sessions were important to participants before the pandemic. To continue to encourage social interaction over video streaming, virtual sessions at many sites were started fifteen minutes prior to the clinician presentation of education or exercise. This allowed for greater communication and cohesion between participants, as well as time to test equipment and adjust Zoom settings as needed. Clinicians have noted that participants use this time to develop peer relationships over video and share stories of their cardiac experience. Participants were encouraged to use the Zoom chat box and other features during a session, which allowed for interaction without

Figure 3. Reduction in Regional Wait Time for Exercise Classes (Weeks from Referral to Exercise)



interruption of the clinician presentations. Time for questions was incorporated into all sessions and some programs offered post-session open telephone lines with specialists (RN, Pharmacist, Dietician, Social Worker) for individual counselling needs. In an informal survey of nutritional education, 90% of respondents (136 of the 151) said they preferred Zoom classes over in-person classes offered at the hospital. Of interest is that this is education provided by a registered dietician virtually from her home kitchen; adding tangible lived examples to healthy lifestyle choices. Overall, informal feedback from participants about their satisfaction with the program was positive, and experiences continue to improve over time as comfort levels increased and technology advanced.

Another Fraser Health cardiac rehabilitation centre at Abbotsford Hospital provides care to some of the most rural populations of the Fraser Valley. These remote areas incur significant amounts of snow for six months of the year. Pre-pandemic, patients reported notably stressful commutes to attend in-person classes. Upon arrival, they were frustrated due to the long driving time, poor road conditions, and lack of available parking. Zoom education eliminated the need to drive and pay for parking. Patients have reported that removing these attendance barriers made participation in cardiac rehabilitation classes much easier and less stressful.

At many centres pre-pandemic, the program growth exceeded the physical space available to provide the services, which negatively affected patient experience and often left participants standing with no seats available during education classes. Participants in the virtual classes now have a greatly improved experience. They can join Zoom sessions from the comfort of their own homes and have the option of attending a class more than once without having to worry about driving or finding a space to park or not having a seat. Virtual health care delivery also released a significant amount of physical hospital space, which at many hospitals was repurposed for much-needed emergency operation pandemic response centres. Overall, the outcomes of virtual cardiac rehabilitation have been favourable. The volumes of patient referrals have remained steady with a slight increase during the pandemic, and the pivot to virtual care has contributed to a significant decrease in time to access care, which in 2021 soon exceeded national benchmarks.

Implications for Further Practice

Having opened options to access care, there was a desire to measure the success of the new model of care. Unfortunately, there is little data available on the health outcomes of virtual cardiac rehabilitation. Select studies discuss positive aspects of virtual care in cardiac recovery;^{4,16} however, none matched the video delivery model that was adopted in Fraser Health. Confidence in

the program was limited initially by not knowing how to measure success in virtual cardiac rehabilitation practices. Over time, balancing expectations and measuring success by patient participation and engagement, rather than performance metrics, allowed the program to grow and expand region-wide.

Fraser Health cardiac rehabilitation teams have gained significant value from the patient and provider experiences in this rapidly changing environment. We now know that with practice, both clinicians and participants become more comfortable with providing and participating in virtual sessions. We also have the newly develop Fraser Health Citizen Support Desk to help participants set up and join Zoom calls and a virtual dashboard that tracks our rehabilitation virtual visits.

