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Healthcare Practice

The potential benefits of AI for healthcare in Canada

Integrating AI into Canadian healthcare could help simplify administrative work; improve system management, care quality, and patient and staff experience; and boost affordability via lower spending.

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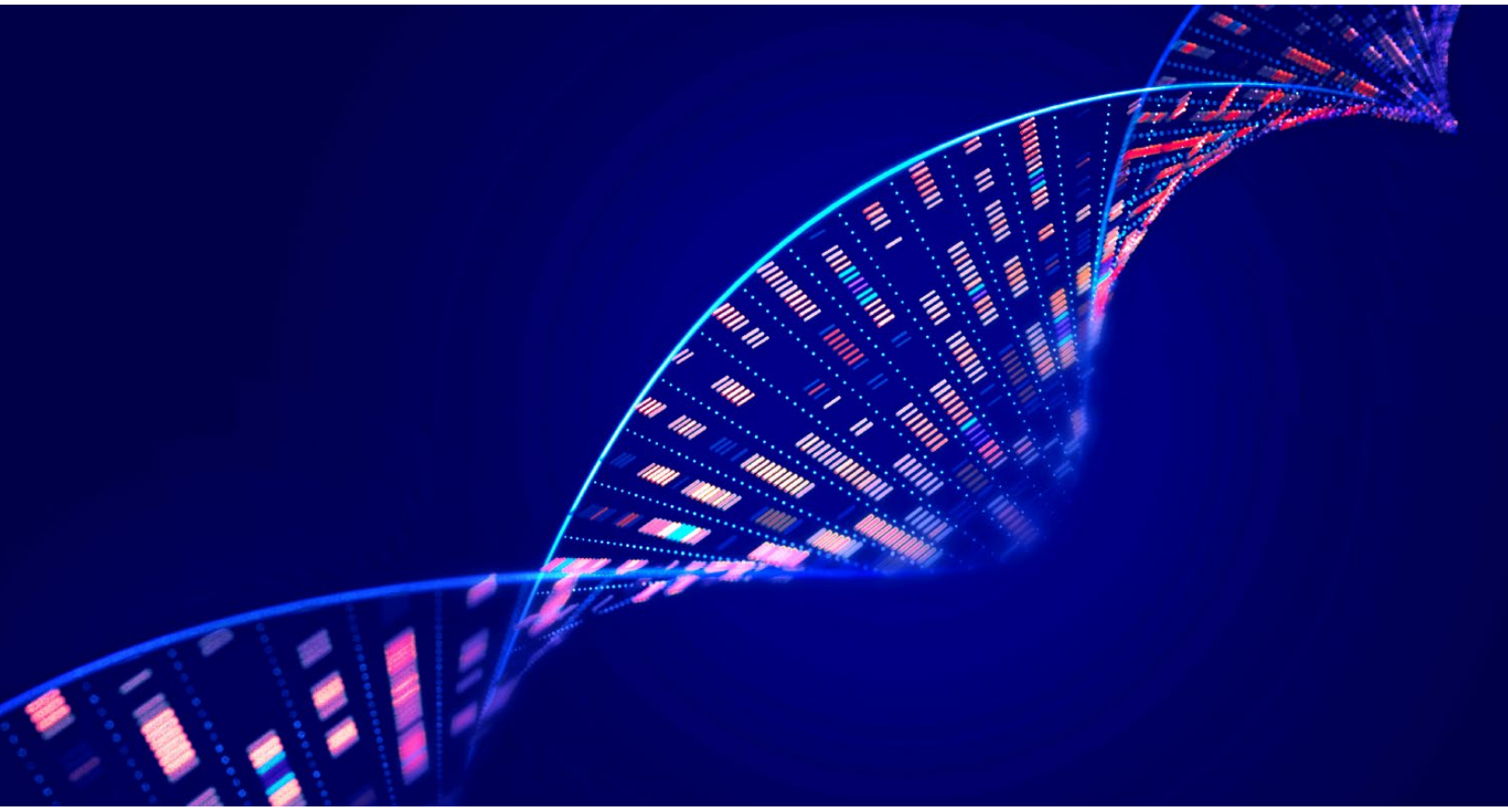

