

Mobilizing Clinician Voices to Manage Health Supply Chain Disruptions Vital to Safe and Quality Patient Care

Anne Snowdon, Cindy Ly, Alexandra Wright and Saba Ghadiri

Abstract

This study examines the role of clinicians during supply chain disruptions and the impact of these disruptions on their capacity to deliver care to patients. Clinician leaders (physicians, nurses, pharmacists and regional health authority leaders) from seven Canadian provinces (Ontario, Alberta, British Columbia, Nova Scotia, Newfoundland and Labrador, Quebec and Manitoba) participated in co-design sessions to identify strategies to integrate frontline clinical expertise into supply chain management. A workgroup led by two clinician leaders (a physician and a nurse) defined the challenges of supply disruptions for clinicians (individuals delivering clinical care to patients, such as physicians, nurses and pharmacists) and identified the structural barriers that limit clinician participation in managing supply disruptions and in adapting care delivery through alternative care pathways and resource allocation. This paper presents a set of actionable clinician-led strategies to engage clinicians in supply chain management to ensure that clinician expertise informs supply management decisions and enables safe and quality patient care that is accessible when and where needed. Strategies include designating agencies responsible for clinician communication during supply shortages, building bilateral communication channels linking clinicians and system leaders, implementing standardized communication protocols to engage the workforce in supply chain management and mobilizing clinical expertise to inform supply disruption decisions.

Introduction

In 2023, more than 3,000 drug shortages were reported to Health Canada (2024c), resulting in clinicians across Canada having to adapt care delivery to patients when approximately eight products every day were in shortage. When the supply of health products is disrupted, clinicians must find alternative approaches to care, with few alternative products available to manage supply disruptions. The frequent and recurring supply disruptions in Canada compromise clinical decision-making and delays in treatment, which directly threaten patient safety (Canadian Pharmacists Association 2020). During the COVID-19 pandemic, clinicians experienced feeling abandoned as health systems limited access to personal protective equipment (PPE) and other critical supplies, improvising products in shortage and rationing care, which had significant and negative impacts on clinicians' ability to deliver care (Snowdon et al. 2024; Snowdon and Saunders 2021). Clinicians reported experiencing moral distress, loss of professional autonomy and erosion of trust in system leadership (Snowdon et al. 2024). Despite the profound consequences of product shortages on the capacity to deliver care to patients, healthcare supply chain teams often manage supply disruptions without the input or engagement of clinicians to guide and inform decisions on alternate care processes or products. In Ontario, the lack of clinical engagement during the COVID-19 pandemic contributed to the decision to divert critical supplies from non-hospital settings that were

experiencing high demands for care of patients with COVID-19 (Snowdon and Wright 2022). This decision was linked to the high mortality rates among seniors living in long-term care homes. In Nova Scotia, regional delays in supply distribution disproportionately affected rural and community-based providers who were not included in allocation planning (Snowdon and Saunders 2022b). In British Columbia, emergency stockpiles were managed centrally, but decisions regarding the allocation of products in shortage were made without clinician input, leading to reduced capacity to support clinicians delivering care to patients (Zhang et al. 2022).

To address this critical gap in clinician engagement of supply disruptions, the Supply Chain Advancement Network in Health Community of Practice (SCANH CoP), a national partnership grant funded by the Social Sciences and Humanities Research Council (SSHRC), advanced a co-design strategy to develop solutions to strengthen healthcare supply chain resilience. As part of this initiative, the Workforce Sustainability Workgroup was tasked with designing solutions to support engagement of clinicians in supply chain management to ensure that clinician expertise informs supply management decisions to ensure safe and quality patient care. Workgroup co-design sessions identified core barriers to clinician participation and generated a set of actionable strategies to meaningfully engage clinician expertise in the management of supply disruptions.

This paper presents four core strategies that emerged from the co-design sessions to support clinician engagement to ensure that clinical insights and expertise inform health supply chain management decisions. These strategies offer health system leaders an opportunity to mobilize clinician expertise, inform decisions about managing disruptions and protect the health and safety of both clinicians and patients and strengthen Canada's resilience.

