

## Case History

# Implementing C4 in the CIUSSS du Centre-Ouest-de-l'Île-de-Montréal

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## Overview

The C4 of the CIUSSS Centre-Ouest de Montréal (CCOMTL) was born out of a strong strategic desire to improve management of inpatient flow. Inspired by command centres at other Canadian and American hospitals, C4 focuses on exceptional care and services through **C**ontinuum of care, **C**ollaboration, **C**ommunication & **C**reativity. The Centre took shape during the first waves of the COVID-19 pandemic. The creation process, coordinated by the Director of Quality, Transformation, Evaluation, Value, Clinical & Organizational Ethics, and Virtual Care (*Direction de la qualité, transformation, évaluation, valorisation, éthique clinique et organisationnelle et des soins virtuels*, DQTEVE-SV) teamed up with the Associate Director, several clinical directorates and "support" directorates to develop a common vision of creating dashboards that meet their needs and finding coordination mechanisms that enable them to efficiently improve day-to-day patient flow. C4 was developed through a progressive, iterative process, with various components incorporated along the way. Specifically, the first C4 components were developed by a working group of decision-makers and clinical leaders who met in the same location over several weeks, building close working relationships and cooperation. Today, C4 has not only improved patient flow within the CCOMTL but has also decreased the number of patients in acute care and met other targeted indicators. C4 is continuously developed, helping to make the CCOMTL an adaptable organization that values continuous learning.

Note: This case study is based on interviews conducted mainly in 2022.

## Patient flow management: the Jewish General Hospital puzzle

### Overcrowded emergency room

The Jewish General Hospital, the CCOMTL's hospital centre, has one of the busiest emergency rooms in Quebec, with 90,000 patients per year (an average of one patient every six minutes). Growing demand fueled the institution's desire to improve its performance so it could continue providing care to every patient who comes to the ER, regardless of whether they lived in the hospital's service area. Over half of the patients who come to the ER, 57% to be exact, do not live in CCOMTL's service area. Out of this number, around 35.5% are not from the Greater Montréal area. This situation makes improving the hospital's patient flow management a crucial matter of ongoing concern.

Up until now, patient flow management has been the responsibility of the Flow Coordinator reporting to the Director of Professional Services (DPS) and supported by three coordinating physicians (Emergency Department, Internal Medicine, and Family Medicine). This mode of operation has created several types of serious challenges. Firstly, this sort of team configuration relies heavily on professional services to manage patient flow when it should be done jointly with nursing staff, so says Joanne Côté, Director of Quality, Transformation, Evaluation, Value, Clinical & Organizational Ethics, and Virtual Care (*Direction de la qualité, transformation, évaluation, valorisation, éthique clinique et organisationnelle et des soins virtuels*, DQTEVE-SV). Moreover, while it is a good idea for coordinating physicians to support patient flow, the fact is that little action has been taken to address systemic issues. Ms. Côté explains:

"The responsibilities of coordinating physicians are in addition to their regular duties, and it's very taxing to do this day in and day out. [...] Also, the physicians don't always talk to each other. They are called upon as needed by the Flow Coordinator."

To create more capacity with the same number of beds on the units, in 2017, President and CEO Dr. Rosenberg instituted a patient flow policy. The policy set several specific objectives for patient flow targets, for example, the number of patients a physician sees in a 20-minute period, the number of cases managed in a two-hour period, or the number of consultations with a medical specialist. However, applying the policy and meeting its objectives proved challenging for different reasons. For one thing, there were no real

incentives or accountability. “There wasn’t necessarily anyone put in charge of auditing,” explained Ms. Côté. Chief of General Surgery and C4’s current Medical Director, Dr. Shannon Fraser, seemed to agree:

“[The patient flow policy] was insufficient, for accountability [...] and for consultation wait times, we would wait hours before saying, ‘OK, I’ve been waiting four hours for a neuro consult.’ It wasn’t automatic. There wasn’t anyone in charge of following up and calling to see why consults weren’t being done. There were some gaps in communication.”

Another problem was the available data to support performance measurement and decision making. “[...] The reports were not produced in real time. They were always three weeks after the end of the period, so you were always operating with a lag time. This made it very difficult to get organized,” she added.

Erin Cook, Associate Director of the DQTEVE-SV, explained the following:

“We weren’t able to solve the flow issues with that kind of structure. We didn’t have data either. We worked with the bed chart that showed us empty beds, but those aren’t actionable (usable) data. There was no macro-level view. All these decisions came down to the bed coordinator, her skills and knowledge, without any other tools to share the responsibility and accountability. So we were stuck.”

The hospital’s flow coordinator, Maria Kosma, who is also a nurse clinician, furthered her training by attending a program for improving hospital flow management at the Institute for Healthcare Improvement (IHI)<sup>1</sup>, in Boston, Massachusetts. The program had her visit high-performing institutions and use detailed real-time data.

Inspired by the best practices in patient flow management, and with the support of her department, the coordinator created dashboards for bed occupancy in care units and the Emergency Department (ED). She transmitted the information by email to nearly one hundred key players twice daily, at 8:00 a.m. and 2:00 p.m. While relevant and useful, the reports did not provide all the information one would hope for in an ideal world. They did not provide an overview of the situation because they did not fully link demand (need for beds) with supply (bed occupancy), making the data shared difficult to use in decision making. This clearly shows that to advance hospital flow management, we need to find engaging mechanisms, or even other tools to share responsibility and accountability, according to the Associate Director of the DQTEVE-SV, Ms. Cook.

### **Dr. Rosenberg’s inspiring project**

President and CEO Dr. Lawrence Rosenberg had been thinking about a command centre for several years. He was inspired by other hospitals that carried out a similar initiative to improve hospital patient flow, such as Humber River Hospital had done in Toronto. The hospital’s command centre was having a major impact, prompting a delegation of CCOMTL directors to organize a visit in 2019 to gain a better understanding of how the Toronto centre operates. The directors were inspired by what they saw, and from it developed a vision for the future of the CCOMTL.

Senior management wanted to begin the process of setting up a command centre, and immediately saw two options: either implement a turnkey system or develop a system of their own. The team met with several companies, such as GE, that offered turnkey solutions that were already in use in many US and Canadian hospitals. At first glance, the possibilities were impressive, however, further reflection led them to conclude that the offering could not be customized enough to align with their needs and particular situation. Furthermore, in addition to being a hospital centre, the CCOMTL is an integrated healthcare network including several front-line, rehabilitation, and long-term care facilities. This meant that the Command Centre had to be able to track flow across all sites and not just at the hospital. If they had gone with a turnkey system, the technological infrastructures and information systems already in place would have quickly led to problems. Associate Executive Director Dan Gabay recalls:

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<sup>1</sup> *IHI Hospital Flow Professional Development Program*

“GE’s business model, a central command centre that streamlines all missions and functions within an entity [...] is very resource intensive. It isn’t realistic, feasible, or viable in Quebec, because we are limited by how much we can invest in systems and by the resources we have access to.”

It was thus decided not to opt for an existing model, but to create a local model. However, they still required a partner to develop certain predictive dashboards using AI for machine learning; the company Maisha Labs was selected.

## Prep work and the first dashboards on flow

### The COVID-19 pandemic as a catalyst

With the looming threat of a pandemic, the Ministère de la Santé et de Services sociaux chose the Jewish General Hospital to treat COVID-19 patients. This decision was sure to exacerbate existing bed management issues. In March 2020, these fears quickly came to fruition. The team was concerned about maintaining its basic activities with the sharp influx of COVID-19 patients. At the same time, many other treatments and services were offloaded due to the pandemic, creating room in care units less affected by hospitalizations related to COVID-19.

This situation created an opportunity to do things differently and bring the command centre to life. Dr. Rosenberg delegated this mission to the DQTEVE-SV, under the management of Associate Executive Director Dan Gabay. He says that this decision was made because “it was felt that assigning the command center to a corporate rather than a clinical directorate, which cuts across the entire organization, would eliminate potential political and territorial issues between directorates on certain sensitive topics or free zones.”

At that time, it was highly important to choose the right person to lead the project. According to Dan Gabay, “We gave weight and importance to the mandate to ensure its success [...] you need a key player, at the level of Associate CEO or Associate ED [...] because you needed to mobilize your management committee for this project. There was no other way.”

In May 2020, a project manager specialized in DQTEVE-SV administrative procedures, Nicolas Seca-Masot, was appointed project facilitator and manager, and a large executive committee was established. It brought together all CIUSSS clinical directorates, including Rehabilitation and Multidisciplinary (DRSM), Mental Health and Addiction (DPSMD), Support Program for the Autonomy of Seniors (SAPA) – Residence and Home Care, Professional Services (DSP), Nursing (DSI), and the DQTEVE-SV. Several medical chiefs also joined the executive committee, such as the Chief of Emergency Medicine, the Chief of Internal Medicine, and the Chief of General Surgery. Dan Gabay explains why such a varied team was needed:

“When you talk about patient flow and you touch a bed, you absolutely need a physician, nurses, and multidisciplinary services, because these three clinical dimensions impact a patient’s daily reality, irrespective of that bed, and for all an organization’s clinical activities.”

To get everyone working together on a common theme, they focused on finding solutions instead of placing blame. Sometimes this way of doing things requires time to learn. Dan Gabay says:

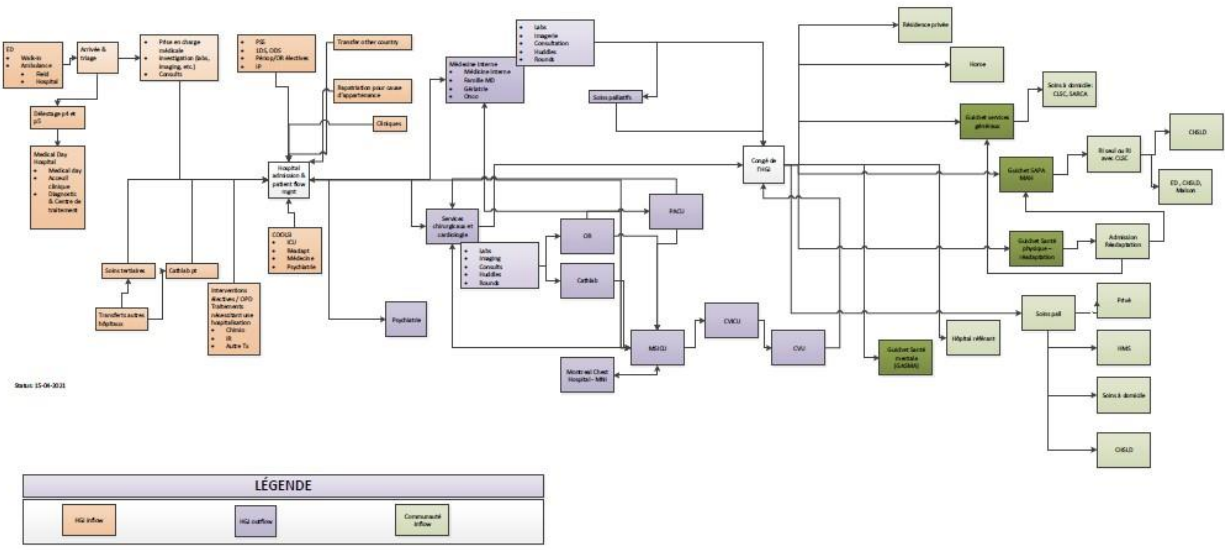
“[At first], it was odd to hear a nurse say the physician is the problem and the physician say the nurse is the problem, or that it’s multidisciplinary. We thought it was funny that by the end of each of these meetings, we always came back to the same thing: ultimately, no one person was more at fault than another—everyone had their part to play.”

### Hospital Command Centres

“A command centre is a centralized operating system that brings together data that is already being collected across [a] hospital so that more informed decisions can be made on how to improve [...] overall efficiency and deliver better care.” – [Humber Command Centre](#). It allows staff to refer to digital dashboards displaying real-time data. This data is actionable on several indicators for faster and more efficient decision making. A command centre turns fragmented information into meaningful, actionable data for clinical staff to use.

Source: Humber Command Centre





Simplified macro-level map (2021)

However, they did notice that feedback on the process largely brought up issues within the hospital. As Joanne Côté explains, for the command centre senior management wanted to create, they needed to expand the scope of the centre’s work to cover the entire CIUSSS:

“The CIUSSS isn’t just a hospital. We needed to make an adjustment. [...] There was a strong perception that it was always focused on the hospital. We had to break free from this idea and say, ‘When I look at a care trajectory, the hospital is but a small point on the trajectory.’”

Five issues were identified as priorities (e.g., local frontline, Emergency Department flow, the discharge process), each assigned to a work committee. As part of a project management approach, the committees received guidance from a DQTEVE-SV representative and were led by two to three people, typically a physician, a member from the Nursing directorate, and a professional from the Multidisciplinary Services directorate. The Associate ED’s aim was to use these themes to develop indicators that could be monitored through a command centre.

### A Medical Director for hospital flow

Based on previous initiatives, the DQTEVE-SV team knew that flow management would require everyone’s participation, as well as a leader with a medical background to remain as close to operations as possible. Dan Gabay explains:

“Physicians are incredibly busy. And, unlike other resources, physicians aren’t employed by the healthcare system. So, I can’t just organize a physician’s work. Physicians work with us, but not for us. This is an important nuance when it comes to flow.”

This means that to get physicians involved and collaborating, they would need a contact person who is a physician and understands their reality and the issues at stake and with whom they share a common language, in order to pool and coordinate their efforts.

A C4 Medical Director position was therefore created to manage patient flow at the medical level. The position would be paid by the Jewish General Hospital Foundation. Dr. Rosenberg tapped Chief of General Surgery Dr. Shannon Fraser for the position. The choice seemed obvious, as Dr. Fraser had already been an important ally since the start of the pandemic; she had been involved in managing patient flow in the ED and was in direct contact with physicians handling the pandemic. Dr. Fraser was interested in and highly committed to improving flow. And with fewer elective surgeries to perform due to the pandemic, at the time she was appointed, she had enough free time to fill this new role.



The role had to be neutral, and Dr. Fraser seemed to be just the right fit. “I hardly use any beds because I perform day surgeries, and that’s why I had credibility. I didn’t want beds for myself, it was for the entire CIUSSS.”

The role of C4 Medical Director in no way replaced that of the DSP within the organization—it was complementary. In fact, the role was more operational, and Dr. Fraser’s clinical practice put her on the ground and alongside other physicians. It was her job to communicate with physicians on everything relating to patient flow. As Dan Gabay explains, “[She] was the liaison with the physicians and brought a medical perspective to the conversation. There was a lot to gain in this regard.”

Dr. Fraser describes her role:

“My role [is to] handle conflicts between teams, help them when they have trouble with testing or other barriers to a patient’s trajectory, and to liaise between the medical team and other teams. The DSP is too busy to do all that.”

On paper, the Medical Director was supposed to work two days a week, but according to Dr. Fraser, it was really a 24-hour-a-day role. To fulfill all her duties, she kept a reduced practice, yet even on those days, she was contacted for flow issues.

“I do fairly short surgeries and I can answer them in between, but it’s interesting...when I’m not there, they always say, ‘Oh, we missed you.’ They’ve gotten used to someone answering them immediately!”

Dr. Fraser says that at some point, the role of Medical Director of Flow could easily become a full-time position.

“If it isn’t full time, it will definitely go beyond work hours. Sometimes it even means working Saturdays and Sundays. It’s effective and it’s needed, but it’s a lot. There should be more than one person doing this job, because we all need downtime sometimes.”

