

Accelerating the Adoption of Digital Health Technologies in Canada

Summary

Canada urgently needs a more strategic approach to accelerate and adopt emerging digital health technologies or it will continue to fall behind the progress of other countries in digital health innovation. Global forces, including rapidly advancing technologies, are reshaping health systems in Canada and around the world. Canada has a narrow window of opportunity to capitalize on its innovation investments and these global trends, if it wishes to translate them into benefits for its citizens.

To accelerate the adoption of emerging digital health technologies in Canada, the Canadian public and private sectors must be far more engaged together around common objectives of sustainable investment, standardized procurement practices, and taking innovation to scale across the Canadian digital health marketplace. ITAC Health calls for more structured collaboration between industry, and all provincial, territorial, and federal governments.

ITAC Health recommends that industry and government:

- 1) Take concrete measurable steps to reinforce dependencies and actions between the public and private sectors to accelerate the adoption of emerging digital technologies. Public sector discussions and decisions on this topic should have advisory panels and consultations between all stakeholders, including vendors.
- 2) Provide incentives and encourage the vendor community to share information and not hoard it for competitive use. The private sector must step up to this commitment to sharing.
- 3) Make long term commitments to annual funding of digital health. Start by requiring reporting and

tracking of commitments and expenditures as a measure of investment in our collective future.

- 4) Invest in standardizing efficient and effective public procurement practices and mechanisms for engagement between the public and private sectors to manage timelines and costs of procurement. Consider how procurement risk can be transferred to the private sector to speed up the process.
- 5) Jointly encourage models of information, communications and technology (ICT) investment, deployment and operation that bring the public and private sectors, large and small corporations, and academia together to grow the labour force and advance the skills needed to successfully implement digital health technologies.
- 6) Aggressively push solutions between and across provinces to gain experience and lessons at scale. Pursue tools and processes to safely liberate patient data enabling access to public patient data sets and solutions for use in a managed way by the private sector to fuel growth and innovation.
- 7) Invest in national privacy and security standards and practices to reduce risk and friction. Our patchwork of provincial and federal laws and policies are outdated and hinder scale and national initiatives.
- 8) Ensure that sufficient broadband capacity exists equally in all areas of the country to support the new digital economy for all Canadians.

Introduction

Everyone involved in health care seems to agree on a vision of the future, but are challenged on the pace and steps to get there. Policy makers, administrators, clinicians

and vendors alike, want a safer, more accessible, and patient centric system. However, our progress appears incremental, when it should be exponential. As it stands today, Canada's health system performance ranks 10th of the 11 countries studied in the Commonwealth Fund's 2014 Report update and is in the bottom two in terms of safety, timeliness of care and system efficiency. There is an opportunity and a need for a more strategic approach for the acceleration and adoption of emerging digital health technologies in Canada.

Global forces are at play that will impact Canadian healthcare and the Canadian health information technology industry. These forces include the increased digitization of health and lifestyle activity that accelerates the application of technologies from other industries into health care, and across borders. Rapid advances in emerging technologies are creating new opportunities for innovation and disruption of traditional healthcare models and processes. Consumers are leveraging emerging technologies, taking greater control over their health and well-being. The fact that much of our legacy infrastructure is approaching end-of-life and is need of renewal offers an opportunity to revector towards the future. The economic benefits of universal healthcare are more accepted, and the global health industry is attracting a lot of attention. While Canada is a small player on the global scene in terms of population size, we have a unique opportunity in the near term as one of the earliest "adopters" and largest collections of single payer health systems in the world. By leveraging our existing foundation and our collective will to reach a common vision, Canada can become a global leader in digital health solutions.

Emerging Technologies

Emerging digital technology is a relative term, capturing new technology that is currently being developed, or will be developed, within the next five to 10 years. Emerging technologies are critical to the continued progression of our digital health system and often are the impetus or tools used to alter business models, drive costs down, and increase capacity for health care delivery. The effective use of health information across the continuum of care and from individual consumer daily living choices to population health management provides the evidence for transformation. Machine learning and artificial intelligence (AI) show promise to expand the capabilities of healthcare providers to predict, diagnose, and treat health conditions.

