Case History

Implementing Hospital@Home with the CIUSSS of West-Central Montreal

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transfert

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Meetings were held with the following people present[1]:

Dr. Lawrence Rosenberg, President and CEO.

Erin Cook, Associate Director of Quality, Transformation, Evaluation, Clinical and Organizational Ethics, and Virtual Care (DQTEVE-SV) directorate when H@H was founded. From June 2023 to May 2025, Ms. Cook was Director of the DQTEVE-SV. She is now Associate President-Director general).

Dr. Lawrence Rudski, Director of the Azrieli Heart Centre at the Jewish General Hospital (JGH), Chief of Medical Information and Medical Director of Virtual Care for the CIUSSS West-Central Montreal.

Lucie Tremblay, Director of Nursing and Director of Vaccination (COVID-19) when H@H was launched. From October 2022 to March 2025, she has been Associate CEO of the CIUSSS West-Central Montreal before retirement.

Aurelia Di Fabrizio, Project Manager for the DQTEVE-SV.

Alla'a Ali, Senior Advisor for the DQTEVE-SV.

Dr. Shannon Fraser, Chief of General Surgery and Medical Director of the C4 Command Centre.

Kimberly Garshore, C4 Coordinator

Chantal Bastien, Assistant to the Director of Nursing (interim) (DSI).

Catherine McDonald, Chief of Admissions for the to Professional Services directorate (DSP).

Viki Doucette, Chief Nurse of the Virtual Unit.

Tracy Heramchuk, Assistant Chief Nurse in the H@H team.

Denis Dao, Pharmacy Coordinator for the Virtual Unit.

Brenda Lécouteur, Coordinator of the Support Program for the Autonomy of Seniors – Home Care (SAPA-SAD).

Lilly Luan, Activity Chief of SAPA-SAD Programs.

Annick Mercier, Activity Chief of SAPA-SAD Programs.

Note: For purpose of readability and in light of the realities of the field, feminine pronouns are used in reference to certain job titles or categories.

[1] The people on this list held the positions mentioned at the time of the events recounted in the case history. Many of these people no longer hold the position they held when this document was published.

The story of the H@H launch

The idea of a hospital at home emerges

The pandemic – a catalyst for virtual care

The possibilities offered by telehealth[2] are expanding, promising to revolutionize the future of healthcare around the world. Before 2020, telehealth services in Quebec were primarily concentrated in university hospital centers, to assist in deploying specialized care and services in remote regions. The COVID-19 pandemic drastically accelerated this development, breaking down many barriers, such as physician pay, fine-tuning and scaling use of telehealth platforms, rapid development of skills and digital literacy among caregivers and the public at large, and development of decision-making algorithms and support procedures. Telehealth grew exponentially in Quebec, from a few tens of thousands of telehealth medical services offered per year to nearly 10 million in the first seven months of the pandemic. (FMEQ, 2021).

The CIUSSS West-Central Montreal (CCOMTL) saw this rapid development in practices in a positive light. It quickly restructured and reorganized the institution's digital health governance by forming a high-impact team with a strategic, cross-disciplinary mandate to support care teams in deploying new ways of providing remote care.

In the spring of 2021, with telehealth use on the rise and a structuring of the digital healthcare offering underway, the idea of developing a hospital at home (H@H) began to germinate at the CCOMTL. At a meeting with the senior management team, Dr. Rosenberg shared his vision of the future of digital health, stating that Hospital at Home could play a key role.

Erin Cook, who at the time was Associate Director of the DQTEVE-SV, and Dr. Rudski, Director of the Azrieli Heart Centre and Medical Director of Virtual Care for the CIUSSS, joined forces to develop a virtual care continuum project through which patients would be hospitalized at home. Dr. Rudski and Ms. Cook had a keen interest in the development of virtual care and were already using connected devices with cardiology patients. Together, they discussed what a virtual continuum might look like and took a unique approach to address the problem. They used a Vision Script, a document that presents a vision of the future in the present tense, as if it were happening today. Cook and Rudski imagined that it was 2024 and reported on how far they'd come in the past three years.

The initiative, which was closely aligned with the vision of the *Care Everywhere* initiative, was very well received by Dr. Rosenberg. In September 2021, he called a meeting with the CCOMTL's Executive Committee, during which he encouraged the team to commit to digital transformation and transformation numérique and come up with strategies to bring this vision to life.

[2] This practice makes it possible to provide health services remotely through the use of information and communication technologies (ICT).

January 2022 – The fifth wave of the pandemic: Avoid offloading at all costs!

January 2022: It was a critical time for Quebec. COVID-19 had been gaining momentum since late 2021. The new, highly contagious Omicron variant was wreaking havoc in Quebec. Cases rose from 500,000 on December 22, 2021, to some 750,000 by January 2022, despite the tightening of health measures, such as a lockdown and curfew (INSPQ, 2022). Quebec was entering its fifth wave. The CCOMTL, like everywhere else, expected to quickly exceed its capacity to care for patients in critical situations and would likely be forced to offload surgeries. Surgical continuum teams were working hard to catch up on the backlog of surgeries from previous waves, and the prospect of a further setback was concerning, and discouraging. Dr. Rosenberg made a decision and took action. The initiative presented to the Executive Committee in September would be the solution for creating bed capacity and avoiding surgery postponements.

What is offloading?

After the start of the COVID-19 pandemic, Quebec was hit with a succession of waves. This forced healthcare facilities to reorganize their facilities and the delivery of care and services to meet the growing needs of COVID-19 patients who required hospitalization for acute care. Offloading involves canceling or postponing non-urgent appointments, such as elective surgeries, to free up intensive care beds. While this strategy creates immediate capacity, it results in longer waiting lists, requiring surgeries to be rescheduled.

COVID@Home: one weekend to set up hospitalization at home for COVID-19 patients

Friday, January 7, 2022: The project is announced and launched

2:00 p.m.: Oxygen at Home meeting

Midday on Friday, January 7, 2022, several people in strategic positions at CCOMTL received invitations from Dr. Rosenberg to an urgent Microsoft Teams meeting at 2:00 p.m. The meeting was mysteriously titled “Oxygen at Home.”

At 2:00 p.m., the following people met on screen:

- Associate CEO, Fancine Dupuis
- Director of Professional Services, Dr. Louise Miner
- ED Chief at the JGH, Dr. Marc Afilalo
- Director of Nursing, Lucie Tremblay
- Director of the Azrieli Heart Centre at the Jewish General Hospital (JGH) and Chief of Medical Information, Dr. Lawrence Rudski
- Director of the Support Program for the Autonomy of Seniors (SAPA), Gary Stoopler
- Associate Director of the SAPA program, Home Care (SAPA-SAD), RI-RTF and LAAA, Luc Méthot
- Director of Quality, Transformation, Evaluation, Value, Clinical & Organizational Ethics, and Virtual Care, Joanne Côté
- Associate Director of Quality, Transformation, Evaluation, Value, Clinical & Organizational Ethics, and Virtual Care, (DQTEVE-SV), Erin Cook.

Dr. Rosenberg remembers the meeting:

"I decided, when the fifth wave began, not to close surgical beds, but to find another way to provide care to COVID-19 patients. I decided to try a hospital at home for them. So, I met with my managers. It was a Friday afternoon [January 7]. We have had a discussion to determine whether it would be possible to set up a hospital at home in three days to avoid shutting down surgeries again. They said, 'Yes, we will try.'"

Dr. Lawrence Rosenberg, CEO of the CCOMTL

Dr. Rosenberg wanted a functional pilot project to be ready to welcome its first patient by Monday morning. The project was based on a collaboration between the hospital environment and the Support Program for the Autonomy of Seniors (SAPA) – Home Care (SAD) section. The goal was for users with COVID-19 to receive care at home with treatment from the Home Care team and telehealth follow-up with telemonitoring [3].

"As is often the case, urgent situations give rise to innovation, […] we did not want to shut down our services anymore. We had already closed clinics and reduced surgeries for two years due to the pandemic. So we said, why not try something else so we can maintain access to the population. It was this sense of urgency that made people take up the cause and to get the initiative off the ground."

Erin Cook, Associate Director of the DQTEVE-SV

The persons gathered that afternoon were motivated for the project but also had some concerns. Annick Mercier, Chief of Activities for SAPA-SAD programs, recalls:

"For sure, there was some resistance at various levels. In terms of how we would go about things, we couldn't move too quickly. We didn't have the resources due to shortages. I think that in the beginning, we told ourselves, 'OK, we have to do this. We will do it and see how it goes.'"

Annick Mercier, Chief of Activities for SAPA-SAD programs

Erin Cook and Dr. Rudski co-direct the COVID@Home pilot project

Dr. Rosenberg, President and CEO, acting as project owner, appointed Erin Cook and Dr. Rudski project co-directors for the administrative and medical components, respectively. This was a welcome opportunity for both Cook and Rudksi:

[3] Telemonitoring: The use of technology to monitor a patient remotely, also called remote patient monitoring.

I remember in the meeting he said: "if you want to lead this, go ahead!. Are you up to it?" When you get an offer like that for something that you wanted to do for a long time, you go ahead and say yes. For me it's always "yes, take every opportunity you're given!".

Dr. Rudski, Director of the Azrieli Heart Centre and Medical Director of Virtual Care

As soon as the *Oxygen at Home* meeting concluded, operationalization began. The CEO had given the group carte blanche to carry out the project, and they formed an initial strategic group and set to work. They relayed information to their teams. People urgently mobilized to set up a virtual hospitalization unit for COVID-19 patients, first called COVID@Home, then Hospital@Home shortly thereafter.

Friday afternoon: Sourcing oxygen suppliers inspiring models

Several group members took on the first challenge: finding the materials needed for Monday morning before supplier offices closed for the weekend. Erin Cook explains:

"The biggest priority at that point was to find a supplier who could potentially deliver oxygen to people's homes by Monday morning. And don't forget, it was the end of the day on Friday during the first week of January. We quickly got to work. The other question was how we would use the tool to monitor vital signs. We had a few tools available to us at the hospital, but of course we had to make sure everything was in good working order before using it with patients."

Erin Cook, Associate Director of the DQTEVE-SV

Erin Cook was also looking for inspiring models to find a framework: "I did take the time to quickly look at what is being done elsewhere. Just to be sure we were covering all the important aspects and were not forgetting anything." She gathered documentation on the hospitalization at home model in Australia, called *Hospital in the Home*—an initiative with some 10 years of history and a model resembling what the CCOMTL aimed to achieve.

"What I liked about their model was that it was very focused on quality. I saw a lot of similarities with how they developed the program, and their vision of quality based on patient experience, data, performance, and quality of care. That's how I found an affinity with this model versus others we were aware of."

Erin Cook, Associate Director of the DQTEVE-SV

Friday evening and Saturday morning: Gather stakeholders and organize work for the weekend

Friday evening and Saturday morning, Erin Cook continued calling on the right people to join their teams. She quickly contacted Aurelia Di Fabrizio, Project Manager of the DQTEVE-SV.

"I had a call with Erin Saturday morning saying that we needed to set up a hospital at home. Friday evening and Saturday morning, it was more strategic meetings to figure out who we needed to contact to work on a hospital at home. Since it was new, we really needed to identify all the stakeholders."

Aurelia Di Fabrizio, Project Manager for the DQTEVE-SV

Over the weekend and until Monday, more than 70 people from 14 clinical and administrative directorates gathered and worked over 12 hours a day on the project.

Under normal circumstances, creating a new trajectory would have been several week's work. However, to speed up the process, the work was broken up into different parts and assigned to working groups (caucuses), which they worked on in parallel and with great skill.

The work was carried out in two cycles. First, each caucus met to draw up a work plan and divide the tasks between members before letting them work individually. Next, medium and large group meetings were scheduled so the groups could pool their work and review the situation in preparation for the next cycle. Erin Cook and Aurelia Di Fabrizio split their time between the different groups to make sure they had an accurate overview and could prepare for the work to be pooled.

List of stakeholders involved in starting up COVID@Home

1. Pharmacy: Chief of Pharmacy, Co-Chief, Pharmacist, Pharmacy Technician
2. Logistics and procurement: Director, Contract Manager, Purchasing representative, Biomedical Manager
3. Admissions: Admissions Manager, Systems Specialist
4. Medical Archives
5. Nursing directorate – DN: Associate DN (interim) and Nursing Advisor/Chief of Nursing Information, Director, etc.
6. Physicians: Medical Co-Director, Physicians with various specializations
7. Command Centre (C4): Administrative Process and Optimization, C4 Coordinator
8. Legal team: Lawyer
9. Multidisciplinary services
10. Transformation team: Project Manager, Optimization and Mapping Specialist
11. Digital health: Senior Clinical IT Consultant, Administrative Process Specialist
12. SAPA-SAD: Coordinator and Chief Program Administrator
13. Performance team: Chief of Performance, Administrative Process Specialist (analyst)
14. Quality: Executive Advisor in patient experience, Risk Management Specialist
15. Patient partner
16. Advisor to Caregivers

Liste des groupes de travail (caucus)

1. “Administration” Caucus: oversee administrative decisions and ensure harmonization of systems and operational elements.
2. “Process and Mapping” Caucus: to map the H@H trajectory, and more specifically that of COVID-19 patients.
3. “Pharmacy” Caucus: plan the home medication circuit (order, preparation, bagging, delivery).
4. “Admission Criteria” Caucus: define client admission criteria.
5. “Clinical Protocols” Caucus: create clinical protocols to guide the work of professionals in the pilot project.
6. “Staffing” Caucus: prepare budgets and compensation mechanisms for H@H teams and physicians.
7. “Technology” Caucus: identify and obtain the right technologies and telemonitoring systems for the pilot project.
8. “Contingency Plan” Caucus: develop legal aspects (e.g., consent, contingency plan with analysis of legal risk, insurance).
9. “Communications” Caucus: plan communications to clinical teams, patients, families and stakeholders.
10. “Performance indicators and patient survey” caucus: define the indicators to track for decision-making and for measuring trajectory performance; prepare a patient satisfaction survey.

Despite the mountain of work to be done, the teams on site were determined to achieve their goal.

> “The first weekend, people were very dedicated. We had a sense of urgency and belonging together. I really don’t think there was a lack of motivation. We worked until 10:00 in the evening, and people energized. We were creating something new. I think people wanted to be there. They wanted to be a part of it.”
>
> Aurelia Di Fabrizio, Project Manager for the DQTEVE-SV

Saturday, January 8, and Sunday, January 9, 2022: fast-paced work

Over the weekend, management and the work groups sprung into action. They created the virtual unit and organized its governance, mapped the care pathway in order to assign staff, planned logistics and technology, drafted care protocols, planned communications for teams and patients, etc.

Creating the administrative portion of the V1 virtual unit

Saturday, January 8, the administrative portion of the V1 unit was created. The *V1 Unité Covid virtuelle – Virtual Covid Unit* had around fifty imaginary beds under the hospital-at-home service. No physical site was established for the virtual unit.

With a view to offering a continuum of care, patients admitted to the virtual unit remain administratively registered at the hospital. The patient is simply transferred from the hospital's physical unit to the virtual hospital-at-home unit to receive care from home.

Incorporating COVID@Home into the Command Centre under the DQTEVE-SV

One of the first questions that arose in terms of governance was whether the newly created virtual care unit should be attached to a directorate.

At the CCOMTL, the DQTEVE-SV directorate already oversees a cross-functional initiative: the Command Center, known as C4, which had set up about a year prior. The C4 is a coordination and steering center for patient flow within the CIUSSS using dashboards with various indicators to support decision making on patient orientation and transfers. The C4 has a dedicated team and a space where screens display data in real time.

DQTEVE-SV of the CCOMTL

The DQTEVE-SV has a strong position within the CCOMTL. This was the what the CEO had wanted from the start of his mandate. He had even told the Director at the time that "the quality department is much more than accreditation. It can develop many other things." According to Erin Cook, "Over time and with success, we have realized that we are unique in this way compared to other organizations."

The company quickly realized that C4's facilities could be used to monitor the health indicators of patients hospitalized at home in real time via telemonitoring and connected devices. The new virtual unit was also aligned with the C4's mission in that it would increase bed capacity and improve patient flow. The COVID@Home pilot project was therefore managed by the DQTEVE-SV and integrated into the C4. The decision place virtual unit under a cross-functional directorate such as the DQTEVE-SV depoliticized the initiative and maximized collaboration between care teams from different sectors.

The close link between a command centre and a virtual unit can also be observed at the Mayo Clinic and the Cleveland Clinic in the United States, as well as the Humber River Hospital in Ontario—three establishments that inspired the CCOMTL to create its Command Centre. "They also embrace this model [of a virtual unit attached to the command centre], so we see that it quite naturally incorporates flow, logistics, command centres and virtual care," said Ms. Cook.

Defining patient eligibility criteria for COVID@Home

Who would be eligible for this trajectory? The group working on admission criteria set to work on this first question. First, a patient needed to have COVID-19 to be eligible under the project. They had to be stable and be deemed to only need a short follow-up period. They could require hospitalization for drug treatments and oxygen therapy, meaning care and services that could be provided at home. A patient had to be able to be responsible for their own medication and be able to take it with online supervision from a virtual nurse. They also had to have support from a caregiver or family member. The patient would ideally reside in the region served by the CCOMTL so they could receive care and services its Home Care team (SAPA-SAD). It was agreed that age would not be a criterion, so as not to exclude potential patients who would have benefitted from this care but were not within a prescribed age range. The team therefore did not follow the recommendation in the literature to limit eligibility to patients ages 70 and under.

When the criteria were met, the patient still needed to consent to participation. The admission criteria set by the work group are available in the appendices (Appendix 1: Eligibility Criteria–Poster).

Mapping the new trajectory

Directed by Dr. Rudski and Marc-André Reid, Clinical Nurse in Nursing–Digital Health, the process mapping work group was an interdisciplinary team that charted the trajectory of COVID-19 patients hospitalized at home. The trajectory followed the steps described below.

Stage 1: Patient identification, evaluation, admission, initial lesson

Patients who were potential candidates for COVID@Home were identified directly in the emergency department or care unit.

The process of identifying potential patients began with the attending physician or specialized nursing practitioner (SNP), who selected eligible candidates in their units (Appendix 2: Physician's Guide to the H@H Transfer Process). This assessment was usually carried out jointly with the assistant head nurse, who had also made an initial selection. Once the candidates had been pre-selected on the floor and the head nurse notified, the nursing staff of the responsible unit would contact the transfer nurse of the virtual care unit. The transfer nurse would then organize and facilitate patient transfer to the virtual care unit. They would meet with patients and assess the patients' eligibility based on the criteria. They would then meet with patients and their caregivers to obtain consent and explain how hospitalization at home works, using the documentation provided (Appendix 3: Initial Lesson for Patients). To check the patient's technological knowledge, the transfer nurse would make a test call using the Microsoft Teams application. They would also make sure all monitoring devices were properly connected via Bluetooth to the phone the patient would be using back at home. This was a key step in guaranteeing good connectivity and therefore secure transmission of vital signs from the IoT. The entire transfer process (Appendix 4: Process of Transfer to the Virtual Care Unit), generally took two to four hours.

Once program admission had been confirmed, the COVID@Home team was informed at a daily caucus. The virtual team then saw that the required material, medication, and care were properly coordinated. Information was transmitted digitally using the systems already in place, including prescriptions, medical records, and material orders for the hospitalized patient at home. This stage concluded with the physical transfer of the patient to their home, either in a private vehicle (e.g., with a caregiver) with legal authorization or in an ambulance. Transportation requests were made by a C4 administrative officer, coordinated by the admissions office.