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Canada spends about CA $330.00 billion (US $245.66 billion) each year on healthcare, equivalent to 12.2 percent of its 2022 GDP.[1] Over the past ten years, Canada's annual healthcare spending has increased, on average, by about one percentage point more than its GDP growth (excluding 2020) of about CA $7,500 per capita each year. This makes Canada one of the top ten healthcare spenders in the world.[2] Despite this escalating spending, outcomes for Canadians are beginning to lag behind those of other countries. The Fraser Institute qualified Canada's performance as "modest to poor," ranking the country last or close to last on four indicators of timeliness of care, for example.[3] An aging population, the increased prevalence of chronic conditions, and the rising costs of personalized healthcare and medications will perpetuate this trajectory unless healthcare systems take steps to transform.

Transforming Canadian healthcare requires a holistic approach encompassing care delivery models, clinical productivity, administrative simplification, and technology enablement. Digital and analytics are increasingly part of the solution. In particular, integrating AI across the Canadian healthcare system—including in public health agencies, ministries of health, hospitals, clinics, home care, and virtual care—could help improve overall system performance. According to McKinsey analysis, at full-scale deployment, efforts based on known AI applications could allow Canada to lower its net healthcare spending by about 4.5 to 8.0 percent per year, increasing affordability without negatively affecting outcomes and experience. This will not be an easy undertaking, and it will require system leaders to address specific pitfalls that can get in the way of capturing the opportunity (see sidebar "Methodology").

This article examines how the Canadian healthcare system can modernize by capturing the full potential of AI. Successfully integrating AI into the healthcare system in a timely and ethical manner will require new models of collaboration, investment in foundational technologies and talent, and a scaled approach to risk management. By implementing the technology at scale and mitigating risk, healthcare leaders can realize five categories of benefits: improved quality of care, enhanced patient and staff experiences, simplified administrative work, lower spending, and optimized system management.

How AI could change Canadian healthcare

AI-based technologies can help promote safer and more-productive healthcare systems. Studies have shown that AI can enhance human capabilities in terms of accuracy, efficiency, and timely execution of medical and related administrative processes.[4] While AI is a vast and complex field, there are two types of AI that are currently in wide use in healthcare: machine learning and natural language processing. Machine learning uses computational techniques that learn from examples, such as predefined parameters, while natural language processing combines machine learning with statistical and deep-learning models to analyze images, video, human language, and other unstructured text; find patterns; and build structured outputs. Natural language processing can, among other tasks, interpret X-ray images or translate voice notes into text-based medical documentation.[5] Generative AI (gen AI)—defined as the use of algorithms to create new content, including audio, code, images, text, simulations, and videos—is another type of AI that will likely be increasingly used in the years to come.[6]

Investments in AI are rapidly increasing and will likely continue to affect healthcare. For instance, between April 2021 and March 2022, venture capital investment in AI ventures in Ontario was

[1] "National health expenditure trends, 2022—snapshot," Canadian Institute for Health Information, November 3, 2022.
[2] Among the 38 countries within the OECD. "Health expenditure and financing," OECD Stat, updated October 2023; "National health expenditure trends," November 3, 2022.
[3] Bacchus Barua and Mackenzie Moir, "Comparing performance of universal health care countries, 2022," Fraser Institute, November 10, 2022.
[4] Wiem Abdelbaki et al., "A systematic literature review of artificial intelligence in the healthcare sector: Benefits, challenges, methodologies, and functionalities," *Journal of Innovation & Knowledge*, January–March 2023, Volume 8, Number 1.
[5] Brandon Carrus and Nikhil R. Sahni, "Artificial intelligence in U.S. health care delivery," *New England Journal of Medicine*, October 12, 2023, Volume 389, Number 15.
[6] "What is generative AI?," McKinsey, January 19, 2023.

Methodology

To size the potential impact of AI on the Canadian healthcare system, we triangulated two approaches.

Bottom-up analysis

First, we conducted a bottom-up analysis leveraging McKinsey's Healthcare Digital Value Assessment (DVA). This assessment includes a detailed AI use-case library (segmented by category) that has been developed and pressure-tested with input from more than 80 healthcare experts and in-depth use-case research, including peer-reviewed articles (with more than 630 papers reviewed), published reports, expert input, and company and solution vendor websites.