Literature Review

The Canadian healthcare system delivers care to 2.96 million patients every year, with nearly 2 million healthcare workers who depend on the supply of health products such as drugs, supplies and medical devices to deliver care across all jurisdictions and settings (CIHI 2024; Statistics Canada 2025). Yet, Canada ranks among the top countries globally in experiencing the highest number of health product shortages with the longest duration compared with other countries (Pharma Compass 2023). In 2023, Canadian health systems experienced 3,098 drug shortages, which contributed to delays in treatment and increased workload burden on clinicians to adapt care processes to manage disruptions.

The current lengthy and frequent supply shortages may well worsen in the future, given the high uncertainty of global supply chains, geopolitical challenges and climate events that impact the access to and distribution of health

products for Canadian health systems (Department of Finance Canada 2025). Frequent supply shortages of long duration limit the ability of clinician teams to deliver care when products are not available, resulting in limitations in care delivery capacity to meet patient needs (Health Canada 2024b, 2024c; Snowdon et al. 2024).

Impact of Supply Shortages on Patient Care

The COVID-19 pandemic demonstrated significant product shortages that exposed systemic vulnerabilities in supply capacity to manage product disruptions, impacting both clinicians and patients during this global health crisis (Aiello 2021; Basky 2020; Boyle et al. 2020; Frangou 2020; Goodwin 2021; Snowdon and Saunders 2021; Snowdon et al. 2024). In the first year of the pandemic, healthcare workers represented 5.8% of Canada's 2.6 million COVID-19 cases, and 46 reported workforce fatalities associated with shortages of protective products required to prevent the spread of infection (CIHI 2025).

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In addition, supply constraints during the COVID-19 pandemic contributed to more than 14,000 deaths among staff and residents in long-term care homes (CIHI 2021; Fisman et al. 2020). Within months of the pandemic onset, one-third of community physicians reported that they had run out of PPE, and 90% of physicians felt anxious about being unable to secure PPE (Vogel 2020). Family physicians reported PPE being critical to support delivery of safe and quality care to their patients (Mathews et al. 2023; Snowdon et al. 2024). When PPE resources were scarce, clinicians reported feeling morally distressed, powerless and abandoned by system leadership (Dean et al. 2019; Rushton et al. 2022). Clinicians were excluded from decisions about product substitutions, leaving them to find ways to adapt care delivery without options or guidance to develop safe alternative care strategies. Clinicians reported a loss of professional autonomy to manage patient care delivery during product shortages as they struggled to fulfill their professional duty of care (Snowdon et al. 2024).

Similarly, acute care clinicians experienced fear and uncertainty as PPE shortages compromised both workforce safety and care quality (Snowdon and Saunders 2021). Although product allocation strategies were introduced to prioritize the use of products in shortage, clinicians were not consulted in product allocation decisions, which had the effect of stripping clinicians of control over care delivery processes and decisions regarding products in care. Erosion of professional autonomy was linked to lower job satisfaction, diminished well-being and

intentions to leave the profession (Cotel et al. 2021; Harvey et al. 2021; Meredith et al. 2022). Supply shortages are widely viewed as a contributing factor to workforce shortages, with Canada now projecting a shortfall of 117,600 nurses by 2030 and 78,000 physicians by 2031 (Canadian Heritage 2024).

Clinician Engagement in Supply Chain Management

When the supply of health products is disrupted and not available in care settings, there is no standardized approach to inform, consult or include clinicians in decisions to manage supply disruptions (Snowdon and Forest 2021). Clinicians have limited input into critical decisions about product substitutions or alternative care processes, which further limits health system capacity to deliver safe patient care during supply shortages (Snowdon and Wright 2022). Clinicians are often unaware of the shortages until a particular product is needed and is found to be in short supply, and clinician input into product substitutions or triage strategies is limited or non-existent (Snowdon et al. 2024). A number of studies have documented that clinician input into supply chain management of shortages was either inconsistent or entirely absent during the pandemic (Beaulieu et al. 2022; Metge and Islam 2022; Snowdon and Saunders 2022a, 2022b; Snowdon and Wright 2022; Zhang et al. 2022). The need to improve coordination and communication among public health leaders and healthcare providers has been well documented as a critical lesson learned from the pandemic experience in Canada (PHAC 2023).

