Supply chain capacity to respond to the COVID-19 pandemic in Ontario: Challenges faced by a health system in transition

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Abstract
This provincial case study, one of seven conducted as part of a national research program on healthcare supply chain management during COVID-19, focuses on Ontario. The context of significant restructuring of health organizations and regions in Ontario challenged the province’s capacity to respond to COVID-19. A complex leadership structure, led by political leaders, with limited healthcare supply chain expertise at decision-making tables and a prioritization of “hospitals first” early in the first wave were described as challenges Ontario faced in managing the pandemic. A lack of supply chain digital infrastructure—and consequently, lack of available data—meant informed decision-making regarding supply utilization and demand forecasting was not possible. The Ontario case presents key lessons learned regarding the unintended consequences of lack of supply chain coordination across organizations, and the prioritization of hospitals and allocation strategies on Canada’s most vulnerable population segments.

Introduction
The COVID-19 pandemic has highlighted significant supply chain challenges as provincial health systems struggled to manage the impact and rapid spread of the virus. In order for health services and public health to meet the unprecedented demands of the current and future pandemics, supply chain and logistics infrastructure must have the capacity to respond to disruptions to ensure that health teams, essential workers, and citizens have the products and equipment needed to contain spread, and for health services to achieve optimal outcomes for those who become infected. Supply chain in health systems source and distribute products to ensure health system teams have timely access to the essential products and equipment needed for care delivery in a timely, safe, and secure manner. Health services supply chain teams source and distribute everything from beds to ventilators, Intravenous (IV) pumps and IV tubing, medications and vaccines, Personal Protective Equipment (PPE), and endotracheal tubes. Hospitals generally have well established supply chain processes and infrastructure, whereas, community agencies (e.g., long-term care, home care, and primary care) have little, if any supply chain infrastructure or expertise.

When supply chain processes are interrupted, there are severe consequences that can place patients and clinicians at great risk. A flood in 2012 at Sanofi Pasteur, the supplier of a bladder cancer drug, ImmuCyst, resulted in significant delays in cancer treatments for patients.1 Pharmaceutical manufacturers were not able to increase production to meet demand due to the time it takes to source the ingredients and manufacture this drug. When Hurricane Maria knocked out the electrical grid in Puerto Rico in 2017, Baxter, one of the only manufacturers of IV bags in the United States, experienced severe stock shortage.2 Canadian and U.S. hospitals were left without the needed supply of IV bags, limiting their ability to deliver intravenous medications for a number of weeks. The demand for IV bags globally skyrocketed, resulting in a 600% cost increase for hospitals that were all competing for a limited international supply.2

Supply chain interruptions during public health crises are also well documented. A key lesson learned from the Severe Acute Respiratory Syndrome (SARS) epidemic in Ontario was the importance of the supply of protective equipment for health workers. Three of the 44 Canadians who died of SARS were healthcare workers as transmission of the virus was poorly understood.3 In total, 400 persons became ill with SARS and 25,000 people were in quarantine.4 Although public health practices and infection control procedures improved following the SARS epidemic, supply chain practices did not change and health supply chain research and evidence remain profoundly underdeveloped. A key finding of the Justice Campbell report foreshadows the context of the COVID-19 strategy in Ontario:

“SARS taught us that we must be ready for the unseen……, there is no longer any excuse for governments and hospitals to be caught off guard and no longer any excuse for health workers not to have available the maximum level of protection through appropriate equipment and training.” – (Justice Archie Campbell, 2006a).

The current COVID-19 pandemic is of much greater scale and complexity than SARS, now shining a bright light on the critical role of supply chain processes in effectively responding and managing the pandemic.

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There is a remarkable dearth of research on health system supply chain in Canada and in global health systems. Supply chain processes in Canadian health systems are highly varied in structure (e.g., centralized in some provinces and decentralized in others), with little coordination across jurisdictions, and operate with little or no transparency, resulting in leadership decisions described by one physician leader as “flying blind” while managing the COVID-19 pandemic. This pandemic has laid bare the critical need for capacity to acquire and move products, equipment, and supplies to enable health teams to deliver essential care services. Health systems must strengthen supply chain processes, informed by empirical evidence of best practices and supply chain resilience.