Using this tool, our Canadian healthcare experts mapped use cases with a focus on the most relevant areas of impact: public health, care delivery, and capacity management. We reviewed use cases at the most granular level to ensure proper cross-system applicability. We ultimately excluded AI use-case categories on digital patient access, research and education, growth and revenue management, and supporting functions, given the limitations in current applicability of these use cases across systems and their limited impact, according to current estimations.

To estimate the total AI opportunity, we summed the net savings impact on total healthcare spending across relevant use cases. To do so, we mapped each use case to the relevant Canadian healthcare spending area (such as inpatient and outpatient costs), based on publicly available data. We then estimated the savings opportunity for each use case given the impact estimates within the database. We confirmed that the DVA tool adequately converted gross savings to net savings, factoring in the expenses needed to maintain AI. Based on the estimates of net savings impact documented in the database, we calculated the equivalent Canadian healthcare net savings opportunity, adjusting it to the entirety of healthcare spending where needed.

We defined net savings as the total gross savings minus AI operational annual expenses. All savings estimates are based on the use of technologies available today and their estimated impact, given published literature and expert input and validation. Savings assume that adoption reaches full scale.

Using this approach, we identified approximately 4.5 to 8.0 percent in potential Canadian healthcare spending net savings per year, given currently known use cases and without sacrificing quality or access.

Top-down analysis

Second, we verified the bottom-up findings against a working paper from the National Bureau of Economic Research (NBER) about AI and healthcare spending.[1] Using those authors' estimates for every high-level use-case category, we mapped relevant areas to the Canadian healthcare system. We factored in the unique differences between the US and Canadian healthcare systems, with estimates in net savings opportunity between 1 and 11 percent, depending on the relevant stakeholder group or area of spending. We included categories across hospitals, public payers, and other sites of care, excluding physician groups and private payers, given the differences in operating models across the two countries.

Given these two data points, we made a final conservative estimate of around 4.5 to 8.0 percent in net savings opportunity for the Canadian healthcare system.

[1] David M. Cutler et al., *The potential impact of artificial intelligence on healthcare spending*, NBER working paper, number 30857, January 2023.

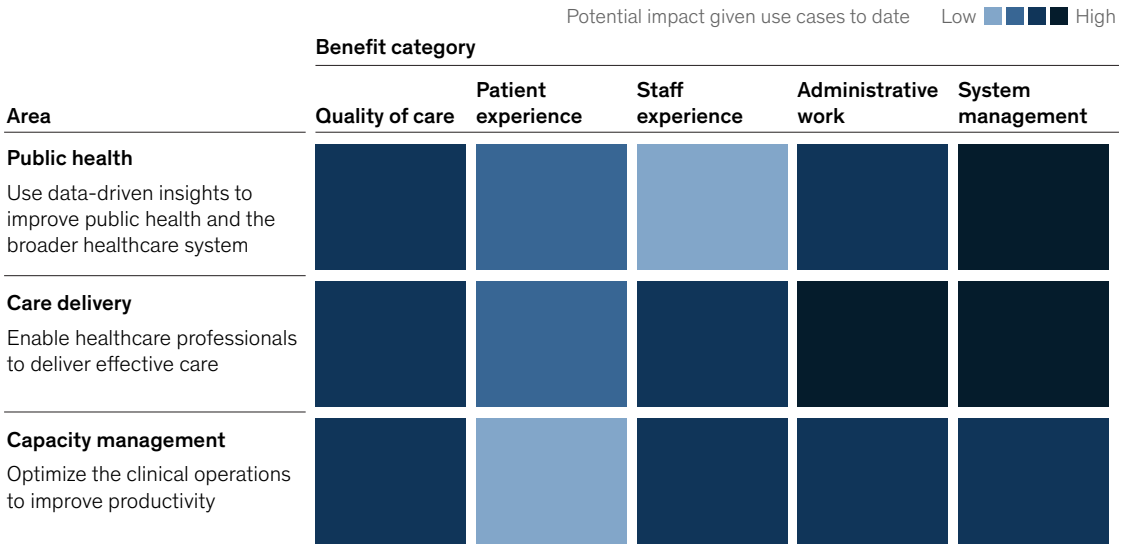
206 percent greater than it had been during the same period in 2020 and 2021.[7] Opportunities for AI integration in Canadian healthcare fall into three broad areas—public health, care delivery, and capacity management.[8] Across those areas, impact to date is most concentrated on three out of the five benefit categories: quality of care, administrative work, and system management (Exhibit 1).