Currently, there are no existing best practices or standards for clinician engagement in managing supply chain disruptions in Canada, and no evidence-based guidelines to support strategies for engaging clinician expertise in health supply chain decision-making (Health Canada 2024a). Disruptions in access to health products require clinicians to shift care delivery processes to accommodate shortages, including cancellations when products are not available for care procedures (Alberta Health Services 2022). During the pandemic, family physicians and acute care teams had little choice but to develop makeshift workflows, improvise care plans and substitute products with limited information or guidelines to support quality and safe care delivery (Mathews et al. 2024; Snowdon and Saunders 2021). Adaptive strategies were often emergent and context-specific, reflecting the self-organizing capacity of healthcare teams in response to rapidly changing circumstances (Thille et al. 2024). Despite the capacity to adapt to supply shortages, these efforts vary widely and place significant pressures on clinicians, limiting the effectiveness and sustainability of care delivery during supply disruptions (Dewar et al. 2020; Rivera et al. 2023).

While the risks that supply shortages pose to clinicians and patients are well documented (Aldrighetti et al. 2019; Golan et al. 2020), there is limited evidence of how health systems

can engage clinicians to support supply chain teams to manage the impact of disruptions on patient care outcomes. There are no best practice guidelines on how clinicians should be informed of supply disruptions, how clinician expertise can inform decisions on product substitution or how clinicians can be supported to adapt care delivery processes when products are not available.

The absence of communication mechanisms that effectively engage clinician input during disruptions leaves system leaders to make decisions to ration product allocation without clinician expertise to identify patients at greatest risk (Snowdon and Forest 2021; Snowdon et al. 2021). This study addresses this critical gap by identifying actionable strategies to mobilize clinician engagement to inform supply chain management of shortages across Canadian health systems. By mobilizing clinician expertise, health systems can better protect patient care and empower the health workforce to contribute to a more resilient supply chain in Canada.

Methods

This study was supported by the SSHRC Partnership Grant program with the mandate to engage partners to advance and strengthen the resilience of Canada's healthcare supply chain. A mixed-method Delphi design, comprising two phases established a workgroup of stakeholders with diverse expertise in health supply chain and clinical practice to co-design solutions to strengthen clinician engagement.

Workgroup participants were recruited from a national CoP, which included more than 60 organizations, including supply chain procurement, health systems, public health and industry. The study received ethics approval from the University of Windsor Research Ethics Board (REB #24-144). All participants provided informed consent prior to participation in each workgroup co-design session and stakeholder interview.

The first phase established a clinician-led workgroup to define the specific challenges and barriers limiting clinician engagement in managing supply disruptions. The workgroup strategy leveraged structured, multi-stakeholder working sessions informed by established principles of co-design and embedded problem-solving in health systems research (MacDonald et al. 2023). These sessions brought together leaders with diverse expertise, including patient care, healthcare policy and workforce development, to examine the barriers to clinician engagement during supply disruptions and inform the co-design of actionable strategies to enable clinical engagement. Members of the workgroup ($n = 25$) participated in repeated, iterative design sessions over 24 months. These structured engagement sessions focused on identifying challenges experienced by clinicians during supply disruptions and co-creating strategies to meaningfully engage clinicians in responding to disruptions to sustain quality and safe care

for patients. Participants included supply chain leaders, clinical professionals (e.g., physicians and nurses), regulatory representatives, government agencies and pharmacy executives. The dialogue and iterative nature of the co-design process reflected participatory inquiry grounded in real-world health system contexts (Greenhalgh et al. 2016).

In the second phase, semi-structured interviews ($n = 9$) were conducted with leaders representing seven provincial health systems (including Alberta, British Columbia, Manitoba, Newfoundland and Labrador, Nova Scotia, Ontario and Quebec), along with leaders in national pharmacy and regulatory policy. These interviews focused on identifying practices and initiatives in each jurisdiction to engage or inform clinicians during health supply disruptions. This second phase served to inform and validate the key insights and themes that had emerged during the workgroup sessions and to capture jurisdiction-specific strategies to support clinician engagement for managing supply chain disruptions.