Stage 2: Hospitalization at home

Patients hospitalized at home would be remotely monitored 24 hours a day, 7 days a week by a virtual nurse using IoT devices (Appendix 5: The Hospital-at-Home Stay Process). Patient rounds, meaning regular follow-up and care coordination meetings between care professionals and patients, would be carried out by phone or videoconference (e.g., MS Teams). Patients would also be able to speak to their attending physician in the same way. As Dr. Rudski explained, the vast majority of medical evaluations are carried out by speaking to the patient, without a physical examination, which can be achieved by telemedicine. (*La Presse*, 2022). Patients' loved ones would also be invited to join virtual consultations, whether at the bedside or elsewhere. The care team would use their clinical judgement to determine the type and frequency of rounds based on the patient's state of health. SAPA-SAD, which already had expertise in home visits, would work closely with the COVID@Home team to provide services to patients through home visits.

Patients hospitalized at home would receive the same care as other hospitalized patients. Procedures would be prioritized in the same way, and transport would be arranged by the care team if the patient needed to go to hospital, for example, for a physical examination, imaging, or an in-person procedure. Should the patient's health significantly deteriorate and require them to return to hospital, transportation would be arranged and the patient admitted directly to a Jewish General Hospital unit for further treatment. However, should the patient go to the ED, their admission to the hospital would end, as this would mean they were no longer hospitalized and were returning to outpatient status. They would then need to be admitted to the ED before being readmitted to the virtual unit, if appropriate for the patient.

Stage 3: End of hospitalization and transfer to community care

Admitted patients would remain in Virtual Care Unit for as long as their state of health required. Once the patient returned to their baseline level of health, the Virtual Care team would discharge them from the hospital. The virtual nurses would make sure the patient had learned all they needed to learn and then transfer the patient file to the appropriate community resource according to the patient's needs for further care and services (Appendix 6: Discharge Process from the Virtual Unit).

Identifying and equipping the cross-disciplinary team

Care on the virtual hospitalization unit had to be available 24 hours a day, 7 days a week. This meant putting a team in place to cover day, evening, and night shifts, 7 days a week starting the following Monday.

The team had to be assembled quickly and combine expertise in virtual care, home care, and COVID-19 care, an emerging practice that needed to be organized. The roles and responsibilities of this interdisciplinary team were defined over the weekend.

Transfer nurse

The transfer nurse worked under the Virtual Care Unit and was responsible for transferring patients from the hospital to the Virtual Unit. They were tasked with pre-screening patients, identified as potentially eligible by the attending physician or specialized nurse practitioner (SNP), using inclusion and exclusion criteria. This involved a physical assessment of the patient and checking the available caregiver support. The transfer nurse then made sure the patient and caregiver had given written consent so that they could proceed with the administrative procedures to transfer the patient to the virtual unit. They then taught the patient about how home hospitalization works, the care they would need, how to self-administer certain medications, and how to use the technology. The transfer nurse scheduled an MS Teams test call. Lastly, the transfer nurse installed the IoT devices, made sure they were working properly, and arranged initial contact with the virtual care team who would be following them.

When this position was created, it was a full-time day position. However, the medium-term goal was to staff a larger team who could cover 7 days a week, 24 hours a day.

Virtual nurses as patient navigators

They set up a team of virtual nurses to follow up with patients hospitalized at home.

A virtual nurse acted as care coordinator for each patient hospitalized at home. This new position was designed to cover two shifts a day, 7 days a week so that decisions could be made about the user's file. These nurses were responsible for monitoring the patient 24/7, reviewing lab results, performing a full evaluation each shift, keeping equipment and medication in supply, documenting and supervising autonomous patients as they took medication remotely during follow-up calls, and communicating with the physician and the SAPA-SAD team providing home care to report any changes. They were also responsible for continuity of care. If services could not be provided in home, the Virtual Care Unit would coordinate transportation for in-person diagnostic testing or medical evaluation. Similarly, the Virtual Care Unit acted as a coordinator and information conduit between the physician, SAPA-SAD, the pharmacy, and other stakeholders. The Virtual Unit therefore centralized all information and acted as a navigator. It was the point of contact for all questions about the patient for the care team. This meant that the virtual nurse was considered the reference person whom the interdisciplinary team could contact regarding the user's file.

Given the labour shortages during the pandemic, and the fact that such tasks could be done remotely, these positions were filled by nurses on preventive leave at home. This was a wise use of their expertise to benefit patients, avoiding reductions in frontline staff and impacting other departments that needed their nurses.

As Lucie Tremblay explained, getting nurses involved and mobilizing them quickly was crucial to the project's success. Fortunately, many nursing professionals appreciated the opening of these new professions, which opened up a new field of practice. Tracy Heramchuk, Assistant Chief nurse, who was part of the team, explains:

" There is a population of nurses that are looking for this. Some of them can't work in a hospital and are ready to make a difference, ready for making a different type of nursing."

Tracy Heramchuk, Assistant Chief Nurse for the H@H team

Given the novelty of the project and the speed with which it had to be implemented, it was also important to reassure and help nurses overcome their initial fears, added Ms. Tremblay.

"Of course, we were working with a tight schedule [to put the project together]. It was important to have people who wanted to get invested, who believed in the project. [. . .] We had to reassure them and say, "You won't be alone. There will be support." We are innovating. We are setting things up. We will touch base regularly to make any necessary adjustments. We will also set up—and this was the beauty of our program—all the structure for interprofessional collaboration."

Lucie Tremblay, Director of Nursing

Once the roles had been defined and the virtual nurses identified, time was set aside over the weekend to train the nurses how to use the devices and tools to follow patients. For each new device, they received training to understand how to receive the signal, read the monitoring frequency and view the data. The explanations were recorded step by step like a reference guide and centralized on a SharePoint site where one could also find the written clinical protocols.

SAPA-SAD nursing staff to provide home care

To put together a team capable of providing nursing for patients hospitalized at home, the project team turned to SAPA-SAD. They identified nurses who had experience working with patients hospitalized at home and put them to work. Lilly Luan, Chief of Activities for SAPA-SAD, explains:

"When you work in a hospital as a nurse, you insert IV lines, you administer medications, you do swabs, you perform ultrasounds, you do ECGs. So all day long, you're doing technical procedures and following physicians' orders. It's a different kind of nursing. Back then, we selected people who already had experience in acute care. They're more comfortable, for example, giving a late IV push of Lasix to COVID@home patients, because they have the knowledge. They've done it before."

Lilly Luan, Chief of Activities for SAPA-SAD Programs

Lucie Tremblay explained that although Home Care nurses were already performing many of the techniques and treatments required for home hospitalization, they did so infrequently. To provide

hospital at home care, it would be necessary to develop the clinical skills needed to monitor health conditions typically monitored in hospital, and to organize care differently.

As with the virtual nurses, the SAPA-SAD nursing staff targeted for the project needed training, which began over the weekend. Their training especially focused on new IoT-integrated equipment and on administering intravenous medication for COVID-19 patients.

The project team decided to put SAPA-SAD nurses in charge of providing in-home care, services, and evaluations that the Virtual Unit would not be able to provide remotely. They would be responsible for managing intravenous medications, from administration to documentation. They would complete and sign a document recording the details of the medication administered and forward the document to the Virtual Unit nurse. The SAPA-SAD nurses would also be responsible for managing and monitoring wound care. This would include evaluating and measuring wounds, documenting, and changing bandages. The nurses would also need to draw blood and communicate at all times with the Virtual Unit. They would perform a physical evaluation of the patient alongside the virtual evaluation. If a problem arose with the remote vital signs monitor, for example, if it did not stay on the patient or the signal was not transmitting, or if the patient was not feeling well, the Virtual Unit would contact SAPA-SAD so a nurse could come in person to take vital signs and resolve the problem. Professionals still needed to visit patients at home, as this is an essential part of virtual care, because “nothing can replace a physical evaluation of the user, to make sure they are safe,” says Brenda Lécouteur, Coordinator at SAPA-SAD.

The administrative unit would continue compiling statistics on the care and services provided by the SAPA-SAD team to patients hospitalized at home. To differentiate between care for clients hospitalized at home and care for regular SAPA-SAD clients, the Virtual Unit is listed as the location.

Other professionals involved

Patients in the COVID@Home program requiring oxygen may also need respiratory care. However, in the absence of respiratory therapists affiliated with CCOMTL’s SAPA-SAD directorate, this service would be covered by the oxygen supplier and its own teams.

It was also possible that some patients hospitalized at home would need care from other SAPA-SAD professionals, such as social workers, physical therapists, or occupational therapists. However, there were no big changes in their practices and involvement, so they did not require any specific training for COVID@Home to get off the ground.

As Covid@Home was focused on patients who were surrounded and supported by family caregivers, Personal Support Services (PSS), which were usually provided in hospital, were not very involved in the project. Patients could be supported by their loved ones for their day-to-day needs, such as meals and hygiene.

Physicians from the open unit

First and foremost, a clinical model needed to be chosen if physicians were to get involved with hospitalization at home. Should COVID@Home be a closed or open unit? If it were a closed unit, they would need physicians solely dedicated to the Virtual Care Unit. This model was not an option for the CCOMTL in the short term. Dr. Rudski explained, "There really wasn't any options because we couldn't all of a sudden say “we're gonna find a doctor or two doctors dedicated…”. We didn't have the personnel for that”.

Dr. Rudski, Erin Cook, and their teams assumed it would be an open unit when the project launched. This model allowed several professionals to be part of the Virtual Unit while continuing their regular practice in their home unit. A patient’s attending physician could continue providing care virtually through COVID@Home while the patient was hospitalized. This was deemed an

interesting scenario for a patient's continuity of care. There was still, however, the issue that patients hospitalized at home added to the workload of the admitting physicians, in addition to their patients in hospital. This was compounded by the fact that medical residents could not support them, as they were not trained for this care their residency program did not include hospitalization at home. So, while an open unit was the best option, it would clearly be a challenge for physicians to mobilize and contribute.

While waiting to promote the project to doctors on the floor and the possibility of hospitalizing patients at home to free up bed capacity, they had to meet the challenge of providing 24/7 medical coverage from the outset for the first patients referred to COVID@Home. Dr. Rudski will provide medical care in the early stages.

" For the first weeks, I did a lot of the coverage because I don't like handing off anything unless I know that it works. So it was only a small number of doctors that were involved in the beginning."

Dr. Rudski, Director of the Azrieli Heart Centre at JGH and Chief of Medical Information

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Dr. Rudski was joined by the Chief of Cardiac Surgery, who had to observe a temporary period of isolation. Like the nursing staff in the Virtual Unit on preventive leave, the physician was mobilized to cover shifts virtually, along with Dr. Rudski.

From the very beginning, it was known that remuneration for medical services provided through COVID@Home would be an issue, as there was no ministerial code yet established for physicians to bill their work in a virtual hospitalization unit. This meant that when the project was launched, physicians who had taken on a COVID@Home patient would have no guarantee that they would be paid. There were two possible scenarios: either no billing at all, or billing care as if the patient were in hospital on their unit, pending the creation of remuneration codes. In the end, many physicians did not actually bill the care they provided on the Virtual Unit.

Planning the clinical and logistical aspects of the care trajectory

The pharmacy's involvement and organization of medication supplies

Implementing the pilot project required significant involvement from the pharmacy, and the pharmacy work group created new procedures for supplying patients with medication.

Typically, the pharmacy would stay in direct contact with the attending physician, however, for the COVID@Home project, it communicated with the Virtual Unit nursing staff. This meant that for patients treated in hospital, the referring physician would establish contact with the pharmacy. If a patient was subsequently transferred to the virtual home hospitalization unit, the pharmacy and the virtual nurse for that patient had to begin communicating, even if the physician continued to monitor the patient. From that point on, the virtual nurse would be in charge of liaising between the physician and the pharmacy, as needed.

Furthermore, in the COVID@Home project, the patient would administer their own oral medication with remote support from the virtual nurse in charge of monitoring and follow-up. This differed from the regular hospital procedure, wherein nursing staff would receive medication in packets and then administer it to the patient. This meant that the hospital pharmacy was not suited to supply drugs directly to patients' homes. In the laboratory, medication packets were prepared in batches by a

robot according to drug profiles. For patients in the COVID@Home project, medication had to be prepared manually: picking up the medication, bagging it, printing labels, stapling, etc.

Adding further complexity to the project was the fact that medications could not be delivered several days in advance, since there were often changes in medication. They had to be prepared and delivered each day, except on weekends, when they were delivered in advance on Friday to avoid overloading the distribution pharmacy.

Choice of telemonitoring devices and clinical equipment

To launch the project quickly, it was a priority to find oxygen suppliers and devices to monitor vital signs remotely. Not surprisingly, orders made on Friday afternoon to suppliers were not answered before the weekend. While waiting to come to an agreement, the team turned to the hospital's oxygen concentrators. This type of device, much larger than portable oxygen tanks concentrates oxygen and eliminates nitrogen from ambient air to provide air with a high oxygen concentration to patients in respiratory failure. They also found several in a CHSLDs, some of which were new and had not been used.

To monitor patients, they opted for tools that required only minimal technical manipulation by patients and caregivers. To prevent patients from having to connect and disconnect telemonitoring devices several times a day, they agreed to use IoT monitoring devices that were designed to be worn continuously (Appendix 7: Technologies Used). The research done by the DSI team, Erin Cook, and Dr. Rudski led them to two vital signs and saturation monitoring devices that CCOMTL already possessed: the Biobeat monitor and the Masimo SafetyNet bracelet.

Masimo SafetyNet *Bracelet*

The Masimo SafetyNet Bracelet measures oxygen saturation and transmits data in real time. This is an essential device for monitoring patients with COVID-19.

Image source: https://professional.masimo.ca/siteassets/us/images/products/sensors--accessories/radius-ppg/air_02sensor_app_6_pdt_40120.png

Biobeat Heart Montior

The Biobeat Heart Monitor tracks vital signs, specifically cardiac signs. The patient wears the device on their chest and the data is transferred via Bluetooth to a phone connected to remote monitoring tools.

Image source: https://www.bio-beat.com/products

Although these devices showed conclusive results in user technology acceptability studies, they were new technologies that had not been used much to date. The devices had been acquired by CCOMTL for a pilot study in cardiology, but they had never been used for direct patient care. The team had to retrieve the devices quickly and study them over the weekend to check reading accuracy and make sure that medical and nursing staff felt comfortable using them.

Fully approved by Health Canada, the Masimo SafetyNet bracelet was similar to what was used in clinical hospital units. The Biobeat monitor had been approved by Health Canada for the pandemic

and was awaiting full approval. These devices were also approved by the FDA[4] and for CE[5] marking purposes. This was the first time they would be used for continuous computer measurement in a pilot project involving a hospital at home program. However, since the devices had a Health Canada Class II rating instead of Class III, they could not be used to continuously monitor patients. This is why the term “continuous spot checks” was used instead of “continuous monitoring” in the usage protocols.

Data would be transmitted from the device via Bluetooth wireless technology to a mobile phone with the supplier’s mobile application installed that would be loaned to the patient. It was also simultaneously available to the virtual monitoring team, who would see the patient's data organized on a dashboard on their computer screens.

Microsoft Teams software was also installed on the loaner phones so patients could communicate using audio or video with the Virtual Unit team. This choice was obvious, as Teams was already used at CIUSSS for staff coordination and telehealth.

The following equipment would be loaned to COVID@Home patients, if they needed it:

- *Biobeat* cardiac monitor
- Masimo SafetyNet device
- Mobile phone including the Microsoft Teams application
- Blood pressure measurement device
- Pulse oximeter

Drafting clinical protocols, practices and procedures

The clinical protocols working group analyzed SAPA-SAD’s service offering to determine which care and services could be safely offered at home and how often COVID-19 patients would receive visits.

The teams also had to create care protocols for the trajectory. They consulted the literature as they progressed to establish best practices in telemonitoring and hospital-at-home care. However, articles and documents were scare on the topic of providing hospital home care for COVID patients, except for an oxygen titration protocol specifically for people with COVID in Swiss hospitals.

Lucie Tremblay, Director of Nursing, also noted that there was very little documentation on nursing practices in telemonitoring in hospital-at-home care. This was a challenge in developing the pilot project protocols and ensuring the quality and safety of care. For example, Nursing attempted to find evidence-based data on the degree of clinical monitoring required for nursing through telemonitoring. As Chantal Bastien, Assistant to the Director of Nursing (interim), pointed out, this was not an easy task: “For example, the patch [technological instrument] will send data continuously, but should the nurse check every ten minutes, every half hour, every hour, three times a day? We did a literature review, but there was nothing. There may be literature [in telehealth] at the patient or physician level, but for nurses, there was nothing.”

Because this was a new concept, they had to rely on everyone’s knowledge and experience to define practices where literature was lacking.

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[4] The U.S. Food and Drug Administration (FDA) is a government organization charged with drug safety monitoring.

[5] CE marking provides a visual indication that the medical device complies with the applicable requirements.

The first versions of protocols for hospital at home were created jointly with several services and a variety of complementary expertise (hospital environment, community environment), facilitated by an assistant to the Director of Nursing and Aurelia Di Fabrizio. Di Fabrizio says, "We used stakeholder recommendations. They were really the ones who told us that, to develop a trajectory like this, we had to do this. We had to develop this or that document." This process led to numerous exchanges and debates between the various professionals taking part in the discussions. For example, the antiviral remdesivir was used during the pandemic with COVID-19 patients. Over the weekend, it was concluded that while they had previously only administered this medication to hospital patients intravenously, they would need to give it to COVID-19 patients hospitalized at home. A hospital protocol already existed for this medication infused at 100 cc/h in the hospital by nursing staff.

Examples of clinical protocols created for COVID@Home

- Patient admission to the Virtual Unit
- Intravenous administration of remdesivir
- Use of oxygen at home
- Use of IoT devices such as Biobeat and Masimo SafetyNet
- Patient discharge from the Virtual Unit

However, the flow rate of pumps used at home was slower and the medication would not be administered in the presence of a nurse. The SAPA-SAD team would install the intravenous device, and virtual nurses would follow up with remote monitoring. With remdesivir being administered in hospital and at home, a new protocol for SAPA-SAD care staff and virtual staff was needed.

To ensure that protocols (steroids, antibiotics, thromboprophylaxis, blood sugar control) and oxygen titration algorithms met standards in terms of medical treatment, Dr. Rudski consulted pulmonologists, hematologists, endocrinologists, and infectious disease specialists who, individually or on behalf of their department, provided concerted and informed opinions.

The nursing advisor for information and documentation of the Nursing directorate, Marc-André Reid, along with the head of the Virtual Unit, Anna D'Ambra[6], and the assistant to the Director of Nursing (interim), Chantal Bastien, met to approve the protocols.

Work began during the intensive weekend, but continued after deployment, as protocols continued to be adjusted based on lessons learned.

"It was rolled out very, very quickly. [...] That was the week that I got involved. Just reviewing the protocols, making sure they aligned with the nurse's field of practice, that they followed other protocols anyway... but it was so innovative that there were no similar protocols. In the beginning, it was just the approval of initial documents."

Chantal Bastien, Assistant to the Director of Nursing (interim)

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[6] Anna D'ambra was Chief of the Virtual Unit when hospital at home was created. The position was eventually taken over by Viki Doucette in the following months.

Organization of legal and budgetary aspects

The teams involved, particularly those in the contingency plan working group, addressed elements affecting the legal component. They created a patient consent form covering oxygen therapy, medication, data transfer, and transportation.

They also developed a contingency plan with a legal risk analysis. For example, several legal checks were necessary to ensure that the CIUSSS and its staff were covered by insurance, as well as doctors and specialists involved in the care of patients admitted to a virtual care unit. Legal services were also consulted to determine the minimum classification required for IoT devices to be used in hospital at home care, since most IoT devices were primarily intended for general wellness and were not designed for medical use.

Although the pilot project was under the direction of DQTEVE-SV, they chose to compile expenses related to hospital at home in the SAPA-SAD[7] budget.