To illustrate the value of digital health technologies to the Canadian healthcare system and the patients and healthcare providers it serves, this paper highlights six emerging technologies (see sidebars) and their importance to health care in Canada. These include virtual care, precision medicine, consumer health, the Internet of (health) Things (IoT), cloud computing and blockchain. Note that these are illustrative examples only and were chosen from hundreds of emerging technologies deployed in healthcare systems already.

The opportunities for accelerating the adoption and use of emerging digital health technologies in Canada can be considered the context of McKinsey's three horizons of growth.

HORIZON 1

Execution

HORIZON 2

Continuous Improvement

HORIZON 3

Research & Development (R&D)

Horizon One represents maturing technologies ready to scale at regional, provincial, or national levels. Execute what is proven to be effective. Telehealth and cloud computing are examples of technologies that we believe have demonstrated effectiveness and are ready for more rapid deployment. Accelerating scale so these become normal operations should be the focus.

Horizon Two represents emerging technologies, still in the experimental stage but ready for limited deployment, and continuous improvement within the health system. We believe consumer health applications and the broad category of the IoT are examples of Horizon Two technologies. Increased deployment of these technologies is needed to understand their potential to bridge gaps between community and acute settings, between patients and providers and as tools to gather data to support continuity of care. Failure to deploy and improve these innovations will delay our decision and ability to scale.

Horizon Three represents those developmental technologies that promise to disrupt the status quo and foster long-term growth. We must deploy Horizon Three technologies such as blockchain, AI, and advanced analytics to better understand the applicable use cases and their benefits.

Lessons Learned

There are many lessons learned from past deployments of digital technologies in Canada and the deployment of emerging technology in other industries or outside of Canada. Below are a few pivotal examples:

- A digital version of a legacy

treatment, while an enabler, will have a limited individual impact on health outcomes. To drive transformation of our health system, emerging digital health technologies must be enabled to disrupt legacy systems and processes and unlock the value of collaboration and data sharing we have inherited from our historically fragmented approach.

- Interoperability is critical. Realizing the benefits of emerging digital health technology requires the open and secure exchange of information between all healthcare providers and their patients. The circle of care spans numerous traditional and non-traditional organizations and systems. Systems that do not integrate seamlessly into a synergistic health information infrastructure are boat anchors to digital innovation and the transformation of the system.
- Stakeholder engagement is key. Successful implementation of digital health requires a good grasp of consumer behaviors and needs, insight into the cultures of healthcare delivery organizations, and effective collaboration with patients and healthcare providers.
- Transparency is essential. To establish and maintain trust, both public and private sector organizations must be open and transparent on expectations, accountabilities, and capabilities, particularly with respect to the interoperability, privacy, security and safety of their products and services.

Healthcare is being challenged to provide deeper care to more people. By understanding the different needs and expectations for acceleration and adoption through the Horizons of Growth, and by building on these lessons learned, industry and government decision-makers have a unique opportunity to develop a culture of sustainable improvements to our health system. We believe the benefits of these improvements are quantifiable improvements in health outcomes and economic growth.

Economic Development

Fundamentally, we believe digital health technology deployment should be more appropriately seen as an economic driver and not as a cost. Canadian investments in innovation must lead to deployment, adoption

Virtual care transforms the patient experience

Virtual care is any interaction between patients and their healthcare providers using information and communications technology. It places healthcare into the hands of patients through their smart phones, tablets, and other devices.

Virtual care will:

- Improve access to care.
- Promote patient engagement.
- Be available anywhere, anytime.

What's holding us back?

- Policy doesn't support practice.
- Infrastructure gaps in underserved areas of the country

Precision medicine personalizes care

Precision medicine leverages the power of AI, big data, genomics and population health to personalize treatment and care. It enables healthcare providers to develop strategies that prevent or treat specific conditions taking into account unique characteristics of each person.

