The Conference Board of Canada

Different Is Necessary

Approaches to Advance Value-Based Procurement in Canada

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Key Findings

- In this second instalment of our three-part research series on value-based procurement (VBP), we showcase best in-class methodologies that can support the implementation and scale of VBP in Canadian healthcare.

- In Europe, contracting authorities have been successful in VBP practices by using the most economically advantageous tender (MEAT) approach, with 68 per cent of medical technology tenders across 11 countries using MEAT instead of the lowest-price approach between 2016 and 2019.

- In Canada, there is currently no mechanism for identifying and reporting the procurement approach taken by provincial, regional, and local healthcare contracting authorities.

- Still, different types of initiatives are advancing the integration of system-level VBP across the country. Our research highlights four scalable methodologies that can help increase the value of healthcare investments at different procurement levels.

- The four examples featured were found to generate considerable value in the form of financial and non-financial advantages for the contracting authority as well as benefits for key stakeholder groups including patients, providers, hospitals, healthcare systems, and the broader society.

- Each methodology also provides solutions to help overcome the most pressing barriers limiting the adoption and scale of VBP in Canada. These solutions include data and measurement as well as pathways to public–private partnerships.

- By addressing barriers, Canada can accelerate and monitor progress toward adoption of VBP approaches that value healthcare investments in terms of patient outcomes, clinician experience, and system sustainability.

- The more our health systems are open and committed to learning from best-in-class methodologies supportive of VBP practices, the more Canada can realize significant value for a range of stakeholders.

VBHC Canada is engaging with an advisory board of pan-Canadian leaders to elevate the topic of VBP as a key element of applied value-based healthcare (VBHC) efforts in Canada. This research series sets the foundation for effective and scalable adoption of VBP policies, regulations, and practices in Canada.

The Value Imperative

In *Setting the Stage: The Status of Value-Based Procurement in Canada,*[1] we illustrate the global and Canadian momentum toward taking a value-based approach to the procurement of health technologies and services. Value is defined as achieving the best patient-centred clinical and operational outcomes at the lowest total cost over the full care cycle.

This is a big shift from the traditional approach of focusing on the lowest possible acquisition price. Across Canada, trail-blazing policies, legislation, and new contracting practices are laying the foundation for the application of value-based procurement (VBP).[2] This advanced approach to procurement is a key pillar of value-based healthcare (VBHC) approaches and encompasses funding of healthcare services, the acquisition of technologies and services, and outcomes reporting.

Many leaders in healthcare consider VBHC, inclusive of applied VBP practices, as an important solution to some of the most pressing issues threatening the sustainability and resiliency of Canada's healthcare systems and supply chains. Key challenges include soaring inflation rates and healthcare costs, provider satisfaction and retention at an all-time low, and ongoing impacts from surgical backlogs and other pandemic-related disruptions.

"We need to find some ways—not just through taxpayer dollars—to catch up on surgical backlogs. By reinvesting the savings generated through VBP, we avoid having to invest more net new resources to help pay for some of the necessary augmentation of care."

Arden Krystal, President and CEO, Southlake Regional Health Centre

An important culture shift is also needed to ensure that Canada's medical technology ecosystem is strong enough to meet the needs of the population and offer innovative solutions to the most pressing health system issues. While the imperative for greater adoption and scale of VBP is undeniable, several barriers currently limit its use in Canada.[3]

1 Gagnon-Arpin and others, *Setting the Stage.*
2 Inclusive of provincial, regional, and local administrative leadership and governance.
3 Gagnon-Arpin and others, *Setting the Stage.*

The situation is very different in Europe. The 2014 EU Public Procurement Directive encourages contracting authorities to award contracts based on the best price/quality ratio rather than the lowest price.[4] This is done by assessing tenders using the most economically advantageous tender (MEAT) approach. A 2020 analysis by IQVIA revealed that, between 2016 and 2019, an average of 68 per cent of medical technology tenders from 11 European countries used the MEAT approach instead of the "lowest price." Use peaked in 2017 with close to 73 per cent of tenders categorized as MEAT. Country-specific levels varied significantly, ranging from over 90 per cent in France to almost none in Slovakia.[5]

In Canada, there is currently no mechanism to identify the procurement approach taken by provincial, regional, and local healthcare contracting authorities. Anecdotal evidence suggests that the use of VBP is low in most parts of the country.

Supporting VBP Adoption in Canada

Different types of initiatives are advancing the integration of system-level VBP in Canada. While such initiatives are few and far between, we can learn a lot from how innovative procurement approaches and supporting methodologies and frameworks are increasing the application of VBP in Canada. Specifically, we can learn the way they are operationalized and drive value for patients, clinicians, and system stakeholders, and collectively bring forward solutions to tackle common barriers to VBP adoption. Our research highlights four scalable approaches that can help increase the value of healthcare investments at different procurement levels. (See Exhibit 1.) We also explore the current momentum toward supply chain centralization and transformation using best practices such as category management, digitalized inventory management, and advanced analytics.