This two-phase design enabled the workgroup to first define potential solutions for clinician engagement during supply disruptions and then examine clinician engagement across jurisdictions to further inform actionable strategies to support clinician engagement across diverse health system contexts.

Data analysis

A reflexive thematic analysis was used to analyze transcripts of both workgroup dialogue and interview transcripts, following the procedures outlined by Braun and Clarke (2021). Transcripts were reviewed iteratively by a research team to ensure immersion in the data. Coding proceeded in several stages: initial code generation, categorization of code clusters and identification of overarching themes. Themes were refined through feedback with workgroup members in subsequent sessions. The analysis aimed to identify actionable insights that could inform real-world implementation of clinician engagement strategies for supply chain decision-making (Greenhalgh et al. 2016). Themes were generated through collaborative discussions and meetings with workgroup members to deepen the understanding of the diverse perspectives and expertise, and also to validate themes with workgroup members. Four final themes were identified, representing crosscutting strategies to inform actionable approaches to meaningfully engage clinicians in product disruptions while preserving their capacity to deliver patient care.

Results

Consistent patterns across all participating Canadian jurisdictions emerged, highlighting a lack of clinician engagement in supply chain decision-making to manage supply disruptions. Four primary themes emerged from the data that illustrate this challenge.

Theme 1: Absence of accountability for clinician engagement in managing supply disruptions

Results revealed an absence of accountability for communicating supply disruptions; clinicians become aware of supply disruptions through their day-to-day work routine, creating a reactive approach that leaves them unprepared:

Basically, the people who have first awareness are the pharmacists and/or pharmacy technicians because they are trying to manage their local inventory ... They are just doing their normal job and it is right there.
(Pharmacy leader)

Often times it will be when [physicians] write a prescription and the pharmacist receives it to process it, [then] they will call you back and say, “we are out of stock on this as [there is] a drug shortage on it.”
(Pharmacy leader)

This reactive approach fundamentally compromises clinician decision making. The current system limits clinicians’ ability to proactively prepare for management of product shortages, such as identifying product substitutions or adapting care protocols to meet patient needs:

If they are supported by a community pharmacy, then it will be the community pharmacist calling the doctor to say, “I cannot get the stock for a while. Here is what I recommend,” and the doctor will say, “yeah or nay.”
(Pharmacy leader)

In instances where clinicians are unaware of disruptions, they experience confusion from being forced to modify patient care practices without notice or explanation:

... they [clinicians] come to us as almost [as] a complaint because they are not aware necessarily [of a supply shortage]. And so, all of a sudden [they will ask], “Hey, how come, I am used to my tracheotomy set, and then now you have given me these two products? What are you talking [about]? How come no one told me? Why did no one tell me?” (Regional health authority leader)

Workgroup members consistently emphasized that clear accountability structures that enable and support clinician engagement are essential:

Accountability is really a key part of this. It is that whole responsibility and accountability so that there is absolute clarity on that. (Nurse leader)

Theme 2: "Top-down" supply allocation that is impervious to patient needs

A consistent finding was that resource allocation decisions are frequently made through top-down directives, with limited opportunity for clinician input into decisions on managing risks for patients. Prescriptive allocation strategies, such as control of product distribution during shortages, were described as excluding clinician expertise:

We [regional health authorities] control the provincial allocation, so if it is a really sensitive item and we get really, really short and there is no substitute, then we do control the allocation ... and then, of course, we are ... also talking to the ministry, especially with contrast media where we had to dial back the number of patients we were seeing [for diagnostic imaging testing]. (Regional health authority leader)

One clinician identified the use of product allocation strategies that ignore clinical risks or outcomes for patient care:

We do not believe in second-class patients nor first-class patients ... allocation is very crude and rudimentary in its approach. It is insensitive to case need, from both an acuity standpoint but also from a volume standpoint. And it is also insensitive to therapeutic alternatives. (Pharmacy leader)