"Since the program did not exist in an administrative unit or cost centre, we had to decide, based on our organization's budget, where we thought the program would best fit. We decided to put it with the SAPA-SAD cost centre, because although patients were hospitalized, the existing frameworks did not account for this model."

Erin Cook, Associate Director of the DQTEVE-SV

The first hospital at home experiences

Monday , January 10, 2022: the pre-test

Monday was devoted to a pilot project simulation and program adjustments. This tabletop simulation, commonly called a dry run, took place in the emergency department conference room with part of the team joining remotely. It consisted of running the process without admitting real patients. The test ensured that oxygen concentrators, Biobeat and Masimo SafetyNet and other devices were in good working order and were integrated into the institution's various information management systems. The test also made sure staff were using monitoring devices correctly, and was a chance to refine communication protocols to specify who should contact whom, when, and by what means to provide care or exchange information. Through this process, they were able to make adjustments to the technology and to how work was coordinated.

"There are a lot of little faults that we needed to improve during the dry run and that we didn't even think about", explained Dr. Rudski.

In conjunction with the simulation, the medical and nursing team sought to identify potential patients in the hospital, based on the defined eligibility criteria, so the project could be launched the following day. However, the teams faced a major problem: no candidates met the inclusion criteria. They would have to loosen their criteria a bit.

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[7] Since this time, the MSSS has amended the financial guidelines and added an administrative unit and a cost centre for hospitalization at home.

"Sure enough, on Monday morning I found out we had nobody to put into the program. All the candidates were too old, too sick, too reluctant, not tech-savy, etc. The solution to this problem was right in front of me on my office wall, where I had one of those motivational plaques paraphrasing a famous quote from the late American football coach Vince Lombardi, saying, "Perfection is not attainable, but if we chase perfection, we can catch excellence." I invoked a version of the Pareto principle, or 80/20 rule: if we could find the best 20 percent of the candidates, no matter how imperfect, we could get 80% of what we wanted done accomplished.

Rosenberg (2023), Patients Matter Most, p. 43

Tuesday, January 11: first patients admitted to COVID@Home

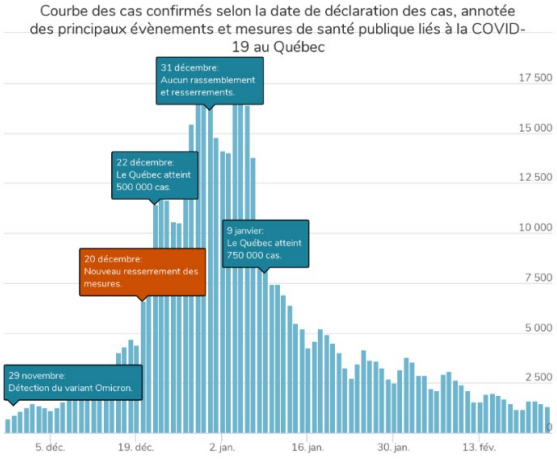
Patient care began Tuesday, January 11, 2022. Among the first COVID@Home patients was Ms. Lin, whose story had been covered in the media. Ms. Lin had been isolated in intensive care for three weeks. She was not recovering well due to sleeping poorly in the hospital and wanted to return home as soon as possible to be with her family, particularly her four young children. She joined COVID@Home on January 14, through which she received oxygen therapy, continuous monitoring with the Masimo SafetyNet bracelet, and virtual meetings with the care team. The care staff observed progressive recovery and on January 30, she was discharged from the hospital, which ended her participation in the program. (JGH News, 2022)

When she was admitted, we thought she would need home oxygen for several weeks, but she recovered more quickly than expected. We believe this is because her level of activity at home is much higher than it would have been in a hospital room.

Dr. Rudski, Director of the Azrieli Heart Centre and Medical Director of Virtual Care

Development and expansion into H@H

By mid-February 2022, the pilot project had allowed a dozen COVID-19 patients to complete their hospitalization in the comfort of their own home. (CCHL, 2023). The fifth wave was subsiding, but despite the decrease in cases, access to care remained difficult. The emergency department was still over capacity, which affected hospitalization capacity and delayed catching up on surgery wait lists.



With this experience, the encouraging performance of COVID@Home gave the CCOMTL teams an opportunity to develop the

project and expand the clientele to include heart failure and post-surgical rehabilitation patients.

V2 Virtual Unit created to accommodate other patient profiles

On February 25, the "V2 Virtual Care at Home Unit" was created, a secondary unit of the Virtual Unit. The Virtual Unit was now divided into two administrative sub-units. The V1 unit was reserved for COVID-19 patients while the V2 unit was reserved for other medical diagnoses. Of the fifty beds created for the Virtual Unit that January, about twenty were transferred to the new sub-unit. This marked the beginning of the H@H program, derived from the COVID@Home pilot project.

The first trajectory developed for H@H was heart failure, with the support and leadership of the cardiology nurse practitioner, Christina Ziccardi: a pragmatic choice, since Dr. Rudski, project co-director, was also Director of the Azrieli Heart Centre at JGH. They also quickly established hospital-at-home trajectories for medical conditions such as pneumonia and septicemia that did not meet the criteria for outpatient parenteral antimicrobial therapy (OPAT). Then, H@H turned to post-surgical hospitalizations (e.g., knee operation, hip replacement, or robotic hysterectomy). These latter hospital-at-home trajectories included support from a SAPA-SAD physiotherapist to aid in recovery, as well as support from pharmacist.

The sixth wave of the pandemic revived the issue of congestion in the ED and hospitalization units. On Monday, April 18, the occupancy rate of JGH Emergency Department gurneys exceeded 200% (*Le Devoir*, 2022). To alleviate this problem, medical staff began to identify and admit H@H patients directly from their admission to the Emergency Department, which meant they did not have to wait to be hospitalized.

H@H in the news

The H@H program was starting to gain traction, and the media was taking an interest in the results. On April 13, 2022, *La Presse* reported that 22 patients had been hospitalized at home, freeing up 136 days of hospital bed occupancy. Only two patients required SAPA-SAD teams to come to their homes. The others were able to receive care virtually (*La Presse*, 2022).

V3 Unit (Glenmount) created to combine acute care and rehabilitation

In summer 2022, at the Glenmount, a rehab facility in the territory, two of four beds in the transitional functional recovery unit (the UTRF, for *unité transitoire de récupération fonctionnelle*) were underutilized. This unit usually accommodated patients with mild rehabilitation and recovery needs. Aiming to improve utilization of bed capacity, the Glenmount invited the virtual unit to use the free beds they had for rehab patients requiring acute care who would need to be hospitalized. Being hospitalized at home with a Glenmount bed allowed these patients to receive acute care while getting the rehab they needed, thus avoiding hospital-associated deconditioning.

On September 23, 2022 the "V3 – Glenmount UTRF Virtual Unit" program was created. Medical care for patient hospitalization was decided by the physician taking virtual charge of the patient within the virtual unit, while rehabilitation care and services were handled by UTRF staff.

"I think the patient who demonstrates so well why the program exists is a gentleman who had cellulitis and needed intravenous antibiotics. He also needed support to be able to climb the stairs at home. So he was transferred to Glenmount. When he entered, he could only climb two stairs. After two weeks, he was strong enough to do thirty. The difference is that usually at Glenmount, there is no medical coverage. Patients are registered and not

admitted. So, there is no medical coverage and nursing care is usually minimal."

Kimberly Garshore, Command Centre Coordinator

Sustained expansion and diversification of patient profiles and practices

Over the months that followed, the H@H team planned to continue opening new trajectories. While initially targeting specific pathologies, it now opened to accommodating patients with varying diagnoses whose care matched H@H's offering (Appendix 8: Development of a Trajectory). Dr. Shannon Fraser, Medical Director of the Command Centre, explained:

"Diagnoses should be somewhat secondary. If the patient has several problems or several diagnoses like the typical patient in medicine, we know we can offer mobilization, oxygen, fluids, and antivirals in H@H. These required services can determine who we can accommodate, not the type of diagnosis."

Dr. Shannon Fraser, General Surgeon and Medical Director of the Command Centre

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Between fall 2022 and 2023, they now admitted patients with increasingly diverse disorders. The following possibilities, among others, were added to the list:

- Pneumonia and pulmonary diseases
- Cellulitis or urinary infections requiring antibiotics, and care that goes beyond the usual outpatient parenteral antibiotic therapy (OPAT) program
- Urology for robotic prostatectomies
- Subcutaneous medication of chemotherapy agents
- Obstetrics
- Neurology and brain tumors
- Bone marrow transplant
- Hepatobiliary surgery, partial pancreatectomies, and partial hepatectomies

These new trajectories were also created with support from the DQTEVE-SV advisor team, which facilitated cross-disciplinary meetings to plan trajectories and develop care adapted to H@H.

As experience was gained, patient admission criteria evolved.

"We self-evaluated and realized that there were patients we could now take whom we could not take in the beginning. This was evidenced by changes to the eligibility criteria. At the beginning, we only took patients ages 65 and under. The average age is now age 83. Before, we did not take any dialysis patients, but as June 14, 2023, we had five."

Viki Doucette, Head Nurse of the Virtual Unit

The evolution of H@H management and governance

A governance structure and steering mechanisms were gradually put in place and consolidated to ensure strategic decision-making, tactical steering, and operational coordination of the initiative (Appendix 9: Governance Structure). These ways of doing things evolved over time to serve needs well.

Daily caucuses

To manage the logistics of patient admissions, the first order of business was to establish two daily caucuses, at 11:00 a.m. and 3:15 p.m. (Appendix 10: Governance and Steering Meeting Schedule).The meetings were facilitated by the Command Centre (C4) coordinator and conducted virtually, but stakeholders could also join in person directly at the Command Centre. Although the purpose of these meetings was initially to discuss patients to be admitted, they also became a chance to share about the clinical issues of admitted patients. Eventually, there was not enough time to cover everything during the short meetings.

A few months after the project began, they decided to split up logistical discussions and clinical discussions by creating two new fifteen-minute daily caucuses. Clinical caucuses were at 8:00 a.m. and 4:00 p.m., at the beginning and end of each shift, which created a clinical coordination channel. This allowed assistant head nurse (ASI), who were closer to operations, to share their clinical report and ensure continuity of care during the clinical caucus, while freeing the program Activity Manager for logistical and administrative management at the 11:00 a.m. and 3:15 p.m. caucuses. The ASI and program Activity Manager handled coordination and follow-up between meetings.

“I think for us it was necessary [that it be carried out by the program Activity Manager at the start], since we were co-building processes and had to align with the hospital. Probably in another CIUSSS, the ball could have been passed to the ASIs more quickly.”

Annick Mercier, Activity Manager of SAPA-SAD Programs

Tactical committee and working committees

At project launch, clinicians attended meetings in the field for daily development and adaptation of trajectories and services based on the immediate needs of identified patients. Teams regularly faced “firsts” (e.g., first patient presenting this health profile, first time performing this or that treatment at home) and had to think about the best ways to organize and offer care in H@H.

"[Daily meetings], obviously, this is not something that is necessarily sustainable. In the initial situation, it was important because it allowed us to target issues, to intervene quickly, and to develop knowledge and agility to continue program development.”

Erin Cook, Associate Director of the DQTEVE-SV

Eventually, they began reducing meetings to twice a week, then eventually to once a week. At that point, the group began calling itself a tactical committee. Weekly meetings provided a formal mechanism for organizing efforts while maintaining the flexibility to react to changing circumstances.

Working committees specific to different clinical environments were also created and attached to the tactical committee. There was a working group for orthopedic surgeons, one for urological surgeons, one for cardiologists, and another for family medicine. By creating distinct committees, members could meet the specific needs of each clinical environment when creating virtual care and tailor solutions to each clinical group.

Tactical Committee Members

- Suzette Chung, C4 Coordinator
- Marc-André Reid, Nursing Advisor, Digital Health
- Anna D'Ambra, Senior Clinical IT Consultant
- Krystle North, Senior Quality Advisor
- Louise Grenier, Assistant to the DQTEVE-SV, Performance
- Serge Cloutier, Assistant Director of Nursing
- Jacques Laporte, Director of Information Resources
- Erin Cook, Director of the DQTEVE-SV
- Dr. Lawrence Rudski, Director of the Azrieli Heart Centre
- Elliott Silverman, Director of Logistics and Procurement
- Dr. Adriana Decker, Assistant Chief of Family Medicine

"We really decentralized [development] to do it with people in the field. This is something I find very important for developing something that truly meets the specific needs of the population and is valuable for teams participating in the development of their trajectories."

Erin Cook, Associate Director of the DQTEVE-SV

Steering Committee

The two project Co-Directors, Erin Cook, Associate Director of Quality, Transformation, Evaluation, Value, Clinical and Organizational Ethics and Virtual Care (DQTEVE-SV) and Dr. Lawrence Rudski, cardiologist, Director of the Azrieli Heart Centre at JGH and Chief Medical Information Officer at CCOMTL, communicated regularly by text and email. They also met every two weeks to take stock of progress and developments in H@H. As Medical Co-Director, Dr. Rudski worked to keep physicians involved and information flowing, in addition to managing medical issues for the various committees he governed and lead.

Executive Committee

An executive committee composed mainly of directors met every day at the beginning to receive project updates, resolve major issues, and make sure that the solutions put in place were prioritized and incorporated into the regular service offering.

Eventually, this committee met monthly and served to strategically target clinical and support needs as well as the future positioning of virtual care within the institution, taking into account external partners. The committee was also tasked with maintaining transparency, performance, risk management, and advocacy, in addition to monitoring and reporting on key performance indicators (KPIs) (Appendix 11: H@H Key Performance Indicators). It also escalated issues and sought CEO support and authority to move the needle in certain situations.

Executive Committee Members

- Dr. Lawrence Rosenberg, President and CEO
- Luc Méthot, Associate Director of SAPA
- Dan Gabay, Associate Executive Director
- Joanne Côté, Director of DQTEVE-SV
- Francine Dupuis, Associate Executive Director
- Dr. Lawrence Rudski, Director of the Azrieli Heart Centre
- Lucie Tremblay, Director of Nursing
- Dr. Marc Afilalo, ED Chief
- Erin Cook, Associate Director of DQTEVE-SV
- Dr. Louise Miner, Director of Professional Services

Performance measurement : monitoring to progress and improve

After a quick start to the project to prevent offloading during the fifth wave, the H@H team and DQTEVE-SV took time to define a value-based vision of hospital at home and establish SMART objectives (specific, measurable, achievable, realistic, and time-bound). This gave precise and measurable direction to the project. They also defined key performance indicators (KPIs), which were monitored daily by the C4 flow team. The KPIs (Appendix 11: H@H Key Performance Indicators) were used to track progress toward objectives to ensure the project stayed aligned with the vision of H@H. Some measures were simpler, as data was directly available without requiring analysis. Others required more work or the creation of multiple tools, as was the case for patient health outcome measures and patient-reported outcome measures (PROMs), for which a short patient survey was developed and distributed.

The indicators were compiled in a performance dashboard that was monitored monthly by the executive committee. According to Erin Cook, this encouraged team accountability and engagement with a continuous improvement approach.

"When we a trend declining, we ask: 'What can we do to improve the situation? Can we explain why? This month, patients felt they did not have all the information they needed to take care of themselves properly at home. Did we have staff turnover? What can we do to fix this?' So, it allows us to continuously reflect on how to improve the program, but really with continuous improvement in mind and not criticism."

Erin Cook, Associate Director of the DQTEVE-SV

In addition to the monthly monitored KPIs, dashboards were displayed on Power BI at the C4 Command Centre so the virtual care team could support decision making and daily caucuses with real-time data. The dashboards were automatically updated. They were also shared with Virtual Unit managers and anyone who requested them (Appendix 12: H@H Dashboards Monitored at C4).

Example of H@H dashboard indicators posted at the Command Centre

- Number of admissions
- Number of discharges
- Number of patients in the unit
- Daily census
- Length of stay in the service
- List of patients and diagnosis

The DQTEVE-SV team was also committed to measuring H@H value compared to regular hospitalization. In addition to measuring patient health outcomes (e.g., distress level, fatigue, shortness of breath, symptom management) and patients' program experience, the team also had to measure care efficiency and quality (e.g., unplanned returns to hospital), as well as costs related to H@H. These results had to be compared with regular hospitalization in order to assess the importance of the initiative.

Patient identification for H@H: communication and change management work with teams and physicians

For H@H to work, clearly the virtual unit had to admit patients. They relied on referrals from care teams at the hospital for recruitment. Although most caregivers saw the value in hospitalizing patients at home and that it did not mean subpar services for these patients, the battle was not yet won.

H@H presentations to care teams and physicians

First, physicians and transfer nursing teams had to be aware of H@H and eligibility criteria so they would consider this option themselves when they came across a patient who could potentially benefit from it. This was especially true when eligibility criteria expanded and patients other than those with COVID-19 could be admitted. This meant the number of physicians who could refer patients had increased tenfold and awareness had to be spread about the initiative as much as possible.

With this in mind, the Virtual Unit planned program presentations for each care unit. To give concrete examples of the type of patient eligible for admission, the chief ASI of the Virtual Unit met with the chief ASI of each unit to review the lists of patients admitted. They did this prior to the presentation to discuss the different scenarios. This ensured that all types of caregivers were informed and aware of the options offered by H@H.

But the most critical factor to keep H@H operational remained physician engagement. For H@H to work, physicians had to agree to transfer their patient while remaining the attending physician. Raising awareness among physicians about H@H and getting them to buy in to the idea "on paper" was one thing but getting them to hospitalize patients at home was another. Physicians faced a number of barriers. For example, admitting patients to H@H meant that the physician was taking on more work by following one or more patients at home in addition to their patients in the hospital. They also did not know the virtual team yet. Trust had to be built—a fact that might give them pause, as might concerns about device reliability or the quality of the process and care. Lastly, the fact that there was no billing code for medical procedures performed in H@H in the project's early days undoubtedly made some doctors hesitant to get on board.

One of the measures adopted by DQTEVE-SV in early 2023 was to establish a team of physician ambassadors for the project. Department and service chiefs were therefore asked to name a volunteer physician who would represent H@H within their team. About forty physicians were thus identified and invited to attend monthly meetings of what was called the Clinical Virtual Care Leadership Group. Once the program had been presented, the meetings became a time to discuss H@H issues and challenges, as well as any questions or concerns.

"We saw certain physicians come each month to meetings. These physicians, we still see them now. They are the same ones who developed trajectories, who were innovative and are involved. We clearly see the positive impacts of this approach in change management."

Alla'a Ali, Senior Advisor for DQTEVE-SV

The number of highly motivated physicians at the meetings, which took place over about eight months, stabilized around 20. They formed the core group. It is interesting to note that these were not necessarily all physicians who made the most use of H@H. But together, they raised awareness about H@H with their colleagues, acted as reference persons, and answered questions. Some took the initiative to give presentations in their service, with support from the DQTEVE-SV transformation team. This helped establish health care worker confidence while offering them opportunities to get involved, to try out and experiment with technologies, and help establish guidelines for tech use in H@H.

The meetings revealed that physicians were concerned about the technology used in H@H and whether it would produce consistently reliable data. To address these concerns, DQTEVE-SV held workshops for clinical teams, during which suppliers of technology that was in use or under consideration came to present their product and answer questions. The DQTEVE-SV also used questionnaires to gather participant feedback on the technologies.

At the same time, with the goal of reaching as many physicians as possible, the project was presented during various medical and academic events, such at the JGH Virtual Scientific Conferences in April 2022[8], at the McGill High Value Healthcare Symposium 2022, at the Research Symposium in early 2023, or during Medical Grand Rounds[9], attended by several of the hospital's physicians. This type of scientific conference presented hospital at home as an inspiring medical practice and highlighted conclusive results. The presentation format piqued the interest of physicians who were looking for new ways of working and who were motivated by clinical excellence. This naturally generated more physician buy-in than a simple directive from management.

