

# Manitoba 2020: How centralizing the healthcare supply chain helped with pandemic management

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## Abstract

A case study design was used to understand Manitoba's response to accessing Personal Protective Equipment (PPE) in the first wave of the global coronavirus pandemic. By evolving early on in the pandemic to a provincially led structure dedicated to the healthcare supply chain, Manitoba was able to avoid major shortages in access to PPE. Leadership was focused on the possibilities for action and implementation (ie, dynamic, adaptive, and collaborative) rather than trying to respond within the status quo (ie, a more linear and traditional approach). As a result, few structural items other than the creation of an effective, province-wide digital network to fully visualize the healthcare supply chain are needed going forward. Manitoba's healthcare supply chain had a number of successes during the initial wave of the global pandemic including many new processes like the local production of PPE and the establishment of new supplier relationships.

## Introduction

Manitoba is a Canadian province which lies in the longitudinal centre of Canada. Its population in 2020 was estimated to be 1.38 million with the census metropolitan area of Winnipeg comprising over 850,000 residents. At the beginning of the COVID-19 pandemic (March 11, 2020), Manitoba was in the midst of a vast healthcare system transformation. The premise of the transformation was to change the way Manitoba's healthcare system was organized; at the time, the entire system's organization was seen to be the primary impediment to the offering of effective clinical services. As a result, an integrated Provincial Clinical and Preventive Services Plan was adopted and was in the midst of being implemented by a newly formed central agency, Shared Health Services (SHS) at the beginning of the pandemic. Although five regional health authorities still exist for delivering clinical and preventive services, SHS now provides centralized administrative functions that use human, capital and financial resources in the most efficient and effective way possible. These functions include healthcare supply chain management.

Manitoba was one of the seven provincial jurisdictions invited to participate in a COVID-19 Rapid Research project funded by the Canadian Institute for Health Research (CIHR Ref. VR5 172 669). The overall purpose of the Manitoba case study was to support four national research objectives that documented healthcare supply chain processes and infrastructure influencing COVID-19 health system outcomes. In addition, the case study also allowed the opportunity to assemble the empirical evidence required to inform the design of supply chain processes and infrastructure within and across Manitoba including the type of leadership required. At the conclusion of the case study, an outline of how Manitoba could best meet the significant demands of a global pandemic like COVID-19 while ensuring that a resilient and secure supply of healthcare products would be available to health teams when and where they are needed to care for every Manitoban.

More specifically, the Manitoba case study set out to answer the following questions about the design of supply chain processes and infrastructure within and across Manitoba during the time of first wave of the COVID-19 pandemic.

1. 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?
2. What procurement models, approaches, and policy frameworks offer secure sourcing of products to meet the surge in demand for care by COVID-19 patients?
3. What is the digital maturity of supply chain infrastructure (and processes) in Manitoba, that, if strengthened, could optimize management of COVID-19?
4. What are the data infrastructure and analytics strategies needed to strengthen the effectiveness of health system supply chain processes to support COVID-19 management?
5. What is the influence of federal government initiatives, from the perspective of provincial stakeholders, on provincial health system capacity to manage COVID-19?

## Methods

We used a case study design to understand Manitoba's response to accessing Personal Protective Equipment (PPE) supplies in the first wave of the global pandemic. Case studies can help researchers gain an in-depth understanding of contemporary phenomena

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including how and why policy decisions are made, how they are implemented, and the results they yield.<sup>1</sup> A combination of in-depth, semi-structured interviews and document review were used to help answer the above questions. Questions noted each participant's role within the province's healthcare supply chain and the challenges encountered and how they were met, key issues, events, successes and failures, other influences, and follow-up questions to clarify responses.<sup>2</sup>

The response rate to an interview invitation amongst key players in government (Winnipeg Regional Health Authority, SHS, Government of Manitoba) was 60%; only those senior in the pandemic's Incident Command Team were unavailable for an interview. Anonymity was ensured and participants were sent an email invitation and an "Information about Participation in the following Research Study" was attached to each follow-up to the recruitment e-mail. The University of Manitoba's Health Research Ethics Board provided ethical approval for this project (HS24170:H2020:366)

Interviews were audio-recorded using Microsoft Teams (Microsoft Teams Version 1.2.00.8872:2021) and transcribed by an independent contracted transcriptionist. Direct quotations were edited only to improve readability. The analysis involved reviewing transcripts, coding, and categorizing text to identify topics and patterns that could be developed into themes, using N-Vivo to assist with organization of data (version 12, QSR International Pty Ltd., Cambridge, MA 2020). The themes were then used to help answer the above research questions.

## Findings

Ten persons were interviewed over the course of six weeks in the Fall 2020. The persons were from the healthcare supply chain (5) both regional and provincial; the frontline (4) including from public health, the provincial lab, a salaried physician and pharmacist lead; and, a provincial policy perspective.(1) Senior public health and SHS (transformation decision-makers) were unavailable for interviews during this time as wave two was ramping up. Follow-up interviews were requested with the original interviewees in December 2020 and three people responded; in addition, Doctors MB gave a confirmatory interview in January 2021.