This paper reports on case study research of the province of Ontario, revealing empirical evidence of supply chain processes and infrastructure within and across Ontario’s provincial health system, during the first two waves of the COVID-19 pandemic. This evidence is analyzed relative to leadership strategies and policy to inform effective, agile, and responsive pandemic management for Canadian health systems. This case study is one of seven conducted to examine health supply chain capacity and infrastructure across Canada, the first national study of health supply chain, funded by CIHR (Ref. # VR5 172 669).

The case study was designed to respond to the following research questions:

- What are the supply chain processes and infrastructure required to optimize effective and timely health services delivery for the current and future phases of the COVID-19 pandemic?
- What procurement models, approaches, and policy frameworks offer secure sourcing of products to meet the surge in demand for care by COVID-19 patients?
- What is the digital maturity of supply chain infrastructure (and processes) in Ontario, that, if strengthened, could optimize management of COVID-19?
- What are the data infrastructure and analytics strategies needed to strengthen the effectiveness of health system supply chain processes to support COVID-19 management?
- What is the influence of federal government initiatives, from the perspective of provincial stakeholders, on provincial health system capacity to manage COVID-19?

### Methods

The case study research employed qualitative methods given there was no prior existing research of health supply chain in Canada to document the essential features and best practices of healthcare supply chain. Theoretical sampling identified key participants who represented varied perspectives and expertise including leaders in supply chain, procurement, clinician leaders (e.g., physicians, nurses, pharmacists, and primary care), health executives, government, union leaders, Group Purchasing Organizations (GPOs), and Shared Services Organizations (SSOs) as well as industry leaders. Semi-structured interviews documented the experiences, perspectives, and views of how supply chain infrastructure and processes were operationalized, the structure, focus, and impact of leadership decisions on supply chain management, health system capacity to respond to pandemic waves, how supply chain capacity influenced leadership decisions and COVID-19 health system outcomes; and, how and which challenges, solutions and gaps in supply chain infrastructure contributed to COVID-19 outcomes in Ontario.

Interviews were audio-recorded using Microsoft Teams and transcribed verbatim by an independent contracted transcriptionist. Thematic analysis included detailed and multiple reviews of transcripts to define themes across interview transcripts. Conceptual categories were defined and all transcripts were coded, categorizing text to identify perspectives and patterns that were developed into themes, using NVivo software to assist with organization of data. The themes are described next and connected with the above research questions. The following sections describe the thematic findings emerging from the qualitative analyses of the 67 interview transcripts.

### Provincial context

Ontario is the second largest province in Canada, with a population of over 13.5 million people. The province of Ontario has a decentralized structure whereby healthcare planning, administration, and implementation of health services are led at the local or regional level, with some features of healthcare, such as Cancer Care being centralized and managed for the entire province. Decentralized health systems have limited oversight of care delivery and each health services organization functions independently with governance structures for each organization that guide the mandate and operations of each organization. Primary care, home care, and long-term care in Ontario function more autonomously, with little direct management by regional or provincial leaders and a mixed model of both privatized service organizations (e.g., residential care, laboratory, and pharmacy) and publicly funded care delivery. The public health system in Ontario is described as “a collaborative effort between a variety of organizations, including the Ministry of Health, Public Health Ontario (PHO), 35 local Public Health Units (PHU), and other collaborative government partnerships.”

Healthcare supply chain in Ontario is similarly decentralized, whereby healthcare organizations across Ontario manage supply chain processes autonomously, deciding on how best to manage supplies and products to meet the supply needs of their own organization. The majority of Ontario hospitals participate in SSOs as well as GPOs to achieve savings through “bulk purchasing” of products and supplies. The SSOs and GPOs tend to work independently of each other with limited coordination across organizations. Purchasing decisions are based on the local budgets of single healthcare providers, focused primarily on achieving lowest cost. There is limited engagement of clinicians in procurement processes and the limited human resources to undertake supply chain management practices.