She says that it is a demanding role, and to do it well, one needs to protect their time. It is also important that she be able to count on her fellow physicians to compensate for the reduced clinical schedule she must keep in order to devote herself to the developing C4. She must also be able to count on her medical teams to take an interest in flow and get involved so that responsibility for the entire “medical” flow does not fall on her shoulders alone.

### The first dashboards on patient flow

One working group was solely dedicated to developing the C4 model—a trio of clinical leaders comprising Dr. Fraser, André Poitras, Clinical-Administrative Coordinator of the ED and Critical Care (intensive and cardiovascular), and Maria Kosma, Flow Coordinator. At the time, they were commonly referred to as the Three Head Monsters<sup>2</sup>. This concept, suggested by Nicolas Seca-Masot, has a virtual governance structure aimed at breaking down the silos of flow management. The group’s aim is to create dashboards displaying real-time data to meet the needs of health professionals on the ground so they can make decisions and take action as quickly as possible to improve hospital flow.

In October 2020, the work committee started creating the first dashboard (first tiles), with the help of Nicolas Seca-Masot, Associate Director of Digital Health Sabine Cohen, and their team. The Digital Health team comprised four areas of expertise, all assigned intensively to the C4 project. An IT Director was also assigned to the project and coordinated actions involving computer equipment and making the product operational.

They started by primarily focusing on information from the bed status email sent by the Flow Coordinator. Mr. Seca-Masot facilitated the process by attempting to clarify elements that are sometimes intuitive in hospital operations but have a logic in flow management. He sought to draw out the tacit knowledge from

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<sup>2</sup> Que l’on appellera par la suite « trio de leadership clinique ».

the minds of the leadership team by asking questions, such as, “How do you know when you need to go into overcapacity?” and “How many stretchers in the ED is too many?” André Poitras says, “It ended up putting words to my operations.”

This knowledge could be converted into indicators and Sabine Cohen helped further that reflection by defining the indicators through data. For example, during a work session, the team asked Ms. Cohen, “We’re looking for information on a particular blocker. Does this information exist? If so, in what format can we retrieve it? In which system? If not, can we create it? If not, what can be done instead? Sabine Cohen can also point out the pitfalls and foresee some challenges.

The dashboard was then built on a combination of multiple linkages between data from different system sources, primarily Med-Urge and Clinibase.

Working closely with Digital Health during the design phase allowed the working group to leverage their expertise. With their knowledge of available data and systems, they could push discussions forward and suggest improvements and ideas that go one step further. What brought the indicators to life, such as colour changes along with status changes or the ability to drill down to the patient, were some of the ideas offered by Digital Health.

Each tile (the dashboard presented on the screen) was built from an accelerated approach, in a short, clearly defined timeframe, without prototyping. The tile was approved and functional within four weeks. The work done on C4 was demanding for the Digital Health team. Sabine Cohen explains:

I would have liked it if we had gotten more staff, but it wasn't possible. Inevitably, this affected other project requests and that's why we've had to work on four-week project cycles, so its manageable and easier to play. We still require a break [between projects],because we can't be exclusive to the Command Centre. We have to serve the entire CIUSSS in their data-related needs."

#### The CCOMTL Digital Health Directorate

This crosscutting directorate has expertise in business data and knowledge about source systems. Their strength lies in matching business and technological needs, to offer clinical and clinical-administrative IT solutions that meet both business and clinical requirements. By understanding where the data are coming from, programmers are able to create “data containers.” The team comprised specialized analysts who do data mining, programming, analysis, and page layout. The Jewish General Hospital had special expertise in areas such as data warehousing, dashboards, and KPI, and this was before the system transformation in 2015. The tiles are made up of dashboards.

Sabine Cohen says that cooperation at the start of the project was key to its success:

We really worked together. It wasn't a classic model where they give you a report that's ready to go and tell you to program it. No, not at all. All the collaboration really bolstered the team, which already had strong data expertise.

To avoid creating dependence on the digital team, they required the C4 project team to appoint a member owner of the dashboard tiles to ensure data governance. The owner was the liaison between Digital Health and the teams working on the tiles. They centralized requests for changes and additions and reviewed the team's questions and passed them on to Digital Health, and vice-versa. This preserved the integrity of the final product, explains Sabine Cohen. Maria Kosma was put in charge of the first tiles on hospital flow. Once the work was completed, she had to explain each tile in detail to the Digital Health team, who made sure she fully understood them. She would then do the same for the teams who would use and interact with the tile.

### **Patients in alternate levels of care (ALC)**

In order to admit new patients, the hospital must be able to free up beds by discharging who no longer require acute care. However, this is not always easy to do. Many patients in hospital centres must remain hospitalized because they are waiting for a placement in a long-term care facility (intermediary resource or a CHSLD), in a rehabilitation facility, or a residential or mental health recovery facility, or to find home care. These patients are in alternate levels of care (ALC). ALC patients are a major challenge for all health organizations, as they contribute to overcrowding.

The first tiles regarding patient flow were made operational early December 2020. The first tile showed inflow, meaning patients entering the CIUSSS through the ED. The second tile showed outflow, meaning inpatients, patients with upcoming discharges and patients in alternate levels of care. (see the box “Patients in Alternate Levels of Care (ALC)”). A third tile showed flow mismatch, meaning the difference between admission demand and capacity. In this same tile, we also see “off service” patients, meaning in another care unit due to a capacity issue on the unit where they were meant to go.

# Inflow

Last refreshed  
23-04-17 10:13

Stretcher occupancy **225 %**

PrePods	Pods	Stretchers	Total
0	85	119	129

# ED Patients NOW

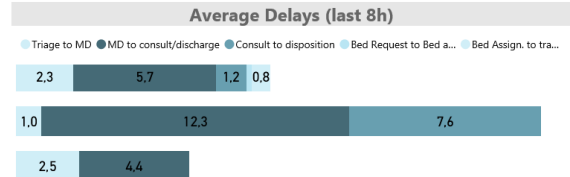
Psy	Covid+	Covid R/O	24 to 48h	> 48h	24 to 48h	> 48h
21	3	15	13	25		
67 % from CCOMTL			WITH admission request			NO admission request

### Admission services

Service	Census	Bed Solved
Internal Medicine	17	0
Family Medicine	3	0
Geriatrics	2	0
Neurology	1	0
Oncology	1	0
Other Medicine (subspec)	2	0
Cardiology	3	0
Psychiatry	18	0
<b>Total</b>	<b>47</b>	<b>0</b>

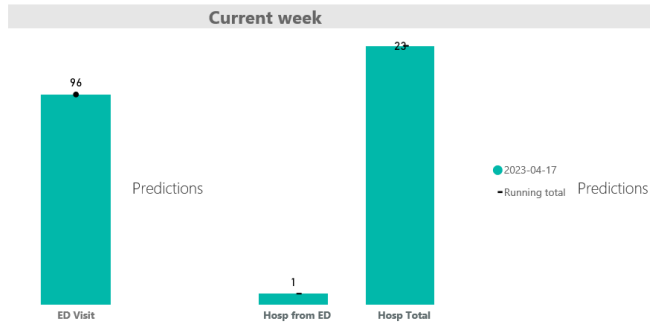
### Pending Consults

Specialty group	Pending Consults	Outside Norms
Internal Medicine	1	1
Geriatrics	4	3
Neurology	4	3
Other Medicine (subspec)	4	4
Surgery	3	3
Other(Soc.Serv.,Disch.Pl.)	2	1
<b>Total</b>	<b>18</b>	<b>15</b>



### Consult Delays (last 8h)

Specialty group	Completed within norms	Completed outside norms	AVG time to complete
Internal Medicine	0	3	14,1
Cardiology	0	2	3,5
Oncology	0	1	7,6
Other Medicine (subspec)	1	1	7,0
Surgery	1	1	3,4
6WER	0	0	
Family Medicine	1	0	1,8
Geriatrics	0	0	
Neurology	0	0	
Palliative Care	0	0	
Psychiatry	0	0	
Other(Soc.Serv.,Disch.Pl.)	0	0	
<b>Total</b>	<b>3</b>	<b>8</b>	<b>7,2</b>



Internal Medicine norm : 4 hours  
All other specialties norm : 2 hours  
Made by Digital Health

# Outflow

Last refreshed  
23-04-17 10:13

## Overcapacity

6	6	1	2	15
Medicine	MH	Surgery	Others	Total

## Covid19+

1	1	1	0	23
K11C (ICU)	K8	K9	K10	Others

## Virtual Wards

0	6	0	6
V1	V2	V3	Total

### Outflow

Unit	Operational capacity	Census	Empty	Signed	Potential
MEDICINE	259	0	8	15	
Special Units	139	19	0	4	
Surgery	117	8	2	4	
OTHER	0	0			
Critical	38	6			
COVID units	0	0			
<b>Total</b>	<b>553</b>	<b>33</b>	<b>10</b>	<b>23</b>	

### Off service (On service)

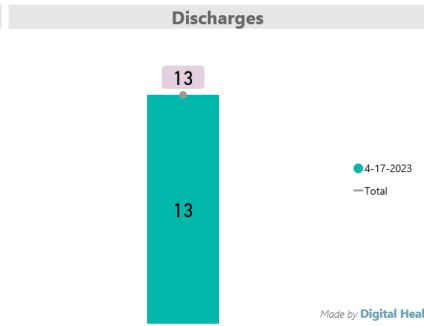
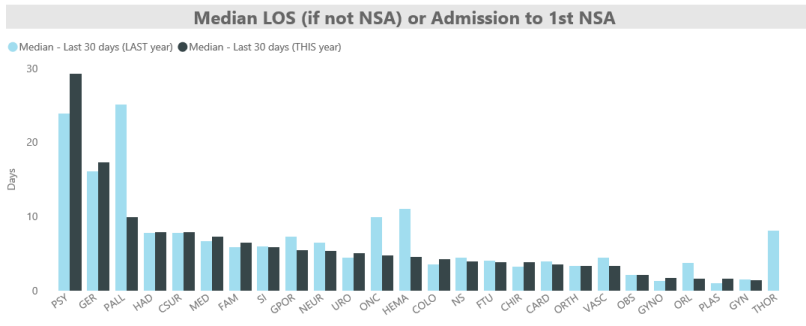
Service	C3	C48W	C7	D41	D53N	K10	K8	K9
FAM (24)						1		
FTU (20)			1	7		1	1	1
GER (57)				2	1	1	1	2
ONC (12)			1			1		
OPH (15)								1
PALL (16)	1							
PSY (54)				8				

### NSA

Current NSA	Inpatient	CComt %	Signed	Potential
Var 08b (Orientation)	6	33%	0	0
Var 08c (Approbation)	12	33%	0	0
Var 09 (Home Care/SAD)	3	33%	0	0
Var 10 (Rehab)	10	40%	1	1
Var 11 (Palliative)	3	67%	0	0
var 12b (CHSLD)	15	60%	0	0
var 14 (Santé mentale)	12	75%	0	0
var 15 (Ordonnance)	4	50%	0	0
<b>Total # of NSA pts</b>	<b>65</b>	<b>51%</b>	<b>1</b>	<b>1</b>

\* Displayed in brackets the number of On Service patients

Légende  
RI-RTF/Var 12a = En attente de Ressources Intermédiaire ou de Type Familiale



### Flow mismatch

Last refreshed 22-01-20 14:13

Flow Mismatch													
indicateur	Family Med.	FTU	Geriatrics	IM Teach	IM Non Teach	IM Covid19+	Oncology	Surgery	Neurology	Card/Card Surgery	Palliative	Psychiatry	Critical Care
Capacity	23	23	58	64	24	19	12	113	24	50	17	48	30
On-Service	20	18	55	59	19	48	7	69	3	41	15	40	25
Max Off Service	2	2	5	6	6	0	2	0	0	0	0	4	0
Off-Service	2	7	14	0	4	0	1	3	18	0	2	0	0
Total census	22	25	68	59	23	48	8	72	21	41	17	40	25
D/C	0	0	1	3	0	3	0	0	0	0	0	0	0
Admissions	1	1	0	9	0	0	0	1	1	0	0	3	0
Total demand	23	26	67	65	23	45	8	73	22	41	17	43	25
Mismatch	0	3	9	1	-1	26	-4	-40	-2	-9	0	-5	-5
.	0	0	1	0	0	1	0	0	0	0	0	0	0

Screen grab of Inflow, Outflow, and Flow mismatch tiles

From that point on, instead of the Flow Coordinator sending out emails, two daily caucuses were held, at 8:40 a.m. and 4:00 p.m. Members used relevant, real-time data to identify challenges and discuss different plans for managing the day's patient flow. The meetings were facilitated by Dr. Fraser in a hybrid format (Teams and in person) and were held seven days a week for the first few months. The following people attended:

- the Flow Coordinator
- the Clinical-Administrative Coordinator – Emergency Department, Critical Care and the Cardiovascular Division
- the C4 Coordinator
- other chiefs
- four Clinical-Administrative Coordinators of Nursing
- the Director of Rehabilitation and Multidisciplinary Services
- the SAPA Director
- the DQTEVE-SV Director
- the Environmental Services Director
- the Director of Information Resources

#### Creation of the C4 coordinator position

It soon became apparent that a dedicated person would be needed to ensure the ascendancy of decisions, coordinate improvement projects arising from caucuses, and act as guardian of the common thread between the various caucuses and teams. A C4 coordinator position is therefore created, and a nurse clinician is appointed in December 2020 to fill it. This position reports to the CAO.

Thanks to her presence at all caucuses and the visibility of data, the coordinator has a comprehensive understanding of the state of flow in the CIUSSS. She can support the clinical triad, investigate situations and get them resolved.

Caucus discussions were based on the dashboard data. Presenting objective data makes it easier to mitigate issues between the units—giving everyone access to the same information made things more transparent. C4's dashboards could be viewed online at all times. The data was updated every 30 minutes to provide an accurate picture of the situation and enable the team to make informed decisions.

A second caucus for ED flow was also set up and held twice a day (9 a.m. and 2:00 p.m.), led by Dr. Fraser. He met with the medical teams (urgentologists, specialist physicians, family physicians, etc.) the ED Coordinating Physician, and the ED Bed Management Officer to make decisions regarding the distribution of ED patients between units. This caucus primarily used dashboard data as well.

## The effect of the first “tiles” on flow

As soon as they became available, the dashboards were integrated into work routines. André Poitras had this to say:

It was the first thing I'd open in the morning, because people would ask us a thousand questions in the morning [...] This is information I use all day long, all the time [...] I have the dashboard open. It self-updates, and I can dig for more details.”

The clinical leadership worked closely together on hospital flow management, with support from the C4 Coordinator, using inflow, outflow, and flow mismatch data. Dr. Shannon Fraser gives an example of how the data was used on a daily basis during flow caucuses:

[One datum] we often use is the mismatch between [the number of patients to be admitted and] the number of patients admissions services are comfortable admitting. [...] We use this in the ED caucus every day, so everyone knows, if a patient needs to be admitted, where its the least crowded and where they can go to receive care more quickly.

The first Inflow, Outflow, and Flow mismatch tiles are data that were initially calculated intuitively by hand to provide an overview of the situation. Nicolas Seca-Misot explains:

What was once done intuitively by hand and in the minds of the clinical leadership trio is now calculated automatically and available to everyone. It has been extracted from the minds of these key players, and this expertise makes it possible to share the status of a situation, saving critical time in day-to-day management.