Quality of care. Many Canadian healthcare organizations and companies are gathering evidence to demonstrate AI's capacity to improve quality of care by incorporating AI into various

[7] "Ontario AI snapshot: The state of the province's AI ecosystem in 2021-22," Vector Institute, November 10, 2022.
[8] A fourth area, digital patient access (such as e-triage and self-care), exists, but value for use cases for digital patient access and their application within the Canadian healthcare system has yet to be demonstrated.

Exhibit 1

AI can have varying impacts on different aspects of healthcare in several areas.



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areas of research, care delivery, and recovery monitoring.[9] For example, Canadian healthcare technology company Swift Medical uses AI and advanced wound-care expertise from clinicians to provide digital wound-management solutions. Swift Medical's platform combines mobile devices, AI-powered computer vision, and machine-learning algorithms to assist healthcare professionals in accurately documenting, measuring, and monitoring wounds. The company reports that its solution has reduced wound-related hospitalizations by more than 14 percent, wound-related emergency visits by 7 percent, and length of stay by 62 percent.[10]

Another healthcare system, BIOS, is working with Montreal-based research institute Mila to develop a closed-loop neuromodulation system using AI. The system could be used in various applications, such as chronic cardiac conditions; according to BIOS, it can automatically recognize relevant neural signals from patients and adjust the timing and degree of stimulation required in real time to potentially improve treatment efficacy.[11]

Administrative tasks. AI can automate administrative tasks such as assisting with clinical documentation, supporting real-time staffing, and improving billing accuracy, which can reduce the administrative burden on clinicians, allowing them to focus more on patient care. By analyzing critical metrics such as visit patterns, intensity of symptoms, and patient preferences (for appointment times, for example), scheduling software offers the potential to improve care coordination and patient experiences by optimizing clinic scheduling.[12]

System management. Some AI use cases can also strengthen healthcare system management while addressing several goals at once, including

[9] Samira Abbasgholizadeh-Rahimi et al., "Application of artificial intelligence in community-based primary health care: Systematic scoping review and critical appraisal," *Journal of Medical Internet Research*, September 2021, Volume 23, Number 9; Samira Abbasgholizadeh-Rahimi et al., "Exploring the roles of artificial intelligence in surgical education: A scoping review," *American Journal of Surgery*, July 2022, Volume 22.
[10] "Zebra Influencer Series: Swift Medical improves outcomes with digital wound care management," Swift Medical, June 8, 2023.
[11] "BIOS Health secures CA$1.8M of new funding to extend Canadian AI collaboration on neuro-cardiology," BIOS, July 25, 2022.
[12] For more about scheduling software, see AlayaCare and "SCALE AI's AI for Healthcare Initiative: $21 million in investments supporting 9 AI projects for better healthcare in Canada," SCALE AI, September 27, 2023.

improved bed utilization and quality of care. As the Canadian population ages and healthcare infrastructure matures, predicting capacity management—and adjusting resources accordingly—will be vital for managing healthcare resources effectively. This could include, for example, optimizing supply and demand to minimize workforce shortages, which is a major priority across the Canadian healthcare system.[13] This could ensure adequate forecasting and the deployment of physicians, nurses, and other health professionals where they are most needed.

At the level of individual facilities, AI-powered remote-monitoring systems are one solution to deploy resources more accurately. They can continuously track and analyze patient vital signs in real time and promptly detect any abnormalities while adhering to clinical guidelines and standards. These capabilities are expected to be part of "hospitals at home" and can be particularly beneficial for patients with chronic conditions or who are living in remote areas where access to healthcare facilities and distance are major barriers. Done well and in conjunction with treatment teams and emergency medical services, this approach could improve overall quality of care while optimizing system management. For example, in cases of acute decompensated heart failure with pulmonary edema, a patient's oxygen requirements could be monitored remotely, rather than requiring the patient to be admitted to a hospital. A pilot project in Québec found that this type of home-based solution has the potential to free up about 5 percent of bed capacity.[14]