To increase physician mobilization, Dr. Rudski also used a personalized approach. Initially, each day, he took it upon himself to go to different units to screen potential patient lists with the physicians. A dashboard, composed of data that had been extracted daily from systems and not updated in real time, was presented to them regarding their unit's participation in H@H. This

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[8] "Soins virtuels et hôpital à domicile – un changement de paradigme et un exercice de changement," conference by Dr. Jonathan Choy, Dr. Lawrence Rudski and Erin Cook, on April 4, 2022.

[9] "Leading Transformational Change: The Hospital@Home Program", by Alla'a Ali, Dr. Rudski, Erin Cook. November 11, 2024.

included the number of referrals and their diagnoses, the number of admitted patients, reasons why patients were admitted or not, etc., which helped to inform and mobilize physicians on the alternative that H@H offered. However, physicians did not always appreciate this approach, seeing it as a challenge to their authority and professional judgment.

This quickly became a means for exchange and feedback, through which physicians sought answers to their questions and concerns. As Dr. Rudski pointed out, it helped clarify physician needs, improve the program, and integrate new types of patients. It was this dialogue with physicians, on an individual basis, that seemed to be the best formula. “This helps show them how simple it is,” explained Dr. Rudski.

Challenges of physician mobilization and adherence

Despite communication efforts to make the initiative known, H@H was rarely at maximum capacity. Physicians sometimes hesitated to transfer patients there. On one hand, this was due to the paradigm shift that H@H had imposed on them. According to Dr. Rosenberg, for many physicians, “medicine is the laying on of hands.” In other words, care passes through touch, face-to-face relationships, and physical examination. However, in the case of H@H, medical consultations were conducted by teleconsultation via videoconferences, on Teams. Their clinical judgments were then based on vital sign data, lab tests, and information provided by virtual nurses.

Concerns were also raised about the Virtual Unit’s patient care. On a hospital unit, trust between physicians and nursing staff had to be built over time. With H@H, physicians did not meet virtual unit members in person and did not communicate directly with SAPA-SAD nurses, since virtual nurses acted as reference persons. Physicians therefore had to build solid collaboration with the program and develop trust, as virtual and SAPA-SAD nurses were their eyes on the patient.

“We are not used to caring for patients long-term at a distance. It takes a level of trust, because we don’t know the teams, the nurses... Here, [on the units] we know everyone, we know how to react when something is not going right. Working in a different environment is a bit scary for physicians.”

Dr. Shannon Fraser, General Surgeon and Medical Director of the Command Centre

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Hospitalizing a patient at home meant freeing up a hospital bed; however, it would immediately be filled by another patient, thereby increasing the number of patients under a physician’s care. This meant that a physician had to be comfortable with the idea of increasing their patient load when transferring a patient to hospital at home.

Furthermore, physicians took on this additional workload alone. They could not rely on support from resident physicians, as caring for patients hospitalized at home was not yet part of medical student curricula. The attending physician therefore risked being called in the evening or at night regarding H@H patients for questions that the on-call resident was normally able to answer. To address this issue, Dr. Rudski and Erin Cook met with McGill Faculty of Medicine representatives, who were responsible for training medical residents at the Jewish General Hospital, to talk to them about H@H and see to what extent their residents could eventually contribute.

Managing concerns and continuous improvement

At the launch of H@H, much of the focus was on quickly setting up the project, which left little time to manage field team concerns and barriers. Ms. Tremblay recounted, “We were in an emergency. Communications were brief, quick. We could have asked about people’s concerns, managed them, given ourselves a little more time...” The fact is news travels fast in a hospital setting. This could be both a blessing and a curse. In the case of H@H, word spread quickly about technical and technological challenges, complex situations, and early failures, raising fears about H@H and complicating team motivation.

In response, the Virtual Unit team encouraged each physician and health professional to quickly inform them of any obstacles they encountered regarding H@H. The unit committed to examining these problems within 24 hours and proposing a solution within 48 hours. Each incident or accident led to a process quality review and was added to a monthly medical post-mortem. A consulting physician from France, where a hospital-at-home model had been in place for several years, also analyzed the model and proposed solutions to improve the program. Hundreds of changes and improvements were made due to the feedback, and all these strategies contributed to increasing physician awareness.

Trust gradually grew between the teams as the program had more success, which helped alleviate concerns. Communications emphasized the benefits to patient well-being (Appendix 13: H@H Benefits). The program also shared data collected on safety assessments and patient experience. The first conclusive results of H@H led physicians and professionals to consider it a good alternative to hospitalization, despite persisting uncertainties.

“It worries us a bit because we always want to have the patient in a safe environment. But with each success story and patient who likes being at home, it balances out. We know it is not better to stay in the emergency department on a stretcher for three days waiting to get a bed.”

Dr. Shannon Fraser, General Surgeon and Medical Director of the Command Centre

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Several other measures were taken, also with a view to incident management and continuous improvement. This helped reassure teams and build confidence in H@H as an alternative that could be safe for the right patients. Such measures included establishing a systematic review of quality processes after each incident or accident, regardless of severity, and scheduling monthly meetings with clinicians to directly analyze reported cases. The institution also hired a consulting physician from France, where the hospital-at-home model was well established, to make recommendations on program improvement.

Patient experience: from communication to trajectory improvement

Patients also had to learn about H@H and how it worked. Since it was an innovation, there was much to be done. To promote the program to patients, posters about H@H were first hung in hospital units. Patients and their families could learn about the service while waiting or moving through the unit and discuss it with their care team (Appendix 14: Hospital at Home Poster for Patients).

The team then developed documents to help transfer nurses explain the service (Appendix 15: Information for Patients and Their Families). The sheet provided essential information, in particular on Virtual Unit team members and the consultation routine, precautions to take while hospitalized at home, and the devices used.

An educational component was also developed to help patients and their families navigate the challenges of using remote monitoring technologies. For example, patients were experiencing technology challenges with their cell phones, so they switched to tablets, which were more user friendly, to communicate with virtual nurses and connect devices. Annick Mercier, Activity Manager of SAPA-SAD Programs stated, “With the tablet, you can just open the tablet, and the nurse can initiate the meeting, so patients don’t have to do much. They just need to open it and they will see the [virtual] nurse!”

Nevertheless, despite information sharing, supervision, and the support offered, there was still a learning curve for H@H patients, the vast majority of whom were navigating it for the first time. For example, being hospitalized at home rather than in the hospital could give the patient a false impression about their actual health status.

Kimberly Gartshore, Transformation Coordinator at DQTEVE-SV, explained, “Sometimes patients think that now they’re home, but we have to remind them that they are still admitted [to the hospital].” Viki Doucette recounted anecdotes:

“There was a patient who went grocery shopping [...] with his Biobeat. We told him: ‘Listen sir, you are hospitalized!’ [...] We also had a patient who had heart arrhythmias. He had decided he wanted to ride his bike. We gasped, ‘What? No, no, no, no, no...’ We had to ask his wife to go get him because he had not brought his [H@H] cell phone. If doesn’t have his cell phone, his [Biobeat] doesn’t work, and we can’t monitor him anymore. We told him, ‘Sir, no biking this week. Please go home!’ So, it’s a process of change [...] for patients and families because they aren’t used to it! It’s another way of seeing things and providing health care.”

Viki Doucette, Head Nurse of the Virtual Unit

From these initial experiences, the H@H team learned an important lesson: it was essential to review processes with the patient experience in mind and to communicate information and empower patients for this period of acute care at home. They needed to be sure that patients clearly understood, from the time they were admitted, what was expected of them as H@H program participants. For example, teams adjusted prescriptions (Patient Order Set or POS) by adding a section allowing physicians to specify the authorized activity level when transferred to home care based on the patient’s physical condition. The POS, tools intended for care staff, specified what the patient could or could not do in their condition, such as driving or doing physical activity.

New roles developed and practices adjusted

Over the months, the project’s expansion and the development of new possibilities and trajectories meant the H@H team had to expand and a core group of stakeholders needed to be heavily involved to the project. Positions for administrative staff, clinical nursing staff, unit manager, and assistant head nurses were therefore created within the Virtual Unit.

The Virtual Unit also created virtual nurse positions and prioritized candidates with diversified skills for a cross-disciplinary team that supported mutual aid. Similarly, given the working conditions, clinical assessment skills were important selection criteria.

"It emerged that nurses are at home, they do all the work alone. Everything is virtual and it sharpens the nurse's clinical assessment skills more. It is precisely because she is not there on site to see [the patient] that she has to ask very specific questions to be aware of everything."

Chantal Bastien, Chantal Bastien, Assistant to the Director of Nursing (interim)

The positions seemed attractive, and several applications were submitted. These positions represented the future of care, and the remote working conditions they offered were rare in the network, mainly limited to Info-Santé.

"In terms of professional development, there is also something exciting about fully leveraging a nurse's skills during this labour crisis."

Lucie Tremblay, Director of Nursing

When the recruits were hired, they underwent training on the technologies and applications used and on how care and services worked. Since the Virtual Unit used 28 applications and software programs, two to three software programs were presented each training day to make sure they were used correctly.

Development of the virtual nurse role and virtual care practice in H@H

The new virtual nurse role was both exciting and full of challenges. Admitting patients from different units with a variety of profiles and sometimes unique backgrounds made care and follow-up somewhat complex. Beyond the more usual nursing team practices (e.g., post-intervention bleeding monitoring, pain assessment, temperature taking), each unit, even each physician, also had specific questions and requirements for the patient hospitalized at home that varied a great deal more than they would on a regular hospital unit. This required excellent communication from care teams and solid individualized care coordination, as well as close monitoring for patients with varied and heterogeneous needs. Virtual nurses had to be able to ask the right questions to physicians, patients, and families to offer high-quality personalized care, while quickly developing their skills in light of the range of clinical practices.

Team nursing was adopted as a collective work method by the Virtual Unit nurses. Team patient care and mutual aid between virtual nurses meant they could share knowledge and haring their knowledge and address cases using a method that emphasized team complementarity.

" It goes back to classic nursing. […] There's a concept of team nursing that you don't need to have your patient assignment; you can do things in teams.

That's what we do. We all get on Teams *and assess the patient together. You wouldn't necessarily do that in the hospital unless you had a concern. […] We just tap into each other and say "hey you wanna come in and do this assessment with me" or "how should I handle this" or "did you have this before" and it's all through chat features, on Teams."*

Tracy Heramchuk, Assistant Head Nurse on the H@H team

While the role of virtual nurse presented challenges, it also undeniably offered interesting practice conditions where nurses were called upon to make the most of their full range of expertise," explained Lucie Tremblay, Director of Nursing at the CCOMTL.

The work-from-home framework also offered different conditions for the practice of nursing, which could be perceived as advantageous by some, but which also required adaptation.

"When we are on a care unit, all sorts of things happen. Someone calls you because they can't find whatever form. A family wants to talk to you while you're distributing medication... It is not the same situation in virtual care, when we are just focused on the client without any external distractions."

Lucie Tremblay, Director of Nursing

"It's one of the most sedentary jobs I've had which is very different as a nurse. We must make ourselves get up after every meeting and walk."

Tracy Heramchuk, Assistant Head Nurse in the H@H team

Development of home care nurse roles within H@H and virtual care practices

With SAPA-SAD nurses following patients hospitalized at home, new practices specific to this clientele had to be developed. The nurses were accustomed to patients with chronic health issues requiring skills to be maintained at home. Now, they had to add patients to their list who had more acute health issues and required critical and rapid care and services.

"These are things we also did at SAPA-SAD. We give antibiotics, we treat cellulitis, we sometimes administer intravenous medications... So, nothing changed in terms of techniques. I think it is more in the number of patients and in speed. For example, if we receive a client now and they need blood drawn or they receive an abnormal result, we have to return the same day to draw their blood again... So, faster, more frequent care, within shorter timeframes."

Brenda Lécouteur, SAPA-SAD Coordinator

This also required SAPA-SAD to update nursing staff on care for certain pathologies and remind them of certain protocols less frequently used in usual home care. SAPA-SAD nurses involved in H@H therefore had to be trained and receive continuous support on using new devices, such as the ambulatory infusion pump (CADD) and connected objects like Biobeat and Masimo.

For example, unlike some CISSS and CIUSSS, administering intravenous Lasix at home was not part of CCOMTL practices for cardiac patient care. This certainly required training, but also a great deal of collaboration with the Virtual Unit. Giving high doses in an infrastructure that was not in a physical hospital required increased monitoring and strong reactivity from teams.

Nurses received virtual care training internally. However, with the rapid changes in care and services, Lucie Tremblay hoped to see university partners follow suit and adjust training curricula. This could mean offering courses specific to virtual patient care and the specificities of these practices. This would equip nursing staff for the new reality, which came with an approach and method for asking questions and treating patients that were different from when they were physically present at a patient's bedside.

"In a few years, health care will not be the same. We will have to change how professionals are prepared... [we must first] prepare them to use these technological tools, but, since they will change very quickly, even faster than what we have already seen, we're going to have to be very good at teaching them to learn."

Lucie Tremblay, Director of Nursing

To initiate this change, CCOMTL actively contributed as a practicum site, particularly in collaboration with McGill University, to integrate nursing students into the H@H program.

This new home health care worker role within H@H also required adjustment in ministerial accountability to more accurately reflect the new reality of their work. At the time, the SAPA-SAD directorate only reported direct clinical hours spent in contact with the patient. As a result, the time workers spent discussing a case with the Virtual Unit was only partially counted in their work hours. However, these coordination hours between the Virtual Unit and the SAPA-SAD nursing staff were essential, and not being able to count them fully gave the impression that H@H caregivers worked fewer hours than they actually did.

Coordination between virtual nurses and home care nurses

Adjusting the SAPA-SAD team workload

Having SAPA-SAD take charge of the first patients had an impact on the service. With this addition workload placed on a team already burdened by the labour shortage and limited capacity, a review of care and service priorities was needed.

"No matter what we do, we increase [SAPA-SAD] workload with H@H. We must be aware of this. I think sometimes people forget that we ask the CLSC to provide care, dressings, treatments, or blood draws. Yes, it is a task, but it is a task that was added to a team that is already in a shortage. They have to prioritize. It is clear that H@H patients, in this program with Dr. Rosenberg,

are priority. The program is number one. Everyone talks about it. Everyone aims for it."

Viki Doucette, Head Nurse of the Virtual Unit

About a year after the project launch, hoping to limit SAPA-SAD's increased workload since taking on H@H patients, an external partner was charged with transporting samples and medical products. This task had previously fallen to SAPA-SAD nursing staff, who took them at the end of their rounds. Now, samples and products could be delivered more quickly, within 15 minutes, under Virtual Unit coordination, while freeing up the nurses' time.

Furthermore, since caring for this more acute clientele required ongoing, fast adjustments, it was difficult for SAPA-SAD to plan and organize in advance for their teams' days on the road. Plans were often changed and unforeseen events punctuated the workday.

Coordinating and duplicating evaluations

Work was also done to coordinate virtual nurse services and those of SAPA-SAD. Since H@H virtual nurses were the key workers, supported by connected object technology, they conducted full patient evaluations. However, SAPA-SAD nurses also were also conducting full evaluations during their home visits.

"In our [SAD component] teams, I think the point that often came up was that as nurses, they have professional responsibility. [They do not want] to arrive at a home, give medication, and then not look at vital signs because the person is already connected remotely... So several were still doing their evaluation, as they would have done for one of our users."

Annick Mercier, Activity Manager of SAPA-SAD Programs

The SAPA-SAD and Virtual Unit nursing teams were complementary. The former went to homes and were, in a way, the eyes and hands of Virtual Unit nursing staff. Their clinical judgment was important and could not be dismissed, as Lécouteur recounts.

"Of course, there are two nurses who are really involved at certain moments of treatment, [namely the virtual nurse and the SAD nurse], but the SAD nurse must do the same evaluation. It is her clinical judgment. If she is not comfortable giving the medication because she knows her patient... [...] She will always apply her clinical judgment and discuss it with the physician."

Brenda Lécouteur, SAPA-SAD Coordinator

The duplicate evaluations could not be completely eliminated, but when teams communicated well and shared patient information with each other, they found a middle ground and built up trust.

Regular communication between teams

Communication was facilitated through daily caucuses between SAPA-SAD teams and the virtual care team. To properly coordinate care, shift handover meetings were scheduled at 8 a.m. and 4 p.m., and virtual care caucuses at 11 a.m. and 3:15 p.m. (Appendix 10: Governance and Steering Meeting Schedule). These frequent, short meetings lasting 15 to 30 minutes brought all key stakeholders up to date on daily developments and the immediate needs of H@H patients. This helped them respond quickly to potential problems and optimize care coordination for hospitalized patients. Outside these caucuses, workers regularly communicated with each other by Teams, phone, or text to ask questions and share information.

Technological and logistical challenges

Care coordination limited by systems

The cross-disciplinary nature of the team highlighted interconnection and system interoperability issues. Up to 28 applications and platforms were being used in H@H patient care and services, but most of the time, only one type of worker could access and use the platforms.

As an example, technical issues thwarted collaborative work between SAPA-SAD nurses who visited patients at home and H@H virtual nurses. It was crucial to providing good care that the two teams communicate before and after each visit to H@H patients. However, SAPA-SAD teams recorded their observations and interventions in a separate system from that of the Virtual Unit team. This prevented mutual access to notes and crucial information about patient status, requiring additional calls and steps to obtain necessary information that then had to be entered into the other system.

The case of Glenmount

After the V3 Unit was created, it was noted that Glenmount's nursing assistants recorded their clinical notes by hand on paper while virtual nurses recorded theirs electronically. This created a duplicate record-keeping system because notes could not be transferred between nursing teams to ensure continuity and consistency of care.

As a workaround, a Teams channel was created where the nurses could write down all the information about the care provided to the patient to keep each other informed. As Chantal Bastien explains, a standardized file within the DSN would resolve this issue. Until then, “each nurse documents what the other says, which ensures that everything is really well documented. Ultimately, the primary goal is patient safety. So we prefer to duplicate.”

With a view to simplifying the experience of nurses, the program planned to launch a new platform that would replace most of the 17 systems they had been using. The platform, part of which was also intended for users, would improve workflow by optimizing navigation and connection between applications, as well as communication between nurses from different programs.

Pharmacy logistics challenges

The Pharmacy Department worked hard to adjust to the arrival of H@H. It was one of the departments most affected by the new service. They had to take special steps to prepare H@H patient prescriptions, which required different packaging, smaller quantities that changed regularly, and special distribution or delivery, inevitably adding work to the team’s load and demanding greater great attention.

"At first, we somewhat underestimated the scope of what was needed for the pharmacy service to work for patients hospitalized at home. So I would say that having pharmacists dedicated to the Virtual Unit, having a way to properly identify medication for the patient, making sure medications are transported to homes on a daily basis—it all had to be developed with the pharmacy. We cannot underestimate this."

Aurelia Di Fabrizio, Project Manager for DQTEVE-SV

The medication process was not at all the same and required a new process (Appendix 16: Medication Process for the Virtual Unit). Indeed, for patients in the hospital, medication was sent to units, where the nursing team could administer them to patients. These medications were packaged for staff to administer. In the case of patients hospitalized at home, medications had to be packaged for patient and caregivers and then be delivered to homes. It was therefore essential that patients and their caregivers clearly understand what each medication was and what dosage to administer. Organizing medication was also an issue, as some patients had to combine several treatments at different frequencies. This could quickly become a confusing.

From the project's launch, they realized they had to make adjustments with the pharmacy and find solutions. "In the beginning, [we] gave all medications in packets and patients panicked. They were not able to read the packets. They didn't understand which medications they should take in a brown bag," explained Viki Doucette, Head Nurse of the Virtual Unit. Packaging the medication in small packets was clearly not ideal for limiting medication errors.