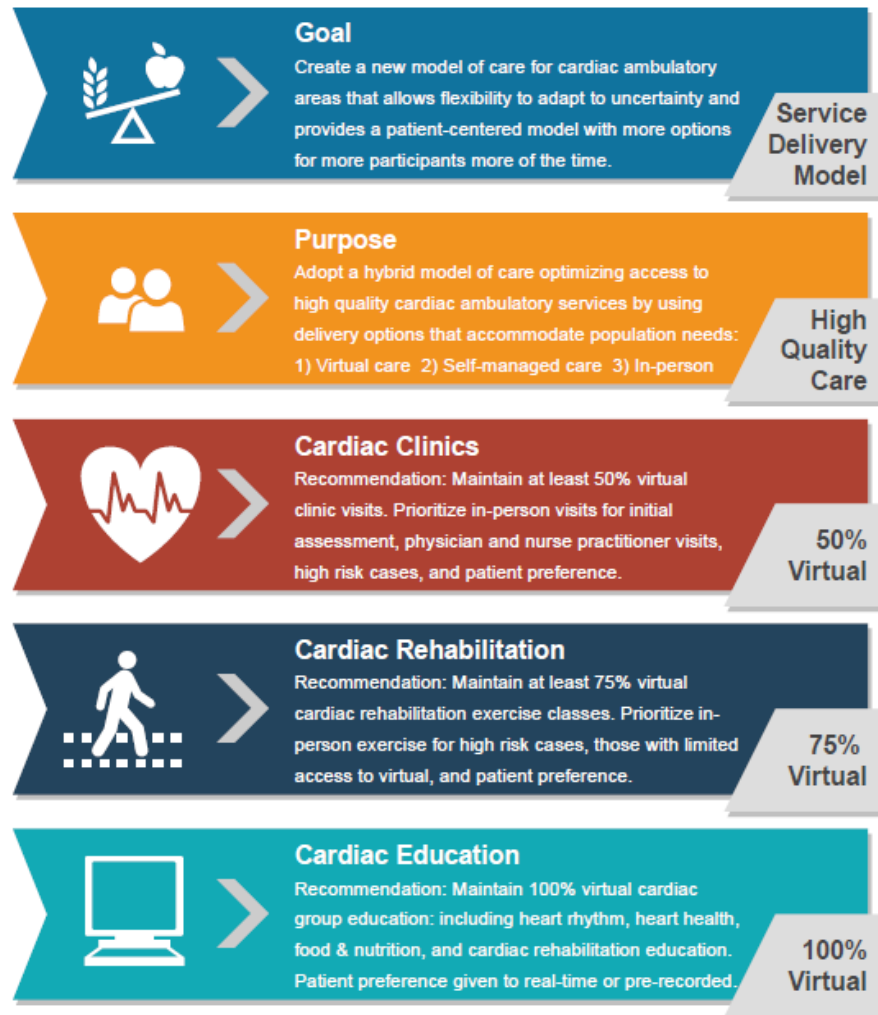
Before the pandemic, we relied too heavily on one model of care delivery that likely did not fit the needs of all of our participants. Providing more options for participants is important going forward. We have also learnt that focusing on exercises that participants enjoy, rather than being overly specific in the type of exercise, has increased adherence to the training programs. The transition was difficult at times, but teams stayed motivated by celebrating the individual successes as a collective, and by believing that they were creating positive change. Teams have optimized equipment and processes, including automation of various virtual steps to increase the use of virtual platforms. Clinicians have also worked diligently to manage the workload associated with integrating technology into healthcare.

The patient and provider experience of this change has helped to inform new sustainable models of cardiac rehabilitation care. The goal is to allow virtual health to be delivered more efficiently and from virtually anywhere. In future, Fraser Health cardiac rehabilitation teams would like to improve and expand this work and move towards an enhanced model of health care delivery that includes virtual, in-person, and self-managed care that meets the needs of more patients, more of the time. See Figure 4.

Suggestion for Further Exploration

There appears to be a gap in the published literature on the health outcomes of video facilitated cardiac rehabilitation education and exercise programs. Many researchers have explored centre-based versus home-based self-managed care, but at the time of this case study submission, no research comparing real-time video education/exercise classes to centre-based care could be retrieved. While home-based rehabilitation is comparable to centre-based, the study of real-time video-based outcomes would be beneficial. Furthermore, the evaluation of quality indicators like morbidity, mortality,

Figure 4: Future Hybrid Model of Care



and readmission rates post-cardiac event for the various models of cardiac rehabilitation care would be valuable.

Lastly, research on the financial impact of virtual cardiac rehabilitation is of importance when planning for program development and sustainability of health systems under constant cost constraints. These analyses could include health system space and equipment saving, participant travel and time reduction to access care, and savings associated with health improvement.

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