Following the outbreak of SARS in 2003 and H1N1 in 2009, there were many recommendations to strengthen supply chain capacity in Ontario; however, few of these recommendations were implemented. When the COVID-19 pandemic unfolded in Ontario, there was no centralized supply chain infrastructure and
limited pandemic stockpile resources, which resulted in organizations having to source critical products, in competition with every other global jurisdiction.

The challenges of Ontario’s decentralized health system were recently highlighted in a report, A Healthy Ontario Building a Sustainable Healthcare System,\textsuperscript{14} which highlighted that patients much preferred integrated care and want healthcare organizations to work better together, supported by improved partnerships and data sharing.\textsuperscript{14} Patients wanted improved streamlined care, improving the transitioning between services and better digital solutions for connection and digital care.\textsuperscript{14}

In the Fall of 2019, Ontario was in the process of re-structuring the healthcare system, transitioning from 14 Local Health Integration Networks (LHINs) organized by geographic boundaries, to five regions spanning the province.\textsuperscript{15} The timing of this major restructuring effort was underway as the COVID-19 pandemic began on January 25, 2020, which presented significant challenges in mobilizing leadership capacity across the province to respond to the pandemic. A new entity, Ontario Health, was created just weeks before the first case of COVID-19 was documented, which consolidated six provincial agencies into one corporate entity.\textsuperscript{15} This decentralized structure of Ontario’s health system was identified as an important context from which to examine Ontario’s response and strategy to manage the COVID-19 pandemic.

**COVID-19 in Ontario**

The first case of COVID-19 was confirmed in Ontario on January 25, 2020, with much uncertainty surrounding the virus, treatment approaches, and the mode of transmission. Media images depicting the destructive impact of the pandemic in countries such as Italy, the United States, and Spain heightened uncertainty due to the devastating impact of the virus on human life and the limited capacity of health systems to manage the massive surge in demand for care. The sequence of key events and government initiatives to respond to the pandemic are summarized in Figure 1.

The first case was identified in Toronto, and served as a “timestamp” and turning point for many healthcare organizations in Ontario. Some described it as a “shift,”
knowing that COVID-19 had now entered Ontario. Health leaders described a sense of “urgency” as they saw a rapid surge of cases emerge in February of 2020. The leadership strategy mobilized to support Ontario’s response to the pandemic is described in the following section.

Leadership and governance enhanced reporting structure

Three weeks after the first case was confirmed in Ontario, the provincial government created an “enhanced response structure” to bring together a variety of stakeholders to inform Ontario’s response to COVID-19. The leadership strategy was comprised of a complex array of committees, “tables,” and leadership groups, representing various jurisdictions and stakeholders across the province. On March 2, 2020, a number of weeks following the first case of COVID-19 in Ontario, the Ministry of Health established a “Health Command Table,” initially with 21 members and then expanded to more than 500 participants. Decisions were led primarily by government officials with daily press conferences announcing pandemic measures by the Premier of Ontario, and on occasion the Minister of Health. The size and complexity of the Command Table was viewed as slow to react to the dynamic changes in the pandemic’s key events. Despite the significant number of stakeholders at the Command Table, organizations and stakeholder groups across the province functioned autonomously, which was consistent with the decentralized leadership structure across the province, resulting in a highly varied array of strategies and approaches to managing the pandemic. The Auditor General’s Report was highly critical of this complex and seemingly “all inclusive” leadership structure, described as “cumbersome” and “slow.” A key informant described the variability in leadership approaches across Ontario stakeholders:

“You’ve got PHO (Public Health Ontario), you’ve got the various public health units, nobody is agreeing on the approach, and everybody is saying I’m going to do it my way... And they’re all different. Like some cancer centers were masking patients; others weren’t. Some cancer centers were masking all staff; in some they weren’t allowed to, and it was just, you know, it was a battle. It was a battle by everybody to try to do it.” (Health System Leader)

Supply chain expertise was not present at the Health Command Table, which was widely viewed as contributing to a lack of understanding of the nuances and complexity of supply chain processes in health systems. A supply chain leader describes:

“There was no one at the table whose voice was being heard with regards to the supply chain, and frankly also you know, (no one) solicited or sought advice on what was happening with the supply chain. It was an afterthought, it’s like we’ll set the direction and then the supply team will have to figure it out.” (Supply Chain Leader)

At the beginning of the pandemic, the Command Table was described as being “hospital focused.” This prioritization of hospitals resulted in limited consideration for health organizations such as home care and long-term care, described in the following:

“The command table focused on public health and acute care, and the focus on acute care was just about how do we free up beds. And it didn’t matter; the homecare component of the LHINs, trying to get people out of hospital that they can’t put in home care, and pushing people out... It was full capacity in LTC as well as retirement homes. So, you have maxed out capacity everywhere else in the system. You have the hospitals running at like 50 or 60% capacity because they emptied them for a surge that, thankfully, didn’t happen. But it happened elsewhere. So, there’s LTC out there and it takes like weeks for government to clue in that they’ve got to get the hospitals to help LTC turn it around” (Health System Leader)

Ontario’s leadership structure was widely viewed as slow and reactive, prioritizing hospitals over other care delivery organizations, often responding with public health measures once surge in COVID-19 cases or outbreaks were established. Notable in the leader perspectives was the absence of engagement or collaboration with federal agencies in responding to the pandemic in Ontario.

Limited supply chain capacity or visibility

At the time the pandemic was declared in Canada, Ontario’s health supply chain infrastructure was localized to individual organizations, resulting in limited visibility of product and equipment inventories and locations (e.g., PPE) across the province. The Health Command Table had no line of sight to product inventories available in any health organization in the province, and no access to supply chain data to inform decisions. Prior to the pandemic, organizations such as hospitals prioritized lowest cost, resulting in the majority of supplies being sourced from China—the epicentre of the pandemic. As quarantine measures were implemented across China, manufacturing capacity stopped, demands for supplies rapidly escalated across every global jurisdiction, resulting in critical shortages and supply chain teams competing across the globe for medical supplies. The procurement of essential products and supplies for Ontario was not coordinated with the efforts of supply chain teams in health organizations such as hospitals, described in the following:

“At times we were bumping into provincial buys where it’s like, your order for 50,000 units... you’ve been bumped because the province is buying five million units. Well, we’ve just been through this 30-day process of vetting the supplier and qualifying them, looking at the products, getting a sample, and now we’re ready to buy only to find out that the province is going to be buying five million units and oh by the way, you’re [only] getting (some) of those.” (Regional Leader)

Health system capacity to meet the increase in demand for critical products meant that supply chain coordination and collaboration across the province was critically needed. Each region varied widely in their supply chain capacity and strategies for procuring products, level of expertise, and capacity to coordinate PPE allocation and implementation of Ministry directives across their regions. While some regions had well-established supply chain expertise and capacity, others started from scratch having to hire supply chain leaders, contract with distributors, building a supply chain strategy,
described as a “piece meal” approach, having little choice but to “build the bridge while driving over it.” A regional leader describes the chaos of being brought in to lead the development of a supply chain strategy in a region which had no supply chain expertise or capacity:

“Finding time to work with (supply chain teams in private sector) and (GPO name) and the health service providers in all of this was also being done at the time we were trying to get them critical PPE immediately because they had COVID ravaging the system. We were working 12 hours a day, 7 days a week. The Ministry Emergency Operations Center (MEOC) had a supply of pandemic PPE and the Ministry had sent an email out and said these are your regional leads, email them. So, we were getting all of these emails from health service providers who needed critical PPE, it was a spreadsheet that they were filling in, they were sending it to us, and quite honestly at the beginning, some of the requests were like crazy high, like 20,000 gowns and I’d like 10,000 gloves and by the way that will last me a week.” (Regional Leader)

The newly formed regions were ill equipped to manage the significant demand for critical products, and regional teams had not been well established in each region given the limited progress made towards restructuring the 14 LHINs into five regions at the time the pandemic unfolded. Regional leaders mobilized resources wherever they could as they struggled to meet the demands of health organizations managing the pandemic response.