An automatic medication dispenser would have been ideal both to reduce self-administration errors and to facilitate narcotic control; however, this was an expensive option. The program instead opted for a pre-filled pill organizer system similar to those used in a community pharmacy. Labeling was also revised for user friendliness and could be printed in English or French based on user preference.

Preparing the pill organizers interrupted usual pharmacy practices. This task had to be done manually, which took more time than preparing medication intended for hospital units. Still, the solution was much more adapted to H@H patients and, as soon as it was implemented, medication errors decreased considerably, explained Tracy Heramchuk, Assistant Head Nurse in the H@H team.

Another challenge was the difficulty of providing certain medications in a stable format. Some products had to be kept at a specific temperature, handled with care, or administered within a limited time once prepared. The distance between where the medication was prepared and where it was administered could be enough to alter certain medications. This meant they had to find a way to simplify the process and prepare more stable pharmaceutical formats for H@H, explained Pharmacist Denis Dao.

They also had to develop the logistics to guarantee appropriate and optimal delivery times to patients. "It is much more planning, preparation [...]. To prepare these special formats, it takes time from our staff. So we really struggle to prepare all this," explained Denis Dao.

During the first months, the pharmacy received H@H requests and handled them alongside its other tasks. To facilitate planning and coordination, Denis Dao was named Virtual Unit Coordinator at the pharmacy in October 2022. He would now take charge of everything related to H@H, while continuing his role as hospital pharmacist.

"No one was really in charge of the project [at the pharmacy]. We didn't have anyone to do the day-to-day work. So, they made me coordinator to manage this. When I arrived, there were problems everywhere. I took some time to really get to the bottom of it, to find the causes... It took months to implement procedures and policies to fix this. It was a lot of back and forth."

Denis Dao, Pharmacist Coordinator for the Virtual Unit

Despite the adjustments, the hospital pharmacy team knew that one element had made things easier their team: CCOMTL prescriptions were computerized. Care teams used PANDAWebRx, software for health professionals to make prescriptions electronically so they are available to the rest of the care team, including physicians, pharmacists, and Virtual Unit nurses.

"I would say we even had an advantage compared to other hospitals because we are perhaps the only center in Quebec that functions solely by electronic prescription. That was already in place. [...] If we had to fax or use paper versions, it would not have worked, it would be very difficult to integrate H@H. So, before proceeding, I would recommend having an electronic medical record for prescriptions."

Denis Dao, Virtual Unit Pharmacist Coordinator

The PANDAWebRX platform was deployed in hospital settings, but it could not be accessed outside the hospital. Thus, when the pharmacy delivered medications to patients, it came with a pharmaceutical record printout. The document was then signed by the SAPA-SAD nurse once she had taken note of it and the medication was administered at home, if patients could not self-administer it. She then sent a photo of the signed document to be compiled later in the Oacis platform, which centralized patient data. The signed document was left with the patient and retrieved during the next delivery to be returned to the Virtual Unit.

Teams also regularly encountered technological challenges with digital tools used jointly with the Virtual Unit. For example, since hospital and SAPA-SAD digital platforms were not connected, clinical notes had to be extracted from the system in a PDF file and sent to the hospital team. "All this, these are small details. [...] I think [we need to think about] providing support, giving guides on how to put a note in PDF, basic things that may seem simple, but for several nurses [...] that was a roadblock," Mercier explained.

Technical problems, including connectivity, were also major issues that teams frequently faced. Some examples included frequent interruptions and connection problems with the Teams platform, which was used for all communication channels between the Virtual Unit, SAPA-SAD, physicians, and users. This required a great deal of flexibility and reactivity.

Furthermore, although the virtual team was working remotely and did not have a designated workspace on site, they did have access to a conference room. This could be useful if virtual nurses had connectivity issues at home, such as during the power outages caused by the ice storm on April 5, 2023.

Managing technical problems that patients encountered also took much time from teams. According to Viki Doucette, “It decreases our ability to take on more patients per nurse and [thus has an impact on our ability] to increase the quota.”

Rapid development of new technologies supporting telehealth

At CCOMTL as elsewhere, the development of new trajectories or new ways of doing things continued as technologies were developed and became more accessible. For example, they now used devices for bedside blood tests such as POCT (point-of-care testing), which tests urine or blood for certain measurements (e.g., glucose levels, blood clotting, electrolytes, etc.). With these measurements, prescriptions could be adjusted based on results received in a matter of minutes rather than an hour using the regular procedure, where hospital units had to send blood samples to the lab. For example, they began using CoaguCheck® Pro to measure prothrombin time and activated partial thromboplastin time, all in less than five minutes.

The Virtual Unit was also beginning to use HoloLens 2 virtual reality headsets in the program for specialized care. They were already being used in long-term care facilities and showed positive results.

Several other technologies were also on CCOMTL’s radar and would enhance H@H digital care or other care modalities.

“Technologies are ‘moving targets.’ Technologies become much easier to use and give us much more information. Each month, new elements emerge that can enhance the hospital-at-home concept.”

Dr. Rosenberg, CEO of CCOMTL

The rapid development of new technologies encouraged the program to consider centralizing acquisitions to achieve economies of scale.

Developing partnerships with surrounding territories

In spring 2023, a significant nursing shortage in the ED of Maisonneuve-Rosemont Hospital (from CIUSSS de l'Est-de-l'Île-de-Montréal [CIUSSS EDIM]) had persisted for several weeks, regularly threatening temporary closures during peak periods. To relieve pressure, the CIUSSS EDIM partnered with CCOMTL’s Virtual Unit. Together, they planned virtual hospitalization trajectories starting with cardiology then hematology-oncology. Thus, ED patients who could benefit from hospital at home were admitted to H@H rather than waiting in the ED for a bed to become available on site. Patients hospitalized at home were followed by the Maisonneuve-Rosemont Hospital medical team, but it was the H@H virtual nursing team that provided care. Home visits were carried out by CIUSSS EDIM’s SAPA-SAD team.

A partnership was also signed with CISSS Montérégie-Ouest in spring 2024 to address a crisis at Suroît Hospital. At a time when a severe nursing shortage was pushing the institution to close 20 hospitalization beds, a solution was implemented within two weeks to prevent this outcome. CCOMTL’s H@H virtual nursing team supported the Suroît unit using technological devices for remote monitoring and interaction. The nursing assistant at Suroît Hospital did patient rounds wearing a virtual reality headset that broadcast images and conversations live to an H@H virtual

nurse at CCOMTL. The H@H nurse saw everything her colleague saw at the patient's bedside and could interact with the patient through her. This enabled the virtual nurse to conduct a patient assessment, which a nursing assistant was not authorized to perform. IoT devices monitored and transmitted the vital signs to CCOMTL's virtual team as they did for H@H patients.

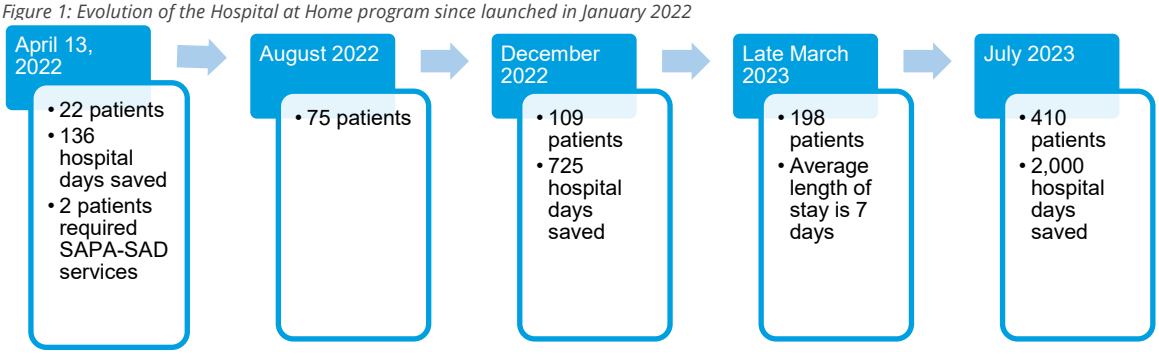
Other similar partnerships were needed with surrounding territories to serve clients who come to the Jewish General Hospital and to ensure service equity. It should be recalled that more than half of CCOMTL patients come from outside the institution's local territory (56%). However, these patients would benefit just as much, if not more, from hospitalization at home with their families and in their environment. They could receive virtual care from the physician and H@H virtual nurses. However, CCOMTL's SAPA-SAD home care teams could not visit patients outside the territory. A network needed to be developed with their local SAPA-SAD directorate, and significant challenges were anticipated for some surrounding areas where SAPA-SAD likely would not be able to support patient care for various reasons, said Erin Cook.

Furthermore, communication between institutions also remained an issue, and a challenge to overcome in each new partnership. This would be the case as long as medical records were not harmonized.

Review of the first 18 months: promising results

H@H results were measured continuously, creating a picture of changes and benefits over time. By July 2023, more than 400 patients received H@H team care and 2,000 hospital days had been saved. It should be noted that hospital statistics taught us that only 4% of eligible patients identified refused the H@H option.

Figure 1: Evolution of the Hospital at Home program since launched in January 2022



According to a survey on the experience of participating patients conducted in summer 2023 (Canadian Healthcare Technology, 2023), 93% of patients who had been hospitalized at home reported having a high level of satisfaction with the program. All responding patients indicated preferring to be hospitalized at home rather than in the hospital and 90% reported that being hospitalized at home played a key role in their recovery.

These benefits and results clearly show the relevance and value of H@H. The most tangible benefit has undoubtedly been the increase in institutional bed capacity (about 0.6% capacity recovered for the first 18 months alone).

Another noteworthy benefit is that, although bed capacity increased, the number of staff required did not increase proportionally. H@H required on average 46% less hospital staff.

H@H was also a less expensive option than conventional hospitalization, with savings on food services, laundry, and maintenance. Patients also tended to recover more quickly at home, where

they moved more, were able to sleep better in their own bed, were with their families, and were in a calmer environment than the hospital. Their average length of stay was sometimes reduced. Moreover, patients hospitalized at home were less at risk of infection than those in hospital settings. “It’s like a second hospital, but definitely less expensive than building another pavilion,” summarized Dr. Rosenberg.

Tomorrow’s H@H: perspectives and challenges

Provincial scaling: H@H in every institution

The CCOMTL’s groundbreaking experience resonated and drew attention. H@H won a 2022 Hippocrates Prize for excellence in care provided to patients by a cross-disciplinary team of health care professionals. The Hippocrates Prizes were awarded in a competition for best practices in innovation and interdisciplinarity in Quebec’s health and social services network.

Following the demonstrated success of CCOMTL’s H@H, the Ministère de la Santé et des Services Sociaux (MSSS) committed to deploying hospital at home in all Quebec institutions by 2026. Hospital at home was now part of "alternatives to hospitalization," a priority ministerial approach that is aimed at improving outpatient patient care and funded by the l’Institut de la pertinence des actes médicaux (IPAM, institute for medical procedure appropriateness). The government estimated that deploying H@H in institutions would eventually free up about 5% of hospital beds and thereby reduce pressure on overburdened emergency departments and units (Almeida and Suarthana, 2023).

To support provincial deployment, Erin Cook was tasked with supporting network institutions. A community of practice was also established, facilitated by Josée Roy, Senior Advisor in Virtual Care for CCOMTL’s DQTEVE-SV. This community made it possible to share documentation, answer questions from other areas planning and deploying H@H, share lessons and best practices, and provide mutual assistance between institutions.

Possibility of a regional or provincial coordination centre and better integrated systems

Even if each institution developed its own hospital at home program, patient mobility between territories remains an issue. H@H admission may seem simple when the patient resides within that territory, but it is more complicated when they do not, and cooperation is needed with their territory of residence. Every CISSS or CIUSSS must take additional administrative steps for patients outside the territory who may be hospitalized at home. This is without taking into account the particularities of each institution, which could complicate care for patients with specific needs requiring expertise that their home care services are unable to provide.

With a view to scaling the model province wide and overcoming inter-institutional challenges, creating a regional virtual centre could be a sound solution. Such a centre would support economies of scale by centralizing home hospitalization management at the regional level, rather than creating multiple local units. Centralization would support standardization and alignment of procedures, while concentrating expertise on regional or provincial strategic planning. This solution would benefit hospitals with low bed capacity that, although they have the necessary skills to develop home hospitalization, find it difficult to deploy virtual units to manage a low volume of patients.

The CCOMTL is considering the future of H@H by envisioning the deployment of a regional coordination centre that would facilitate the care of patients from different territories through

coordination between institutions and their respective SAD. Thus, once the H@H services of the various institutions are operational, certain responsibilities could be gradually centralized.

"It has now been a year and a half since the Ministère supported institutions in deploying certain hospital at home initiatives. For institutions that CCOMTL helped directly, namely Montérégie-ouest and Maisonneuve-Rosemont, we were able to set them up much more quickly and help them implement their programs more easily compared to institutions that did not have this intensive peer assistance. This is simply due to the sharing of expertise and experience and to cooperation on deployment. There's certainly something to be learned about how to position expertise and offer support for implementation in Quebec."

Erin Cook, Associate Director of DQTEVE-SV

In the same vein, the fact that so many IT platforms and systems are used also complicates collaboration with partners. For example, there were numerous technological challenges in establishing the partnership with Maisonneuve-Rosemont Hospital.

"At [JGH], we are mostly digital, which makes implementing virtual trajectories much easier. In developing virtual trajectories with HMR, we had to manage the issue of paper documentation used in their institution. We had to modify our processes to send documentation by secure email and this added several steps."

Aurelia Di Fabrizio, Project Manager for DQTEVE-SV

Regional or provincial coordination therefore called for integrating and harmonizing systems supporting trajectories.

"Without implementing a virtual care platform supporting an integrated virtual trajectory, which spans all phases of hospital, community, and virtual care, we will be neither as safe nor as efficient as we could be. The hospital at home model has proven economically viable in international models. We could be much more economically viable throughout the province with integrated technological solutions."

Erin Cook, Associate Director of DQTEVE-SV

The arrival of the Digital Health Record (DSN) should already help make information available to all health workers in the same trajectory and reduce the number of systems used. Information system mapping could certainly point out gaps and improvement possibilities, of which there would surely be many, despite DSN implementation.

Legislative barriers to using new connected devices

Although IoT devices are developing rapidly and promise a connected future of care, their availability on the Canadian market and regulations are not keeping pace. The Health Canada approval process takes time (12 to 24 months), which is quite slow compared to market demand.

In hospital at home, several devices could prove useful in enabling patients to independently perform tests or measurements that, in a hospital setting, require the intervention or assistance of healthcare personnel, and transmit the results in real time to the virtual care team. However, for many of the technologies that could be used by patients at home, such as blood pressure monitors or point-of-care tests (POTCs), companies have not gotten them approved with Health Canada for this type of use, as there is not a large enough Canadian market to justify the lengthy and laborious process of obtaining approval. Several interesting technologies relevant to home hospitalization are therefore available in the United States and Europe but do not have Health Canada approval for such use here.

This makes it necessary to have a home nurse or to transfer a patient to a hospital setting to perform tests that appear simple and that patients can sometimes even perform at home with their own over-the-counter devices (which are less reliable and lack data transmission capabilities). Other solutions involve circumventing these constraints when possible. “For example, there are blood pressure cuffs that can be activated remotely for a short time,” explains a member of the virtual care team, “but taking instant measurements requires approval for medical device software.” He went on to say that the device can be programmed to take measurements systematically every five minutes, and that this is a possibility.

Provincial striking force for connected technology acquisition

Tomorrow's H@H could gather a provincial striking force for monitoring and choosing technologies relevant to H@H. For now, it was still difficult to know existing solutions by each doing our own monitoring on our side, explained Erin Cook.

“A provincial consortium would simplify the evaluation and implementation of new technologies with Health Canada, establishing standardized usage protocols for H@H in Quebec healthcare institutions, and negotiating better acquisition costs for the entire province. [...] By increasing demand and having better understanding of clinical needs from the patient perspective, we could better advocate with technology companies and more effectively express these needs to Health Canada.”

Erin Cook, Associate Director of DQTEVE-SV

Similarly, the devices that are available and meet the requirements of tenders do not always offer features that make them easy to use. “If I have an elderly patient and I need to take their blood pressure, it's much easier with our patch, which requires no patient intervention, than with the proposed system, which has five or six features and has to be manipulated,” explains Erin Cook. “It's difficult for older people. Procurement needs to move toward a value-based approach that would allow us to purchase devices that are appropriate for users,” adds Erin Cook.

Toward a model that includes general practitioners and primary care

One of the developments being considered for the future of H@H at CCOMTL but also explored by other institutions developing a H@H model, would be to admit patients to the hospital at home program from within the community. This could be useful, for example, for patients monitored by home care teams (in nursing homes) or for patients living in intermediate care facilities or long-term care facilities who are experiencing an acute situation requiring hospital care. Rather than transferring these patients to the emergency room, where they could face risks such as quickly becoming deconditioned, they could receive care at home by a hospital physician and the H@H team. They would also continue to receive care and services for their chronic condition and loss of independence, provided by home support or staff at their place of residence or care facility.

"Hospitalizing from home care, so far if we have done it. It has been very rare. [...] But, [...] there is something exciting about this possibility."

Lucie Tremblay, Director of Nursing

A referral by a family physician from the community or intensive home care (SIAD) could also be an interesting possibility.

Furthermore, the idea of having a team of specialized physicians who are dedicated partly or entirely to the Virtual Unit and are able to make home visits remained appealing (corresponding to a closed unit model). A partnership could be set up with SIAD's team of general practitioners, who also visit patients at home, thereby preventing patients from having to return to hospital.

Intensive Home Care (SIAD)

SIAD is a home nursing service designed to quickly assess (within 24 hours) and provide intensive short-term follow-up to people who are losing their independence and have an acute health problem. This service is offered at home, in private seniors' residences (RPA) or in intermediate resources to avoid or shorten hospital stays.

Source: Centre intégré universitaire de santé et de services sociaux de l'Estrie – Centre hospitalier universitaire de Sherbrooke, 2023

One of the most frequently suggested improvements is to build a team of home care nurses dedicated to the virtual unit. This would relieve the SAPA-SAD team, which is already stretched thin. However, current constraints on the health and social services network mean that this solution is not straightforward and that a rigorous risk-benefit analysis must first be conducted. Given the permanent nature of such reorganization, it would only be considered if deemed necessary for the success and sustainability of H@H.

Remuneration for medical procedures performed by general practitioners

Joint work with Dr. Lucie Poitras, the MSSS's Direction générale adjointe des services spécialisés, de la pertinence clinique et de la biologie médicale, led to the creation, in December 2022, of a remuneration code for medical procedures performed in a virtual unit. As previously stated, up until this point, acts performed by physicians were billed as if the patient were hospitalized in the hospital, for lack of appropriate remuneration code for hospital at home.

However, this measure only applies to specialist physicians, as such remuneration was made possible through IPAM funding for provincial deployment of alternatives to hospitalization, including hospital at home. IPAM is an institute created by the Quebec Federation of Medical Specialists.

General practitioners working on care units at the Jewish General Hospital are therefore not yet able to bill procedures relating to H@H. Currently, they can only bill within the virtual home recovery program, as a home visit to the patient, because patients are not considered to be hospitalized there. However, for H@H, the patient is considered hospitalized, which remains an issue in billing between FMOQ and RAMQ. They may eventually receive a billing code, which would facilitate transferring the patients of general practitioners to the Virtual Unit.

To improve this situation, “it will be important to make people understand why we need family medicine in this initiative, because there are many opportunities,” explained Erin Cook.