4 EUR-Lex, *Directive 2014/24/EU of the European Parliament.*

5 IQVIA, *Public Procurement in the MedTech Sector in Europe.*

Exhibit 1
Case Studies of VBP-Supportive Methodologies by Procurement Level

1. Hospital unit	2. Hospital program	3. Regional	4. Provincial
Improving patient safety using the MEAT VBP Framework	Competitive dialogue at the Southlake Cardiac Program	Eastern Health's VBP policy and practices	Ontario's procurement of cardiac devices

Source: The Conference Board of Canada.

The four methodologies analyzed were found to generate considerable value in the form of financial and non-financial advantages for the contracting authority and of benefits for key stakeholder groups including patients/population groups, healthcare providers, hospitals, healthcare systems, and society at large. (See Exhibit 2.)

Each applied methodology provides solutions to help overcome the most pressing barriers limiting the adoption and scale of VBP in Canada as identified in *Setting the Stage: The Status of Value-Based Procurement in Canada*.[6] The methodologies also address common barriers. (See Exhibit 3.)

While some barriers are unique to certain procurement levels (for example, hospital programs face barriers related to hospital system finance models), the four methodologies tackle the following three barriers effectively: data and measurement; pathways to public–private partnerships; and professional capacity to lead, structure, and monitor VBP initiatives. In the third instalment of this research series, we dig deeper into solutions and strategies to overcome these barriers and effectively operationalize system-level VBP across procurement settings.

6 Gagnon-Arpin and others, *Setting the Stage.*

Exhibit 2
VBP Outcomes and Benefits for Patients and Other System Stakeholders

Patients/population groups	Providers	Hospitals	Healthcare system	Society
• Satisfaction • Wait time to access services • Recovery time • Rehospitalization • Reoperation • Adverse outcomes • Activities of daily living and functional quality of life • Mortality • Morbidity • Access to innovations • Access to care closer to home	• Engagement and input • Point of care burden • Handling, functionality, and training • Access to innovations • Satisfaction • Recruitment and retention	• Total cost of care • Downstream treatment costs • Rehospitalization • Access to innovations • Efficiency of clinical workflows • Evidence-based patient care pathways • Resource utilization efficiencies • Clinical excellence • Equity in service delivery and warranty performance	• Access to care • Wait times for services and procedures (diagnostics, treatment, care) • Product traceability • Patient safety • Clinical experience • Health equity • Capacity • Continuum of care and transitions in care (from hospital to the community) • Stakeholder collaboration	• Economic productivity of patients and informal caregivers • Research and development • Adoption of innovations • Sustainability (removal of materials, waste management)

Source: The Conference Board of Canada.

Exhibit 3
Methodologies Examined Address the Most Pressing Barriers to VBP Adoption in Canada

	Pressing Barriers to VBP Adoption					
VBP-supportive methodologies (procurement level)	**Health and hospital system finance models**	**Provincial funding models**	**Data and measurement**	**Policy and legislation**	**Pathways to public–private partnerships**	**Professional capacity to lead VBP**
1. Improving patient safety using the MEAT VBP Framework (hospital unit)	✓		✓		✓	✓
2. Competitive dialogue at the Southlake Cardiac Program (hospital program)	✓		✓		✓	✓
3. Eastern Health's VBP policy and directive (regional)		✓	✓	✓	✓	✓
4. Ontario's procurement of cardiac devices (provincial)	✓	✓	✓		✓	✓

Source: The Conference Board of Canada.

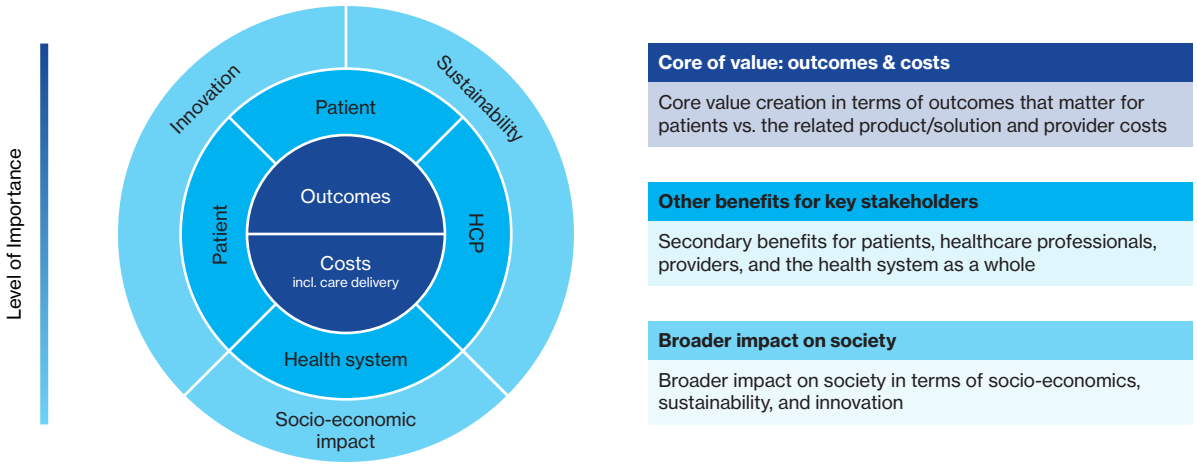
Methodology #1: Improving Patient Safety Using the MEAT VBP Framework