Carol Viegas, Flow Coordinator, also asked André Poitras and Dr. Fraser to lend their expertise whenever an issue emerged. She delegated medical issues to Dr. Fraser and nursing issues to André Poitras. “This already saves us a lot more time than before,” explains Viegas. “It really helps to have Dr. Fraser and André Poitras. We waste less time when we can speak to this physician and that physician. When Shannon is there, she says, ‘It’s OK, Carol, I have it.’”

André Poitras, in reference to his involvement in the trio, says, “It’s demanding, but I like the work. I find the synergy and efficiency of the team fulfilling, because we make a difference, and that’s really satisfying and motivating.”

The team played an influential role, but also had the authority and legitimacy to make decisions to remove roadblocks relating to patient flow. The method of communication could be adapted to the context or situation. For example, Dr. Fraser might send out a general email regarding a bed issue, or during a more targeted challenge, she can call the involved clinical team directly.

According to Dr. Fraser, sometimes a medical issue required a simple discussion to raise awareness among those concerned, and others it required a change in the way people work. For example, until recently physicians were saving resident consultations to review all at once, usually at the end of the day. Now, files are reviewed one at a time as they come up, so that decisions can be made more quickly and beds can be vacated more quickly. This is the kind of change to work methods made possible by prioritizing organization-wide patient flow and freeing up Dr. Fraser to focus on resolving issues with physicians.

The position adopted by Dr. Fraser and André Poitras was also important in this sensitive work. Dr. Fraser on her role:

It’s more [of a] facilitating [leadership]. We want to help. We aren’t there to police people. If something isn’t working, it’s not because someone isn’t doing their job well. It’s because there’s a challenge we need to handle together. [...] It’s much better received to ask, ‘How can I help you,’ than to police people. It’s important and even crucial to have good relationships with our colleagues. Taking the time to listen to their point of view can prevent several problems, such as avoidance or obstacles to flow.

Carole Viegas says transparency is key. “If you are transparent, the whole team will be able to understand what you are facing and will rally around you. When they understand your reality, they will be a team player with you [...] I press the panic button unless I really have to.”

Decisions made in C4 during caucus meetings must also cascade down to the teams. André Poitras explains that Teams, email, and text messaging are used to forward information.

If, for example, we're over capacity in the morning, I come back [from the C4] and I send text messages as usual to all the chiefs or an email to everyone, like Dr. Fraser does with the medical teams, to say, “Attention everyone, we have some challenges on the way.” Please, be proactive and try to get your discharges through, send your patients home and get ready, because it looks like we have a difficult day ahead of us.”

The trio did more than just make requests to teams; communication was two-way street. The trio also took charge of certain situations to dig down to the source of problems and attempt to solve them, sometimes going so far as to inject resources if possible.

## The C4 takes flight

### The pilot project: relationships and collaboration in the C4

In December 2020, when the first tiles were created, the subcommittees encountered challenges that kept them from advancing in their work as much as hoped. It was not for lack of consensus, explained the Associate ED. “The map was objective. There was a consensus among stakeholders, directors, and physicians on the issues [and] there was a consensus on what actions had to be taken.” It turned out that the small committees only made progress at meetings, that outside meetings, members spent very little time on this work. The committees were not making progress with concrete actions. There were many reasons for this stagnation, but it seemed that the project was too big. Dan Gabay believes that launching five working groups at the same time spread resources too thin and hindered progress in all groups. “You have to agree on a goal that is realistic and that you want to reach, and then narrow the scope of the mandate.”

The situation was, therefore, critical considering all the resources allocated to the initiative. It was also at this time that the third wave of COVID-19 was emerging and pressure on the system began to mount. Management decided to gather decision makers to work in the same space for a set amount of time—three months—and alongside operations, hold work sessions to build C4. It was decided that with the first dashboards produced and the flow caucuses in place, it was time to establish a vision, a mission, and the first objectives of C4 before pursuing the initiative further. The idea was to have directors and associate directors work closely together to create cross-disciplinary links within the organization and facilitate cooperation in building C4.

This idea refers to the Team of Team concept, popularized by McChrystal's work in 2015, published under the same name. A few members of management were familiar with the theory, which matched the vision that management was putting in place.

Nevertheless, the idea of gathering the team in one room was surprisingly unusual. Dan Gabay recalls:

It was quite peculiar because it was an experiment without an agenda, and for someone like Joanne Côté or me, it was an aberration. [...] I was hesitant but given that it was December and a bit quieter, we decided that 10-12 weeks was doable.

Aware that they must change how they worked if they were to make any progress, Dan Gabay and Joanne Côté went ahead with the initiative. They dismantled the five work committees and established the pilot project.

Gabay advised the clinical directorates (DSI, DSP, DRSM, SAPA (Residence and Home Care), DSIPL, DQTEVE-SV) that they must free up associate directors for the next 12 weeks so they could carry out their duties together in a conference room and attend work sessions to create the C4 of CCOMTL. Reactions to this news were mixed. Erin Cook, who is currently Associate Director of the DQTEVE-SV, was Associate Director of Sapa Residence at the time. She remembers her reaction:

I was trying to figure it out in my head I literally came out [of the meeting] and I said, "I don't understand, what is your objective?" and [Dan Gabay] said, "It's up to you, we don't have any objectives." I was thinking, "How are we going to carry out a project without any objectives?"

But people were not just surprised, they were enthusiastic to work together on this joint project that affected the entire CCOMTL. André Poitras shares his thoughts:

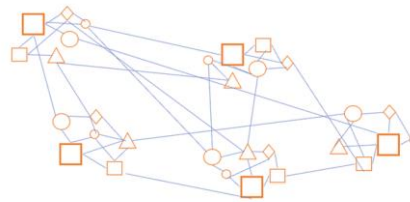
#### C4 pilot project actors

The following members of management met every day in the same room to manage their operations, side by side:

- C4 Coordinator
- AD of the DSI or Clinical-Administrative Coordinator of the ED and Critical Care
- AD SAPA Residence or Home Care
- Director or AD of Mental Health
- AD of the DRSM
- Director of the DSIPL
- Director of the DQTEVE & SV
- Associate Executive Director

#### Teams of teams

Popularized by McChrystal (2015), the concept Team of Teams is based on the premise that, in a complex and quickly changing environment, and particularly in times of crisis, the teams within an organization or system cannot continue to function as isolated units and remain indifferent to the activities of other teams. Instead, they must rely on shared information, links, and authentic relationships between them and on mutual trust to function with the speed and precision the situation requires.



Team of Teams approach (adapted from McChrystal, 2015)

Source: C4 Command Centre Cadre de référence/Concept Framework, 2022

It was exciting to have a command centre that was going to be aware of all the problems and where we could address all these problems quickly. Because in my day-to-day critical care with the ED, I needed a lot of partnerships and influential leadership, so that the ED could be freed up and I could give patients access to care.

The C4 Coordinator was very helpful in planning and setting up the room, in close cooperation with IT, and in transferring the team.



In addition to the usual management activities, Joanne Côté, Director of the DQTEVE-SV, held daily workshops with support from the C4 Coordinator. A number of topics were covered in the discussions that took place over many weeks:

- the specific issues and realities involved with each mission
- collaboration between missions and the crosscutting information needed for fluid patient trajectories
- the link between the front line, in the broadest sense, and the hospital
- cascading and escalating critical information, and cross-departmental communication.

Throughout these discussions, they posted issues on the wall and the group progressively identified issues from their departments that could be applied to the Command Centre. Joanne Côté explains that topics were always discussed from the user's perspective. She says that when the team does not share a common vision, "Different stakeholders pull the rug out from under each other, and the process goes off the rails." The teams had some experience in this matter, which made the job easier. "I have to admit that with the Integrated Practice Units model [implemented in recent years], people have become much more aware of user experience. [...] we always used to say in our IPUs [...], you have to have a shared vision of what should happen to the patient," she explains. Dan Gabay agrees: "The realities of each department are different, but there is one common challenge: the reality of the patient."

#### The objectives of C4

- 1- Improve healthcare access and quality for patients throughout the CCOMTL network.
- 2- Improve patient flow by improving service coordination, responding more quickly, and providing access to data and data analysis in real time.
- 3- Increase staff effectiveness by eliminating redundant or unnecessary processes in the management of flow and transitions between acute and post-acute care, as well as rehabilitation and long-term care or community services.
- 4- Create a data-centric culture to improve the experience, satisfaction, and engagement of patients, staff, clinicians, and healthcare system leaders.

Gutberg, J. (2022) C4 Cadre de référence, p.15



Wide-angle view of the C4 Command Centre in its first phase, with many screens in the JGH board room containing real-time data about the flow of healthcare users through the facilities of CIUSSS West-Central Montreal. <https://iqhnews.ciuisswestcentral.ca/all-systems-go-for-launch-of-digital-nerve-centre-to-help-improve-care/>

The team posted flow tiles on screens in the room. They continued to hold caucuses twice a day, with conversations informed by data. The caucuses were held in hybrid format, with some people attending in person (in the C4 conference room) and some remotely via Teams. Everyone had access to data via the intranet.

In addition to the daily caucuses, during this time, morning safety rounds—15-minute caucuses held 5 days a week at 10:00 a.m.—were also resumed. All the clinical directorates and corporate departments (including

Finance, IT, Technical Services, Logistics, HR (including communications and emergency measures), Academic Affairs, Digital Health, and the Service Quality and Complaints Commissioner) were present at the caucuses. “The safety round is really a time for situational awareness on the entire CIUSSS. It’s a 10-15-minute round table on CIUSS issues [of all manner] that can have an impact on patients’ safety,” explained Dan Gabay. Such meetings were already being held before the pandemic but were put on hold. Now, they were held in hybrid format.

### A turning point: Communication and collaboration

The team made progress and built relationships week after week. “There were days when discussions were really relevant and days when things weren’t [so clear]. But the team was becoming increasingly close knit,” explains Dan Gabay.

The ambiguity of the early days gradually subsided. Luc Méthot, Associate Director of SAPA, says, “At first, we wondered what we were doing there. We were building a plane mid-flight. It can be disorienting, especially during a pandemic, but there were work sessions, we defined the vision and it improved over time.”

The associate directors, who were conducting activities side by side, got along well and helped each other out. Erin Cook shares her experience:

Sitting in the Command Centre was very educational for me... hearing about other peoples’ truths, issues, and blockages. [For example], at one point, the Associate Director of Rehabilitation [...] spoke about an issue regarding one of her ALC patients. [A colleague replied] “*Oh, I didn’t know it was such a big issue for you, I’ll get someone from my team to help. I’ll go talk to him so we can try to resolve this issue.*” We cannot act on information we don’t have! So it opened the door for the to share information in a strategic way so they could take concrete, operational actions to solve issues. [...] That’s when we realized there was added value to having everyone together in the room.”

André Poitras also spoke of this time as an opportunity to get to know their colleagues better, to understand the issues they face and how quickly they were able to resolve situations:



*The pilot project group at work in the JGH board room.*

I saw that there were major advantages to being in that room. It helped my reticence in the beginning [...] I connected with people through small talk, and while those connections may seem ordinary, they weren’t [...] It helped me a lot. When I had a call [...] I could quickly toss the ball to my coworker sitting across from me so they could help me out. That made a huge difference, because before, I had to finish my call and then call someone else, who may or may not answer the phone... Then I had to send an email, so I would write an email and then I would reread it, but I would get interrupted.

Dr. Fraser explains how the working group created shared accountability and broke down silos within the organization:

With silos, it’s easier to blame or place accountability on another person [...] I think the idea was to make the CIUSSS and everyone accountable. These are our patients, not yours, and not mine [...] Now we are working on the same floor where we’re handling everyone’s challenges and trying to work together.

The third wave of the pandemic was also in full swing while the group was at work. In addition to handling their own regular operations between the workshops, they were also managing the pandemic. “*Because all*

*the associate directors were together so it became a de facto third-wave crisis unit,"* says Dan Gabay. He says the experience showed them beyond a shadow of a doubt that the concept was well suited for crisis management:

We realized that the command centre fit well with the logic of a crisis unit [because it brought] decision makers together to tackle day-to-day challenges. It unites teams around a common problem.

## Leveraging command centre experience to lead COVID-19 vaccination campaigns

In December 2020, the CIUSSS was identified by the Ministère de la Santé et des Services sociaux (MSSS – Ministry of Health and Social Services) as a pilot site for vaccination in nursing homes. Lucie Tremblay, the appointed project director, held an in-person working group for two weeks in December at Maimonides Geriatric Centre to build synergy between the directorates and support quick decision making. Present were the Director of Logistics, the Director of Nursing, the Director of the Vaccination Campaign, the Director of SAPA and the Associate Directors, Long-term Care and Home Care (for Intermediate Resources and Family-Type Resources), the Associate Director of Human Resources, and the Director of Quality, Transformation, Evaluation, Value, Clinical & Organizational Ethics, and Virtual Care (DQTEVE-SV). From the satellite office, they planned and launched the campaign and quickly built the dashboards needed to manage it. The Directors and Associate Directors cascaded the information to mobilize their teams and achieve the targeted results.



*The satellite office for vaccination at Maimonides Geriatric Centre. Source: <https://jghnews.ciuisswestcentral.ca/all-systems-go-for-launch-of-digital-nerve-centre-to-help-improve-care/>*

In late February 2021, a mass vaccination command centre was established at the CLSC Côte-Des-Neiges. This model drew upon the expertise built through the nursing home vaccination pilot project and on the experience of the Command Centre (flow) that had debuted nearly two months prior. It was the obvious choice for organizing, orchestrating, and overseeing public vaccination.

For the campaign to run smoothly, many strategic and logistical decisions had to be made every day, and the satellite team had to deal with constant unforeseen or changing circumstances. For example, demand for vaccines varied between each of the three vaccination sites and sometimes even varied from day to day within the same site, especially because of the walk-in service. Vaccine supply also varied. The CCOMTL never knew in advance how many doses would be delivered, and sometimes the doses their facility was meant to receive would end up being delivered to other regions where the need was deemed greater. They also had to plan for proper storage and transportation of the vaccines, for which there were different requirements. There was also high staff turnover of staff at vaccination sites. The campaign had to be closely monitored, and satellite technology enabled rapid, concerted, and well-informed decision-making.



*In the Vaccination Command Centre, (from left) Joanne Côté, Lucie Tremblay, Sonia Boccardi, Amina Talib and Erin Cook (Associate Director of SAPA and Long-Term Care) plan the day's strategy. Behind them, the screens at left and centre display the latest data about COVID-19 vaccinations at CCOMTL. Source: <https://jghnews.ciuisswestcentral.ca/decision-makers-strategize-at-vaccination-command-centre-to-keep-the-shots-coming/>*

## End of the C4 pilot project

Once the C4 working group's mandate had been completed, meaning the vision governance, and priorities of C4 had been established, the clinical directors returned to their bases (except a few people who had already left the board room to join the mass vaccination satellite office team). They continued to meet daily at the flow caucuses, and five times per week at morning safety rounds, which they had done since September 2022 (and started meeting three days a week instead of five once the third wave subsided). They also kept close ties through their joint work on the C4 Strategic Governance Committee.

They also communicated more spontaneously in a Teams chat group for CIUSSS flow, which other more tactical and operational players gradually joined, such as the flow caucus. They used the space to ask specific questions and quickly share information, giving them visibility on specific events. For example, if the Flow Coordinator wrote in the chat that four hip fractures just entered the ER, orthopedics and rehabilitation automatically expected to receive these patients in their units (a real-life example from the team's experience).

Members of management remained omnipresent in C4, and it was important they do so. Dan Gabay comments:

I go to the caucuses on an ad hoc basis, and I go to the physical C4 space ad hoc as well and people don't know when I'm going to come. I talk to people on an ongoing basis and I follow up on issues that are stagnating and ask questions about the data I see.