In sum, the success of hospital at home relies on stakeholder engagement, including physicians. Their status as self-employed workers paid per procedure constitutes a barrier to their participation in hospital at home. For hospital at home to work, physicians have to agree to transfer their patient while remaining the attending physician. If few physicians see the benefit in doing so, whether for them or for the patient, H@H can not be developed, despite being a promising model for the future of care, and despite being highly beneficial to the organization and health system terms of access. Health system performance and physician remuneration are sometimes in competition, explain Erin Cook and Dr. Rudski.

Challenges recruiting nurses and physicians

Specialized nurse practitioners

Recruiting and training nurse practitioners (NPs) required thorough reflection to meet the specific needs of different care environments.

Complex regulatory and administrative issues influence SNP involvement, particularly in the context of H@H. Current regulations, stipulate that in order for a nurse practitioner to follow a hospitalized patient, they must be trained and integrated into a hospital, as the administrative infrastructure considers the patient to be hospitalized even if they are receiving care at home. This constraint makes it difficult for front-line SNPs from community settings, such as Home Care (SAPA-SAD), to be involved in following patients admitted to H@H. Nevertheless, front-line SNPs could be involved in H@H if the provincial nursing workforce plan allowed it, explains Lucie Tremblay.

To overcome these obstacles, SNPs must be allowed greater mobility between hospitals and the community, and regulations must be adapted to standardize practices. In Europe, for example, some countries have developed master’s programs specifically focusing on home hospitalization, which could serve as inspiration for structuring and enhancing this role in the Quebec system.

Thus, a review of regulatory frameworks and training courses is essential to optimize the contribution of SNPs to hospital at home and effectively support the development of this practice.

Specialist physicians, general practitioners, and unit models

The CCOMTL initially opted for the open unit model, as it was a simple and viable short-term solution. In this model, the specialist physician who knows the patient remains involved, which supports continuity of care. However, this meant increased workload for physicians and significant change management within teams due to the labour shortage. Despite these challenges, this approach provided some flexibility in a context where there the resources and structure did not yet allow for a more integrated model.

On the other hand, the advantages of the closed unit model, where patients admitted to the unit would be under the care of a physician assigned to that unit, are significant and raise the possibility

of a shift to a hybrid model. Currently, hospital at home programs that serve as models, such as those in Calgary and Kaiser Permanente, have a structure in which an internist or hospitalist is dedicated to the virtual unit, explains Dr. Rudski. The closed virtual unit covers a variety of care trajectories, favoring co-management of patients with a specialist physician when necessary, such as a surgeon for certain post-op cases. By comparison, in Quebec, surgeons can no longer bill for procedures performed on a patient who has undergone surgery after 7-30 days. A patient whose post-surgical care is prolonged must change doctors or units. The change is more complex in home hospitalization, where another physician must agree to take on a patient they do not know and have never seen due to their hospitalization at home, explains Dr. Rudski.

This closed model, in which one or more doctors are linked to the virtual unit and take charge of patients, ensures more comprehensive care for patients hospitalized at home. It also ensures a more stable supply of patients transferred to the unit, as it does not depend on specialist doctors who are willing to admit their patients while remaining their primary care physicians. However, for this model to be considered, it must be possible to free up physicians from the hospital units so that they can devote themselves fully to the virtual unit, or to recruit a new physician for the virtual unit. However, with the current regulatory constraints, physicians cannot be recruited quickly. The addition of a doctor must go through the government's medical workforce plans.

That said, for physicians to be trained and want to devote their careers to a hospital-at-home unit, the model must first be taught to students and residents, offered as an internship opportunity, and promoted by university medical schools, explains Dr. Rudski. Although Dr. Rudski has tried to advocate for including hospital-at-home practices in medical training curriculum at Montreal universities, he has been told that changes to the training program are in line with the requirements of the Royal College of Physicians and Surgeons of Canada. In short: if it is not on the Royal College exam, it is not being studied at universities!

For the time being, the only possible avenue is to be invited to give a presentation to students as part of a course, or to give lectures and presentations.

Conclusion

In retrospect, the teams involved in rolling out H@H had several successes that put the program on the right track and ensured its long-term viability.

First, the crisis situation served as a catalyst. The sense of urgency around the risk of surgical beds being closed made it possible to mobilize all the necessary stakeholders in record time, with more than 70 people working for 72 hours to get such a large-scale project off the ground.

He was supported by the CEO, Dr. Rosenberg, who was committed to the success of the project. As a result, the initiative became a priority within the organization, and efforts were coordinated to ensure that the project ran smoothly.

Two credible leaders were identified to co-lead the project: Erin Cook and Dr. Rudski. They worked hard to rally stakeholders and coordinate everyone's commitment to moving forward despite the challenges.

"Sometimes things are hard, but there is a way to discuss it to make it a learning opportunity and improve what we are doing. We definitely need determined leaders to achieve this."

Lucie Tremblay, Director of Nursing

The agile approach made it possible to design the initial trajectory very quickly while ensuring safety, quality, and efficiency of care provided by COVID@Home. The subsequent trajectories were also added to H@H with agility. The teams made numerous improvements iteratively by closely monitoring the initiative and quickly adjusting once the results were in.

"Short iterations allow us to make regular adjustments without ever compromising patient safety. It's a demanding method, and in other industries, agile methods can have an impact on productivity and profitability. Here, as people's health and lives were at stake, we had to be vigilant about the safety of care."

Lucie Tremblay, Director of Nursing

The speed with which hospital at home was rolled out and the lack of benchmarks in Quebec forced the team to develop its own protocols and learn from its own experiences while adjusting quickly. The team's flexibility was one of the conditions for success that were identified.

"Everything changes from one week to the next, or even from one minute to the next. You really have to be flexible and open-minded to be ready to try things out and monitor them closely. You can't say it won't work until you've tried it. And if it doesn't work, you have to be able to reassess and ask yourself what you need to do, what you need to change. It's not up to the patient to change, it's up to us to change our program."

Viki Doucette, Head Nurse of the Virtual Unit

Short but regular meetings were organized to coordinate care effectively. These 30-minute caucuses played a crucial role in the success of this approach in that teams could share information and ensure continuity between shifts. Daily meetings helped them build a new team that transcends silos and ensures the smooth flow of care between the hospital and the community, explained Erin Cook. Together, the various stakeholders co-built the H@H.

"I also think that one of our big wins was communication. Of course, there were other areas where we could have communicated better, but I think we really focused on huddle culture (caucuses). We made sure people could meet and talk to each other often. So yes, it took time, but that's how we resolved issues. That's why we were able to address problems centrally, which was also a big win."

Aurelia Di Fabrizio, Project Manager for DQTEVE-SV

Lastly, some believe that the CCOMTL's strong culture of innovation was an important factor in implementing H@H. Certain CCOMTL teams are accustomed to experimenting with innovative

solutions and juggling a multitude of constraints to address major challenges. For example, they pioneered the roll-out of telehealth during the COVID-19 pandemic, developed their own digital health record, known as the Connected Health Record (CHR), ahead of and in conjunction with the ministerial project, and set up a command center to oversee flow within the institution. Management teams are able to take priority projects from the ideation stage to development and implementation and have gained some experience in innovation through their projects.

"I think we have a culture of innovation, a culture of quality. We do what we think or what we know is best for patients, with the good results. We don't wait for solutions from the Ministère. We prefer to experiment and find ways of working in the field, at home."

Dr. Rosenberg, CEO of CCOMTL

Innovation and novelty generate enthusiasm, and new directorate projects attract the interest of managers, who want to get involved. Ms. Di Fabrizio spoke about the excitement the teams felt when H@H was implemented.

"We see that people are very excited when we talk about something new and innovative that we are about to start. [For H@H], that was really special to see. People's level of involvement, people's passion, it was really a wonderful, wonderful, wonderful... Everyone really enjoyed working together."

Aurelia Di Fabrizio, Project Manager for DQTEVE-SV

That more than 70 people were involved in co-building the model over three intensive days and the innovation was successfully rolled out is a testament how meaningful the initiative was and how aligned it was with the shared vision of care.

"A big part of this commitment comes from the vision Dr. Rosenberg set for the organization, 'Care Everywhere.' The vision is that we provide the right care to the right person, by the right professional, in the right place, and for the right outcome. The innovative projects rolled out across the organization have always been in line with this vision of improving quality of care for patients."

Erin Cook, Associate Director of DQTEVE-SV

The next steps will be to support institutions that roll out hospital at home and continue working to remove constraints and find solutions to challenges threatening its expansion and smooth operation, whether these are legislative in nature or relate to supply, physician remuneration, training, or labour shortages.

Epilogue

At the beginning of 2024, the program accommodated patients with a wide range of diagnoses from more than 30 established pathways (Appendix 17: Non-exhaustive List for Diagnoses Eligible for H@H and Services Offered). Patient partners regularly contribute to evaluating and implementing quality improvement plans, as well evaluating comfort and user experience with connected devices. The virtual unit can accommodate up to 25 patients simultaneously. H@H has had 900 admissions since its launch—equivalent to 4,000 hospital days.

The clinical team consists of approximately 20 full-time equivalents, including a head nurse, two assistant head nurses, a nurse educator, two administrative staff members, and a team of clinical nurses providing patient care 24/7. The program now uses a hybrid medical model: an open unit for all specialties and a closed unit for internal medicine, which means that an internist is assigned to H@H each week and provides care to internal medicine patients hospitalized at home, in addition their patients in their hospital unit.

The H@H program generates value by creating better access, optimizing the use of human resources (3,137.5 hours of employment insurance saved in the first year), achieving financial gains (projected recurring savings of $1.5 million per year in operating costs) and improving patient experience (93% prefer this model). Most importantly, patient-reported outcomes are higher in all areas measured compared to those for care in hospital. The program has low morbidity and mortality rates, meeting standards comparable to those for hospital care.

H@H won the international VBHC Prize in 2024 for its innovative initiatives in value-based healthcare.

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Appendix 1: Eligibility Criteria – Poster

*Note that criteria 11 to 13 were added to the original criteria when unit V3 - Glenmount was added.

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Soins virtuels

CRITÈRES D'ADMISSIBILITÉ

1	Stable sur le plan hémodynamique.
2	Le patient est capable de se déplacer en toute sécurité de manière autonome ou avec un soutien tel qu'identifié par l'évaluation OT/PT avant le transfert, au besoin.
3	Le soutien du patient ou du soignant est adéquat, selon les besoins.
4	Le soignant est en mesure d'aider à la communication, selon les besoins du patient.
5	Le patient et/ou la famille est capable de gérer la technologie et les dispositifs de surveillance portables.
6	Le patient réussit la liste de vérification des médicaments pour l'auto-administration/ou encore, une personne de soutien peut faciliter l'administration sécuritaire des médicaments pour le patient.
7	Le patient a donné son consentement.
8	Le patient est capable de suivre et de respecter les instructions de l'équipe soignante.
9	Le patient n'est pas connu pour l'abus de substances actives ou d'alcoolisme.
10	Le patient et/ou le soignant lit et comprend l'anglais et/ou le français.
11	Le patient doit avoir besoin d'une réadaptation légère et avoir un problème médical connu nécessitant des soins virtuels.
12	Le patient doit être max assist x1 pour les transferts et la mobilisation.
13	Le régime fourni est faible en sel et en sucre; il est de consistance régulière ou en purée; pas de régime particulier.

Appendix 2: Physician's Guide to the H@H Transfer Process

Centre intégré universitaire de santé et de services sociaux du Centre-Ouest-de-l'Île-de-Montréal
Québec

Guide du médecin pour le processus de transfert à l'Hôpital@Domicile

Instructions étape par étape pour les médecins afin de transférer un patient à l'Hôpital@Domicile(H@D).

1. Le médecin référent s'assure que le patient réponde aux critères d'inclusion et d'exclusion.
2. Le médecin référent identifie le médecin/IPS de l'Hôpital@Domicile qui prendra en charge ce type de patient et discute de ce candidat potentiel avec lui. Le médecin référent et le médecin (MD-H@D) doivent être d'accord sur l'éligibilité médicale du patient afin de poursuivre le dépistage.
3. Le médecin référent informe l'assistante-infirmière-chef de l'unité de l'HGJ du patient potentiel pour l'Hôpital@Domicile.
4. Le médecin référent s'assure que les consultations requises[1] ont été effectuées et que les résultats permettent un transfert vers l'Hôpital@Domicile, le cas échéant.
5. Le MD-H@D s'assure que les examens de préadmission requis sont effectués (par exemple, spirométrie, écho, etc.).
6. Le MD-H@D identifie tous les rendez-vous devant avoir lieu lors du séjour en H@D (par exemple, MIBI à la fin de la semaine, radiographie pulmonaire dans une semaine, etc.)
7. Le MD-H@D confirme l'autorisation médicale et informe l'assistante-infirmière chef de l'unité de l'HGJ que le patient sera transféré.
8. Le MD-H@D remplit l'ensemble des ordonnances pour le patient (POS[2]) approprié.
9. Le MD-H@D identifie les exigences en matière de supervision et les inclut dans le POS.
    a. Biobeats vs Masimo vs vérification ponctuelle uniquement
    b. Concentrateur d'oxygène à domicile
    c. Thérapie IV (déterminer si le patient a besoin d'une IV ou d'un PICC)
    d. Besoins en pansements (si une ordonnance est requise, veuillez l'indiquer sur les POS supplémentaires)
10. Le MD-H@D inscrit les ordonnances de médicaments dans PandaWeb
    a. Ajoute le protocole d'ordonnances générales de l'Hôpital@Domicile
    b. Complète les ordonnances de transfert dans PandaWeb.
11. L'assistante-infirmière-chef de l'unité de l'HGJ informe l'assistante-infirmière-chef de l'Hôpital@Domicile que le patient est prêt à être transféré.

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[1] Par exemple : médecine interne, soins des plaies, maladies infectieuses, endocrinologie, pneumologie, équipe interdisciplinaire (PT, OT, IR, etc.)
[2] Patient order set

Appendix 3: Initial Lesson for Patients

Teams

- Patients are shown how to download and use Microsoft Teams for their teleconsultations with the virtual team.

Portable electronic devices

- The training includes instructions on how to connect to the device, the applications used, how to change the device if necessary, and what to do and not to do (e.g., showering may be contraindicated depending on the device in use). A document containing all the important information is given to the patient.

Sphygmomanometer

- The patient is instructed on how to take their blood pressure and receives instructions on how to record the results and send them to the virtual care team.

Weight

- For patients with chronic heart failure, instructions on how to provide a “dry weight” are provided.

Medication

- Training on the type of medication the patient is taking, how to take it, and instructions on specific adjustments that may be necessary following lab results. The process for regular or one-off delivery of medication is also explained to the patient.

Oxygen

- The patient is trained to adjust the oxygen level, learn how to move with the equipment, and perform breathing exercises and spirometry.

Contact the virtual care team

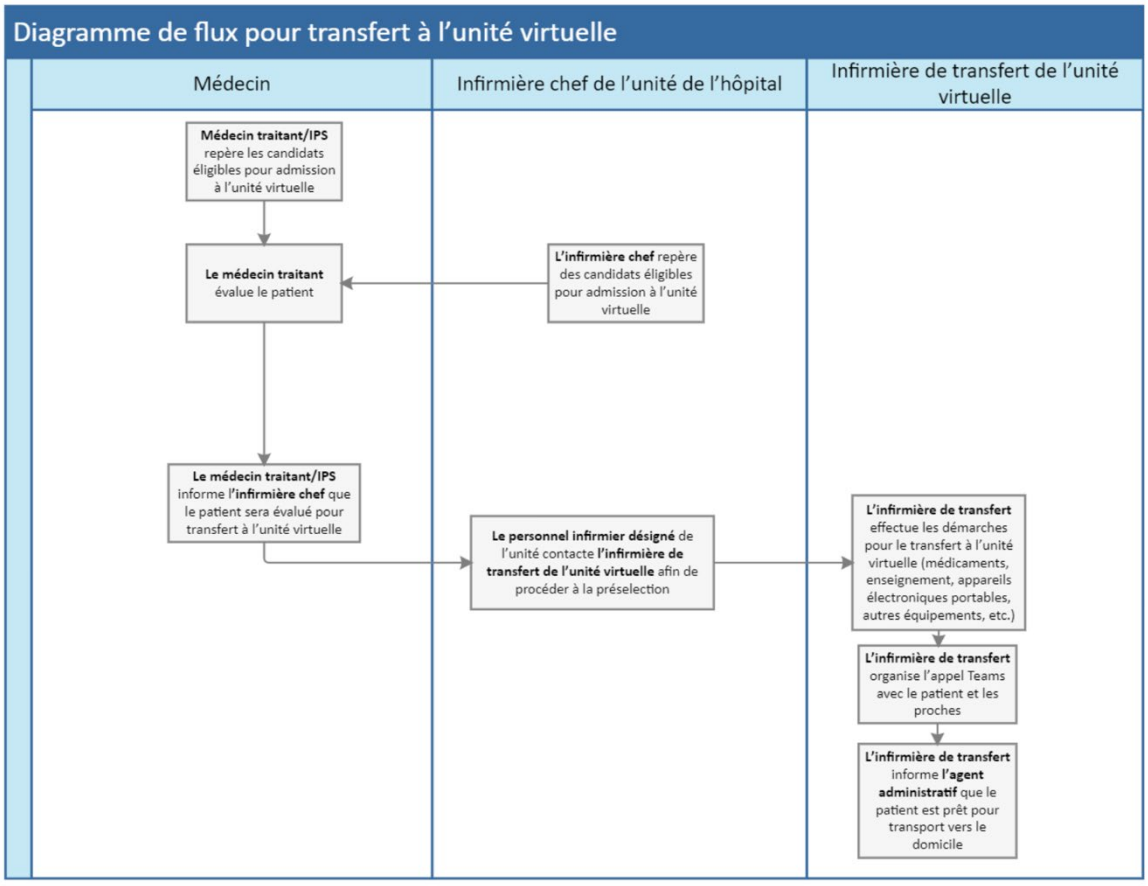
- The patient is instructed on situations that require them to quickly contact the team, such as chest pain, fever, difficulty breathing, loose clips, etc. They are also informed about how to communicate with the team in these situations.

Diagnostic test or additional procedures

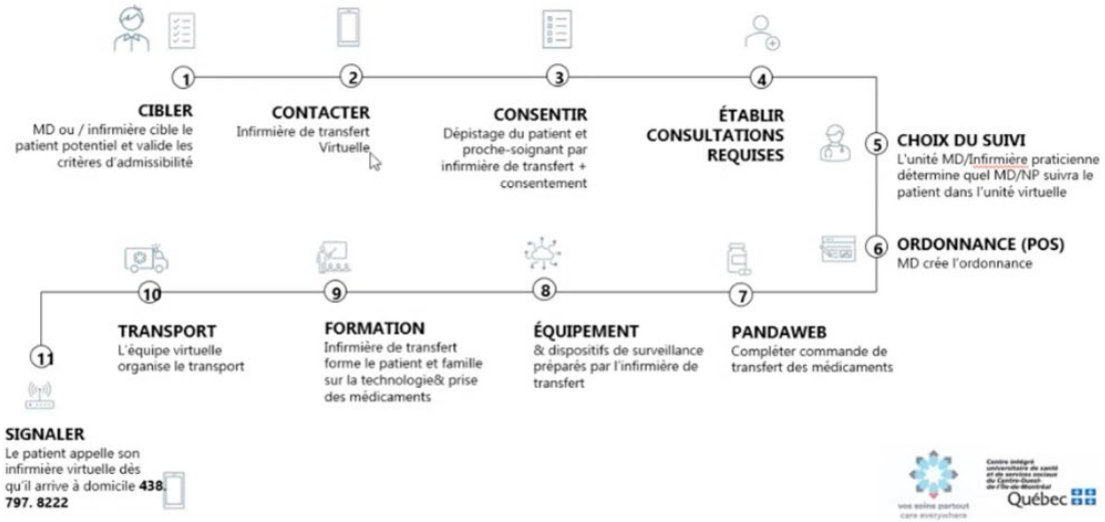
- If the patient needs to go to the hospital for a blood test, an X-ray, a procedure, or anything else, they are told how to get there, how transportation is arranged by the Virtual Unit team, what to expect at the hospital, what to bring, etc.