Tool for Mapping and Estimating Value

Developed in response to the EU Procurement Directive, the MEAT VBP Framework aims to support the systemic and organizational use and implementation of VBP in healthcare.[7] This framework joins other value-based approaches to procurement and can be supported by payment and vendor engagement methods such as competitive dialogue, bundled payments, provincial procurement (for multiple hospital organizations), and risk-sharing agreements.[8]

The framework can be adapted and applied pragmatically to generate insights into the value of medical, technical, therapeutic, care program/service innovations, or of everyday healthcare consumables. It guides contracting authorities and suppliers to consider value from the perspective of different stakeholders. The core layer features the "value equation" that is pointedly the health outcomes that matter to patients over the cost of delivering these outcomes, the central tenet to value-based healthcare (VBHC) approaches. The second layer has secondary benefits for key stakeholders including patients, healthcare professionals (HCPs), hospitals or other service delivery institutions, and healthcare systems. Finally, the third layer considers value from the perspective of the broader impact on society and the environment. (See Exhibit 4.)

Exhibit 4
The MEAT VBP Framework Has Three Layers of Varying Importance



Note: HCP = Health care professional.
Source: MedTech Europe, Gerecke and others, The Conference Board of Canada.

7 Gerecke and others, *How Procurement Unlocks Value-Based Health Care*.
8 Gagnon-Arpin and others, *Setting the Stage*.

Generating Value at the Hospital Unit Level

With VBP, value is measured as the best patient-centred clinical and operational outcomes at the lowest total cost over the full care cycle.[9] We applied the MEAT VBP Framework to a specific example: the procurement of innovative bloodstream infection prevention solutions in the intensive care unit (ICU). (See more details in Appendix B, Methodology.)

The innovative infection prevention solutions considered do have higher annual costs ($43,300 for a 25-bed ICU) than do products used in the current standard of care. However, the evidence demonstrates that the use of the innovative solutions significantly reduces both local site infections and central-line-associated bloodstream infections (CLABSI).[10,11,12] Our mapping exercise illustrates value across four domains of the MEAT VBP Framework. (See Exhibit 5). We estimate annual efficiency gains of $235,400 (for a 25-bed ICU) from avoided infections. These efficiency gains are due to non-incurred physician, hospital, and drug costs to treat infections using current standard of care technologies.[13,14] By considering costs over the full care cycle as well as robust clinical evidence, use of this innovative medical technology can reduce local site and bloodstream infections in the ICU. Our analysis estimates potential annual efficiency gains of over $192,000 for a 25-bed ICU (or $7,685 per ICU bed).

In practice, a VBP contract for an innovative medical technology could include risk-sharing or other assurances related to the realization of outcomes and efficiency gains for the contracting authority. For example, the level of vendor compensation could depend on the innovation being able to achieve agreed-upon outcomes. This approach requires access to data as well as the ability to measure the impacts/outcomes and attribute them to the innovation itself (rather than other quality improvement efforts). In addition to the potential efficiency gains, the innovation may offer considerable benefits to patients, healthcare professionals, hospitals, health systems, and the broader society.

The value estimated in this example is conservative as it does not include downstream healthcare costs from short- and long-term CLABSI complications such as sepsis and acute or chronic renal failure (with or without dialysis). It also does not include productivity losses from the extended hospital stay, disability from severe or repeated infections, or wage losses for informal caregivers.

9 Ibid.
10 Loft and others, “Health Economic Analysis.”
11 Kamboj and others, “Use of Disinfection Cap.”
12 Timsit and others, “Randomized Controlled Trial of Chlorhexidine Dressing.”
13 Canadian Nosocomial Infection Surveillance Program, “Device-Associated Infections.”
14 Laupland and others, “Cost of Intensive Care Unit-Acquired Bloodstream Infections.”

Exhibit 5
Applied Mapping of Value Criteria Using the MEAT VBP Framework

Outcome Focus
Reduced rate of ICU-acquired CLABSI and local infections: 34% reduced risk of intraluminal contamination and 63% reduced risk of extraluminal contamination

Cost of Care Focus
Materials and products: added costs from dressings, caps, antimicrobial protection solutions

Benefits to stakeholders
Patients: satisfaction, recovery time, functional quality of life, mortality, morbidity

Healthcare professionals: reduced point of care burden, improved handling, functionality, and training

Hospitals: reduced complications, total cost per case, long- term costs of treatment, rehospitalization

Healthcare systems: cost per capita, patient safety, clinical experience/excellence, opportunities for improved health equity, continuum of care and transitions in care (from hospital to the community)

Broader impact on society
Socio-economic impact: productivity losses, burden carried by non-professional caregivers

Innovation: development of new and improved technologies

Sustainability: reduced waste, removal of materials

Sources: Loft and others, "Health Economic Analysis"; Kamboj and others, "Use of Disinfection Cap"; Timsit and others, "Randomized Controlled Trial of Chlorhexidine Dressing"; The Conference Board of Canada.