**Sourcing and procurement challenges.** For many of the regions across the province, one of the greatest challenges was ensuring all organizations had the critical products needed to ensure the safety of the workforce and enable clinicians to deliver care to patients. Larger organizations, such as hospitals, had supply chain teams who worked with SSOs and GPOs to source and procure products. However, GPOs and SSOs were unable to source products in the required volumes to meet the surge in demand due to the global shortages of critical products, which resulted in GPOs and SSOs having to place their customers on allocation to conserve product inventories. Allocation models limited supply distribution to providing organizations with product volumes according to pre-pandemic contracts. The surge in demand required much higher product volumes than the GPOs and SSOs could provide to almost every health organization. One leader describes the desperation of their efforts to find new sources of critical products in order to meet surge in demand:

“[We made] calls that I can’t tell you, calling everybody under the sun at any time of night and making deals, like unthinkable deals... to switch to reusable gowns and basically you know, get very aggressive to say you have to do this because we’re running out of our historical levels. So it was, I would describe it as a total [****] show.” (Healthcare Leader)

Smaller organizations in particular were exceptionally vulnerable. Smaller budgets, limited supply chain expertise, and prioritization of “hospitals first” made it difficult, if not impossible, to source and procure supplies. Provincial decisions were widely viewed to be focused on conserving supply chain capacity by prioritizing hospitals and leaving other health organizations to source supplies, described in the following:

“This was a struggle. There were a couple times where chemotherapy units were threatening to have to shut down because they only had three days’ worth of masks and stuff. The fact that someone can’t get cancer treatment because we can’t find a mask was just, you know, unbelievable.” (Healthcare Leader)

**Allocation framework to conserve PPE inventory and manage crisis of critical shortages.** The allocation of PPE was a defining feature of the first and second wave of the pandemic and the “allocation framework” created by the province was designed to guide decisions on allocation of critical products, described in the following:

“Basically, it (the allocation framework) just said, the supplies go where people need it and we’ll divide it up and then go on a basis of an algorithm. By that time, we had already basically described the allocation. But at that point people thought there was some secret framework and then it just got embarrassing because if they had sent it out, it would be like the ‘emperor has no clothes’. It’s basically a set of priorities (that are followed); it (PPE) goes to patients first, healthcare workers next, you know, pharmacy, it was just a tiering of (who gets PPE first) …” (Health System Expert)

Allocation strategies were a common practice used by Ministry of Health teams, GPOs, SSOs, and distributors in the private sector. Critical product inventories were dramatically reduced once regions in China were under quarantine and manufacturing capacity came to a halt. Allocation frameworks were a decision-making tool to guide decisions regarding the distribution of PPE products from provincial stockpiles to those organizations in greatest need. The goal of the allocation strategy was to conserve inventories of critical products until such time as PPE products could be sourced and procured, in order to reduce the risk of running out of critical products. A key informant describes:

“For our contract demand, they continued to provide some product within the context of the contract, but because of the sheer volumes of requests that they were getting, everybody went on allocation. You only got a certain percentage of what you were going to get, and the percentage was not going to keep up with our utilization. Our consumption numbers were way too high for that.” (Supply Chain Leader)

Community organizations were deeply impacted by critical shortages of PPE due to their limited supply chain expertise and lack of capacity to procure critical supplies. A quote from Ontario’s Long-Term Care COVID-19 Commission describes how long-term care homes were “on their own”:

“Given the PPE shortage and the absence of a provincial stockpile, the province advised healthcare organizations, including long-term care homes, to implement “supply stewardship”—that is, to “ration your supply.” At the outset, long-term care homes were on their own; they needed to access their own supply chains and could not depend on a provincial backstop.”—Ontario’s Long-Term Care COVID-19 Commission
Many key informants described how there was a “hospital first” strategy by the provincial government, where hospitals were prioritized for critical supplies and PPE:

“It was when there was very limited supply they [government of Ontario] made an allocation decision, to where that supply would have the greatest impact. And made a decision that that would be in acute care. Right; wrong; I’m not sure.” (Health System Leader)