On the importance of staying involved in the process, he says:

It's useful and important. You have 16 directors, but only one Associate ED, one Associate CEO, and one CEO. When you put the lever high enough, its power translates into actions. It has to start with the CEO and be strategic.

This support and presence from management prompted buy-in from the C4 team, says Coordinator Kimberley Gartshore:

This is a clear direction the organization is taking. No one is arguing the decisions made by Dr. Fraser, because she has the support of the CEO, Dr. Rosenberg. We publish what we do [for example, in the JGH News magazine], so people can see the added value and slowly everyone joins us.

## C4 governance structure: IPU model

C4 relied on three levels of governance: strategic, tactical, and operational. This model was inspired by the integrated practice unit (IPU) model the CCOMTL applied for care and service trajectories a few years prior. This governance model as well known and understood among clinical directors, which made implementation easier. Ms. Côté explains: "The day where I said it was like one of our IPU committees [...], it started making sense. People started identifying with it."

C4's governance structure was organized into four committees with no established hierarchy between them. Each committee had its own defined mandate and composition.

An Executive Committee defined C4's main orientations. It comprised the Associate CEO, the Associate Executive Director, the Director of DQTEVE-SV, and the C4 Medical Director. It meets a few times at first, then met an average of twice a year. The CAO, who participates in these meetings, acts as a conduit for information between this committee and the others. The Associate Executive Director, who attended the meetings, acted as a conduit of information between this and other committees.

The Strategic Committee was primarily composed of the members who created the first pilot project, meaning associate directors of clinical directorates. Its mandate was to select priorities for C4 to work on and to set mandates for the tactical committee. This committee was composed of clinical directors and associate directors, who met every month when C4 launched, and eventually every three months. By

meeting more frequently in the beginning, the committee built and maintained team commitment and involvement in the project.

The Tactical Committee's mandate was to coordinate C4's mandates (team selections, indicator development). It was composed of 17 representatives from all directorates. This committee also plotted C4's next steps and identified needs and issues to be handled. It met each week for a steady flow of information from operations to the various directorates. The meetings were eventually spaced out and held on a monthly basis.

The Operational Committee was primarily made up of members who were appointed by the Tactical Committee, and who therefore varied depending on the mandate. They formed an in-person working group at C4 to improve processes. They received guidance from an administrative process specialist who facilitated and led their work sessions. Different people were in charge of facilitating each caucus depending on the theme and the level of leadership required (see Appendix for caucus details).

Figure 1: C4 Governance



According to Erin Cook, "The strategic, tactical, and operational governance structure was highly important for communication." The Operational Committee shared their decisions on new ways of working with the Strategic Committee, for bottom-up communication.

## C4's next challenge: patients in alternate levels of care (ALC)

In March 2021, the C4 Strategic Committee called on various actors to join the ALC working group. Associate Director of Rehabilitation and Multidisciplinary Services (DRSM) Mary Lattas, who had been in charge of ALC patients within the CIUSSS for several years, steered the process from the outset and acted as project owner. Erin Cook says:

We cannot underestimate the need for leadership in such an activity, and Mary Lattas is a very strong leader with an ability to mobilize people. Although it's a cross-functional issue, she was the clinical lead on this one. Team maturity and leadership are important factors.

Joanne Côté says it can be challenging to identify the level at which decisions need to be made within each directorate. "It can vary from one directorate to the next." Mary Lattas wanted the group to comprise different

hierarchical levels to ensure alignment between strategy and operations, and she wanted clinicians to be included. Those identified were invited to the C4 meeting room to develop the ALC component. This included key members from the SAPA directorate, the residential resource point of access (Mécanisme d'accès à l'hébergement, or MAH), Rehabilitation, Nursing, Long-term Care and Home Care, and Mental Health.

#### Members of the C4 ALC working group

- C4 Coordinator
- Project Manager
- Representatives from the rehab request triage team/Bed access service for physical rehab and respiratory care
- Coordinator of Social Services, Nursing Home Rehabilitation Services, and Technical Aids Services
- Chief of the Hospital Social Services Department
- Chief of Access Program Administration – SAPA
- Social Worker – MAH – ALC/Mental Health and Addiction Directorate
- Nursing Advisor – Discharge Planning Nurse
- Assistant Chief of Physical Therapy
- Nurse Clinician – Geriatric Nurse Consultant

While there were real benefits to bringing everyone together in the same room, Dan Gabay recalls that it was not without impact, as “you decentralize managers who are key to operations in their respective areas.” Creating the unity needed for a common vision and to strengthen collaboration was done somewhat to the detriment of local management. Luckily, the situation was temporary, but it did mean they had to be efficient and make progress on the project, explains Dan Gabay.

When the working group was launched, everyone was getting their bearings. It was a challenging period of uncertainty. According to Dan Gabay, “It was irritating for some people who like more structure to be in an abstract environment in the beginning, because the objectives weren’t defined yet.”

The members of the Strategic Committee, who were involved in the pilot project, guided the process and reassured their colleagues. André Poitras explained to the team, “There’s adaptation involved, but I’m not imposing anything unpleasant on you that I haven’t done myself. I’ve done it, and there’s a positive side to it.”

During this period, the first goal was to map the process and analyze the data so the group could work together to set common work objectives and targets for ALC patients.

Like the previous working group, the ALC working group alternated between regular work sessions and workshops led by the DQTEVE-SV and Mary Lattas, who was highly experienced in the matter. The group aimed to understand ALC patients, home in on their issues, and identify what data was needed to steer them better. The main aim was to improve processes and find solutions to reduce the number of ALC patients who remain in the facility. The C4 Coordinator was in charge of tracking the group’s success stories and posting them on the wall, which helped keep the team stay engaged.

A number of people were also involved with the working group at different points but did not necessarily attend in person. This was the case for several physicians. It was understandable that their patients were the priority, but their input was crucial in many ways. Mark Biunno explains:

Of course it is really important for physicians to be there. It is really important. We invite them all the time. When there are important meetings and we really need their input and feedback, we will wait until they are there. We don't want to make any decisions without their knowledge, because it has an impact on how they work. They need to be at the table.

And one cannot mobilize physicians unless there is a clear reason to invest their time, explains André Poitras.

If I go talk to the physicians, what is the added value for them? For some of them, it was, “If I can avoid having to look at 10 reports to find one piece of information I need, I will put energy into the meetings.” [...] You just have to find what that thing is and frame it right. It's politics and strategy, but I think that for

a command centre, it's so important to bring it back to discussions with our medical partners right from the start.

A partner researcher from the CIUSSS, doctoral fellow Jennifer Gutberg, surveyed members of the ALC working group at the start and end of the process. She explained that although in the beginning, participants did not clearly see the added value of meeting together in the Command Centre to develop the ALC component, results eventually showed that progress had been made in this regard.

Suzette Chung, Head Nurse in charge of discharge planning and ED flow trajectory was also in the ALC group. She says meeting with different levels of clinicians and managers was a truly enriching experience. "If we have challenges, we discuss them face-to-face," she says. They were calling and emailing each other less frequently. Luc Méthot recalls, "It breaks down hierarchical silos, because you're sitting together and you're part of the Command Centre [...] there is a better flow of communication."

### **Data challenges: accessibility and quality**

One major roadblock in handling ALC patients and their day-to-day management was gaining access to the information needed to understand and make informed decisions. The C4's need to have access to certain data in CHSLDs (residential and long-term care centres) and rehabilitation hospitals in real time highlighted the delays and challenges to accessing this information. As in hospitals, bed occupancy charts and other management information were not computerized in community facilities, explains Mary Lattas, Director of Rehabilitation and Multidisciplinary Services.

In response to this challenge, the teams implemented parallel solutions to ensure data visibility. To access information on bed availability, for example, the Digital Health team imported data from Excel forms shared with the CHSLDs. However, this way of working created an additional task for the teams in the field, as they had to keep the tables up to date, but as Sabine Cohen points out, "We could no longer operate by making calls. It's a big challenge because this information is very important for managing ALC patients."

Once data became accessible, it also had to be high quality and reliable to be displayed at the Command Centre and used to make decisions. For the Digital Health team, this was the number one criterion. "We can't afford to deliver a tile if it's not really top quality. We don't deliver until the process ensures the quality of the data," explains Sabine Cohen. Quality data must be auditable, and we must be able to confirm that it represents the right patient in the right bed in the source system. Sabine Cohen explains how her team met this requirement:

[Right from the design stage,] we really held the managers in the field accountable, told them that this information would be visible to the Command Center and, if there was an error, that they would be questioned about it, would have to respond and make sure the information quality was acceptable.

The demand for data quality meant that certain work processes had to be reviewed. In particular, the Digital Health team identified quality issues in certain cases where, for example, data was not entered in real time. Sabine Cohen recalls a very specific process that had to be adapted:

Our patient admission process is not (...) in real time. We admit patients as we go along, but sometimes information is entered in batches. So the paperwork piles up. (...) And batches aren't always entered at the same time, and it's a huge problem because we can't follow a patient's trajectory... We don't know, maybe a patient arrived thirty minutes ago and the paperwork isn't entered until an hour later.

And while tiles and data were being added at C4, they had to make sure it was consistent with previous data.

When a new tile is being launched, we have to make sure that it aligns with the others, because certain indicators are repeated. They might be repeated in another history, another objective on another tile, but the result has to be the same, because these are the same people who will do a 180° to understand the situation today in the facility. So one indicator cannot contradict another.



C4's Medical Director, Dr. Fraser, was also involved in sensitizing the field team to the impact of data entry, which required teams to reorganize how they work. The fact that C4 was a well-known organizational priority also made it easier to change the way things were done.

However, Sabine Cohen notes, "Everyone saw the benefits [of focusing on data]. It's not about putting up nice tiles, it's really about helping you move your patients forward and reduce your stress. You really have to convey the 'what's in it for me.'"

Conversely, sometimes the data presented was contested, especially in the beginning, and it was important to be able to answer teams to build trust in the data. When questioned, or when a figure seemed dubious, it was important to check it rather than defend it out of hand, as errors can occur, explains Carol Viegas. She remembers when COVID-19 cases began to drop and the institution saw its indicators go back up and show a greater variety of patients, many people asked if the figures were really accurate. Carol Viegas would take time to check the data with Dr. Fraser and the team in the field. She took a positive view of these challenges. "[the teams] trust us enough to say that if there's something wrong, we'll just email Carol and we'll get the explanation. [...] They're satisfied, because we've built up that trust."

### ALC Dashboard

The alternate level of care dashboard, called NSA/FRA in the dashboard below, is dynamic and was specifically designed to monitor flow, including that of ALC patients and users at risk of becoming ALC patients. The dashboard, used by the network facilitator and the interdisciplinary team identifies users at risk of becoming ALC patients. It also identifies the pivot worker, services in place, dates of the last home care service, etc. By relying on having teams in the field to use our dashboards, such as the average length of stay (ALOS) or ALC dashboards, we can plan transfers in advance and coordinate them optimally, avoiding unnecessary delays.

The NSA/FRA dashboard provides the hospital's interdisciplinary and community teams real-time data on vulnerable patients who have been or who are at risk of receiving ALC status.

This ability to predict based on carefully studied indicators and data on the history of hospitalization supports resource management and the implementation of proactive measures. The tool also provides information on patients at four critical points along the continuum: leading up from Home Care to the ED, at the ED, at admission to the hospital, and during a previous inpatient rehabilitation stay.

This complementary tool collects information enabling decision makers to implement proactive or corrective measures to improve network flow without having to consult multiple information systems. The tool designers ensured that each user can select indicators and visual data according to their needs. The tool's flexibility was useful in developing a shared, cross-disciplinary vision for the CCOMTL. The fact that everyone had access to the same data meant stronger collaboration and communication between stakeholders. The dashboard also allows us to see occupancy in the three rehabilitation hospitals (CH Richardson, Catherine Booth, and Mt-Sinai) all at once. It also helps interdisciplinary teams prioritize consultations—patient admission vs. Discharge.

The table has two tabs: 1) Potential inflow, and 2) Current situation. A number of options can be selected, including risk factors (ISO SMAF, heavy user (GU), etc.), and ALC variables at the hospital and in the community. The drill-through option makes it possible to drill down for patient details in the form of a table (name, RAMQ code, age, length of stay, number of risk factors, PRISMA-7, institution of origin, diagnosis, etc.)

# Flow NSA-FRA

### ED

**Potential NSA from ED**  
from ED  
**41**

**ED admission requests**

Internal medicine	8
Cardiology	6
Geriatrics	2
Fast Track Unit	1
Orthopaedics	1
Palliative care	1

**Number of risk factors**

2	3	5
	11	2
	4	7
20		

### JGH

**Provenance**

Ccomtl	Hors Ccomtl
--------	-------------

**Potential NSA**  
from JGH  
**22**

**Unit**

- Sélectionner tout
- C7 (Non Teach IM)
- K6 (IM)
- K7 (IM)
- C3 (Fam Med Teach)
- C6 (Ger)
- D6 (Ger)
- CVU (Cardio/Cardia...)
- D4 (former BNW)
- K1D7
- 5WD7
- D5 (Sx)
- K8 (Sx)
- K9 (Sx)
- C4 (BWI)
- MSICU
- CVICU (Cardio/Card...
- 4Main (Pall)
- K10 (Neuro/NSI)
- B3AU (formally 4E)

**Current NSA**

- Sélectionner tout
- Age 75+
- From RI in CCOMTL
- From RPA
- GU Physical Healt...
- Patient living alone

**Potential NSA top Diagnosis**

### Community

**Potential Inflow**  
from JGH  
**11**

**Empty beds**

- C. Booth
- Richardson
- Mont-Sinaï

**Potential Inflow to Community (from JGH)**

Var 08b (Orientation)	1
Var 09 (Home Care/SAD)	3
Var 10 (Rehab)	3
var 12b (CHSLD)	2
var 14 (Santé mentale)	1
var 15 (Ordonnance)	1

Sources: MedUrge, Clinibase Ci, Medecho, iCLSC, Medivis, SIPAD, eClinibase

Sources: SIPAD, Medurge, Clinibase Ci, eClinibase

Sources: Clinibase Sichel, Medecho, Medurge, Clinibase Ci, Medivis, eRendez-vous

**Flow NSA-FRA**

Service/Programme

AVC CSUR FAM FTU GER

Patients

Ccomtl  Hors Ccomtl

Provenance ED (JGH)

CH Catherine Booth  Hôpital Richardson  JGH

Tout

**Aujourd'hui**

var 12b (CHSLD)	11
var 14 (Santé mentale)	8
Var 08c (Approbation)	8
Var 10 (Rehab)	7
Var 08b (Orientation)	6
Var 09 (Home Care/SAD)	4
Var 08c Orientation en ...	3
var 15 (Ordonnance)	2
Var 08b Evaluation en c...	2
Var 12b soins longue d...	1
Var 09 s.a.d. requis	1
Var 12a RTF/RI	1
Var 15 Ordonnance Jud...	1

**72** NSA

**39** Hors délai (JGH)

**57%** du Ccomtl

**82** avg LOS

**0** Potential

**1** Signed (JGH)

Sources: JGH Clinibase Ci, CAV Clinibase, Medurge

Last refresh: 2023-04-12 12:43:01

**Départ NSA vs 1ère déclaration NSA (JGH)**

Last 30 days

**TOTAL**  
139 1ère déclaration  
152 Départs

**NSA par unité**

C6	16
B3AU	11
C48W	8
D41	8
C3	4
CB1	4
CB2	3
D6	3
C7	2
J4	2
K6	2
(Vide)	1
4M	1
B3HC	1

**Patients NSA par CIUSSS & CLSC d'appartenance**

**Donut chart:**  
50-80 4%  
80+ 47%  
50-79 43%  
<50 6%

Map of ALC patients shows from what zone these patients come from.