Extrapolating Value to a National Scale – The Art of the Possible

The potential annual net value[15] of Canadian ICUs adopting innovative bloodstream infection prevention products could range from $5.3 million in a scenario where 15 per cent of ICU beds in Canada adopt a value-based approach to procuring this evidence-based medical technology. This is compared with a status quo scenario where hospitals are assumed to use the lowest price approach to procuring required standard-of-care technologies to support patient care. Health system value for ICUs in Canada is estimated at $26.4 million at 75 per cent adoption. (See Table 1.)

While this financial value might seem modest from the perspective of overall healthcare spending or of resources used by ICUs, it is generated by replacing just two standard-of-care products with more innovative ones. Furthermore, building in risk-sharing strategies and reductions or penalties into the vendor contract can safeguard against the products not achieving the desired outcomes and financial benefits. Using an outcomes-based, risk-sharing approach to procurement can also incentivize more contracting authorities in Canada to invest in evidence-based innovative medical technologies.

15 Net value is calculated as the difference between the direct healthcare cost savings from avoided bloodstream infections and the additional direct costs of purchasing the innovative medical technologies (compared with the current standard of care products).

Table 1

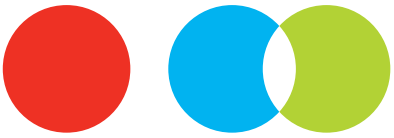
Extrapolating Value From the Scale and Spread of the Innovation

(number of intensive care unit (ICU) beds; annual efficiency gains by uptake scenario; 2020–21)

	Number of ICU beds by province, 2020–21	Annual efficiency gains by uptake scenario (% of ICU beds using innovation)			
		15%	25%	50%	75%
Canada	**4,591**	$5,292,275	$8,820,459	$17,640,918	$26,461,376
Newfoundland and Labrador	95	$109,511	$182,519	$365,038	$547,556
Nova Scotia	124	$142,941	$238,235	$476,470	$714,705
Prince Edward Island	24	$27,666	$46,110	$92,220	$138,330
New Brunswick	147	$169,454	$282,424	$564,848	$847,271
Quebec	1,306	$1,505,492	$2,509,153	$5,018,305	$7,527,458
Ontario	1,881	$2,168,323	$3,613,871	$7,227,743	$10,841,614
Manitoba	153	$176,371	$293,951	$587,903	$881,854
Saskatchewan	110	$126,803	$211,338	$422,675	$634,013
Alberta	374	$431,129	$718,548	$1,437,095	$2,155,643
British Columbia	472	$544,098	$906,830	$1,813,660	$2,720,490

Source: Canadian Institute for Health Information; The Conference Board of Canada.

In our analysis, potential value is estimated for varying degrees of technology adoption. Hospital size and other factors can mitigate the adoption of innovations and integration into patient care. Canada's academic hospital centres and regional tertiary care centres are likely best positioned to be early adopters of VBP approaches and, therefore, to realize near-term value.



Methodology #2: Competitive Dialogue at the Southlake Regional Health Centre Cardiac Program

A Successful New Procurement Model

In 2015, the cardiac program at the Southlake Regional Health Centre in Ontario, Canada (Southlake) received funding from the REACH[16] Innovation Procurement Funding Program. The initiative, a collaboration between the Health Technology Exchange (HTX) and the Ontario Ministry of Government and Consumer Services, aimed to demonstrate new ways of evaluating and procuring innovative medical technologies that address high-priority health system needs.[17] Southlake was chosen as one of five projects. It used the grant to test a procurement process that used outcomes-based and risk-sharing competitive dialogue, an approach supporting value-based healthcare approaches to service delivery.

With all major contracts expiring around the same time, Southlake had a unique opportunity to procure products, technologies, and value-added services for the entire cardiac program, which included four cardiac subspecialty streams. Before the initiative, Southlake's cardiac program had a high spending rate of around $25 million per year in technologies and supplies.[18,19,20] These were acquired through standard RFPs (requests for proposals) with narrow specifications and a focus on lowest price, rarely leaving room for dialogue between vendors and the hospital team.

With support from the REACH Program, Southlake engaged the vendor community in a two-phase competitive dialogue process. The goal was to define and design solutions tailored to the priorities of the cardiac program to strengthen its performance and improve both clinical and patient outcomes. The development of a vendor engagement strategy was also an important objective of the project. It was used to foster innovation, ensure alignment of clinical and program performance objectives, and provide structured and measurable pathways to value realization. Indeed, the relationships developed with vendors through the competitive dialogue process and beyond allowed for the design of targeted solutions and the inclusion of several "value-added benefits" (e.g., first access to new technology, research support, and others).[21]

To improve clinical outcomes and patient experience, a set of quality performance indicators (QPI) were developed using reporting targets from the Cardiac Care Network of Ontario (now CorHealth Ontario) and the International Consortium for Health Outcomes Measurement (ICHOM) Global Standards. These included various targets for congestive heart failure

16 REACH stands for "Resources for Evaluating, Adopting and Capitalizing on Innovative Healthcare Technology."
17 CIMTEC, "HTX REACH Program."
18 Deloitte, "Improving Innovation Performance."
19 Southlake Regional Health Centre, *Creating Value Through Innovation Procurement.*
20 In 2020, Southlake had the fourth largest cardiac program in Ontario and served a population of 1.8 million.
21 Southlake Regional Health Centre, *Creating Value Through Innovation Procurement*.