Note: Adapted from *Offre de service–unité de soins virtuels [internal document],* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l’Île-de-Montréal (CCOMTL), 2022. Adapted with permission.

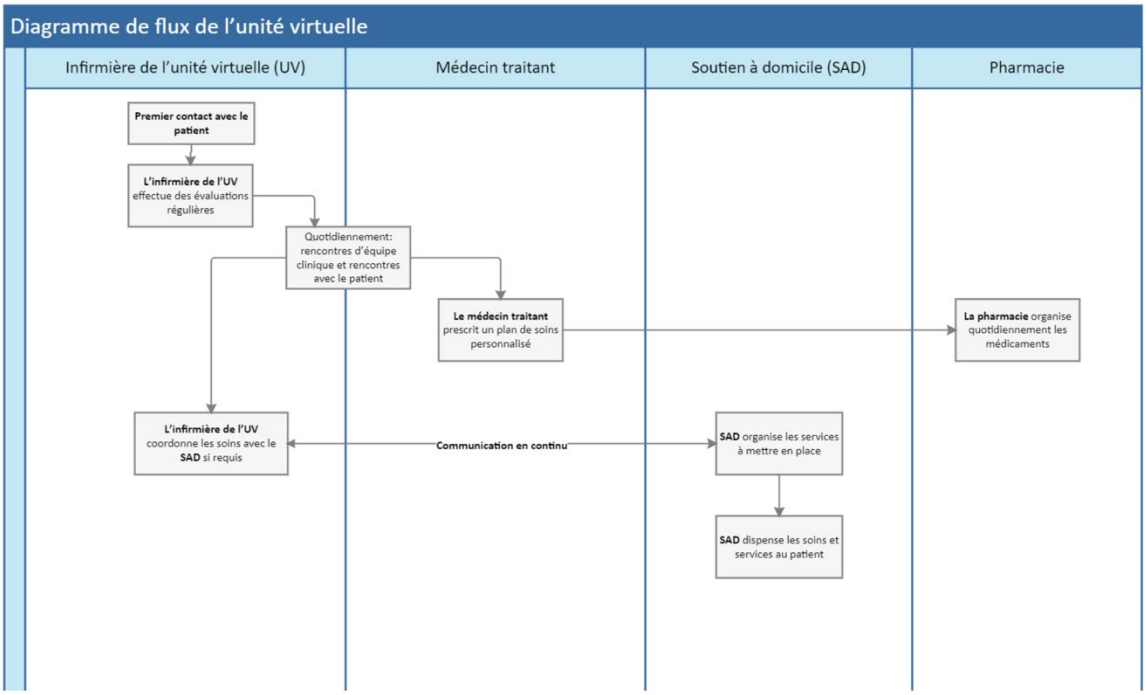
Appendix 4: Process of Transfer to the Virtual Care Unit



Note: Drawn from *Comment implanter une unité de soins virtuels? [internal document],* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l'Île-de-Montréal (CCOMTL), 2023. Reproduced with permission.

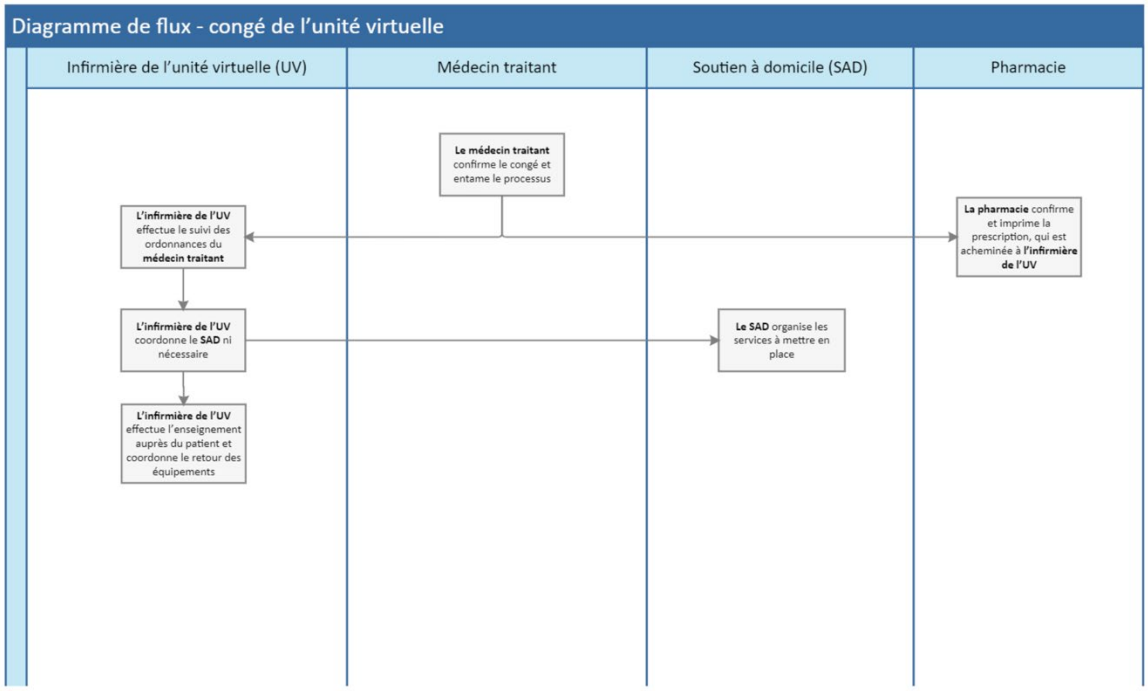


Appendix 5: The Hospital-at-Home Stay Process



Note: Drawn from *Comment implanter une unité de soins virtuels? [internal document],* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l'Île-de-Montréal (CCOMTL), 2023. Reproduced with permission.

Appendix 6: Discharge Process from the Virtual Unit



Note: Drawn from *Comment implanter une unité de soins virtuels? [internal document],* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l'Île-de-Montréal (CCOMTL), 2023. Reproduced with permission.

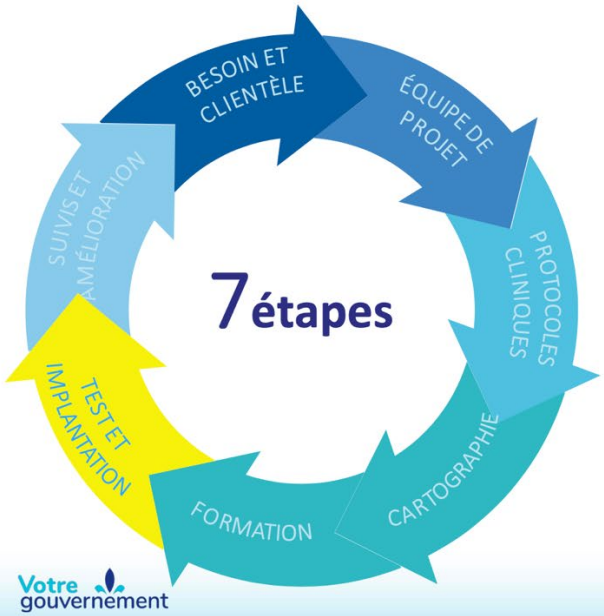
Appendix 7: Technologies Used

Device	Purpose	What it does
Masimo Biobeat	Monitor vital signs remotely	Provides a single-lead ECG Provides readings at q 5 seconds
CADD Pump	Portable pump for administering intravenous medication	Allows the patient to move safely during IV medication infusion
iPhone	Communication device between the patient and the Virtual Unit	A bell for patients admitted to hospital at home, providing 24/7 access to the healthcare team.
MS Surface	Communication device	Provides a visual overview of the patient. Compatible with the AnyDesk app so nurses can manage the link to the Teams meeting, making the experience easier for patients who are less comfortable with this type of technology
Epoc CoaguCheck Pro	Point-of-service testing (under development)	Blood results on site, in the patient's home
HoloLens Nonagon	Telehealth triage support tools	Potential in frontline care (Nonagon) and specialized care (HoloLens)
To come	Fetal heart rate monitor/Portable NST monitor	Remote monitoring of certain patients with high-risk pregnancies

Note: Adapted from *Offre de service–unité de soins virtuels [internal document],* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l'Île-de-Montréal (CCOMTL), 2022. Adapted with permission.

Appendix 8: Development of a Trajectory

DÉVELOPPEMENT D'UNE TRAJECTOIRE



Étape 1
Déterminer les besoins et le type de clientèle, Critères d'inclusion spécifiques

Étape 2
Identification d'une équipe de projet et des parties prenantes

Étape 3
Développement des protocoles cliniques, identification des besoins cliniques, des objets connectés nécessaires

Étape 4
Cartographie de la trajectoire, arrimage avec parties prenantes ex SAD, pharmacie

Étape 5
Formation des équipes ex: USV, SAD

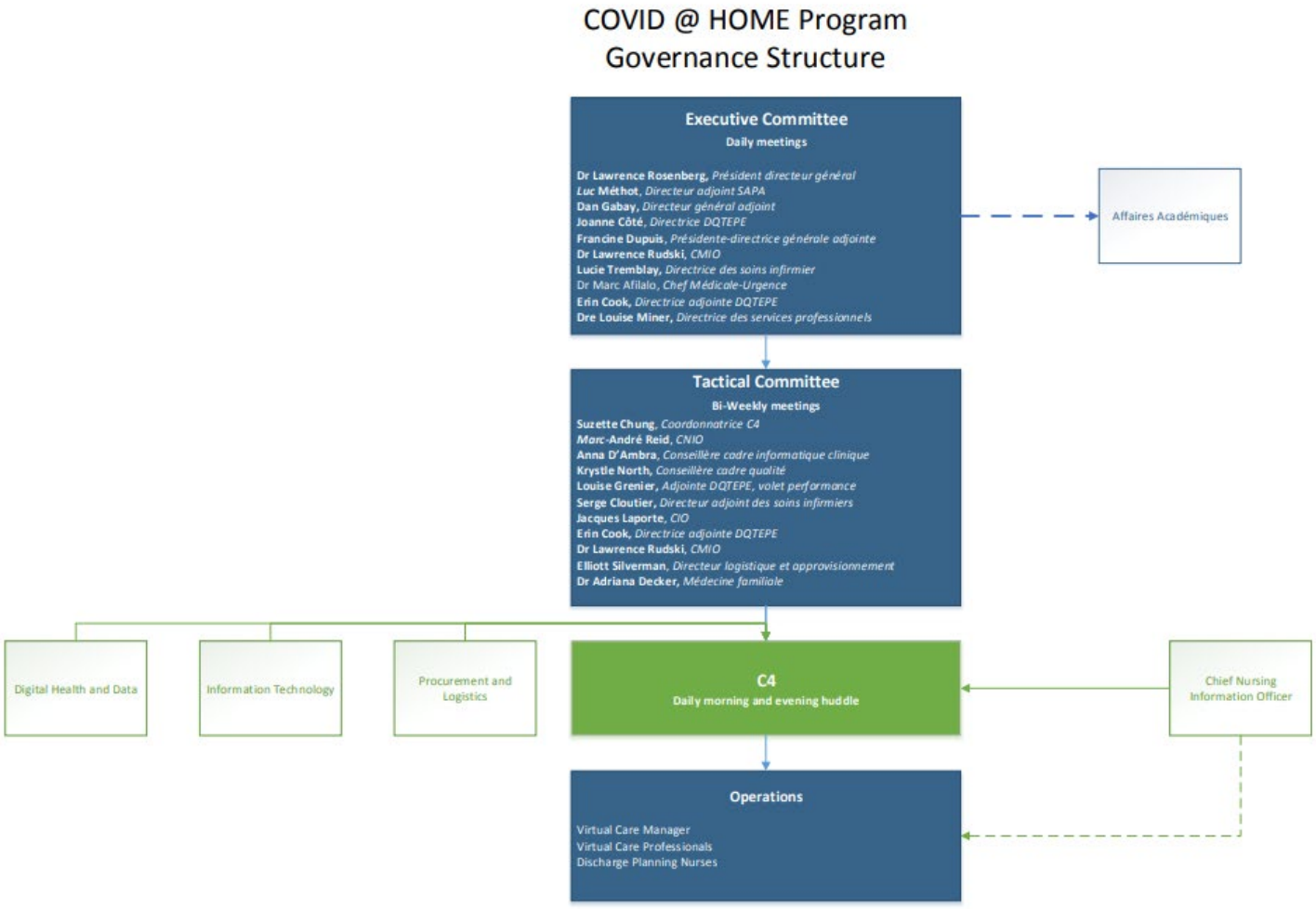
Étape 6
Test et implantation

Étape 7
Suivis et amélioration continue
Indicateurs pour cette trajectoire, modalités de suivis

Votre gouvernement

Québec

Appendix 9: Governance Structure



Appendix 10: Governance and Steering Meeting Schedule

Schedule	Meeting	Led by	People present	Objectives
7:30 a.m.	SAPA-SAD meeting	SAPA-SAD	SAPA-SAD cross-disciplinary teams	Provide an update on the health status of all patients cared for by SAPA-SAD teams, including those in H@H. Identify obstacles, share issues with medical professionals, and technical problems.
8:00 a.m.	SAPA-SAD coordination meeting - 1st meeting	SAPA-SAD	SAPA-SAD ASI	Update on H@H patients. Manage issues raised by teams and identify those to be submitted to the Virtual Unit.
8:30 a.m.	Alignment meeting between SAPA-SAD and the Virtual Unit		SAPA-SAD ASI Virtual Unit Open to all CCOMTL professionals or other CI(U)SSS	Report on patients' health, answer questions, identify changes to care, and make adjustments to home visit schedules.
10: a.m.	Caucus Safety round	C4 Coordinator, Director or Associate Director of the DQTEVE-SV	Organizational leaders: clinical and corporate management (directors and ADs), C4 Medical Director, DQTEVE-SV, Complaints Commissioner, Communications, Emergency Measures Coordinator and Optilab Cluster Administrative Director.	Raise the issues of H@H fluidity and CCOMTL security.
11:00 a.m. **3:15 p.m.**	Caucus of virtual care	C4 Coordinator	Virtual care service manager, virtual care nurses, designated pharmacist, Director of Rehabilitation and Multidisciplinary Services (DRSM), Medical Director of C4 and Assistant Director of DQTEVE-SV, ASI of SAPA-SAD	Gather all stakeholders who attended the various H@H caucuses to discuss all the issues affecting the project. Take stock of patients, roadblocks, identify potential patients. Organize logistics around new admissions and leave.
4 p.m.	SAPA-SAD coordination meeting-2nd meeting	SAPA-SAD	SAPA-SAD ASI	Update on H@H patients. Manage issues raised by teams and identify those to be submitted to the Virtual Unit.

Appendix 11: H@H Key Performance Indicators

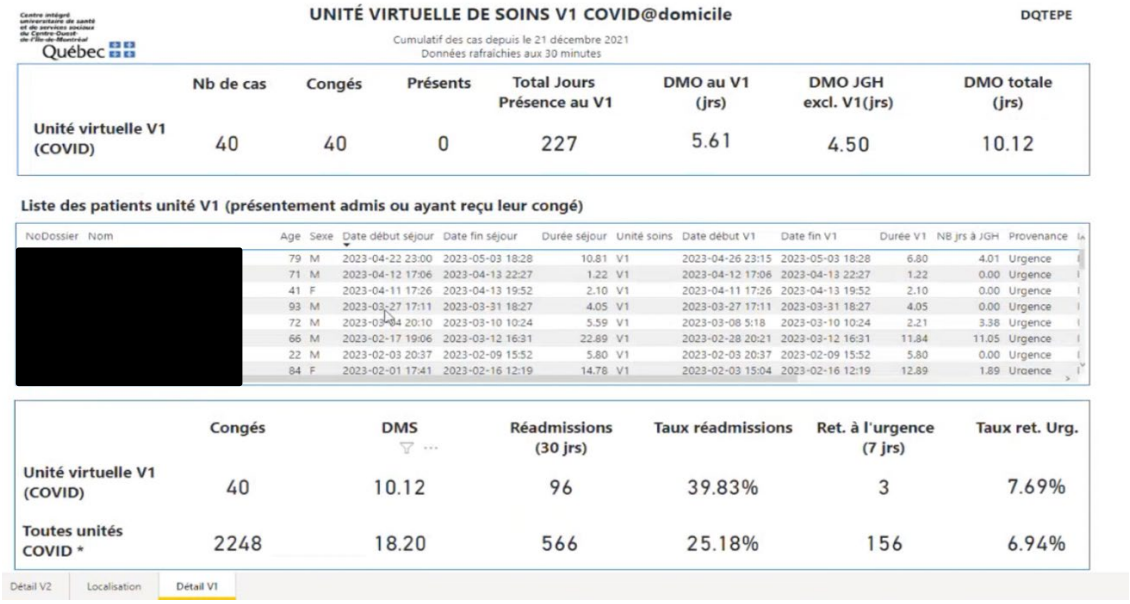
Mesure	Indicateur
Accessibilité	Durée moyenne d'occupation UV (jrs)
	Durée moyenne d'occupation HJG (jrs)
	Durée moyenne d'occupation Total (jrs)
	Durée moyenne sur civière (Hrs)
	Proportion des patients en soins virtuels
Qualité et sécurité	Taux de réadmission à l'hôpital dans les 30 jours (pour toute cause)
	Taux de retour à l'urgence dans les 7 jours
	Taux de retour à l'hôpital dans le même épisode
	Taux d'infections nosocomiales
	Taux de mortalité intrahospitalière
	Taux d'infections
	Taux de complications
Résultat de santé	État fonctionnel et/ ou état de santé déclaré par l'usager
Expérience usager et des proches aidants	Pourcentage des usagers qui recommanderaient les soins virtuels/soins à HGJ
	Taux de satisfaction globale
	Taux de préférence global pour les services en soins virtuels vs en personne
	Pourcentage des proches aidants déclarants hauts niveaux de fardeau
	Pourcentage des proches aidants qui recommanderaient les soins virtuels
Coût de soins	Taux de la main-d'œuvre utilisée en réassignation
	Coût moyen par épisode de soins
Efficacité	Ratio Infirmier HT / JP
	Percentage of Patient reported that care coordinator helped them get what they needed
	Pourcentage de patients déclarant qu'ils ne savaient pas exactement comment obtenir les soins dont ils avaient besoin
Équité dans les soins	Distribution des usagers sur le territoire

Note: Drawn from *Comment implanter une unité de soins virtuels?* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l'Île-de-Montréal (CCOMTL), 2023. Reproduced with permission.