Clinician engagement is particularly limited, yet critical, in rural, remote and Indigenous communities, where decision-making structures are less well developed and supply disruption consequences are amplified due to fewer resources or options available to manage supply disruptions:

... many of these rural and remote communities in Indigenous communities are now running their own health authorities, and so they are even more isolated ... these are the most vulnerable communities in terms of a supply chain disruption and probably have the least structure in terms of communicating and responding [to supply shortages] effectively. (Nurse leader)

Theme 3: Inequitable communication of information

Significant disparities in how supply shortage information reaches different healthcare settings emerged across a number of jurisdictions. While regional health authorities maintained direct communication channels with their hospital sector, clinicians in smaller or independent practices were often left uninformed:

With some of those smaller hospitals, they [clinicians] come to us as almost [as] a complaint because they are not aware necessarily [of a supply shortage] ... there are

1,000 facilities, right? So, there is only so much we can do. (Regional health authority leader)

The lack of digital infrastructure creates additional obstacles to communicating with clinicians most impacted by specific product shortages:

I think, right now, we need a system. A solution or a software and app or something that can actually do this communication. Pump out the communication ... I think that is what [we] could improve [on]. (Regional health authority leader)

The importance of centralized, timely and transparent communication emerged as a key strategy needed to support clinician engagement:

I would love to be able to put a supply disruption front-facing document on [shortage] insight that just feeds from my system into there, and it would be visible for anybody ... they [clinicians] know that they have one place to look. (Regional health authority leader)

Theme 4: The untapped resource of clinical expertise in supply chain decision-making

Participants consistently identified clinical expertise as an underused resource in supply chain management. Participants described clinicians as uniquely positioned to assess patient-level impacts of supply shortages:

The people who are actually at the care interface, who are implementing the plan of care, are the ones who are likely to be most impacted by any [product] shortage. (Nurse leader)

Participants described clinical expertise as exceptionally important to inform decisions on identifying product alternatives or alternative care processes. Yet, supply chain decision-makers do not have the clinical expertise to inform decisions on product alternatives:

The next question that comes to mind is what is the appropriate alternative [care options and products] and who needs to be involved [in decision-making]? ... [T]here needs to be some sort of networking infrastructure or vehicle established that allows these folks to come together and develop the appropriate awareness and to develop relevant solutions for the intervening time. (Pharmacy leader)

Participants emphasized that clinical insights could inform proactive rather than reactive supply management:

... you need to have at the ready where your alternate [products] are if something goes down that is a major supply chain [disruption] ... You cannot really be scrambling to figure that stuff out [once the supply disruption has begun]. (Physician leader)

Participants identified professional associations as existing infrastructure that could be accessed as channels for communication to enable and facilitate clinical engagement, citing the comprehensive reach to members that is common to most professional associations:

I know industry and industry associations have been around the table of some of these meetings, but I do not think you can do this without them. (Workforce association leader)

A dominant theme among participants was the recognition of the need for systematic approaches to clinical engagement to address the inequities of communication identified in many jurisdictions:

[I wonder] whether there is an actual ability for a checklist-type thing ... that gets to the communication considerations that were just raised. (Physician leader)

The absence of clinician engagement in the management of supply shortages led to a number of insights, such as identifying the workforce groups that need to be notified and strategies to communicate supply disruption information to them. The clinician groups that bring important expertise to managing supply disruptions were described:

... I am thinking of nurse practitioners, physicians, including GPs [general practitioners] and relevant consultants [specialties] ... And then any of the other medical or clinical specialties that are authorized to prescribe (Pharmacy leader)

Several participants pointed to regulatory bodies as potential channels to support outreach and engagement with clinicians:

With regard to the regulatory bodies, I think without a doubt, certainly for medicine, the [regulatory] colleges have the best account of their active, practicing members. (Medical association leader)

Associations of clinical professions were viewed as offering a direct communication channel for each group of clinicians who work in healthcare systems.

Workforce Strategies to Strengthen Capacity for Care Delivery During Supply Disruptions

The outcome of the workgroup co-design processes revealed actionable strategies to support clinician engagement in the management of supply disruptions. Workgroup participants determined that effective clinician engagement during supply disruptions required four foundational elements, which are summarized in Table 1.