The net savings potential

According to the McKinsey analysis conducted for this article and based on today's healthcare spending in Canada, a CA $14 billion to CA $26 billion per year net savings opportunity could be generated in the Canadian healthcare system in the near term by using AI at scale to improve quality of care, enhance patient and staff experiences, simplify administrative work, and optimize overall system management across the main areas of healthcare (Exhibit 2). When executed well and with appropriate risk management, AI could deliver increased affordability by lowering healthcare spending in Canada without negatively affecting outcomes and experience—and in some circumstances, potentially improving them. The areas with the highest potential for net savings opportunity within public health are system setup and planning and population health management, which, if optimized, could collectively garner CA $9 billion to CA $16 billion in net savings opportunity. In addition, using AI in care delivery to improve clinical-decision support and IT systems and hardware could save CA $2 billion to CA $5 billion of spending. Last, capacity management, comprising capacity control, resource planning, and supply chain management, is estimated to collectively create a net savings opportunity in the range of CA $3 billion to CA $5 billion.

Even more potential value could be realized as additional gen AI use cases are identified.[15] Given the novelty of the field, use cases, their implications, and their impact will need to be assessed and considered carefully, ensuring the appropriate level of human oversight, especially for clinically oriented use cases. Gen AI use cases (such as the generation of medical documentation) alone could improve affordability by reaping an additional CA $5 billion to CA $9 billion in net savings opportunity for the Canadian healthcare system.[16] Other uses include enhanced decision aids and rapidly generated treatment plans based on personalized analyses, tailored and sustained patient engagement plans, and targeted medical documentation reviews to generate specific insights related to patient visits, such as new risk factors.

Overcoming implementation challenges and risks

Capturing this potential is difficult given the unique challenges healthcare presents and as evidenced by experience with past healthcare IT programs and broader technology program

[13] "Canada is addressing current and emerging labour demands in health care," Government of Canada, June 8, 2023.
[14] Joe Bongiorno, "Quebec pilot project will bring hospital care to patients at homes," CBC, May 1, 2023.
[15] "The economic potential of generative AI: The next productivity frontier," McKinsey, June 14, 2023.
[16] Figures derived via McKinsey analysis of Canadian healthcare spending's contribution to global healthcare spending, taken from "The economic potential of generative AI," June 14, 2023.

Exhibit 2

AI can generate net savings that increase affordability across the three main areas of Canadian healthcare without negative effects.

Low ■■■■ High

Area	Category and domain	Description (nonexhaustive)	Estimated net savings at stake[1]
Public health Use data-driven insights to improve public health and the broader healthcare system	**System setup** Long-term system planning	Forecasting population health and capacity to ensure that the healthcare system is meeting current and future health concerns	~1.5–3.0% CA $5 billion–CA $9 billion
	Population health management Health promotion analytics	Identifying and targeting population groups with optimal interventions through analytic segmentation and digital enablement	~1.0–2.0% CA $4 billion–CA $7 billion
Care delivery Enable healthcare professionals to deliver effective care	**Clinical-decision support** Disease and complication prediction	Predicting patient risk factors and behaviors to ensure the best patient care possible by personalizing treatment and minimizing the potential for adverse events	~0.5–1.0% CA $1 billion–CA $3 billion
	IT systems and hardware for care Electronic health records and information exchange	Integrating analytics and digital tools with electronic health records and other medical documents to allow optimization of their full potential in driving greater efficiencies	~0.5% CA $1 billion–CA $2 billion
Capacity management Optimize clinical operations to improve productivity	**Capacity control and resource planning** Capacity and resource scheduling	Implementing digital systems and models to improve efficiencies and minimize risks or gaps in planning	~0.5–1.0% CA $2 billion–CA $3 billion
	Supply chain management Procurement and spending analytics	Streamlining procurement operations and minimizing costs due to losses or unavoidable risks with process automation, smart tracking, and analytics	~0.5% CA $1 billion–CA $2 billion
Total from ~CA $330 billion total Canadian healthcare spending			**~4.5–8.0%** **CA $14 billion–CA $26 billion**

Note: CA $1 billion = US $745,239,800.
[1]Value at stake is calculated based on published AI use cases applicable for a public health system and then extrapolated to health system savings care costs; each lever was assessed individually, and the savings were applied to the specific relevant costs and then extrapolated to the entire system.