Appendix 12: H@H Dashboards Monitored at C4

Data from June 26, 2023

Table 1: V1 Virtual Care Unit - COVID@Home



UNITÉ VIRTUELLE DE SOINS V1 COVID@domicile

DQTEPE

Cumulatif des cas depuis le 21 décembre 2021
Données rafraîchies aux 30 minutes

	Nb de cas	Congés	Présents	Total Jours Présence au V1	DMO au V1 (jrs)	DMO JGH excl. V1(jrs)	DMO totale (jrs)
Unité virtuelle V1 (COVID)	40	40	0	227	5.61	4.50	10.12

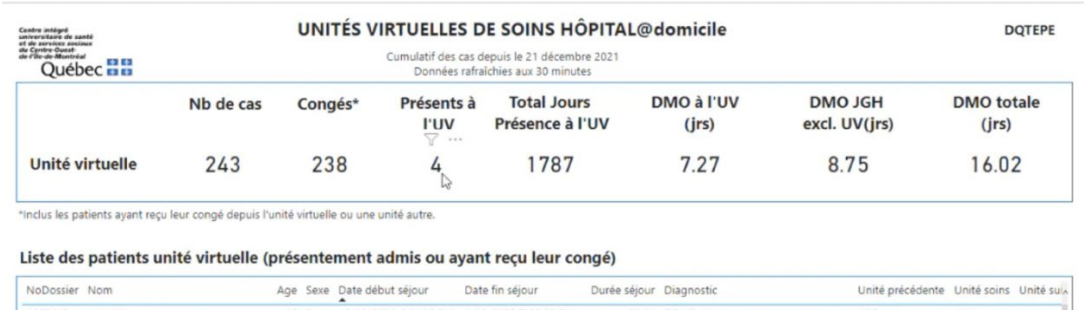
Liste des patients unité V1 (présentement admis ou ayant reçu leur congé)

NoDossier	Nom	Age	Sexe	Date début séjour	Date fin séjour	Durée séjour	Unité soins	Date début V1	Date fin V1	Durée V1	NB jrs à JGH	Provenance
[redacted]		79	M	2023-04-22 23:00	2023-05-03 18:28	10.81	V1	2023-04-26 23:15	2023-05-03 18:28	6.80	4.01	Urgence
		71	M	2023-04-12 17:06	2023-04-13 22:27	1.22	V1	2023-04-12 17:06	2023-04-13 22:27	1.22	0.00	Urgence
		41	F	2023-04-11 17:26	2023-04-13 19:52	2.10	V1	2023-04-11 17:26	2023-04-13 19:52	2.10	0.00	Urgence
		93	M	2023-03-27 17:11	2023-03-31 18:27	4.05	V1	2023-03-27 17:11	2023-03-31 18:27	4.05	0.00	Urgence
		72	M	2023-03-04 20:10	2023-03-10 10:24	5.59	V1	2023-03-08 5:18	2023-03-10 10:24	2.21	3.38	Urgence
		66	M	2023-02-17 19:06	2023-03-12 16:31	22.89	V1	2023-02-28 20:21	2023-03-12 16:31	11.84	11.05	Urgence
		22	M	2023-02-03 20:37	2023-02-09 15:52	5.80	V1	2023-02-03 20:37	2023-02-09 15:52	5.80	0.00	Urgence
		84	F	2023-02-01 17:41	2023-02-16 12:19	14.78	V1	2023-02-03 15:04	2023-02-16 12:19	12.89	1.89	Urgence

	Congés	DMS	Réadmissions (30 jrs)	Taux réadmissions	Ret. à l'urgence (7 jrs)	Taux ret. Urg.
Unité virtuelle V1 (COVID)	40	10.12	96	39.83%	3	7.69%
Toutes unités COVID *	2248	18.20	566	25.18%	156	6.94%

Détail V2 | Localisation | Détail V1

Table 2: V2 Virtual Care Unit - COVID@Home



UNITÉS VIRTUELLES DE SOINS HÔPITAL@domicile

DQTEPE

Cumulatif des cas depuis le 21 décembre 2021
Données rafraîchies aux 30 minutes

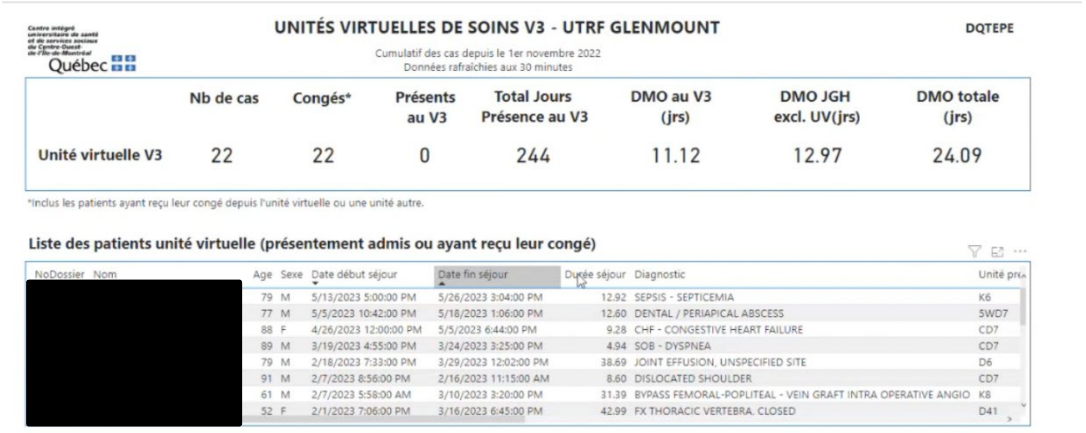
	Nb de cas	Congés*	Présents à l'UV	Total Jours Présence à l'UV	DMO à l'UV (jrs)	DMO JGH excl. UV(jrs)	DMO totale (jrs)
Unité virtuelle	243	238	4	1787	7.27	8.75	16.02

*Inclus les patients ayant reçu leur congé depuis l'unité virtuelle ou une unité autre.

Liste des patients unité virtuelle (présentement admis ou ayant reçu leur congé)

NoDossier	Nom	Age	Sexe	Date début séjour	Date fin séjour	Durée séjour	Diagnostic	Unité précédente	Unité soins	Unité sui

Table 3: V3 Virtual Care Unit - UTRF Glenmount



UNITÉS VIRTUELLES DE SOINS V3 - UTRF GLENMOUNT

DQTEPE

Cumulatif des cas depuis le 1er novembre 2022
Données rafraîchies aux 30 minutes

	Nb de cas	Congés*	Présents au V3	Total Jours Présence au V3	DMO au V3 (jrs)	DMO JGH excl. UV(jrs)	DMO totale (jrs)
Unité virtuelle V3	22	22	0	244	11.12	12.97	24.09

*Inclus les patients ayant reçu leur congé depuis l'unité virtuelle ou une unité autre.

Liste des patients unité virtuelle (présentement admis ou ayant reçu leur congé)

NoDossier	Nom	Age	Sexe	Date début séjour	Date fin séjour	Durée séjour	Diagnostic	Unité pré
[redacted]		79	M	5/13/2023 5:00:00 PM	5/26/2023 3:04:00 PM	12.92	SEPSIS - SEPTICEMIA	K6
		77	M	5/5/2023 10:42:00 PM	5/18/2023 1:06:00 PM	12.60	DENTAL / PERIAPICAL ABSCESS	5WD7
		88	F	4/26/2023 12:00:00 PM	5/5/2023 6:44:00 PM	9.28	CHF - CONGESTIVE HEART FAILURE	CD7
		89	M	3/19/2023 4:55:00 PM	3/24/2023 3:25:00 PM	4.94	SOB - DYSPNEA	CD7
		79	M	2/18/2023 7:33:00 PM	3/29/2023 12:02:00 PM	38.69	JOINT EFFUSION, UNSPECIFIED SITE	D6
		91	M	2/7/2023 8:56:00 PM	2/16/2023 11:15:00 AM	8.60	DISLOCATED SHOULDER	CD7
		61	M	2/7/2023 5:58:00 AM	3/10/2023 3:20:00 PM	31.39	BYPASS FEMORAL-POPLITEAL - VEIN GRAFT INTRA OPERATIVE ANGIO	K8
		52	F	2/1/2023 7:06:00 PM	3/16/2023 6:45:00 PM	42.99	FX THORACIC VERTEBRA, CLOSED	D41

Appendix 13: H@H Benefits

The benefits of the H@H project were identified by healthcare staff and the Virtual Unit through follow-ups with patients and their caregivers, as well as surveys.

Benefits for patients

Better quality of life during treatment

- No contact with other patients
- No hospital noises
- More pleasant to sleep in one's own bed
- Regular eating habits
- Presence of family members

Health benefits for patients

- Reduced risk of deconditioning: an environment that promotes independence
- Reduced risk of contracting a nosocomial infection
- No H@H-related infections after eight months of operation
- Faster relief

Improved access to and quality of healthcare

- Constant availability with 24/7 contact
- Greater responsiveness in emergencies via Teams with virtual nurses than with hospital bells
- Freed up hospital beds

Benefits for the institution

Decrease in days of presence
Decrease in average length of stay

- Increased hospital bed capacity
- Catch up on surgery backlogs
- Improved patient flow

Lower overall costs

- Savings on services such as food, laundry, and maintenance“It's like a second hospital, but it's cheaper than building another ward” - Dr. Rosenberg

Greater operating efficiency

- Reduction in healthcare staff required compared to regular hospitalization: 46% fewer hospital staff
- Optimal utilization of staff on preventive leave
- Better experience for virtual nurses working remotely

Appendix 14: Hospital at Home Poster for Patients

Appendix 15: Information for Patients and Their Families

Fiche-santé HGJ

Janvier 2023

Hôpital@Domicile

Hôpital général juif
Jewish General Hospital

Notre mission

Le CIUSSS du Centre-Ouest-de-l'Île-de-Montréal offre aux usagers éligibles la possibilité d'être suivis à domicile par son programme *Hôpital@Domicile* qui vise à offrir un accès à distance aux soins. Nous souhaitons ainsi réduire la propagation des infections hospitalières et vous permettre de reprendre des forces dans le confort de votre foyer avec le soutien d'une équipe médicale.

À quoi s'attendre?

Une équipe d'infirmières, d'infirmières praticiennes spécialisées et de médecins vous suivra depuis votre domicile, 24h/24 et 7j/7, pendant toute la durée de vos traitements, à l'aide d'appareils connectés (le cas échéant).

Une infirmière sera en contact avec vous plusieurs fois par jour pour évaluer votre état de santé, répondre à vos questions et vous aider si nécessaire.

Dans le cadre du programme *Hôpital@Domicile*, vous êtes considéré comme hospitalisé. Cela signifie que vous devez suivre les mêmes procédures et directives que tout autre patient hospitalisé. Le transport sera organisé pour tout test de diagnostic ou évaluation médicale en personne.

Membres de l'équipe

Infirmier(ère) de transfert : vous aide à effectuer la transition entre l'hôpital et votre domicile et vous donne un enseignement sur le programme et les appareils dont vous aurez besoin.

Infirmier(ère)s virtuel(le)s : vous surveillent 24 heures sur 24, 7 jours sur 7, vous contactent tout au long de la journée pour surveiller votre état et sont votre point de contact pour toute question ou problème.

Médecins & Infirmières praticiennes spécialisées : vous surveillent, sont en contact avec vous si nécessaire. Ils apporteront tout ajustement nécessaire à votre plan de traitement. Ils sont toujours en contact avec les infirmières virtuelles.

Personnel en CLSC : peut se rendre chez vous pour certains médicaments, traitements ou analyses sanguines spécifiques, ou pour vous aider dans d'autres tâches. Le personnel sera toujours en contact avec les infirmières virtuelles.

Pharmacie de l'hôpital : participera au changement de vos médicaments et sera responsable de la livraison de ces médicaments à votre domicile.

Physiothérapeute/ergothérapeute : vous aidera à vous mobiliser, si nécessaire.

Travailleur social / nutritionniste : participera à votre plan de traitement, si nécessaire.

Votre journée à l'*Hôpital@Domicile*

Matin

- Appel matinal de l'infirmière de nuit et des équipes multidisciplinaires, avec le médecin et les infirmières.

Après-midi - Avec votre infirmière

- Appel téléphonique en après-midi.
- Appel vidéo à l'heure du souper.
- Appel téléphonique avant le coucher.

Précautions pendant votre traitement

- Si vous avez besoin d'un dispositif Biobeat ou Masimo, il doit être porté en permanence. Si vous devez l'enlever, contactez votre infirmière.
- Ne prenez pas de douche ou de bain lorsque vous portez le dispositif. Contactez l'infirmière pour planifier le retrait du dispositif en tenant compte de l'heure de votre bain.
- Soyez disponible plusieurs fois par jour pour des appels avec votre équipe soignante. Si vous devez quitter la maison (comme le permet une ordonnance médicale en fonction de votre état), il est nécessaire d'en informer l'équipe infirmière afin qu'elle puisse interpréter tout changement de vos signes vitaux dans ce contexte.

Que se passera-t-il à la fin de votre traitement?

- Lorsque votre état s'est stabilisé et que vous n'avez plus besoin d'être admis dans le programme *Hôpital@Domicile*, le médecin ou l'infirmière praticienne organisera votre sortie avec l'infirmière virtuelle.
- Tout l'équipement et le matériel fournis par le programme doivent être retournés à l'hôpital. Des dispositions seront prises par l'agent administratif.
- Vous recevrez des instructions de votre équipe soignante avant votre sortie.

Matériel

- Téléphone portable comprenant l'application *Microsoft Teams*
- Appareil Biobeat ou Masimo
- Appareil de mesure de la pression sanguine
- Oxymètre de pouls
- Balance, si nécessaire
- Tablette d'ordinateur Microsoft Surface, si nécessaire
- Concentrateur d'oxygène et réservoir, si nécessaire

Information

Pour contacter l'infirmière
24 heures sur 24, 7 jours sur 7 : 438-797-8222

Si vous avez des questions, contactez l'infirmière virtuelle.

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3755 Côte-Sainte-Catherine
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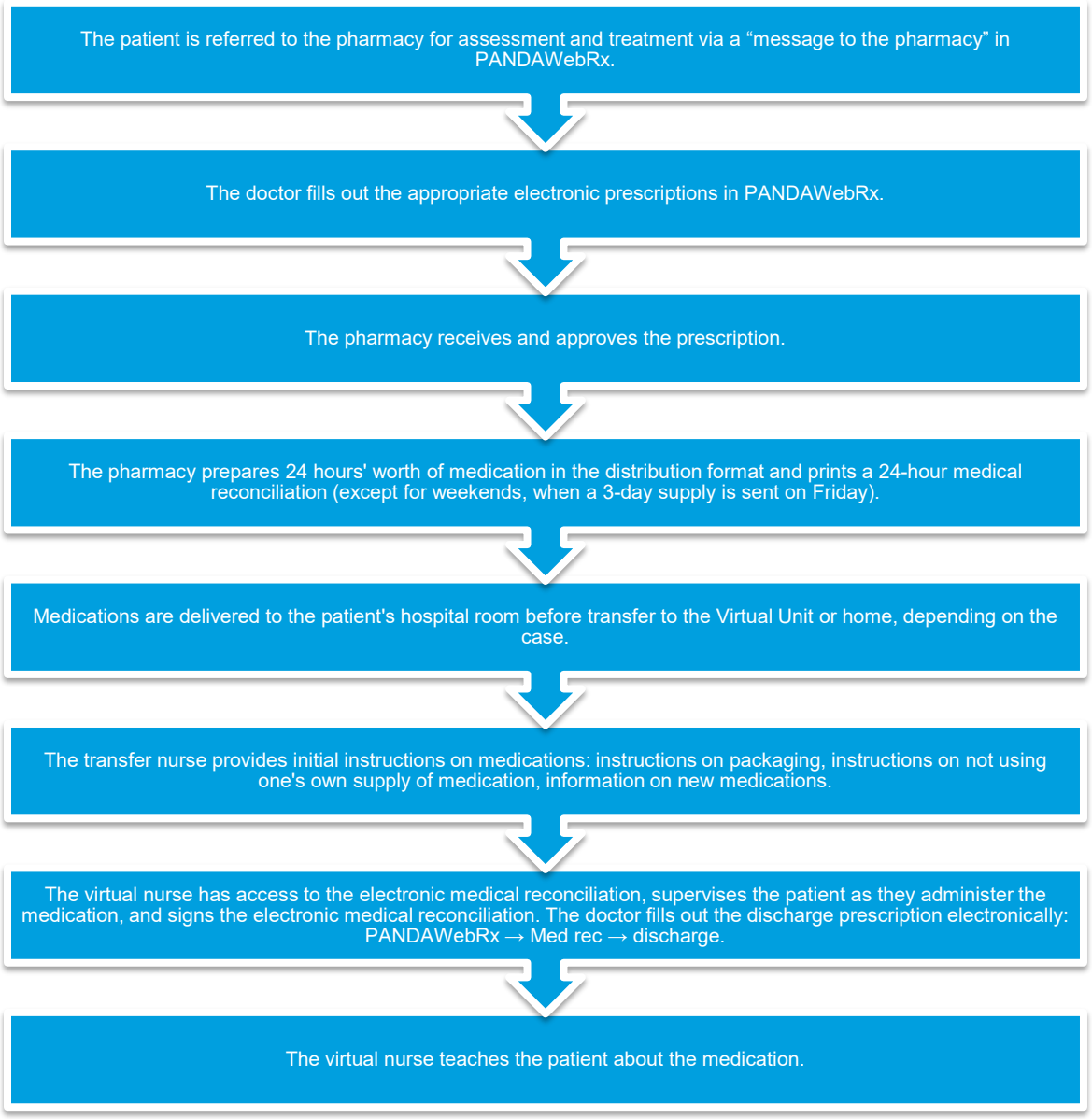
Centre intégré universitaire de santé et de services sociaux du Centre-Ouest-de-l'Île-de-Montréal
Québec

Appendix 16: Medication Process for the Virtual Unit



Note: Adapted from *Offre de service – unité de soins virtuels* Centre intégré universitaire de santé et services sociaux du Centre-Ouest-de-l’Île-de-Montréal (CCOMTL), 2022. Adapted with permission.

Appendix 17: Non-exhaustive List for Diagnoses Eligible for H@H and Services Offered

COMMON DIAGNOSES

Cardiology
- CHF - diuresis/ GDMT
- MI – post acute phase
- Bridging for anticoagulation
- Endocarditis
- Post Cardiac Surgeries
- Pre-op cardiac surgery
- Pre-ablation
- MRI/PET/MIBI pending

Respiratory
- Pneumonia
- COPD
- ILD flare
- Pending in-patient rehab
- COVID-19

ENT
- Dobhoff/PEG feedings NEW
- Tongue resection
- Thyroidectomy
- Wound infection

Internal Medicine
- Virtual Ward Closed Unit with weekly MD rotation

Oncology
- Neutropenia
- BiTES NEW
- Autologous stem cell transplant for multiple myeloma NEW
- Fever
- Chemotherapy
- Cancer workup
  - Pending biopsy
  - Pending treatment decision

Thrombosis
- Pulmonary Embolism

Infectious Disease
- Cellulitis
- Wound Infection
- Bacteremia
- Viral Hepatitis
- Transition to OPAT

GI/General Surgery/Colorectal
- Diverticulitis
- Bowel Obstruction
- Pancreatitis
- Appendicitis
- Cholelithiasis
- Cholecystitis
- Stable GI bleed post scope

Renal and Urinary
- Resolving Acute Kidney Injury
- UTI / Urosepsis
- Electrolyte Imbalances

Palliative
- Pain management
- Transition support to home during end-of-life care

ED
- Admission to H@H under ED, 48-72 hours

Can't find a diagnosis you need?
Let us know, and we'll co-develop it!

SERVICE OFFERINGS

Home Services
- Wound care
- Vital sign monitoring
- Regular Labs (max BID)
- Home oxygen therapy (max 3L/min)
- Feedings via Dobhoff/PEG
- IV fluids (40 ml/hour max)

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- Dr Harvey Chang
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- Dr Marco Mascarella
- Dr Vicky Tagalakis
- Dr Maral Koolian
- Dr Carmela Pepe
- Dr Matthew Ades
- Dr Lindsey Gerstein

Medication
- Daily medication deliveries (PRNs supplied)
- Insulin (fixed dose or sliding scale)
- Steroids (example: Methylprednisolone)
- IV Antibiotics, examples:
  - Ampicillin
  - Cefazoline
  - Daptomycin
  - Pip-Tazo
  - Remdesivir
  - Ampho-B
  - Azithromycin
  - Ceftriaxone
  - Ertapenem
  - Meropenem