Discussion

This study revealed a lack of infrastructure and accountability to mobilize clinical expertise to inform supply management decisions, focused on the health and safety of both patients and clinicians. The absence of leadership accountability to engage clinical expertise during supply chain disruptions has a number of consequences. This accountability gap leads to delayed communication, ad hoc workarounds and forcing clinicians to deliver care without essential insights and information on product shortages. Participants believed having designated entities (e.g., regulatory bodies, professional associations) responsible for clinician communication during supply shortages would ensure that clinicians are empowered with the necessary information to support care decisions and protect those most in need. When health systems are accountable for communicating with their health workforce, clinicians report feeling reduced moral distress and enhanced clinician confidence in system leadership (Gautier et al. 2023; Geerts et al. 2021).

The second issue is the a priori, top-down product allocation directives that exclude clinician input and do not account for risk or impact on patient safety. This exclusion creates particular risks for vulnerable populations, especially those in rural or remote communities who possess unique population-specific needs (Anaraki et al. 2022; Waddell-Henowitch et al. 2021). When workforce engagement is absent, clinicians experience greater anxiety, burnout and detachment from institutional priorities (McGinn et al. 2024; Rosen et al. 2022). By enabling clinician voices to engage in supply allocation decisions, clinician autonomy to make patient care decisions is protected and supported by system leaders, which is associated with workforce retention (D'Alessandro-Lowe et al. 2024).

Inequitable communication across healthcare facilities or systems undermines the capacity of clinicians to deliver equitable care. Findings revealed significant disparities in how notifications of supply shortages are delivered to different healthcare settings (e.g., smaller hospitals and private practice), creating an uneven landscape where some clinicians lack the needed information to deliver quality and safe care. Communication disparities contribute to an erosion of their professional autonomy, as clinicians without timely information cannot adequately prepare for shortages or adapt care

TABLE 1.**Actionable strategies and their implications for clinician workforce engagement during supply disruptions**

Finding	Actionable strategy	Clinician workforce implications
Absence of accountability for engagement of clinicians to inform supply management of disruptions	Accountability for clinician engagement: designated roles and entities responsible for clinician communication during supply shortages. Clearly defined accountabilities for timing, type of information and clinician engagement to support care delivery	Increased trust in health systems reduces uncertainty and enables clinicians to make informed, timely decisions on care delivery with confidence during shortages
Lack of clinical expertise in supply chain decision-making	Mobilize clinician expertise to inform management of supply shortages to proactively manage the health supply chain (e.g., determine alternative products and care processes before a disruption) and mitigate risks for patients	Enables clinicians to plan care proactively, rather than reactively, while trying to manage care delivery during product shortages, informs management of supply disruptions focused on needs and risks for patients, reduces the burden on clinicians at the point of care to support quality and safe patient care and overcomes gaps in expertise among supply chain teams
Inequitable communication of supply disruptions	Standardized clinician engagement protocols: design consistent protocols and standardized communication channels to ensure that communication reaches all relevant clinician providers, regardless of the type of care setting (e.g., long-term care, hospital or home care)	Promotes equity, ensuring that all providers, especially in Indigenous and underserved settings, receive timely, accurate information, allowing time for clinicians to engage and inform changes to care protocols to mitigate risks to patients, minimize confusion and improve capacity to deliver quality care
"Top-down" supply allocation impervious to patient needs	Clinician engagement is supported by bilateral forums for communication with system leaders: create communication channels linking clinicians and system leaders for engagement and contribution of expertise to supply management decisions during product disruptions	Enables direct and clear channels of communication for clinicians to engage with system leaders to identify at-risk populations and manage supply disruptions effectively

protocols to protect their patients (Snowdon et al. 2024). Health systems have the opportunity to advance strategies to ensure that communication reaches all relevant clinicians regardless of care setting, allowing time for clinicians to adapt care to mitigate risks of supply disruption for patient care. Embedding clinician communication is not only a supply chain best practice but a strategic imperative for workforce empowerment, patient safety and health system resilience.