(CHF) and other patient cohorts.[22] QPIs were used to establish risk-sharing requirements included in each vendor contract. Specifically, vendors incurred penalties—such as having to reimburse the cardiac program—if QPI outcomes were not achieved.[23] This ensured the shared accountability (between the contracting authority and the vendor) for the realization of defined and agreed-upon program outcomes.

Generating Value at the Hospital Program Level

The competitive dialogue process used at Southlake achieved significant value not only for the cardiac program and the hospital, but also for patient outcomes and domains of healthcare provider experience. As for financial benefits, program costs were reduced by 35 per cent in 2017 compared with the base year (2014–15); this is equivalent to approximately $9 million per year ($10.5 million in 2021 dollars).[24,25] This was driven largely by the purchasing power generated by procuring supplies, technologies, and solutions at the program level instead of subspecialty stream. These savings are effectively reinvested to improve patient access to diagnostic services and treatments and to improve quality of care within the program.

Within one year, QPIs for CHF patients were on target for achieving the planned reductions in hospital readmissions, length of stay, and wait times to access the heart function clinic.[26]

These improvements were estimated at $162,000 in efficiencies. Several "value-added services" were also procured through the competitive dialogue process, such as patient and physician education tools, the creation of a heart failure patient pathway, equipment upgrades, and first access to new technology. At the hospital level, the initiative established capacity and foundations for future procurement projects and improved the relationship among the finance team, the procurement project team, and clinicians. The competitive dialogue and risk-sharing process and were found to encourage and support collaboration between the hospital team and vendors. This led to the development of targeted solutions to meet the needs of the program and helped achieve desired outcomes.[27]

22 HealthPRO, "Anything Is Possible."
23 Snowdon and others, "Case Study: Innovation Procurement for a Cardiac Program."
24 Deloitte, "Improving Innovation Performance."
25 Southlake Regional Health Centre, *Creating Value Through Innovation Procurement.*
26 Ibid.
27 Snowdon and others, "Case Study: Innovation Procurement for a Cardiac Program."

Methodology #3: Eastern Health's VBP Policy and Practices

VBP Model Paves the Way for Health Regions

Through its value-based procurement policy, Eastern Health—Newfoundland's largest health authority—is addressing an important barrier to the successful and widespread adoption of VBP in the region.[28] The policy was put in place to move away from awarding contracts based on the lowest price by shifting to a new innovative method that centres around value.[29] The policy is operationalized through a VBP model, which applies a value-based lens to decision-making processes. As stated in Eastern Health's value-based procurement policy, contracting authorities can chose from among several innovative approaches to the procurement of products, technologies, and solutions in healthcare, including the following:[30]

- fixed bundled payments
- hypothetical patient cases
- pretender product testing
- establishing disease registries
- risk-sharing
- competitive dialogue
- vested outsourcing

Many of these VBP approaches require building good relationships with industry partners. The policy is helping to develop and streamline effective public–private partnerships and build professional capacity for procurement teams to lead VBP projects.

"We learned a lot during the pandemic, when we couldn't get the products we needed because we had removed any remaining value [through price reduction], and there was nothing left in it. Really what these value-based contracts are, they're partnerships ... and you have to go into it with the mindset that your partner has to be successful. So that means your partner from the private sector, they have to make a profit."

Ron Johnson, Vice-President, Innovation and Rural Health, Eastern Health

Eastern Health has approximately 20 ongoing VBP initiatives. One project aims to address the high rates of diabetes in rural Newfoundland. The final value-based agreement with the successful vendor specified patient-focused, evidence-based clinical targets to be achieved, including a desired range for hemoglobin A1C levels and body mass index (BMI). The vendor's payments depended on demonstrated achievement of the specified patient outcomes. Ultimately, targets were met, and value was realized for the cohort of rural diabetic patients, the contracting authority, and the vendor.

28 Eastern Health, "Value-Based Procurement OPS-MS-110."
29 Eastern Health, "Value-Based Lens in Decision-Making."
30 Eastern Health, "Value-Based Procurement OPS-MS-110."

Recently, Eastern Health took a VBP approach to tackling pervasive issues with staff scheduling, patient flow, and patient cohorts remaining in the region's hospitals to receive alternate levels of care (ALC) because they cannot be discharged home or to community care settings. Looking for innovative solutions, Eastern Health sought a partner from the vendor community who would agree to solve these issues and who would be paid using the savings generated. Several bids were received from leading companies, and the agreement was set up using the following general parameters:

- eastern Health procured a $30-million software and change management solution, to be paid for out of the savings generated;
- a $3-million down payment/mobilization payment from Eastern Health was awarded to the successful vendor, with no additional payments to be made until savings were achieved;
- the savings opportunity was identified upfront through evidence and data analysis. As savings are achieved prospectively, 50 per cent is assigned to the vendor and 50 per cent is directed back to Eastern Health until the capital is paid off;
- once the capital is paid off, 25 per cent of any additional savings are assigned to the vendor to support continuing solution success while 75 per cent is assigned to Eastern Health.