As of May 26, 2020, there were 298 outbreaks at long-term care homes compared to 84 outbreaks at hospitals.20 In Ontario, infection and death rates were exceptionally high, with 61% of all deaths in long-term care, reaching 4,000 deaths by April 2021.19 The Canadian Armed Forces were called into the worst-hit long-term care homes and found extreme crisis in these settings.20 The workforce faced “intolerable levels of stress,” faced with fear of exposure to the virus and spreading the infection to their families. A key informant describes how long-term care homes could only receive PPE from the province once an outbreak had occurred:

“We had only once, one time, did we receive supplies. We pushed the system and received supplies from the Ministry and that was when we had a confirmed outbreak here.” (Long-term Care Leader)

Another strategy used to conserve product supply during the early waves of the pandemic was focused on managing hospital bed capacity by cancelling “elective” surgeries to further reduce the demands for critical products needed for patient care delivery. Elective is considered any surgery that is planned, which is distinct from emergency surgeries that are unplanned. A clinician describes the impact of shutting down of non-essential (e.g., elective) services:

“The majority of cancer cases were suddenly all being turfed. And we don’t consider any tumour growing in someone’s body an elective surgery... Like the hospitals basically cancelled everything within days. The speed at which the system shut down was just mind boggling, just how fast that happened... and even to this day, there’s 10,000 [cancer] tumours out there waiting to be removed.” (Clinician Leader)

The impact of the reduction in services is widely viewed as a challenge that will have significant impact on the health of the citizens of Ontario in the coming months and years. The critical shortages of protective products in Ontario due to the “hospitals first” approach contributed to the devastating impact on the long-term care sector, due to the significant impact of supply shortages and the conservation of hospital capacity, which resulted in transfers to long-term care. These and many other factors contributed to devastating outcomes for Ontario seniors living in long-term care, which resulted in the province having to request support from the Canadian Military to go into homes to provide care for seniors.17 Military support from federal agencies was the only substantive engagement of Federal agencies described by participants in this case study.

Limited supply chain data and underdeveloped digital infrastructure. There were few, if any, organizations or government entities in Ontario that had digital infrastructure that offered transparency of data, including public health testing data, COVID-19 case counts across health organizations, or hospitalization rates. Digital infrastructure was advanced in some hospitals; however, none of the organizations had digital connectivity, or interoperability, across organizations or regions. Leaders and decision-makers were left “flying blind”20 when making supply chain decisions, with little data able to accurately track utilization rates of critical supplies, or demand for critical products. The impact of the lack of data and digital infrastructure is described:

“It’s been very clear that our system was not set up for COVID and we were probably, of all provinces, the least well designed to address a pandemic like this, and I would say the biggest failing was data and a lack of visibility into what we had on hand, how fast we were going through it, and what’s coming in.” (Supply Chain Leader)

To track the demand and utilization of critical products, decision-makers relied on manual counts of PPE, collected by frontline staff who reported daily counts of PPE product volumes. One key informant described: “Data quality was nothing to write home about,” and decision-making was “at the whim of daily reporting.” The manual counting required valuable time for teams in clinical settings to complete every day and was considered inaccurate and under reported due to fears that critical products would be re-directed to other organizations if reporting was accurate, described by a healthcare leader:

“The government started data collection and validation tools because some people were exaggerating their need and their demand, everybody was scared right, no one was saying I have this (product counts), because no one knew.” (Healthcare Leader)

Ontario had no provincial-level data or digital infrastructure to support accurate tracking of product utilization, and organizations experiencing the greatest need for products to respond to COVID-19 cases. The lack of data infrastructure resulted in lack of transparency of supply inventory data needed to inform decisions, described in the following:

“It was absolute chaos. It was chaos on a number of fronts because we didn’t have, we still have, very poor data around what inventory was actually in the system and we didn’t have clear sight line for confidence in orders that were coming in from China. A lot of them were really disrupted and we had orders that didn’t come through, that got taken from us off the loading dock, all kinds of things. We didn’t have a lot of confidence in what was coming into the warehouse, we didn’t know really that much about what was in the sector.” (Procurement Leader)

The decentralized leadership structure of Ontario’s health system, coupled with the lack of data infrastructure, contributed to a chaotic environment whereby organizations were left to find alternative sources of critical products. Provincial leaders and
decision makers were “flying blind”, making decisions to manage the events of the pandemic without data to inform their decisions. The hardest hit sector in Ontario was long-term care, which was unable to safely protect senior citizens living in these settings and not able to offer protective equipment to support the safety of the health workforce across the province.