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implementation. In aggregate, the impact potential for AI in the Canadian healthcare system is tremendous. However, the decentralized nature of healthcare delivery in Canada means that individual healthcare systems and sites of care may struggle to effectively capture benefits independently. If each organization or healthcare system pursues a unique and differentiated approach to risk management, scaling AI solutions across Canada could become more difficult. Execution would require leaders to work in a coordinated manner and think differently about strategic planning, operational planning, and change management. It would also require a strategic and comprehensive approach to risk management. Several risks would need to be understood and mitigated to ensure patients receive a high quality of care and clinicians feel well resourced and supported (see sidebar "Understanding the risks of integrating AI into healthcare").

Understanding the risks of integrating AI into healthcare

Risk lies in several areas of AI integration and should be thoughtfully considered, specifically by creating risk and legal frameworks that govern the use of AI (for example, guardrails for data structure to minimize bias, controls and protocols to prevent misuse and disuse, and maintaining a human in the loop for accountability and quality assurance). Because consensus on guidance has not yet emerged, healthcare leaders should be aware of several risk areas, including the following[1]:

1. *Patient privacy, confidentiality, informed consent, and autonomy.* Patients may not have consented to the ways in which AI applications leverage data, or AI applications may leverage data in manners that weren't initially intended. Information requires adequate protection and control. AI could also be seen as displacing medical decision-making ownership, affecting patient autonomy.
2. *Clinical decision making and performance.* AI can produce inaccurate or uncertain answers and lagging quality if models and data aren't sufficiently and continually updated, potentially affecting patient outcomes and experience.
3. *Bias and fairness.* AI could inherit biases from training data, especially in an environment, such as healthcare, with data limitations. This could negatively affect populations that are already vulnerable.
4. *Public transparency.* AI algorithms and tools may be opaque to patients and clinicians, limiting assessment of the quality of the output.
5. *Regulatory compliance.* As healthcare workers create, receive, transmit, and store sensitive patient-health data, they become vulnerable to data security breaches that could expose sensitive data to external parties. These activities carry substantial liability risks.
6. *Output interpretability and misinformation.* AI could generate insufficient explanations and meanings of specific outputs, affecting interpretation and overall impact. In some instances, it could lead to misinformation.
7. *Resource limitations.* Adequate training and technological infrastructure will require additional energy and resources, which could be difficult to implement in systems with fewer resources.
8. *Workforce.* New AI working models could adjust the capabilities required to do some jobs, which could affect the organizational talent mix and employee well-being.

[1] "Ethics and governance of artificial intelligence for health," World Health Organization, June 28, 2021; Glenn Cohen, Sara Gerke, and Timo Minssen, "Ethical and legal challenges of artificial intelligence-driven healthcare," in Adam Bohr and Kaveh Memarzadeh, Artificial Intelligence in Healthcare, Cambridge, MA: Academic Press, 2020.

Developing, implementing, and scaling the use of healthcare AI applications requires thinking differently about the healthcare system as a whole, not just one application at a time.

Three critical steps to accelerate and expand AI use-case adoption

Based on our knowledge of and experience with global healthcare and AI implementation, there are three steps for leaders that are critical for success yet often overlooked: invest in critical foundational standards and infrastructure, assess and track the value at stake with a vision toward at-scale implementation, and build trust within and across the organization by preparing staff and patients alike.[17]

Investing in critical foundational standards and infrastructure

In 1991, the National Task Force Report on Health Information highlighted the lack of comparable data about health information's prevalence and efficacy nationwide, leading to the creation of the Canadian Institute for Health Information (CIHI), a national nonpartisan organization.[18] All provinces

[17] There are many steps required in an implementation journey. For a complete overview, see Eric Lamarre, Kate Smaje, and Rodney Zemmel, "Rewired to outcompete," *McKinsey Quarterly*, June 20, 2023.
[18] "CIHI: A history," CIHI, accessed on January 11, 2024.

could benefit from shared Canadian AI standards for the scale of data and analytics required to have an impact and enhance care delivery. Singapore and other countries have launched similar approaches, such as Singapore's Model AI Governance Framework.[19] Some Canadian industries have also addressed similar challenges by creating federally anchored solutions, including the Canadian Pension Plan Investment Board; public-sector organizations such as the Transportation Safety Board of Canada; and private-sector solutions such as Interac and the insurance fraud–focused not-for-profit Équité Association.