### Supply chain processes and infrastructure

During the first wave of the pandemic, a fairly centralized infrastructure was observed to be operational with some supply chain visibility from source of product to hospitals and other agencies under the direct management of government. At the time of our study, visibility of the supply chain only extended to the institutional level and not to the patient-level. Supply chain infrastructure also did not include centralized inventory management. Fee-for-Service (FFS) physicians, dentists, and others were not included in governmental PPE distribution; they were "on their own" for sourcing and procuring needed PPE as it was decided that their fee structure should cover these supplies.

Centralization of supply chain processes and infrastructure was incomplete at the beginning of the pandemic. The

province's healthcare system (structure and processes) was in the midst of an organizational and functional transformation as the pandemic was declared. Before the pandemic, the healthcare supply chain in Manitoba (sourcing, procuring, distributing, and utilization) was managed mostly by the province's largest health region: the Winnipeg Regional Health Authority (WRHA) with some local purchasing by the other four, mainly rural health authorities. The Government of Manitoba (GOM) had also just established (November 2019) a new Procurement and Supply Chain division under the Minister of Finance/Central Services in order to centralize and consolidate supply chain functions for all public agencies in the province (not just Health). "*Who did what*" changed after the pandemic was declared as vast amounts of money were needed to purchase sufficient PPE on the open market. After one month, GOM had spent \$400 million and the WRHA/Shared Services had spent \$15 million on procuring PPE.

As a result, the GOM's Procurement and Supply Chain division stepped up to draft the contracts and purchase the needed access to large amounts of PPE well beyond the WRHA's capacity to order under a limited budget. The WRHA took the lead on the sourcing of PPE that met Canadian standards for use. In addition, involving the leaders of the regional and provincial supply chain organizations on the province's incident command team meant that there was quick recognition of what was needed to ensure that the province met the requirements for providing PPE (eg, gowns, N95 respirators, procedure masks, face shields, and gloves).

### Procurement models, approaches, and policy frameworks

Another observation by participants was that a mix of domestic and international sources meeting Canadian standards for PPE is essential during a pandemic. Further, involving the primary payer (GOM), infection prevention and control (IP&C) and clinical experts in procurement decisions meant there were less surprises related to potential shortages. From this, participants came to the conclusion that multi-source contracts for essential PPE are required when there is a risk of breaks in the supply chain.

The WRHA's supply chain team had, as a practice, the habit of scanning the environment to understand any challenges which might present a problem to the healthcare supply chain. As a result, they had begun to increase the amount of PPE on-hand well before the pandemic's declaration. In January, the team went from holding 30 days supply of PPE to 90 days supply. However, responsibilities quickly needed to be broadened because of the millions of dollars involved and because GOM had trade agreements to abide by.

*(At the end of March 2020)...there was a decision made that central services (GOM) was going to become more involved in managing the healthcare supply chain and in enabling the government to make policy decisions on who has the priority to receive PPE as well as ensuring PPE supply was maintained enough to respond to people who were acutely ill. (By having GOM take a lead role in healthcare supply chain management) a balanced and sufficient supply could be assured to be able to meet the demands and needs of other governmental services, whether that be through family services, group homes, justice, education, etc... (Healthcare Supply Chain Interview)*

Two things happened to the usual procurement process at the beginning of the pandemic. The first was that tendering stopped and contracts were extended to June 30, 2020 and, if there was no contract, items were sole-sourced and purchased. The second was that, in addition to bolstering the supply of available PPE, the WRHA's supply chain team immediately took to sourcing items by jumpstarting local manufacturing of key products: hand sanitizers (to WHO standards), IP&C-approved face shields, throat swabs (3D printing), reusable Level-1 gowns (from Canada Goose), and procedure masks (Hutterite colonies). The lasting effect of this second effort was that supply chain staff now have expertise in developing specifications for the manufacture of new products.

The healthcare supply chain teams from the WRHA/Shared Health and the government's Procurement and Supply Chain division may have been the agencies procuring, sourcing, and distributing PPE, but they were doing this under the powers given to the Chief Public Health Officer when the threat to public health exists because of an epidemic. For example, public health took the lead role in determining the standards for use of PPE. Supply chain staff and SHS Chief Medical Officer, IP&C, and communications staff worked together to specifically describe the standards of use that PPE must meet and accordingly, how best to distribute the supplies. By June 2020, the Public Health Agency of Canada (PHAC) had taken over the role of ensuring that quality-based products met utilization standards in Canada.<sup>1</sup>

### **Manitoba's digital supply chain infrastructure (and processes)**

Supply chain infrastructure needs more maturity in Manitoba (eg, visibility to the point of patient care) to fully and efficiently cover the province in needed PPE. In addition, there is need for less a labourious method to input supplies ordered, received, and utilized in the system currently under use. The following speaks to the need for more digital maturity in the supply chain.