Generating Value at the Regional Level

An important value-add for Eastern Health is building its experience operationalizing VBP. Supported by its VBP policy and model, this includes the development of new tools and agreements structured to generate innovative, successful, and sustainable health solutions for the region. Ultimately, the goal is to generate value for the population it serves through the improvement of population-based, clinical, and operational outcomes. Relatedly, a value-add of doing VBP for regional health authorities is the development of long-term strategies to improve healthcare practices and service delivery through innovation.

According to Ron Johnson, Vice-President at Eastern Health, the strategy to "defeat the marketplace" through major price reduction is a short-term strategy that can lead to a weak marketplace. The region felt the effects of this situation when it struggled to procure necessary equipment and supplies during the COVID-19 pandemic. After years of extracting the lowest price possible from vendors, Eastern Health's medical technology ecosystem was not strong enough to respond to the rapid surge in demand for products and protective equipment. Under its VBP policy and model, the health authority has since forged strong partnerships with the vendor community. It also established value-based practices that can drive sustainable value for the region and help it respond, mitigate, and potentially withstand future procurement or supply chain disruptions.

Methodology #4: Ontario's Procurement of Cardiac Devices

Provincial Value-Based Procurement

In 2018, the first provincial value-based procurement of implantable cardioverter defibrillator (ICD) and cardiac resynchronization therapy (CRT) devices was undertaken in Ontario.[31] The initiative was a collaboration among the Ontario Ministry of Health and Long-Term Care, CorHealth Ontario, Plexxus, and the province's 12 ICD-implanting centres. The goal was to design and deliver a VBP process that provided benefits to patients and helped to solve significant health system challenges. The project featured a strong governance model and extensive stakeholder engagement to define value from the perspective of patients, hospitals and providers, the healthcare ecosystems for ICD care, and vendors/suppliers.[32]

This engagement led to the development of an RFP centred on improving patient outcomes and costs across the full cycle of care for this patient cohort. Examples of product requirements that were important to patients and system stakeholders included device longevity (a longer battery life minimizes the need for multiple replacement surgeries over the patient's lifespan); compatibility of new implanted devices with magnetic resonance imaging (MRI) by ensuring leads (wires that attach the medical device to the heart) are from the same supplier; and integrated remote device monitoring services/compatibility.[33]

These elements and others were built into the scope of the RFP, which looked at the total cost of care over a patient's lifetime[34] by analyzing data on device longevity, life expectancy of Ontario patients by device type, the cost of implant surgery and subsequent devices, etc. The evaluation process included various stages that considered the province's goal of ensuring competitive pricing and setting a minimum standard of service/warranty, while allowing each hospital to undertake its own evaluation and recognizing differences in clinical requirements. The process also allowed each hospital to review a range of vendor-proposed solutions (e.g., warranties, at-risk services, etc.) and to negotiate directly for these solutions prior to finalizing the contract.

Some key elements that differentiated Ontario's provincial procurement of ICDs/CRTs from traditional procurement processes include the following:

- a focus on ensuring savings were reinvested into the patient pathway through a commitment from government;
- utilization of provincial registries and other Ontario data to build a validated model that predicted replacement volumes based on vendor-submitted longevity estimates by device and setting;

31 Plexxus, *Plexxus Leads Ontario's First Value-Based Procurement of ICD and CRT Devices.*

32 Klein and Bell, "Innovation in Procurement."

33 Plexxus, *Plexxus Leads Ontario's First Value-Based Procurement of ICD and CRT Devices.*

34 The approach used a total cost of ownership analysis, which is very different than looking at the lowest cost of a device over a single budget cycle (i.e., one year).

- multi-stage process that achieved provincial goals and allowed for site-specific solutions (e.g., risk-sharing, innovation agreements);
- common services requirements for all vendors ensuring that patients experiencing device challenges or failures are serviced regardless of which hospital they come to (i.e., if not their implanting centre);
- provincial clinical working group with representation from each site secured a commitment for devices and leads (wires that attach the device to the heart) to come from the same supplier, ensuring the use of MRI-compatible devices for new implantations moving forward, where clinically appropriate;
- a patient panel that was part of the procurement process to ensure patient needs were clearly heard and addressed, leading to a focus on longevity, MRI compatibility, etc.;
- remote device monitoring as part of the financial evaluation, to ensure that forthcoming recommendations from the Canadian Agency for Drugs and Technologies in Health (CADTH) and health technology assessments could be easily implemented at scale, where possible.