Leaders across the healthcare system can administer foundational governance, data, technical standards, and underlying infrastructure. Public–private partnerships could help enforce these standards, as well.

Technology standards. To define technology standards, leaders could first consider the current technology stack and longer-term technology needs by considering computational power, scale of electricity use, exposure to cybersecurity risk, and potential future AI applications of interest (including gen AI). Leaders can then define the required infrastructure, technologies, and tools to standardize the technology being used and reduce the time needed to deploy AI use cases. It is also important at this stage to consider how provincial and federal requirements, such as electronic-health-record integration use or mandatory program use, could shift.

Data governance. Leadership alignment across the healthcare system on data governance and strategy could help identify and organize data sets and determine which internal and external data sources to use based on the case. For example, triangulating vast patient data with a specific patient's demographic, health status, and genetic factors allows AI to provide a personalized patient treatment plan to optimize healthcare delivery and improve patient satisfaction. A holistic system perspective is likely required to modernize the Canadian healthcare system, especially given the current rise in personalized medicine.

Cross-functional risk management. To build and test their high-value AI implementation plans, leaders will need to assemble a team focused on risk management for the organization more broadly. This team should comprise individuals from across the organization who have a broad range of capabilities, such as patient advocates, health professionals, administrative managers, and data scientists. It is essential for leaders to review potential risks with this team and identify mitigation strategies, which may vary across patient populations, jurisdictions, and data types.

Public–private partnerships. The strategic, technical, and talent requirements to fully embed AI into Canadian healthcare systems may surpass what Canadian healthcare systems can do themselves. Public–private collaborative models have proved to be helpful in other instances. For example, the Alternative Financing and Procurement model in Ontario (where healthcare represents a large share of infrastructure projects) has helped keep projects within budget, reporting CA $400 million in potential savings compared with traditional procurement.[20]

The Canadian Institute for Advanced Research (CIFAR) recently launched two health solution networks in AI—the Integrated AI for Health Imaging Solution Network and the AI for Diabetes Prediction & Prevention Solution Network—which convene academics, not-for-profits, and hospitals, further highlighting the importance of multipartner engagement.[21] National AI institutes, such as Amii in Edmonton, Mila in Montréal, and the Vector Institute in Toronto, are helping to translate research in AI into commercial applications and allow public and private organizations with a focus on healthcare to adopt these new technologies. Healthcare systems eventually will need to consider whether to sustain certain capabilities in-house or through

[19] "Singapore's approach to AI governance," Personal Data Protection Commission, accessed on January 11, 2024.
[20] "Backgrounder: Infrastructure Ontario," King's Printer for Ontario, June 24, 2011.
[21] Kathleen Sandusky, "CIFAR announces launch of two AI for Health Solution Networks," CIFAR, July 13, 2023.

partnerships; consequently, they can benefit from leveraging near-term opportunities to accelerate the path to adoption and scale while delivering projects on time and on budget. If designed well, public–private partnerships can bring complementary capabilities, expand capacity, and sustain efforts.

Assessing and tracking the value at stake with a vision toward at-scale implementation

Delays and cost overruns are two common challenges that have emerged with past implementations of large healthcare system IT projects in Canada and elsewhere. A review of 16 publicly announced, major Canadian healthcare system IT projects, which represent more than 65 percent of healthcare IT investments from 2013 to 2023, revealed that three-quarters of these projects reported issues with delivery and cost management. Many early signals of those challenges may already be present as Canadian healthcare leaders experience limitations in articulating the status of AI applications, the value AI has added to systems, and the path to full-scale implementation.

While the technology for certain applications may still be nascent, AI's uses are rapidly increasing across healthcare systems nationally. It is crucial that leaders envision the long-term potential impact of AI, including new approaches such as gen AI, and determine which areas of investment—enhancing patient journeys or improving staff well-being, for example—could be prioritized to best address healthcare system priorities. This also means engaging in provincewide and pan-national dialogues on the vision for AI in healthcare systems at scale, helping Canadian healthcare systems leapfrog long-standing barriers, such as information portability and treatment continuity.