**Devastating impact of COVID-19 in long-term care**

By April 2020, seniors in Canada had the highest rates of COVID-19 with 79% of all deaths in Canada connected to long-term care and senior’s homes.21 Ontario mirrored these facts as of May 26, 2020, there were 298 outbreaks at long-term care homes compared to 84 outbreaks at hospitals.18 Many experts suggested that long-term care homes were “completely neglected” at the beginning of the pandemic while hospitals were not only better prepared, their staff had better access to personal protective equipment and security when it comes to employment.18 In May, the Canadian Armed Forces were sent into some of Ontario’s worst-hit long-term care homes and reported devastating findings. The Ontario government announced a formal enquiry to examine the gaps in long-term care to inform decisions and initiatives to better protect seniors as the pandemic unfolded. Long-term care and the impact of COVID-19 on seniors across the province were among the most devastating outcomes of the pandemic in this province.

**Conclusions and implications for health leaders**

Ontario was severely challenged in responding to the global pandemic of unprecedented scope and scale, caught in the midst of major restructuring of health organizations and regions across the province, having no centralized leadership structure or coordination of pandemic management efforts across the province, and little or no access to data to inform decisions. The province’s capacity to respond was further challenged by a large and complex leadership structure that had no clear line of accountability to organizations across the province, resulting in inconsistencies in efforts to manage the pandemic in each geographic region. There was no digital infrastructure to make visible the supply challenges, critical product inventories, or accuracy in rates of product demand utilization, which precluded data-driven decisions to optimize supply chain capacity to distribute critical products across the province. Limited representation of key areas of expertise, such as health supply chain and clinician leadership at decision-making tables, and lack of data and digital infrastructure to inform decisions or to accurately forecast utilization contributed to the many challenges evident in the Ontario case. The intense competition for critical products globally, and lack of supply chain management expertise further contributed to significant challenges for health organizations across the province, particularly organizations providing care to vulnerable populations, most notably Ontario seniors.

The Ontario case profiles a number of critical lessons learned and implications for health leaders, which align with the LEADS framework, described in the following.

**Engage others** was a strategy that the Ontario government attempted; however, the complexity and the massive number of stakeholders engaged at the Health Command Table lacked clearly stated goals, with little evidence of collaboration and coordination of efforts to contribute to effective management of the pandemic. Responsibilities and accountabilities to respond to demands for care remained within individual organizations and sectors (e.g., hospitals, public health, and long-term care), with limited opportunity for engaging leaders to share ideas, bring key areas of expertise to decision-making tables, and very limited evidence of cooperation or collaboration across organizations to achieve results. Despite engaging more than 500 members in the Command Table, the ability to foster development of others, ensure clarity and consistency of communication, build a team able to work meaningfully together was not evident in this Ontario case. The Ontario case demonstrates the critical dimensions of leadership strategies that engage others to foster development, establish clear lines of communication to support a sense of teamwork and meaningful engagement to advance the objectives of provincial efforts to coordinate pandemic management.

**Achieving results** was a challenge in Ontario whereby the underlying decentralized leadership made it nearly impossible to set the direction, strategically align stakeholder values, vision and evidence, take action to implement decisions, and evaluate outcomes and results. Ontario leaders were disadvantaged by the challenges of the health system restructuring process, just as the pandemic started, leaving high levels of uncertainty regarding leadership structures and accountabilities, which were changing with the restructuring process. Clarity of the direction and strategy for the pandemic response was very limited, and taking action at the provincial level was limited to a “power and control” strategy to impose public health restrictions, which were implemented with a high degree of variability across the province. Integration of organizational strategy to advance provincial-level responses was not possible due to the highly decentralized structure of health organizations across the province. Health leaders were limited to managing within their personal scope of practice and accountability, which precluded a coordinated or collaborative approach to pandemic responsiveness.