## Creation of ALC caucuses

There was a clear need to create a caucus mechanism to rapidly share critical information between hospitals, rehabilitation hospitals, Home Care, Information Resources (IR), and CHSLDs. Before this could be done, the team first had to obtain computers, screens, and headsets. Once this was done, the ALC

caucus was established and met twice daily for 15 minutes, at 8:30 a.m. and 3:45 p.m. The caucus comprised the C4 Medical Director, the DRSM Coordinator, and representatives from Social Services, SAPA, the resource point of access (MAH), Home Care, Nursing, Discharge Planning, Rehabilitation, the rehabilitation point of access, Geriatrics, and Mental Health. During a fast-paced round table discussion led initially by Mark Demaine, Coordinator of Social and Rehabilitation Services in CHSLDs and Technical Assistance Services (and then by Suzette Chung, Assistant to the DRSM responsible for the ALC file), members were able to discuss issues regarding ALC patients and plan upcoming discharges. Mark Demaine explains that what made it easier to talk about these things was “the range and levels of people in attendance. There are clinical practitioners as well as department heads, coordinators, managers, and directors. It takes all these people to ensure that everything runs smoothly.” Morning meetings were mainly focused on sharing information on the number of upcoming discharges and the factors blocking eminent discharges, such that all caucus members were up to date on the ALC patient situation. Late afternoon meetings were a chance to follow up on the ALC patients discussed in the morning. Mary Lattas also points out that “the addition of caucuses helps us work more efficiently by reducing conflicts arising from a lack of communication on factors that make a difference.”

### Dozens of opportunities for improvement

Part of the work the ALC working group did in the C4 room was to analyze and understand what was blocking patient trajectories. The team selected 25 cases of patients who exceeded the normal number of days in alternate level of care in acute care beds and analyzed those cases to map the process of patient discharge and transfer. The analysis was used to restructure certain parts of the process and identify targets for improvement projects that affect nursing, rehabilitation, housekeeping, and maintenance.

For example, during the workshops the ALC working group developed a tool enabling users to explain why an elderly inpatient should be kept in hospital when they no longer require acute care. This tool (i.e., the ALC patient sheet titled *CLSC – Résultat de la discussion pré-rencontre de planification de congé* (CLSC - Discussion results from before the discharge planning meeting), was used by the social worker in a meeting with the CLSC, the hospital treatment team, and the family. It ensured that all avenues had been explored for the patient to receive sufficient care in order to stay in their home. Suzette Chung says, “Then, if we have exhausted all the possibilities with the CLSC, the chief of Sapa and the chief of Social Services have to sign the sheet to give their mutual approval.” Other tools were developed, such as a digital table of patients in the ED who could be at risk of becoming ALC patients, based on the factors of criticality established (in the ED field of the first tile above). The clinician and network facilitator used the risk factor analysis to drill down for information and to identify potential solutions. This allowed the network facilitator to target certain patients and make early interventions, explains Mark Demaine. The group developed the tools together and quickly went on site to test and improve them.

While the new tools were being implemented, Mary Lattas met with the managers and clinicians who would be affected to explain what had changed. She reassured them of the usefulness of the changes by explaining how the new ways of working were aligned with best practices and could help reduce patients’ average length of stay. As for the legitimacy of the initiatives, the fact that they came from C4 automatically gave them more weight.

The working group also listened to the needs of staff at three rehabilitation hospitals experiencing major organizational challenges: a significant staffing shortage, problems communicating information, admission processes that were not always harmonized or efficient, and ill-adapted work tools. The sites identified a need for discharge planning nurses; one such nurse was added to the team, and later another, reporting to Carol Viegas. The nurses helped resolve the issues that block patients from being discharged (e.g., waiting for a test or examination, help with meals). The nurses were part of the C4 budget, under the DQTEVE-SV.

## The crucial role of C4 Coordinator

The C4 Coordinator examined and documented issues and bottlenecks that arose in caucuses, followed up on actions taken, and supported teams to facilitate patient movement.

Kimberly Gartshore, the Coordinator, cites a recent example:

With housekeeping or patient transportation, [it seemed there were sometimes] delays, so I worked with the team to take the data on average times and analyze the trends. I present the findings to the team and together we assess whether there are any blockers and what solutions are possible to improve the situation.

Mark Biunno, specialist in administrative procedures:

She is the one in charge of following up. [For example, if there is a problem], she contacts the people to find out what happened, why, how to prevent it from happening again, who to contact [if there is a problem], etc.

This is an important role in supporting the teams. André Poitras explains:

She is really an operator who reports to everyone, in her defense [...] not everyone [...] has the skills to lead a meeting, make action plans, and get people to focus the way she does.

## Impact of the ALC working group

With the introduction of caucuses and information available in real time, rehabilitation hospitals could now start admissions as early as 9:45 a.m., 75 minutes earlier than before. Acute care beds occupied by ALC patients were vacated earlier and there was better access to beds.

With dozens of improvements in place, the results were impressive. The number of ALC patients dropped from 67 to around 20, at the lowest. However, when the pandemic subsided and regular activities resumed, the number of ALC patients rose again and stabilized at around 43 patients in 2022. “We managed to reduce our ALOS in the rehabilitation hospital to six days. It’s not just numbers, it’s people [who benefit],” says Mary Lattas.

The impact of the group’s work was also palpable within the team itself. “There’s better collaboration, because everyone is aware of each other’s realities, and management uses *we* a lot when they communicate. The Command Centre enables us to work on the collective *we*,” says Luc Méthot.

All the work done by the ALC working group at C4 created better harmony in spaces where there is contact between directorates. The dashboards created to facilitate decision making and patient movements breathed new life into the teams. Mary Lattas:

There were already several of us working together to manage the ALC patient situation before the Command Centre launch but, unfortunately, we were limited in what we could do. The Command Centre gave us access to constantly updated information on the situation in CIUSSS facilities.

The rehabilitation hospitals aligned requests from all acute care centres with the capacity of CIUSSS CCOMTL by tracking bed flow along the rehabilitation continuum. By organizing both flow and admission caucuses and monitoring the single point of access waiting list on a daily basis and the requested bed types (LPA, geriatrics, neuro, etc.), teams were able to allocate the necessary resources and reorganize services at rehabilitation sites to optimize bed flow. These initiatives increased access to rehabilitation beds in our CIUSSS from 28 to 52%, reduced wait times from 2.8 to 1.4 days, and increased volumes from 13 to 40% based on the type of rehabilitation program.

After a thorough needs analysis and close cooperation with several directorates, Sharon O’Grady (Rehabilitation Nursing Coordinator) and other coordinators at Catherine Booth Hospital and Richardson Hospital welcomed the addition of new technological tools to facilitate the day-to-day management of patient movements. The installation of electronic bed charts and the inclusion of these two sites in the flow

report of beds in the community marked real progress in harmonizing practices between acute care sites and community care sites. These tools also gave CIUSSS leaders a more complete view of the use of resources in the care continuum.

#### C4: a physical and virtual space

To ensure C4's continuity and sustainability, in March 2021, the project established a temporary physical location where the working group could meet. The room was equipped with screens displaying current and future tiles and with six workstations that met infection prevention and control (IPAC) standards on room size for the workers. The room stayed open at all times and sometimes curious employees and managers would come to visit the space and see how it worked.

This was when the Command Centre's concept was named C4, for **C**are, **C**ollaborate, **C**oordinate and **C**ommunicate, and when the C4 Coordinator relocated to the new space. This gave her a view of all the indicators and enabled her to attend all the caucuses.



*The Command Centre on the second floor of Pavilion B at the JGH. Source: <https://jghnews.ciusswestcentral.ca/patient-traffic-is-flowing-more-smoothly-thanks-to-new-digital-command-centre/>*

#### Working group members return to their posts

The ALC working group was originally intended to operate for three months but lasted six. After three months had passed, in June 2021, the ALC team were getting results but they were still unstable and required work to solidify. The team, therefore, decided to extend their work at C4 another three months. Suzette Chung explains:

One of the reasons was that we wanted to further decrease the number of ALC patients. [We wanted] the team to be independent and functional by reaching a higher level of maturity with tighter communication and more synergy.

In August 2021, the in-person team was dismantled and all members returned to their regular posts. Erin Cook explains the transition from the project phase to the operational phase:

When it became operational, the working groups had reached a level of maturity and you didn't need to be in the room all the time anymore. People understood the added value and that there was a local

manager for the teams. We wanted to keep it balanced. We're decentralizing C4 but staying connected through Teams and the caucuses.

André Poitras has similar thoughts:

All the Command Centre working groups started with these people showing up in person, with the idea to build these ties and synergy. Once that was created, we could be [remote] and the synergy was still there. We know we can call this person or that person to get things moving.

Before separating, the team also agreed on a contingency plan. When the number of ALC patients reached 45, which corresponds to the ministerial target of 8% of beds set for the institution, they must physically return to work at C4 until the situation is managed and the number of beds reduced. André Poitras explains this joint decision: "If the numbers rise too much, we need people to come back in person to speed up conversations, do faster follow-ups, and have great synergy."

Once they were back at their posts, the working group members continued holding ALC caucuses twice daily. In addition to the caucuses, the team continued to meet once a week on Teams to find solutions for blockers requiring more analysis or to target referral delays. During the meetings, members provided updates on recent events that had not gone well and improved processes based on objective data-driven discussions rather than perceptions. Mary Lattas specifies how the meetings with interdisciplinary teams quickly progressed: "I would say that the first time we did the exercise, everyone was trying to justify what they had done. By the second time, they were already more open to questioning how they worked and to stating what could have been done differently."

Mark Demaine also points out the role data plays in holding people accountable. "The data add to the sentiment that we have to act and be aware, not just of my little unit, but of the impact it has on flow and on a patient's care trajectory."

Similarly, over time, caucus discussions shifted from strategic to more operational matters, and this meant changes to caucus membership. Associate directors partially handed their spots over to coordinators or program chiefs. They returned on occasion to attend caucuses as needed, either to help solve more complex challenges or to highlight achievements and congratulate teams. "I don't want my presence to always mean there's a problem," jokes Mary Lattas. She says that even if she does not always attend the meetings, she is always aware of what is happening.

## A new mental health component at C4

### Determining a strategy

A mental health component, the C4's second priority identified early 2021, was underway. In September 2021, a steering committee was created for this priority. Mark Biunno, a newly hired Business Process Specialist assigned to C4's various continuous improvement tasks, took charge alongside DQTEVE-SV Associate Director Erin Cook and the Associate Director of Mental Health. Their mandate was to establish the project's objectives and decide who would be the key players on the C4 – Mental Health Operations Committee. Mark Biunno explains that, based on the project objectives they needed to "assemble a team of people who can make decisions, who would be able to take action to make decisions about obstacles and how to handle them." The strategic committee then presented the project to the relevant directorates and asked them to release those delegated in order to form the tactical committee.

Unlike the ALC team, the Mental Health directorate agreed it was not feasible to send staff back to C4 full time due to staff obligations on the care unit and in ambulatory services, as they were involved with the direct care of mental health patients. This meant that the tactical committee had to choose another working method so the group could make progress on improving flows and creating dashboards with actionable data. They decided to form two teams that would both take on an issue previously identified by the C4

working group: wait lists in frontline ambulatory services, and the average length of stay on the care unit. The members would continue to carry out their duties at their regular post but would come to C4 for workshops. Joanne Côté says, “We had to be agile [...] and flexible enough to adapt to the teams’ reality without losing sight of our objective.”

At the project’s outset, Mark Biunno gave a presentation welcoming the Operations Committee, sharing the context, relevance, objectives, and benefits of C4, and explaining C4’s experience to date. He developed this presentation in response to feedback from the ALC project team, who would have liked to understand more about the project and the context from the beginning.

### **Workshops: average length of stay and wait list**

In early December 2021, Mark Biunno backed the two teams of the Mental Health Operations Committee in reducing average lengths of stay and wait lists. The teams went back and forth every day. In the morning they held workshops on average length of stay, and in the afternoon they held workshops on shortening wait lists.

The average length-of-stay (ALOS) team included the Chief Nurse of the Psychiatry Unit, the Associate Director, two service coordinators in the community, the coordinator of intensive care services in the living environment, and the coordinator of flexible intensive care, as well as the head of the psychiatry department and a psychologist, who joined the meetings once a week. Together, they covered all aspects of patients’ potential trajectories. Psychiatrists were always invited and while they only attended occasionally, their participation was essential.

The ALOS team agreed to meet every day for an hour and a half to table pre-established topics. They created a standard work schedule for the week.

- On Mondays, the team monitored each patient on the unit to assign tasks and follow-ups.
- Tuesdays were dedicated to systematic follow-up of patients, since the physicians, who were more involved in this part, were more available; decisions made about patients during systematic follow-ups had an impact on physicians’ practices.
- Wednesday meetings focused on the average length of stay of mental health patients specifically in the ED.
- On Thursdays, the team worked on aligning the hospital and outpatient clinics, where patients receive follow-up once they have been discharged.
- Lastly, Fridays were devoted to a varia meeting for topics not covered during the week, such as follow-ups or the diagnosis-related group (DRG).

Wednesday’s discussions on average lengths of stay in EDs served first and foremost to shed light on what really happens in the ED. The team was questioning certain measures taken and the accuracy of the data produced by the systems (e.g., the times calculated by Med-urge between triage, the first consultation, a request for specialist consultation and a mental health consultation). Part of the work thus aimed at “correcting people’s understanding of the emergency protocols so they trust the measures,” explains Mark Biunno, who played a facilitating role by calling and leading the various meetings. According to the DQTEVE-SV Director, building trust was a necessary step in getting teams on board.

Once people understood [...] that its really a team that’s there to help them find solutions, to put them into place and make sure it continues with dashboards that allow them to track their data, we would get their commitment.

The team members, specialists in their own realities, drew on the week’s workshops to draft a list of possible improvements and then prioritized them. They started with achievable targets that were easily accessible—quick wins—such as simplifying certain administrative processes (e.g., instead of emailing a document every day, creating a Teams group where document updates can be seen more instantly). Then they moved

on to things that required more effort but had more significant results. For example, to reduce ALOS in Mental Health, the team aimed to implement systematic follow-up, which “required much more change in professional and administrative practices, including redefining roles and responsibilities,” points out Mark Biunno.

The team working in on wait lists in the afternoon needed to gather front-line management, the adult mental health point of access (GASMA), outpatient clinical services, and partners such as family medicine groups (GMFs) and general health services. When their mandate began, the team’s goal was to understand each of the services and their mission. Mark Biunno explains how this time investment proved beneficial:

[It helps us] break down silos. It’s like starting a discussion. Some were already working together, but they didn’t necessarily know about the services provided in other departments (...) There’s a better, more understanding of the whole picture, a broader view than before, and (they are) better equipped.

During the project phase, several contextual factors, including COVID-19 waves that sometimes interrupted the project, kept the committee from reaching the level of agility it had hoped for. The team was also affected by manager turnover, which had an impact on its maturity and ability to efficiently produce fast results. Still, Joanne Côté highlights some impressive results: “We went from an average length of stay of 25.6 days in period seven (P7) in 2019-2020 to 20 days in P7 in 2022-2023 and we hit our overall target.” With all the challenges the teams faced and the waves of COVID-19, the teams continued their workshops until July 2022. During this period, the team also integrated departmental projects such as the Hospital at Home in Mental Health and stepping up homecare services for this clientele.