*I was asked plenty of times, how many contracts do you have in place and who are your suppliers and what's your top ten. I'm running Excel spreadsheets to do contract management and we manage roughly 3000 contracts here on Excel spreadsheets! It's mind boggling...(Supply Chain Leader)*

However, the ability to change (and have specific contract management software) is somewhat hampered by the lack of recognition by healthcare leaders and frontline workers of the importance of the supply chain in how it helps the system to survive. Respondents were hopeful this recognition had changed over the course of the pandemic.

Regardless, an effort to build digital infrastructure under one structure and "on the fly" was done in three stages.

*Initially what we did in the supply chain to digitally determine demand and track use of PPE was to combine three functions under one structure. The first one was our use of Excel to determine demand. We obtained data from an HR perspective and specifically from the union data, we were using to collapse the number of*

*healthcare unions. We looked at each employee working in each sector. So with that we know that in homecare they have 220,000 visits a month. We calculated backwards to determine how many visits they would have in a day. For nurse interactions, how many nurses in 12-hour time shifts work in a facility, and we were able to calculate back how many masks would be used; each person should have 2 masks or 4 masks a day, like 1 to come in, 1 after coffee break, 1 after lunch; 1 after another coffee break and so on, so 4 procedure masks a day. Then the calculation for doctors, so every single area of healthcare service delivery.*

*Our second scenario was to build a provincial ERP system by combining seven ERP systems under one operational file. We used Power BI (IBM), a business analytics program to do this. So what we were able to do is we were able to bring all the ERP systems from QHR, Great Plain, SAP, you know, into one system to get visibility on inventory and consumption rates.*

*The third thing we did at that point was to engage Deloitte to build a very sophisticated model to calculate our PPE needs as our epidemiology data on COVID-19 would change. From this effort we would be able to design dashboards (a tool to help track, analyze and display healthcare supply chain data). (Supply Chain Leader)*

With respect to having an infrastructure to analyze data, this was the intent of the above, that is, digitizing as much information as possible. However, the dashboards were in a rudimentary form when we gathered our data and it is not known what analytical strategies were eventually applied. It was clear in the Fall 2020 that a move to adopting SAP (a German company that develops software to manage business operations) province-wide as the inventory management system was underway. Tied to the development of infrastructure was the need for an automated distribution network. This was accomplished by using an already existing GOM platform, the Materials Distribution Agency (MDA) which was already under the control of the Procurement and Supply Chain division. With over 76,000 square feet of warehouse and 80 staff, the MDA adjusted to become a part of the healthcare supply chain.

### **The influence of federal government initiatives**

In the opinion of healthcare supply chain participants, the Public Health Agency of Canada did a good job of setting standards and determining which PPE products met the quality standards for safety and effectiveness. Health Canada on the other hand came up with a directive regarding respirators and then rescinded it which cost Manitoba and other provinces millions of dollars.

*...when the federal government came out and said KN95s are okay to substitute for N95 respirators we all went and bought millions and millions of dollars' worth. Then, the government changed its mind; they come back, like after we not only expended the money, we actually gave people 30% to 40% cash up front, and then did not ever see the product...we failed every KN95 (not on a percentage of filtration but on fit) and you don't get reimbursed. Like that's sunk money. (Supply Chain Leader)*

Finally, Manitoba's healthcare supply chain had a number of successes during the initial wave of the global pandemic. These include no healthcare professional who needed PPE went

without, centralized supply chain functions were in the midst of development and continued, many new processes were tried and survived, and a new province-wide digital network was developed and continues to improve its visibility.

### A word on leadership

Although the project did not have a specific research question around leadership, there were enough comments about leadership in our interviews to warrant a comment. Given the adaptation of government bureaucracy around sourcing from local producers procurement and contracting “on the fly” plus the creativity in using existing digital means to plan and manage the healthcare supply chain, leadership at the mid-decision maker level was less than traditional in its response to the pandemic. The actions of Manitoba’s supply chain leaders can be described as adaptive and effective.<sup>3</sup> Further and moving forward, there are alternative structures that supply chain leaders and, indeed, pandemic leaders could use to respond to challenging crises.<sup>4</sup> We recognize that senior leaders in public health and SHS were not interviewed for this study. However, there appears to have been tacit recognition of the healthcare supply chain’s efforts by the Government of Manitoba: the creation of a central pandemic warehouse and stockpile of personal protective equipment; and, the involvement of others outside of government—Precision ADM made swabs and members of Hutterite colonies sewed masks.<sup>5</sup>

### Conclusion

By adapting to one provincially led structure dedicated to the healthcare supply chain early in the pandemic, Manitoba was able to avoid major shortages in access to PPE. Leadership was focused on the possibilities for action and implementation rather than trying to respond within the traditional status quo structures and processes. As a result, few structural items other than the creation of an effective, province-wide digital network to visualize the healthcare supply chain are needed going forward. Centralization of many supply chain functions meant that alternative supply sources for PPE could be investigated more efficiently. In the end, government services requiring PPE were able to access it. However, other healthcare services only reimbursed and not managed by the government (fee-for-service

physicians and dentists) were on their own. Finally, Manitoba’s healthcare supply chain management and the learnings from the first wave of the COVID-19 pandemic (March–June 2020) will help contribute to a more strategic framework for healthcare supply chain implementation across Canada.

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