Generating Value at the Provincial Level

The VBP methodology used in the Ontario ICD/CRT project created financial and non-financial value for patients, providers and hospitals, the healthcare system, and the vendor/supplier community.[35] Savings were realized by purchasing a large volume of devices and solutions at scale rather than purchasing them for individual hospital sites or small groups of sites. Hospitals could then reinvest these savings into buying new technologies and improving access to services and patient care. While the financial benefits were considered large, they were incurred and recorded at the hospital/site level. The project assessment process did not continue long enough to include a post-hoc evaluation of savings realized locally or across the province.

In terms of value to patients, the project focused on achieving important outcomes identified through the patient engagement process. These included fewer lifetime device replacements, improved quality of life, and ease of follow-up. For the Ontario Ministry of Health and Long-Term Care, using VBP methodologies drives healthcare system sustainability and equity through improved value for money and access to care.[36] It also builds capacity to develop and implement value-based approaches to procurement in other areas, promotes effective public–private partnerships, and mobilizes supply chain transformation. (See Supply Chain Integration and Best Practices.)

35 Klein and Bell, “Innovation in Procurement.”
36 Ibid.

Supply Chain Integration and Best Practices

The COVID-19 pandemic has highlighted the central role that supply chains play in the ability of healthcare systems to deliver services and support public health initiatives. In Canada, Alberta Health Services' (AHS) centralized and digitally enabled healthcare supply chain allowed the province to adequately meet the unprecedented surges in demand for medical technologies, standard of care medical supplies and services, and even share some of its supplies with other provinces.[37]

Centralized and real-time data on COVID-19 outcomes in relation to inventory levels of critical healthcare products also allowed predictive analytics and kept procurement teams abreast of supply chain priorities. Having supply chain teams in Alberta integrated into senior leadership structures was another asset that supported effective decision-making.[38] These important elements have positioned AHS to further operationalize VBP approaches and practices and to generate value for patients and other stakeholders across the province.

In November 2020, Ontario announced its move toward a centralized, whole-of-government procurement model with the launch of Supply Ontario, anticipated to be fully operational by late 2023.[39] The goal of the new agency is to modernize public procurement across sectors (e.g., health, education, government, and social services) and to deliver more value and better outcomes for the population.[40] The current momentum toward supply chain centralization is supported by the literature. A recent study found that having a decentralized supply chain model—where teams at the regional or organizational levels (e.g., hospitals, primary care offices, long-term care facilities) source and manage supplies and products individually—increases supply chain fragility.[41]

At the federal level, the Government of Canada took a centralized and coordinated approach to the procurement of medical supplies and equipment to help provinces and territories meet urgent needs in response to the pandemic. Specifically, the federal government bought personal protective equipment (PPE) and medical supplies in bulk and initiated and supported strategies for domestic manufacturing transformation to meet local demand.

37 Snowdon, Saunders, and Wright, "Key Characteristics of a Fragile Healthcare Supply Chain."
38 Snowdon and Wright, "Digitally Enabled Supply Chain as a Strategic Asset for the COVID-19 Response in Alberta."
39 Ontario, Supply Ontario, "Our Progress."
40 Ontario, Supply Ontario, "About Us."
41 Snowdon, Saunders, and Wright, "Key Characteristics of a Fragile Healthcare Supply Chain."

In parallel with supply chain centralization, category management is gaining in popularity as one of many supportive best practices including digitally enabled inventory management, product standardization, and clinical engagement.[42],[43] The idea behind category management is to bundle similar products and services under "spend categories."

The approach is used to generate better buying power (through bulk purchasing) while keeping categories small enough to be manageable, to drive long-term value, and to improve supplier relationships.[44,45] Indeed, bundling similar products can support value-based approaches to procurement by helping organizations or broader provincial healthcare ecosystems to consider the total value of products and solutions (across patient/population groups and clinical departments in some cases) instead of focusing on the lowest cost.

42 Ibid.

43 Ivey International Centre for Health Innovation, *Health Sector Supply Chain Strategy & Management*.

44 Plexxus, "Suppliers."

45 Ivey International Centre for Health Innovation, *Health Sector Supply Chain Strategy & Management*.

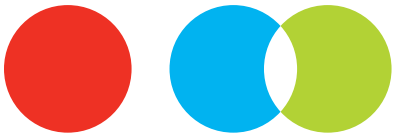
Scaling Effective Methodologies and Applied Frameworks

The economic and social imperative for increasing the value of our healthcare investments is stronger than ever. Different is necessary, particularly as Canadian healthcare systems respond to current challenges and the necessity of forging renewed foundations of governance, practice, and patient engagement. Indeed, taking a value-based approach to health service delivery and procurement is an important solution to some of the most pressing issues threatening the sustainability and resiliency of Canada's healthcare systems and supply chains.

While barriers to the broad adoption of VBP across Canada's health systems do persist, there are outstanding examples of methodologies and applied frameworks that support the integration of system-level VBP at all levels. These approaches are lighting the way to a value-oriented approach to procurement in Canadian health systems transformation.

Our research shows that an enormous amount of financial and non-financial value can be realized across stakeholder groups by shifting to VBP practices. Unfortunately, contracting authorities in Canada face a range of challenges that limit their adoption of VBP. There is currently no mechanism for identifying the procurement approach taken by provincial, regional, and local healthcare contracting authorities in Canada. This is of critical importance in terms of monitoring and reporting both the progress of VBP and VBHC in general, as evidenced by the significant value realized by high-performing health systems worldwide making this effort.