In hindsight, they also understood the importance of choosing teams that were ready to make progress and succeed. Dr. Fraser says:

The Mental Health team was facing some major challenges. That’s why they decided to give it a try, to get some support from C4. But they weren’t quite ready, for various reasons. That’s why it took longer. Now we’re seeing the benefits. But it’s still much slower if the teams aren’t ready.”

Dan Gabay agrees:

In the first stage, mental health was all encompassing, it was huge. [...] We could have held back a lot more and sought out some early wins. Once you’ve got some wins, you can start broadening your scope. [...] Now, we’re starting to see some gains in mental health, but it took longer than expected.”

They also realized that, as was the case with the first C4 projects, perhaps ambitions for Mental Health were also too broad or too ambitious.

## **CCOMTL’s virtual care driven by C4**

With its ability to increase the capacity of facilities, the volume of care provided, and the quality and safety of care in carefully targeted cases, while ensuring that patients receive care in an environment that is familiar to them and conducive to their recovery, telehealth is a path to the future that has been strongly boosted by the pandemic.

C4 helped set up virtual care initiatives, as it was a space where the health indicators of patients followed at home via the Internet could be monitored at all times, enabling healthcare teams to make quick decisions. Virtual care was also one of the solutions for increasing flow, so the initiatives were all assigned to the C4 Coordinator.

Hospital at Home (H@H) is one of the services offered by Virtual Care. It was actually set up to create bed capacity, not to address ALC patients. H@H patients were not ALC patients, but patients who would have had to remain in hospital to receive care but were able to receive it in their own homes with remote virtual monitoring by professionals.



Two solutions that C4 developed to increase admission capacity for ED patients waiting to be hospitalized were H@H and early discharge.

## Hospital@Home

Hospital at Home had been a project under discussion and development at CCOMTL for some time. But in late January 2022, the needs of the population during the 5th wave of COVID-19 and the needs of patients on the surgery wait list accelerated the initiative. CEO Dr. Rosenberg challenged the teams to set up a hospital at home service for patients hospitalized with Covid, and to make it effective by the following Monday. It was a tall order! Azrieli Heart Center Medical Director Dr. Lawrence Rudski and DQTEVE-SV Associate Director Erin Cook took on the project. They held a meeting with around 30 people for the entire weekend with the goal of providing services by Monday morning. It was a bold approach, one that was sure to make a mark. "It takes willingness and creativity to set something up in 48 hours! And maybe that's our strength, we like projects!" says Luc Méthot.

Hospital at Home was tied to C4. It increased bed capacity and flow—a patient who could safely receive care at home meant another available bed. Once patients were admitted to the program, their coordination was organized by C4, who made sure all the equipment, medication, and care was provided for them to remain at home. Patients admitted to H@H received 24/7 remote monitoring by a nurse, as well as access to their GP if needed. Rounds were coordinated by phone or videoconference (Teams). The care team used their clinical judgement to determine how and how often rounds would take place, based on patients'

### What is the Hospital at Home?

Hospital at Home means that a hospitalized patient can return home to finish their recovery at home while being monitored continuously and receiving attentive care from virtual teams 24/7 using technological tools that transmit information. While hospitalized at home, the patient is cared for by the same physician they had in hospital. The patient is still considered to be admitted to hospital and has the same priorities as an inpatient.

The program welcomed patients with 13 different trajectories and continued to develop. Care teams identified the patients and a virtual care transfer nurse evaluated them to ensure they met the many inclusion and exclusion criteria set by the medical teams. The nurse also trained the caregiver and checked to make sure the equipment was working properly. In December 2022, with the 109 patients who were hospitalized at home, the organization was able to save 725 days of presence in hospital, freeing up hospital capacity at the same time. The overall user satisfaction rate was 93%.

The duration Hospital at Home care varied. It could last two days or two weeks depending on their clinical needs, just as it would have at the hospital.

"The point of hospitalization is to improve the client's health status. It has been shown that patients improve more quickly at home and that the rate of complications is low," says Dr. Vincent Oliva, President of the Fédération des médecins spécialistes du Québec. The same applied to hospital-acquired infections, which so far had been prevented in all patients in the Hospital at Home program.

"The aim was not to save money, but to improve quality of care: in that sense, we achieved our goal," says Erin Cook.

mental health situation. The Home Care team provided services requiring patients to see a nurse in person. If a patient needed tests or procedures, the team would organize transportation for them.

Chief of Virtual Care Vicky Doucet managed the Virtual Ward team, comprising an assistant chief nurse and a dozen nurse clinicians. Other professionals were also available as needed for virtual meetings: a pharmacist, a physical therapist, a respiratory therapist, and a social worker. Nurses also joined the team on an ad hoc basis. With staff feeling the effects of the pandemic, nurses who were unable to work in person for various reasons had the opportunity to work from home monitoring H@H patients.

For the CLSC’s virtual care, this meant sometimes offering more acute care than usual. To help the teams embrace this shift and grasp its importance, the staff heard testimonial from a user that brought meaning to it all. “He was so happy to be back home! I think that really resonated with the health workers in the community,” explained Luc Méthot.

The project also took on a patient partner. He was involved in planning and managing post-acute care stays at Glenmount for Hospital at Home care. In February 2022, he began attending weekly meetings tabling the status of current projects, issues encountered, success stories, and the development of new trajectories, as documenting how care and services can be organized differently.

They also introduced an early discharge service. This was intended for patients who were stable but awaiting final test results, or a final blood test that could be done at home or by the CLSC, for example. Contrary to H@H, patients who received early discharge were no longer considered to be admitted to the hospital. They could return home but receive personalized nursing support.

The dashboard for the H@H virtual care unit posted at C4 tracked the overall results of the initiative. It showed the total number of patients admitted to the unit, the number of patients discharged, the number of patients currently hospitalized on the virtual unit, the total days of presence since the start of the project, and the average length of stay (ALOS) on the virtual unit combined with the total ALOS of the hospital (JGH).

Centre intégré universitaire de santé et de services sociaux du Centre-ouest de l'île-de-Montreal Québec		UNITÉS VIRTUELLES DE SOINS HÔPITAL@domicile					DQTEPE
Cumulatif des cas depuis le 21 décembre 2021 Données rafraichies 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	109	106	1	725	6.59	8.06	14.64

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

Screen grab of the Hospital@Home virtual unit chart

Data to monitor patient status was tracked remotely by a nurse clinician on the virtual care team.

Two daily care caucuses were established, one at 11:00 a.m. and the other at 3:15 p.m. Previously facilitated by the C4 Coordinator, the caucuses were now led by the department head and included the virtual care nurses, a designated pharmacist, the Rehabilitation and Multidisciplinary Services directorate (DRSM), the C4 Medical Director and the DQTEVE-SV Associate Director.

In the space of fifteen minutes, they would go over the H@H and early discharge patients, then discuss issues and upcoming and departing patients, and then adjust their services as needed.

## A C4 satellite office in the ED

The Emergency Department is the starting point of a major part of the hospital's activity. Between 40 to 50% of admissions are patients who came through the ED. Overcrowding in the JGH ED prompted the team to innovate to improve its admission capacity. For example, about ten years prior, the JGH ED had set up a Rapid Assessment Zone (RAZ). The team was looking at how they could work differently and seemed very receptive to the arrival of C4 at the CCOMTL. The team had also been very involved with C4 from the outset; the data in the Inflow tile came from the ED. The ED team also held a flow caucus twice daily and there was always an ED physician at the CIUSSS flow caucus, usually the Flow Doctor. He was also in regular contact with Dr. Fraser outside the caucus to manage flow issues.

The ED is the department with the largest data culture, with over 25 years of data collection. It works with the many dashboards of the Med-Urge system (nearly 50) to try to navigate its flow as best as possible.

### The JGH's Rapid Assessment Zone (RAZ)

The RAZ is a space for patients who need to be seen quickly, but who are not at immediate risk. Patients could sit in one of 25 reclining chairs and receive care as an outpatient rather than being admitted on a stretcher straight away, so they could go home more quickly. The JGH's RAZ had just a few spots in the early stages and now has 25.

Plans had been in the works for some time to create a satellite office in the ED. The vision was for each section of the ED to have a C4 office with the data it needed all in one place, accessible at a glance at any time. This would help give all staff a common understanding of the situation. "Once you see all the data in front of you, it tells a story. You can't hide from it," explains Sabine Cohen, Associate Director of Digital Health. They also hoped to eventually be able to access data on their phones, from the cloud rather than the intranet.

In 2022, the announcement that Minister Christian Dubé would visit in June hastened completion of the satellite office. The CCOMTL hoped to show how useful C4 and the satellite office were, and how cloud computing and Power BI could further C4's potential. ED Chief Marc Afilalo quickly formed a working group of urgentologists, nurses, a few people from the Digital Health team, and Erin Cook, who was Associate Director of DQTEVE-SV at the time. They set an ambitious deadline to set up a C4 satellite office in the ER in four weeks.

As the ED was already well mapped out in previous steps, and the team was familiar with its issues and blockers, they could quickly get to work targeting information needed to make the dashboards they needed first.

The Digital Health team met twice a week with the ED working committee. At the first meeting, the DQTEVE-SV helped present the vision and mandate with the aim of launching digital health. The health team presented what already existed within C4 and listened to the challenges of each committee member and what was needed in terms of data display to better manage the ED. According to Sabine Cohen, this process "really sparked some great discussions on everyone's responsibility toward their common flow objective."

The Digital Health team knew it had to quickly show ED workers a visual of indicators and then work on improving and enhancing them. Using Med-urge and existing reports, the team selected which information to focus on in the satellite office. In just the second meeting of that week, Digital Health already had a draft of the dashboards to present, which the group discussed along with some adjustment suggestions.

Although the process was off to a flying start Dr. Afilalo realized that the working group was a bit too big and that this would make meetings less efficient and slow down progress. With this in mind, he designated four key people to report back on the needs of their colleagues.

While the dashboards were being developed, IT acted quickly to order screens, install all the wiring, manage access, and test the Wi-Fi connection.

The ED's satellite office was quickly taking shape. Each of the three emergency zones (called PODs: green, yellow, and orange) were now equipped with screens displaying information specific to the zone. The colour code made it possible to quickly identify and act on major problems. There were also three workstations—for the charge nurse, the flow physician, and the clerical coordinator of flow—each with their own dashboard with information specific to their role. For example, the head nurse could see on her dashboards the number of pre-pod patients, meaning patients who need to be seen quickly but cannot be placed on a stretcher for lack of space. Dr. Afialo says the dashboard served three purposes: "(1) to show how many patients there are in pre-pod, (2) to show how long they've been there, and (3) to tell you which stretchers are available where these patients can be taken directly." As for the ED flow coordinator, his dashboard allowed him to see the state of ED traffic at a glance and know if he needed to bring in more staff for the next shift.

The purpose of using cloud technology was to make the dashboards more accessible. "Cloud technology is a huge success, because when you have the application on your phone, you can check your C4 dashboards from anywhere," Sabine Cohen enthusiastically explains. She also says that on the other hand, this requires much more advanced security.

Dr. Afialo says staff were an important factor in setting up the ED satellite office. "Our great strength in the ED is our team. They're all involved. Everyone's in the same boat and heading in the same direction. It's fun and easy." Dr. Afialo attended every working group meeting, and his leadership was also recognized.

C4 and its ED satellite office helped the team be innovative and carry out projects that had been on the back burner for some time, such as teletriage. Suzette Chung, now co-manager of patient flow in the ED, explains:

With C4, we introduced teletriage in the ED, as a C4 initiative. We've developed it and are looking at establishing different trajectories, always with the aim of ensuring that patients receive the right access to care. [...] I'm always in touch with C4, because there's always a project or initiative we want to launch. We work together.

## **C4 support for ministerial objectives and directives**

The C4 also supported teams working on ministerial priorities. For example, the Ministère had been closely monitoring average lengths of stay (ALOS) for seven medical diagnoses (seven "DRGs", i.e. diagnosis-related groups) since 2022. These DRGs were posted in C4, and those with results exceeding the Ministère's targets were the focus of specific working groups: ALOS in cardiology, neurology, and musculoskeletal care, and for schizophrenia inpatients. An administrative process specialist on the transformation team focused on the first three ALOS, while another focused on schizophrenia ALOS (the other three DRGs had ALOS in line with ministerial expectations). To work on the more challenging ALOS, the group set up a working committee with directors or associate directors and some key players (e.g., unit chief, practice management consultant, physician in charge, nurse, administrative process specialist).

Next, the group spent several weeks meeting with teams in the field, archiving, and performance to gain a better understanding of the data, how it is captured, and what it means. Then, the data was analyzed to understand fluctuations and what was causing them, by creating maps and studying patient trajectories to identify blockers. The analysis was linked to the mapping work already done in C4 and by centralizing information of all ALOS to identify common problems and overlaps. The group followed up on C4's progress on a weekly basis, with links made to various improvement projects within the institution.

The team began systematically communicating with the teams concerned with each ALOS when data on time periods was available, enabling everyone to stay abreast of the situation. When the situation seemed to be deteriorating, they organized meetings to analyze the situation and decide on action priorities. Aurelia Di Fabrizio, Chief of the Transformation Team in the DQTEVE-SV.

We send a table with the ministerial target, and then we figure out the number of coded patients and break it down by period to show if this month is higher than the previous month. Then, for everyone in the red, we send another communication to those teams, specifically so they do something about it right away. But usually, for these teams, we're already having meetings with them because we support them on an ongoing basis.

One major challenge encountered in process improvement was the widening gap between available data and real time. The archivist shortage (the same shortage affecting most professions in the healthcare system) was creating a time lag that made it difficult to mobilize teams. When work began on the seven DRGs, the available data was seven months old. Kimberley Gartshore explains that approaching teams with outdated figures is “challenging, because the teams don't feel the figures represent their current reality.” They tried various solutions to get around the problem, such as creating a real-time database, but this led to data reliability issues (the coded data sent to the Ministère and those in the real-time data base did not match). They also tried to launch live coding on certain units that were having more trouble, meaning with an archivist on site who coded the data as it came in. Today, data is less out of sync.

Significant improvements were noted in certain DRGs. For example, the ALOS schizophrenia was 62 days in 2020. The target was set at 40 for the first year. The institution was able to reduce this to 26 days in 2022. However, it was evident that despite internal efforts, they had little control over certain blocking factors (e.g., centralized point of access and accessibility of out-of-hospital resources).

Results also fluctuated in the medium term. “We can have periods of improvement for three to four days, and then a period where it increases for another three to four days. It fluctuates,” explains Aurelia Di Fabrizio. “But the most important change is that we're talking about average lengths of stay. The teams are up to date. There's a lot of data sharing, a lot of talk about ALOS, and I get emails from managers who are involved asking me questions,” she adds. Yet, while some teams were very attentive to ALOS, for others, ALOS was not part of their vocabulary.

## C4's results speak for themselves

### Improvement on several indicators

Two and a half years after the start of the C4 development process, and just over a year after the first working group, the CCOMTL saw improvement on several monitoring indicators. The following table shows the main indicators compared over three years. The benchmarking year is the year prior to the pandemic (2019-2020), for better comparability.