**Develop coalitions.** Partnerships and networks of expertise were largely absent in Ontario, which precluded leadership collaboration across the province. There was no evidence of developing coalitions to coordinate efforts or build collaborations across the multiple “tables,” committees, and decision-making groups formed at the onset of the pandemic. Collaborative approaches to leadership were further compromised by the very slow response to formulating a Health Command Table, announced on March 2, 2021, five weeks after the first COVID-19 case was diagnosed in the province. Coalitions between government decision-makers, health professional (workforce) organizations, and sector leaders (e.g., long-term care, home care, and community care) were not
evident in the Ontario case, which precluded a collaborative approach to leadership strategies to effectively manage the pandemic. Specifically, coalitions with federal agencies were also not evident in the Ontario case, with the exception of the request for military support to manage the crisis in long-term care, documented in the Auditor General’s report.

System transformation. The province of Ontario was very early in a system transformation process, having dismantled the leadership teams and boards for each of the 14 local health integration networks across the province, leaving a significant gap in leadership infrastructure at the time the pandemic unfolded. Systems thinking, implementing effective processes across stakeholder groups, particularly across the many supply chain stakeholders, was not evident in the early phases of the pandemic. The processes implemented were widely viewed as slow to respond with lengthy implementation, resulting in “building the bridge while driving over it.” The virtual supply chain strategy relied on manual counts of critical products, which was then uploaded into a database to inform decisions. Distribution of critical products in short supply were allocated only after outbreaks were established, rather than being proactive in preventing outbreaks for high-risk populations such as seniors living in congregate settings. The crisis that emerged in long-term care was a clear indication of the limited capacity of the province of Ontario to adequately respond to the pandemic, hampered by a very decentralized leadership model, a transition toward health system restructuring, a lack of data and digital infrastructure to inform decisions, and a lack of supply chain infrastructure and capacity to coordinate efforts to source and procure the critical products needed to ensure safe work environments for the health workforce, and to prevent transmission of COVID-19 in high-risk communities and work environments.

A number of key lessons learned for health leaders are illustrated by this Ontario case study:

a. Leadership structures, accountabilities, and infrastructure must be clearly established, with agreed upon decision-making structures and strategies to effectively engage stakeholders, ensure the necessary expertise is informing decisions, and coalitions of stakeholders are mobilized to effectively manage unexpected events such as pandemics. It is notable that the many recommendations and lessons learned from SARs were simply not implemented or recognized in the years following 2006, despite evidence and recommendations of the Justice Campbell inquiry. There is no question that pandemics will unfold in future, and preparedness relative to leadership infrastructure and accountabilities is critical to successful management of such events in future.

b. Effective leadership requires a results-oriented strategy that meaningfully engages others, clearly establishes direction, values the use of evidence, and is supported by data-driven decision-making. Achieving results necessarily requires accurate and accessible data to inform decisions, and evaluate effectiveness and outcomes of decisions, particularly supply chain capacity and outcomes, during events such as pandemics. Leaders must accurately measure the effectiveness and capacity of health systems to respond to such events in a manner that is equitable, and validated by data and evidence.

c. System transformation is critical to any provincial health system response to crisis events such as a pandemic. Although Ontario was compromised in its response to this pandemic due to system restructuring, critical lessons learned must be carefully considered at the system level to inform and encourage system innovation to prepare Ontario for such events in future. Digital infrastructure that creates transparency of health system capacity to respond to surge in demand will be critical to Ontario’s future capacity to respond to pandemic events. Data that is open, transparent, and accessible to all stakeholders is a strategic asset, particularly supply chain data, and enables collaboration and coordination across organizations to support effective and high performing coalitions of stakeholders to mobilize and advance emergency responses to events in future. Digitally-enabled health systems and supply chain infrastructure in particular, will be strategic assets able to sustain health system capacity to effectively and proactively manage pandemic events well into Ontario’s future.

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