Finally, clinicians have the expertise and are best-positioned to determine care alternatives and product substitutions that ensure quality and safe care, yet their knowledge is untapped due to an absence of a communication strategy that mobilizes clinicians' voices. Supply chain resilience requires supply logistics optimization that is informed by clinician expertise to ensure that the management of supply disruptions prioritizes safety for patients and the clinician workforce to preserve and protect clinician autonomy to deliver care to patients. Clinician engagement in supply management decisions (e.g., alternative products and care processes) can build proactive, rather than reactive responses, to supply disruptions, which strengthens the quality and safety of care, while also

reducing the moral distress for clinicians who must deliver quality care within situations of supply shortages (Dewar et al. 2020; Rivera et al. 2023). Meaningful clinician engagement in managing supply shortages gives voice to and acknowledges the critical role of clinical expertise that instills leadership accountability and equitable communication where both system leaders and clinicians are empowered to fulfill their duty of care to Canadians.

Future Directions

Advancing supply chain resilience requires building effective channels of communication that engage supply chain teams and clinicians to ensure that management of supply shortages focuses on the protection of both patients and clinicians at the end of the health supply chain. Professional associations are well-positioned to serve as the key facilitators to design communication strategies to inform and engage clinicians by leveraging their existing infrastructure to create a robust strategy that leverages the voice and expertise of clinicians and supply chain teams to inform the management of supply shortages. As Canada considers a national credentialing system for

the health workforce, communication pathways across all jurisdictions may be an important future opportunity to advance communication tools to support clinical engagement and inform the management of supply disruptions across multiple jurisdictions.

The absence of clinician engagement among supply chain teams may be a key factor that has contributed to supply chain fragility in meeting the demands for patient care delivery during supply disruptions. Organizations such as Accreditation Canada who already collaborate with government agencies, regional health authorities and standards organizations have an opportunity to integrate clinician communication and engagement requirements into existing performance assessment frameworks, building on their established infrastructure for quality improvement.

Professional regulatory bodies maintain comprehensive clinician registries and are well-positioned to enable direct communication with clinicians during supply disruptions. Regulatory bodies offer a strategic asset for developing system-wide engagement strategies that address the communication inequities identified in this study. Canada's health systems could readily advance standards for clinician engagement

during supply disruptions that reinforce the accountability structures, autonomy of clinician practice and communication strategies that are essential to protecting the health and wellness of all Canadians.

Conclusion

The health supply chain is the foundational infrastructure in health systems that ensures that clinicians have access to the health products (e.g., medications, medical devices and supplies) needed to deliver effective and safe patient care. Supply chain resilience requires razor-sharp focus on the end point of the health supply chain, which is the health and wellness of patients and the health workforce. Effective engagement of clinician expertise to guide and inform management of supply disruptions is fundamental to supporting clinician autonomy to deliver quality and safe care. Clinician engagement in the management of supply disruptions strengthens supply chain resilience by prioritizing patient and clinician health and protecting Canada's capacity to deliver safe, high-quality care when and where needed. **HQ**

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About the Authors

Anne W. Snowden, BScN, MSc, PhD, is the scientific director and chief executive officer of Supply Chain Advancement Network in Health, an international knowledge translation platform that engages health system leaders and supply chain experts to advance global capacity, to adopt and scale best practices in the healthcare supply chain to offer traceability of products and care processes from bench to bedside to patient outcomes. She is a full professor of Strategy and Entrepreneurship at the Odette School of Business, University of Windsor, in Windsor, ON. She can be reached by e-mail at anne.snowdon@uwindsor.ca.

Cindy Ly, MA, is a research analyst at Supply Chain Advancement Network in Health, University of Windsor, in Windsor, ON.

Alexandra Wright, PhD, is the research director of Supply Chain Advancement Network in Health, University of Windsor, in Windsor, ON. She received her PhD from the Dalla Lana School of Public Health, Institute of Health Policy, Management and Evaluation at the University of Toronto in Toronto, ON.

Saba Ghadiri, B.Eng., MA, is a research analyst at Supply Chain Advancement Network in Health, University of Windsor in Windsor, ON.