Table 1: Comparison of indicators before and after C4

ED	2019-2020 P7	2021-2022 P7	2021-2022 P13	2022-2023 P7
Care unit admission times	31.3 hrs.	23.3 hrs.	24.2 hrs.	28.3 hrs.
Use of overcapacity protocol	152 times		6 times	3 times
<b>ALC</b>				
Daily median	67	45	43	61.4
Occupation rate	11.5%	8.7%	7.8%	10.8%
ALOS – Geriatrics unit	16.5 days	15.5 days	15.6 days	
ALOS – Rehabilitation hospitals				
Catherine Booth	39.10 days	35.56 days	34.69 days	33.92 days
Julius Richardson	40.96 days	40.99 days	39.81 days	42.99 days
<b>Mental Health</b>				
Wait list – adults		734 (P3) → 331	645	602
ED admission times		18	10	7
ALOS – Psychiatric unit	25.6 days	21.2 days	19.5 days	20.0 days

The most marked improvement was clearly in the number of times overcapacity protocol was used. One factor affecting this was the increased visibility that C4 provided for patient traffic and flows within the institution, enabling teams to react upstream of overflow situations, explains André Poitras.

We became much more proactive when we had the data in front of us and could see what was coming. Before, we'd wait until we were in the red, completely stuck, before launching the overcapacity protocol, floor to ceiling and wall to wall. We'd bring up 12 patients or more, and then it was a disaster. Now, we look at the day's schedule in the morning. Do we have several discharges coming up or none at all? We have all this in front of us and we're able to say, "I've reached 15 ED admissions for internal medicine, so we're going into preventative overcapacity." We go into overcapacity when we need it, proactively and upstream, instead of being reactive and going every which way when the fire has already been lit.

After a clear improvement in 2021-2022, momentum was waning in the last period measured for certain indicators, such as the time it took to admit ED patients into care units. This increase in admission times left teams questioning what could have caused it. Were the improvements made by C4 long lasting? Joanne Côté says, "Maybe the interventions put in place [to remove bottlenecks] are still working well, but we have bottlenecks somewhere else now." She pointed to the example of the recent increase in ALC patients. A great deal of effort had been put into keeping the elderly at home for as long as possible by providing out-of-hospital care. When hospitalization is required, patients need more. They have lost more autonomy and require a high volume of care or placement in a long-term care facility. The number of elderly people requiring long-term care increased as the waves of the pandemic rolled through. At the same time, the organization had lost several long-term care beds in its territory in recent years. This had a direct impact on the number of ALC patients waiting for placement in a residence. They went back to the map to understand where the blocker(s) were located and how to act on them. Joanne Côté says, "We're really working on continuous improvement and multiple iterations." This meant they could never rest on their laurels—as soon as one thing was fixed, another would emerge. The teams continued their efforts in C4, and it was a continuous process.

The teams were also more familiar with C4 and were learning to work with the data. André Poitras says conversations that had initially been more one way—requests made to teams—were increasingly more two-way—teams could also ask for and receive help.

In the first year and a half, the Command Centre was very much perceived as, "I'm informing you, do this, I'm asking you for this." But when physicians and head nurses realized it wasn't one-sided... "Ah, can I ask for something?" "Yes, tell me what I can do, I see there are some blockers, if you need anything let me know." Slowly, people started to relax and things began to unblock. Now the physician can see that it's working, and they can discharge the patient. It created a "what's in it for me" [mentality], because people realize they can use C4 to complain about something and they'll find the source of the problem to change the situation, inject resources, and solve it."

The two-way conversations accelerated the work and C4 could move forward differently by focusing on the needs expressed in the field. C4 no longer worked from the top down only—now it worked with a bottom-up approach. To support the C4 team in responding to team requests, it outlined a service offering. They would hire a nursing consultant in fall 2022 and also planned to move the DQTEVE-SV transformation team under the C4 Coordinator. They also hoped to align the organization's projects, flow being the ultimate priority, in pursuit of value for the user and the vision of "care everywhere."

### **Intangible benefits: breaking down silos, collaboration, empowerment, and accountability**

In addition to the results, those on the inside reported a number of collateral benefits.

Firstly, directors developed a close working relationship through the strategic working committee, and it was visible even to outsiders. Joanne Côté recounts that several institutions came to visit C4 and that, during the visits, people would ask, "My God, how long have you been working together?"

We were even able to finish each others' sentences. We were able to take on situations at a moment's notice... and in some cases, the person had only been there a few months. It's a question of culture. We make sure we're all speaking the same language and have a common goal.

But this organizational maturity probably was not only due to C4, Joanne Côté also explained.

In our CIUSSS, we had already set up a care model called Integrated Practice Units (IPUs) and had already started to break down silos. [C4] is built on the work that had already begun. But the real turning point was when we—the Associate Directors, Directors, and myself—sat together in a room for 12 weeks. That was a pivotal moment. [...] One big thing that came from the exercise was that people had a better understanding of other departments and the issues they face, and that by cooperating we can achieve much more impactful results. In terms of maturity, it all started years ago and has been building slowly. But this year, we can see that the organization has turned a major corner!

Breaking down silos was not just about teams. They were also breaking down budgets a little more, when the Executive Committee deemed it necessary. “I was very clear with the C4 Executive Committee that the money could move from one department to another if needed. Now, the Executive Committee has become the place where decisions are made on allocating resources to unblock issues,” explains Dan Gabay.

C4 may have meant extra work for those already on the job, but many felt the time and energy investment helped them save time and energy in the long run. Mark Demaine says understanding patient flow better and people from different directorates supporting each other added meaning to their work. “We’re so supported by the other directorates. It’s fun, even with the challenges!”

Despite the challenges of participation and commitment that C4 faced, especially in its infancy, buy-in increased gradually as teams saw its benefits and usefulness. Luc Méthot said this had a ripple effect:

In C4, there is rigour [...]. The Hospital at Home team meets each day at 11 a.m., so that creates discipline. What’s more, you have everyone there, so you don’t have to wait. Projects used to move more slowly. Now, the issues and successes are named on a daily basis, so things move very quickly. If someone we need isn’t there, we go find them. Management can’t say, “Oh, no, I don’t feel like participating.” We need you, you come, it’s an organizational vision.

André Poitras says attending these operational caucuses was also beneficial in his strategic role within the organization. “The operational side [of C4] keeps me informed of what’s happening with flow issues. When I get into strategy, I’m not just “pie in the sky.”

With data available to C4 in real time, teams were no longer working from perceptions. This made discussions, negotiations, and decision making easier because they were able to view things objectively. “The biggest realization we’ve had is the power of data,” says Joanne Côté. “We’re able to show the source of the information. The information is high quality, it’s been checked. We can say, “This is the real picture of your area of activity.”

André Poitras explains how data availability can lead people to take action and cooperate. For example, by seeing the data on the mismatch chart, physicians were able to see where things were getting out of control and jump in to help if possible.

Doctors are able to see that their colleague has 15 out-of-area patients while they have only two. Knowing what others are dealing with helps to optimize cooperation and remember that the most important thing is for the patient to receive quality care. They’re going to get quality care from us or from you. Do I have room? I’ll take them because you’re obviously overwhelmed. The patient who needs specialized care, [...] I’ll send him to you, and I’ll take the patient who is no longer acute, and I’ll give them excellent care with us too.

For him, it’s not just the data, but the accountability that comes with this new transparency that is driving changes in the organization. Forming caucuses was nothing new for the organization—it had been tried some fifteen years ago. At that time, caucuses lasted longer, people had to show up in person, and work was less efficient. This lasted a few years, with mixed success. This time, the caucuses were back, but it was different. André Poitras explains.

The big difference is that there was no accountability [before]. We’d come and present the information [to the caucus]. The bed management coordinator would facilitate the meeting and everyone would say how many beds they had. [...] Now, we have this information in real time on our dashboards, and it’s confirmed. But the biggest difference, in our morning caucuses, is that everyone knows why they’re there, with accountability. If we say, for example, “I have 47 patients admitted to the ED, four hip fractures and

87 ALC patients," the group members in rehabilitation know that Dr. Shannon Fraser and I are going to ask questions: "Do you have any discharges, do you think that could happen any sooner?" So as a key player in C4, I know there's an expectation that I keep things moving.

Dan Gabay, Associate Executive Director, in the same vein, says the fact that there are two flow caucuses in the same day somehow forces people to follow up on the morning's situations at the end of the day.

Accountability isn't explicit [...] it's implicit. It would be embarrassing to present the same results week after week. You yourself would feel uncomfortable every time you present your results [...] And you don't even need to present your results, they're visible to everyone. Suddenly, you're more sensitive to this.

## Next steps for C4

### Integrating artificial intelligence: Maisha Labs

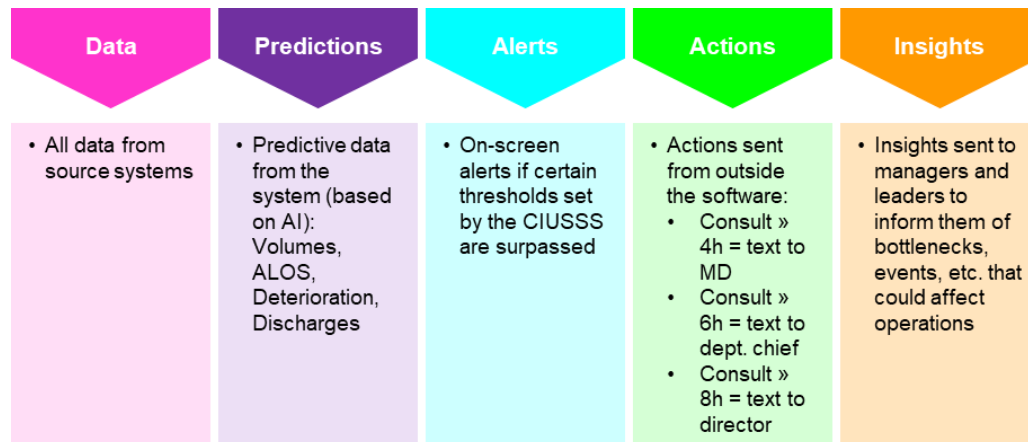
External supplier Maisha Labs is developing predictive data tiles for C4. Specifically for emergency care, the institution can feed machine learning with 25 years of data collected for over 80,000 patients per year, and around 60 indicators for each of them. They have already delivered an algorithm that predicts admissions per day. The Flow Coordinator uses this indicator every day. In the near future, C4 should also receive tiles for managing the hospital's care units, integrating certain physiological data (e.g., blood pressure), which can be used for a clinical reading of a patient's status. Several other tiles are in the pipeline.

### Applications, text messages, and alerts

Initially, the dashboards developed by C4 could be viewed on a computer connected to the hospital's intranet. C4 then transferred certain dashboards, including inflow, outflow, mismatch, and ED satellite to Power BI, a service from the Microsoft Power Apps suite that enables employees to access tools on their smartphones and tablets. This transfer not only made it much easier for everyone to view the dashboards from anywhere but came with the new possibility of programming automatic alerts. For example, in the future, alerts could be displayed on screens, and text messages could be automatically sent to targeted groups when an indicator reached a certain threshold, to notify them when the ED was experiencing a very high volume of traffic. More specifically, text messages could also be sent automatically to notify a lead physician or department head that patients were exceeding the time limits for a consultation in their department, something Dr. Fraser was doing over the phone. The 2017 flow policy had set out precisely who was responsible for what in terms of flow—an important first step. So they knew who should automatically receive which alerts if so needed. Not unlike texting, critical insights could be passed on to managers and leaders to prompt swift action. They also wanted to be able to extract longer-term system knowledge on trends, bottlenecks, internal and external situations that affect operations, and flow through reports and analysis.



Figure 2: C4 and its features in development

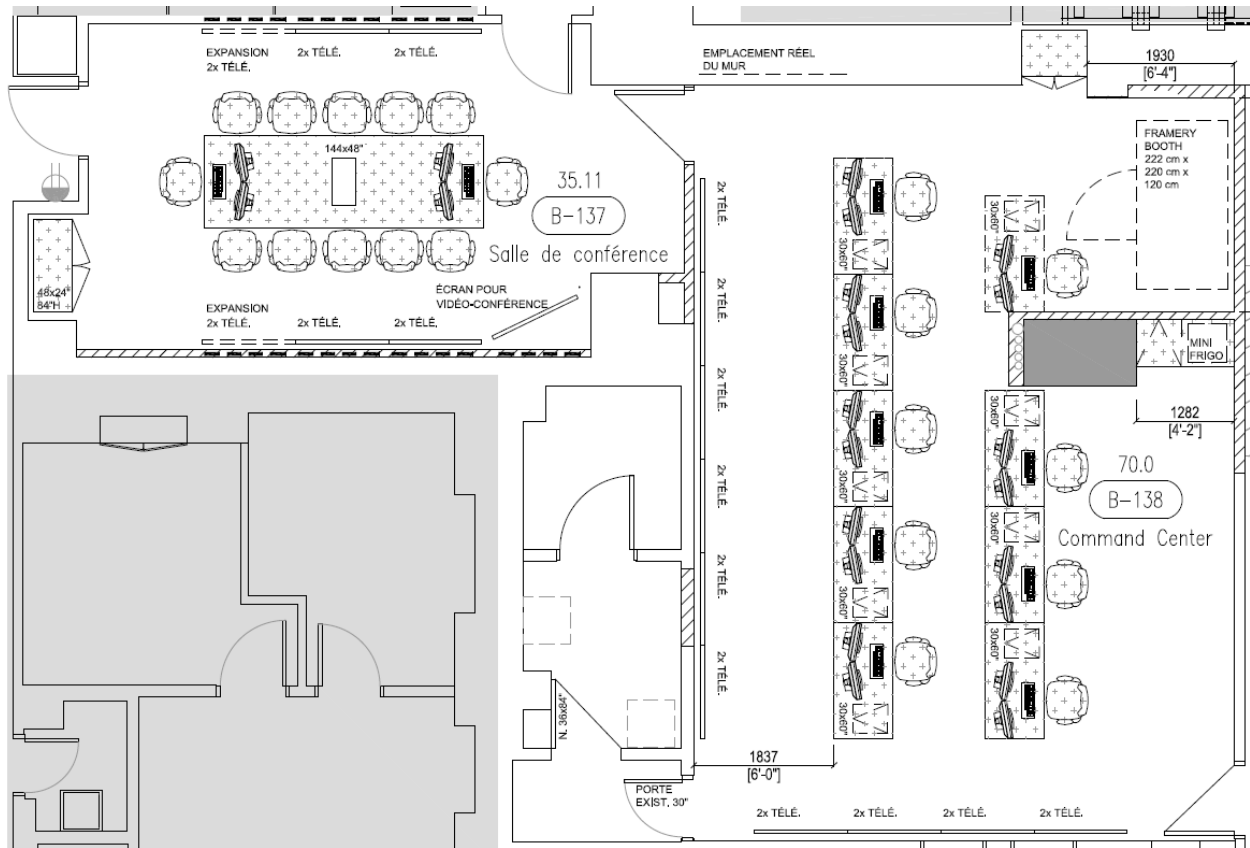


### Moving C4

The CCOMTL is building and fitting out a new 1900-foot room to house C4. Dan Gabay says this is the result the last two years of learning. “We are building a modular environment to meet different types of needs, such as for training, mapping sessions, work sessions, and crisis management.”

This location will also include the institution’s strategic steering room. It will become operational in 2023. C4 will thus become a hub that is visible and accessible to all. Dan Gabay reflects on what the move might create: “I think people will come out of curiosity, see what’s happening on the screens, and say, ‘Ah, you’re looking at this, but that’s not an indicator.’ I would be interested if, one day, people were to say what we should be doing or watching.” This would be proof that people are taking ownership of C4 and that it is useful to them. The following figure shows the plans for the future C4.