Multidisciplinary teams that include managers, digital and analytics leaders, healthcare professionals, and patient representatives can then identify current and potential AI use cases based on their prospective value and a clear understanding of how impact will be measured. Ways of defining impact could include measures of improved healthcare outcomes, better operational performance, and financial impact. At the leadership level, identifying sources of negative value such as specific patient risks or infrastructure costs is critical. Ideally, assessments consider the type of system change needed to capture that value. These changes can then be linked directly to the priorities defined by the healthcare system and the estimated associated value so leaders can assess the value of potential investments and track the impact of AI. Integrating AI use cases into organizations' existing analytics landscape to build on capabilities is vital.

Building trust within and across the organization by preparing staff and patients alike

Given the novelty of AI, leaders across the healthcare system need to build trust by developing a clearly stated goal to protect patients and staff while delivering their mission, further enabled by AI. This could include, for example, creating an overall framework for monitoring risk, developing controls to assess ethics and bias across data and models, or forming early external partnerships with patient advocacy groups and community organizations. Keeping in mind the protection of patients and staff, leaders can conduct a scan of potential vendors and partners based on targeted use cases and capability needs. They can then outline potential ways of working together and define the associated roles and responsibilities required to foster the partnership, such as advisory committees, joint ventures, or outsourcing. Leaders will need to invest to track and improve adoption through training and change-management initiatives.[22]

Gaining patient and clinician buy-in. Adequate preparation will also involve change management and alignment of patient and workforce expectations. Failed digital and AI implementations have affected patients and healthcare staff alike, and many express justifiable concerns today.[23] One case in point: external validation of the data reported by an AI-powered electronic-medical-record prediction tool used in hundreds of US hospitals revealed

[22] "What is digital transformation?," McKinsey, June 14, 2023.
[23] Ingrid Larsson et al., "Challenges to implementing artificial intelligence in healthcare: A qualitative interview study with healthcare leaders in Sweden," *BMC Health Services Research*, July 2022, Volume 22, Number 850.

it missed the target use case in two-thirds of cases.[24] As accuracy and use of the tools increase over time, trust can continue to build, and more patients may recognize and benefit from the value of the technology. Successful change management requires a recognition of the challenges of adopting AI in healthcare systems—for example, the need to avoid harm and the need to work in a coordinated manner across stakeholders such as regulatory bodies and professional associations. Digital literacy—especially in vulnerable groups such as the elderly and new immigrants—and access in rural areas of Canada will require special considerations. Healthcare leaders should consider these factors when creating and deploying patient and workforce change-management strategies as AI is implemented and scaled.

Preparing the workforce. Throughout the healthcare system, leaders should assess which talent will be most affected by use cases, or AI overall, and upskill as needed. For any gaps in the organizational workflow, leaders can pinpoint which roles would help improve operations and hire as needed. The AI talent pipeline is expanding rapidly—Ontario student enrollment in AI programs in the 2021–22 academic year increased 17 percent over the previous period—but attracting that talent to the healthcare sector will require strategic planning and thoughtful incentives to compete with the more than 22,000 AI jobs created across all sectors from 2021 to 2022 in Ontario alone.[25] Value comes from adopting AI fully, which requires leaders to identify a detailed set of digital and operational workflows that need updating and then to begin change management well before use-case deployment. Engaging all relevant stakeholder representatives along the process is essential to build legitimacy, identify risks early, and set up the organization for success.

If AI is integrated ethically, fairly, and risk-consciously into the country's healthcare system, Canada could improve healthcare affordability by lowering its annual healthcare spending by about 4.5 to 8.0 percent (up to CA $26 billion). Canadian healthcare leaders who fail to act now to fully integrate AI into their existing systems risk falling behind in an accelerating field. Organizations across Canada have started to invest in AI capabilities—but more can be done. Successful integration of AI technologies and applications takes a new, more collaborative, coordinated approach to benefit all Canadians. Healthcare leaders can take steps today to begin or accelerate their journey. Given the scale required, working across public and private sectors will be vital to integrate AI use cases into the healthcare system nationwide and help provinces improve healthcare. If more healthcare systems integrate AI capabilities into their functions, Canada's population health and healthcare delivery could improve greatly, ultimately saving lives and improving healthcare affordability by lowering spending.

[24] John P. Donnelly, "External validation of a widely implemented proprietary sepsis prediction model in hospitalized patients," *JAMA Internal Medicine*, August 2021, Volume 181, Number 8.
[25] "Ontario AI snapshot," Vector Institute, November 10, 2022.

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