In the third and final part of this research series, we put forth a set of recommendations and goalposts for the effective and scalable adoption of VBP policies, regulations, and practices in Canada.



Appendix A
Methodology

A literature review and environmental scan were carried out to identify Canadian and international examples of best-in-class VBP-supportive methodologies. The four complementary examples that were selected were based on their level of procurement, potential for scale and spread, demonstrated impact, and availability of supporting data and information. Consultations with a 14-member advisory committee provided additional insights that helped guide content development for the case studies.

In the first featured methodology, the MEAT VBP Framework was applied to the hypothetical procurement of innovative bloodstream infection-prevention solutions in the intensive care unit. (See Table 1.)

The analysis used to present/estimate value and to extrapolate it to the provincial and national level leverages various published findings, assumptions, and inputs. Table 2 presents the additional practice and ICU-utilization assumptions used in the first case study. (See Table 2.)

Since the analysis is based on assumptions sourced from the published literature, variations in hospital-specific infection rates or other practice and ICU-utilization assumptions can impact the potential value that may be realized by individual institutions. For example, we use a pre-innovation baseline central-line-associated bloodstream infection (CLABSI) rate of 1.1 per cent and 0.4 per cent rate of local site infections.[1] We also assume a 34 per cent reduced risk of intraluminal contamination[2] and 63 per cent reduced risk of extraluminal contamination[3] with the use of the antimicrobial protection solutions. We used an average cost per case of CLABSI of $24,000.[4]

For the resulting value to be tangible and easier to interpret, the way we quantify and extrapolate value does not follow the same methodology that is used in actual tender evaluations. Examples of tender evaluation methodologies that leverage formula-based MEAT approaches include the Value for Money Index and Weighted Value for Money Index, where value is assigned a rating.[5]

1 Canadian Nosocomial Infection Surveillance Program, “Device-Associated Infections.”
2 Kamboj and others, “Use of Disinfection Cap.”
3 Timsit and others, “Randomized Controlled Trial of Chlorhexidine Dressing.”
4 Laupland and others, “Cost of Intensive Care Unit-acquired Bloodstream Infections.”
5 Commerce Decisions, “Calculating MEAT.”

Table 1
Summary of Clinical Context and Evidence

The issue: Intensive care unit (ICU) patients have a known risk of bloodstream infections	Patients in the ICU usually require a central line to get medication and fluids. For some patients, the line can develop an infection due to repeated contact with patient's skin due to bacterial colonization (intraluminally or extraluminally), leading to a central-line-associated bloodstream infection (CLABSI).[1] This is a serious complication that requires monitoring and immediate treatment and has been associated with prolonged ICU and inpatient length of stay.[2]
Status quo: Prevention measures	Proactive quality and safety procedures are in place to minimize and manage infection occurrence. Manual disinfection of the catheter hub at every manipulation (average 16 hub manipulations/patient/day) and use of I.V. advanced securement dressings without chlorhexidine gluconate (CHG) to protect the catheter entry site (of the central line).[3]
Innovation: Antimicrobial protection solutions	Use of disinfecting catheter barrier caps, an approved medical technology, removes the need to manually disinfect the hub and I.V. dressings with CHG, providing persistent antimicrobial protection at the (catheter) entry site.[4] Both solutions have been shown in clinical research to reduce CLABSI rates[5,6]and are recommended for use in clinical guidelines published by the Canadian Vascular Access Association[7] (CVAA) and the Infusion Nurses Society (INS).[8]
Value: Better outcomes offset higher cost of materials	Prevention of ICU-acquired infections lead to reduced patient morbidity and mortality, and savings from avoided hospital, physician, and drug costs.

Source: The Conference Board of Canada.

1 Canadian Nosocomial Infection Surveillance Program, "Device-Associated Infections."
2 Laupland and others, "Cost of Intensive Care Unit-Acquired Bloodstream Infections."
3 *In addition to other prevention measures (e.g., hand hygiene, sterile injection technique, prompt catheter removal, etc.).
4 3M Science, "Reduce Risk at All Access Points."
5 Kamboj and others, "Use of Disinfection Cap."
6 Timsit and others, "Randomized Controlled Trial of Chlorhexidine Dressing."
7 Canadian Vascular Access Association, CVAA Guidelines.
8 Gorski and others, "Infusion Therapy Standards of Practice, 8th Edition."

Table 2
Practice and ICU-Utilization Assumptions

Number of beds in ICU	25
Average length of stay (days)	3
Bed occupancy rate	100%
Proportion of patients with IV catheter	100%
Number of catheters per patient	1
Number of days between IV dressing changes	6
Number of hub manipulations/ patient/day	16; Comparator
3M™ Curos™ Disinfecting Cap	Innovation
I.V. Advanced Securement Dressing Without CHG	Comparator
I.V. Advanced Securement Dressing With CHG	Innovation

Source: The Conference Board of Canada.

Appendix B
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