Figure 3: Layout of the future C4



The central C4 is an important place for mobilizing teams and ensuring cohesivity across all sections. On the other hand, the CCOMTL's size and multiple sites requires them to expand their activities beyond the institution's walls. Dan Gabay recounts how they learned through experience:

A command centre that centralizes all operations is not realistic for an organization with multiple missions at 34 sites. The reality is that we had to create a variable geometry and consider satellite offices. [...] A hybrid approach might be useful, meaning decentralizing into satellite offices and keeping a central hub.

### Future priorities, future satellite offices

Discussions are underway to create other satellite offices, such as in Mental Health, Cardiology, and the Surgery Unit. However, having pursued very rapid development up until now, they also had to recognize the importance of respecting capacities within the organization and its teams to take on new projects. Building on achievements remains a priority, as does integrating new technologies (predictive data, Power BI, and alerts). New project development must also take into account team readiness to ensure its success and must also account for teams' ability to clear their schedules and commit to the project goals.

Drawing on first experiences, they will adjust how they work as a team for the next C4 priorities and satellite office. They must strike a balance between being more directive and imposing a direction, as they did with the projects in the first months, and allowing teams to self-orient, as was the case with the first working group and the ALC working group. They are still looking for that balance. "It's not a free for all. We're going to start putting down some guidelines a little better than we did in the beginning, when we were almost impeding progress. It will help us [start] new satellite offices. We'll waste less time and be more aligned in our processes," says Dan Gabay, enthusiastically.

## Securing human and financial resources in the long run

Considerable investments were made to develop C4. The CIUSSS purchased the technological equipment (screens, computers, headsets). The JGH Foundation helped fund the partnership with Maisha Labs to develop the predictive data tiles. It also helped fund the position of the C4 Medical Director in the early days. However, adding human resources to work at C4 requires funding from operational budgets if it is to be sustainable. Thus, the positions of C4 Coordinator, head of the Transformation Team services under the C4 Coordinator, Discharge Nurse(s), and Nursing Consultant are all funded by operations. These resources are essential to flow and are fully aligned with the vision of Mr. Dubé's health plan. Two new Medical Flow Coordinators have also been hired, reporting to Dr. Shannon Fraser, C4 Medical Director. These two new roles are complementary, one in family medicine and the other in gerontology. Part of their mandate will be related to virtual care.

## Evaluating the Command Centre

To understand the impact of C4 within CCOMTL, the DQTEVE-SV team is working with Jennifer Gutberg, a doctoral student at the University of Toronto and consultant, who is evaluating the effects of the Command Centre. Her mandate is to understand which changes in practices lead to better results in meeting specific short-, medium- and long-term objectives. A logic model will provide solid evidence of the effects C4 has on different areas, such as patient outcomes, implementation outcomes, and clinician experience outcomes. It is hoped this will provide a better understanding of how C4 is transforming the organization.

## C4 transferability: Lessons and insights for other institutions

Over the past year, some thirty delegations from network institutions have visited C4 to learn how to set up their own command centres. Many of them have already begun to set up command centres, each in their own way, and are already seeing noticeable impacts on certain indicators. Joanne Côté explains.

Some started with Excel files and information processing and have had super-interesting results. It shows us that there are ingredients, but there is no recipe. Each organization has to develop its vision and decide what it wants to do with the command centre and set the goals they want to achieve.

The CCOMTL team is convinced that a command centre like C4 can be set up in other institutions, and these experiences are further proof. "It is a mistake to think that the Command Centre is limited to one tool (the technology). The tool is almost secondary," explains Dan Gabay. The Digital Health directorate agrees. For them, C4 is not a turnkey solution that's ready to be exported. Sabine Cohen says, "It would be difficult to share or transfer the tiles to another CIUSSS because they don't work the same way. [...] It's really tailored to the culture of the institution and the way things work here." The tiles were built according to the CCOMTL's data needs. However, the tiles can certainly serve as inspiration to other institutions and there would undoubtedly be advantages in linking up developers so they can share knowledge as a community of practice would do.

According to Joanne Côté, C4 is not a tech solution, but an integrating tool. It is built using a flexible, iterative approach. "Waiting for your project to be perfectly tailored before you start doesn't work," says Dan Gabay. He says the important thing is to take action and embark on this organizational learning process, and the rest will follow. "Already, caucuses are very easy and inexpensive to set up," he adds.

It requires knowing about the composition. [You need] players who are decision-makers and can [have an impact on] an issue. And you mobilize your first working group. Through the caucuses, you can hold work sessions. Through the work sessions, you can identify indicators. Through the indicators, you can start building your first table, which can be an Excel spreadsheet or a Word document, it doesn't matter, as long as the information is there and available. [...] The message we want to convey is that you only need quality information. Even if it's communicated on paper, as long as it's transparent, as long as it forces accountability, you'll get results.

In fact, in the early days of C4, with extensive mapping and simultaneous working groups taking on multiple priorities, C4 had a more structured, planned approach. This approach made it so difficult to move forward that management decided to take another approach that emerged when working groups began to meet.

In the first iteration, we had a more conventional set-up. The idea was to gather virtually all the strategies to have a game plan before launching a [physical] environment, whereas [for the sequel], we assembled the environment before even having formed a game plan.

The CCOMTL's innovative culture and the right to make mistakes were important factors in the success of such an approach. André Poitras explains that the CCOMTL is accustomed to trying out new projects and giving itself the right to fail.

At the CCOMTL, we'll talk about a project, we'll try it out, we'll adapt it, modify it, address problems [...]. So quickly, it either works or we're going to say it doesn't work and we don't really need it. We're not going to lose resources over it. The advantage [when you make a mistake] is that you stop talking about it, and then you move on."

"Sometimes you try things out and you're not sure whether the result will be congruent. But we like to try things out and make up for it later," explains Côté. Suzette Chung agrees, commenting on the institution's culture, which facilitates large-scale projects: "We like each other a lot. We're like a family. [...] We're always trying to do something innovative and everyone wants to get on board. It's not top-down. We encourage everyone to speak up. Communication is really fluid between us, and this contributes to our success." These efforts support the development of a team of teams.

In short, Dan Gabay says the key elements in building a command centre are relevant information, indicators, objectives, effective caucuses, and coaching field teams to achieve results.

A majority of those who have experienced it also see bringing together stakeholders face to face in the same workplace as the cornerstone upon which the C4 was built, and a crucial part of the process of developing a command centre. Erin Cook explains.

If another facility decides not to [gather people in the same room], they're going to have trouble getting commitment and a common understanding of things. [...] I think it's a really important process, for everyone to be together. It takes the organization to another level of maturity. We shouldn't underestimate how important it is.

The team now realizes that this synergy, which grew during the working group meetings and continued to develop thereafter, is still present today and still having an impact. So much so that, in fall 2022, the team is reconsidering whether they should return in person to C4 when ALC patients reach the set contingency level. "We've noticed that, compared with this time last year, maturity has become so important that even though [the teams] are remote, they're just as effective as when they were in the room," explains Joanne Côté.

For those who were not directly involved in the operational committees, they became more committed and mobilized over time as they saw demonstrations and proof in the results. The message spread throughout the organization that C4 was making progress, and this inspired others to get involved. Dr. Fraser says, "As soon as we started with the ALC patients, other people were talking about it, and they were more interested." Enthusiasm for C4 caught on further when Dr. Fraser held caucuses in the Emergency Department. The effectiveness of the caucus drew interest, and all the admitting medical services wanted to join the caucus. "They realized that in 15 minutes, they can have all the information on all the patients, instead of receiving the information two hours later," she explains.

Lastly, C4 is an institution-wide approach that began with a strong strategic intent. "C4 brings Dr. Rosenberg's vision of quality care and flow to life, to improve the patient experience," says Luc Méthot. And for Sabine Cohen, this requires a data-driven culture. "Our CEO, Dr. Rosenberg, is very data driven. He refuses to manage with anecdotes, that's just the way it is and has always been."

Although it involves mobilizing the organization's strategic players, ultimately, it is an operational steering mechanism that serves teams in the field just as well. "The strength of the concept is governance, communication, information transparency, and that's what works," says Dan Gabay. "C4 lets us keep our finger on the pulse of the organization and stay nimble enough turn on a dime to see what our options are. And that's really the strength of C4, to be able to do that," explains Joanne Côté.

## Bibliography

<https://www.humbercommandcentre.ca/#highlights>

Jennifer Gutberg (2022). C4 Command Center: Cadre de référence / Concept Framework, CIUSSS Centre-Ouest-de-l'Île-de-Montréal, 51 pages.

<https://jghnews.ciuussswestcentral.ca/fr/10708/>

<https://jghnews.ciuussswestcentral.ca/fr/tout-est-en-place-pour-le-lancement-du-centre-nevralgique-numerique-visant-a-ameliorer-les-soins/>

<https://jghnews.ciuussswestcentral.ca/fr/la-circulation-des-patients-est-plus-fluide-grace-au-nouveau-centre-de-commandement-numerique/>

<https://jghnews.ciuussswestcentral.ca/fr/le-nouveau-centre-de-commandement-numerique-joue-un-role-cle-pour-rationaliser-lacces-aux-soins-en-sante-mentale/>

[jghfoundation.org/wp-content/uploads/2022/10/HGJ\\_annual\\_report\\_2021-2022-FR-WEB\\_final.pdf](http://jghfoundation.org/wp-content/uploads/2022/10/HGJ_annual_report_2021-2022-FR-WEB_final.pdf)

CIUSSS Centre-Ouest-de-l'Île-de-Montréal (2021). Centre de commandement – C4: Concept, présentation power point non publiée [20220609\_C4\_CONCEPT\_EC]

McChrystal, G. S., Collins, T., Silverman, D., & Fussell, C. (2015). Team of teams: New rules of engagement for a complex world: Penguin.

Blanchet, S. (octobre 2022). L'hospitalisation à domicile accroît la capacité hospitalière », Revue Le Spécialiste, FMSQ, p.3-5. <https://fmsqkiosk.milibris.com/reader/ec160319-59ac-4664-b510-7bc13ba858a2?origin=/le-specialiste/le-specialiste/2022-10>

Blanchet, S. (octobre 2022). L'unité virtuelle de l'hôpital Général Juif, Revue Le Spécialiste, FMSQ, p.6-8. <https://fmsqkiosk.milibris.com/reader/ec160319-59ac-4664-b510-7bc13ba858a2?origin=/le-specialiste/le-specialiste/2022-10>

MSSS (2021) Orientations ministérielles: organisation et implantation d'une zone d'évaluation rapide (ZER). Québec, 10p. [https://publications.msss.gouv.qc.ca/msss/fichiers/2021/21-905-01W\\_annexe\\_ZER.pdf](https://publications.msss.gouv.qc.ca/msss/fichiers/2021/21-905-01W_annexe_ZER.pdf)

## Appendix 1: A day at C4

8:15 a.m.	Critical care caucus** (set up before C4)	<b>Led by</b> the JGH Flow Coordinator <b>In attendance:</b> Head Nurse of Intensive Care, Head Nurse of Cardiovascular Intensive Care <b>Objectif:</b> Situation analysis to approve heart surgery
8:30 a.m.	CIUSSS ALC caucus	<b>Led by</b> the social services coordinator responsible for ALC patients <b>In attendance:</b> C4 Coordinator, representatives from social services, SAPA, the residential resource point of access (MAH), Home Care, Nursing, Discharge Planning, Rehabilitation point of access, geriatrics, and Mental Health. <b>Objective:</b> Round table on issues, discharge numbers
8:40 a.m.	CIUSSS Flow Caucus	<b>Led by</b> the C4 Medical Director <b>In attendance:</b> JGH Flow Coordinator, the Clinical-Administrative Coordinator – Emergency Department, Critical Care and the Cardiovascular Division, C4 Coordinator, the four Clinical-Administrative Coordinators of Nursing (JGH), DRSM, SAPA, DQTEVE-SV, Environmental Services, and Information Resources <b>Objective:</b> Analysis and distribution of fluidity issues
9:00 a.m.	ED Flow Caucus	<b>Led by</b> the C4 Medical Director <b>In attendance:</b> medical teams (urgentologists, medical specialists, family physicians, etc.), ED Coordinating Physician, and an agent from ED bed management . <b>Objective:</b> Patient allocation decisions
10:00 a.m.	Safety Round Caucus (weekly meetings, number varies vary as needed)	<b>Led by</b> the C4 Coordinator or the Associate Director of the DQTEVE-SV <b>In attendance:</b> All clinical and corporate directorates (directors and associate directors), C4 Medical Director, DQTEVE-SV, the complaints commissioner, communications, Emergency Measures Coordinator, and Optilab cluster administrative director. <b>Objective:</b> Situational awareness, round table on CIUSSS issues
11:00 a.m.	Virtual Care Caucus	<b>Led by</b> the C4 Coordinator <b>In attendance:</b> Chief of Virtual Care, Virtual Nursing, Pharmacist, DRSM, C4 Medical Director, Associate Director of the DQTEVE-SV and the Co-Director of Virtual Care: Erin Cook. <b>Objective:</b> Roundtable, discussion of issues
2:00 p.m.	ED Flow Caucus	<b>Led by</b> the C4 Medical Director <b>In attendance:</b> medical teams (urgentologists, medical specialists, family physicians, etc.), ED Coordinating Physician, and an agent from ED bed management . <b>Objective:</b> Patient allocation decisions
3:45 p.m.	CIUSSS ALC caucus	<b>Led by</b> the Social Services Coordinator in charge of ALC patients (DRSM) <b>In attendance:</b> C4 Coordinator, SAPA: the residential resource point of access (MAH), Home Care, DSI of Discharge Planning, Rehabilitation access point, Geriatrics, and Mental Health <b>Objective:</b> Roundtable on the issues, number of discharges planned
4:00 p.m.	CIUSSS Flow Caucus	<b>Led by</b> Optilab cluster administrative director <b>In attendance:</b> JGH Flow Coordinator, Clinical-Administrative Coordinator – Emergency Department, Critical Care and the Cardiovascular Division, C4 Coordinator, the four Clinical-Administrative Coordinators of Nursing (JGH), etc. <b>Objective:</b> Analysis and distribution of fluidity issues

## **Appendix 2: List of people interviewed and their title (at the time of the meeting)**

1. Dr. Rosenberg, President and CEO
2. Dan Gabay, Associate Executive Director
3. Joanne Côté, Director of the DQTEVE-SV
4. Erin Cook, Associate Director of the DQTEVE-SV
5. Nicolas Seca-Masot, DQTEVE-SV Administrative Procedures Specialist
6. Mark Biunno, DQTEVE-SV Administrative Procedures Specialist
7. André Poitras, Associate Director of Nursing and Clinical Operations
8. Dr. Shanon Fraser, C4 Director and Chief of General Surgery
9. Carole Viegas, Flow Coordinator at the hospital
10. Sabine Cohen, Associate Director of Digital Health
11. Mary Lattas, Director of Rehabilitation and Multidisciplinary Services (DRSM)
12. Luc Méthot, Associate Director of Home Support for SAPA
13. Dr. Marc Afilalo, Chief of the Emergency Department
14. Mark Demaine, Coordinator of Social and Rehabilitation Services in CHSLDs and Technical Assistance Services
15. Suzette Chung, C4 Coordinator in 2021 and 2022
16. Kimberly Gartshore, C4 Coordinator as of May 2022
17. Jennifer Gutberg, PhD Health Services Researcher candidate, University of Toronto, and consultant
18. Aurelia Di Fabrizio, Chief of the Transformation team (PMO) in the DQTEVE-SV