Precision medicine will:

- Predict disease and impairment.
- Tailor diagnosis and treatment.
- Target specific outcomes.

What's holding us back?

- Ineffective procurement mechanisms.
- Legacy approaches to healthcare policy.

Consumer health empowers the patient

Consumer Health is the use of personal computing devices and the Internet to support consumers in obtaining information, analyzing their own unique health care needs and helping them make decisions about their own health.

Consumer health will:

- Empower the consumer/patient to take control of their own health.
- Promote wellness and healthy lifestyles.
- Reduce the strain on the healthcare system.

What's holding us back?

- Accepted integration with traditional clinical practices.
- Infrastructure gaps in underserved areas of the country.

and eventually, scale. Emerging health technologies are an important part of the larger digital economy, contributing to Canadian innovation and competitiveness. It is estimated that in 2015 Canada's healthcare IT market was worth \$3.5 billion (USD) and this is expected to grow to 6.5 billion (USD) by 2021 with a compound annual growth rate of 11.1 per cent.¹ The public and private sector must work together to put this growth to effective use rather than reinventing legacy solutions, duplication and customization.

In Ontario alone, the Ontario Centers of Excellence reports that the advanced health technologies sector is home to more than 1100 companies employing 42,500 people.² The Ontario Centers of Excellence further reports that the global medical technology industry exceeded \$2 trillion in sales in 2010 and is expected to more than double by 2020. Ontario's share of this giant market is currently just two per cent.

Together we must do more to promote Canadian health innovation in the global marketplace. If we fail to deploy and scale emerging digital technology, then we will not be positioned to innovate in the new world it creates.

Together we bring different strengths and weaknesses to the table. The public sector needs to manage its low tolerance for risk by enabling the private sector to take on more. The private sector must be prepared to take on risk in exchange for some ability to influence outcomes. We believe there are solutions whereby the public sector can enable this transfer by allowing off ramps for big projects, or keeping projects smaller, or providing guarantees on timelines and adoption - so that the private sector can quantify the risk and their return on investment. We know this transfer can be successful. Recent developments in social equity bonds funding projects shows that risk return and capital investment can be transparent and attractive to all sides.

Together we need to explore how best to structure projects to fail fast, which means being able to agree on how and when to pivot together on projects up front and in contracts.

We have the potential to create a vibrant digital health technology industry in a country with some of the largest single payers (provinces)—a uniquely Canadian advantage—with some of the largest data assets if we manage how to open these valuable

assets appropriately. This potential could be a huge economic win for employment in the knowledge economy and for other economic growth measures, including attracting investment and talent.

Scaling up IT solutions across the Horizons of Growth will increase the number of companies across the spectrum of health care and wellness, but we believe we should be deliberate; and strongly encourage policies and practices for a mix of large and small companies in all projects. Replicating the concepts of the supercluster at smaller scale would help drive economic growth. The concept of mixing companies, public institutions and academia around common problems is a good recipe, just at a smaller scale, so they can move faster. Hubs are a viable economic vehicle and tool to maximise the return on investments.

One force we must acknowledge is the global transition to universal health care. Canada faces a future where, as more countries adopt public health systems, ICT human resources will become scarcer (e.g. The Affordable Care Act drove up human resource requirements in US significantly). With less access to immigrant human resources to fuel our move to home and community, and an aging work force, we need to sustain and increase our capacity by building our ICT capacity. Not surprisingly the increase in universal health care coverage globally will create a larger export market for Canadian digital technology expertise.

Government and industry need to grow a labour force linked to the skills needed to successfully implement digital health technologies (i.e. increased private/public support for academic program development, education events for health care organizations' staff, etc.). We need to show career development paths within and between public and private sector organizations and attract staff from other industries with proven successful track records in digital technologies implementation. The resultant more informed individuals will become catalysts for change towards impactful uses of digital health technologies, in addition to the creation of a marketable work force worldwide.

Today, Canada can capitalize on this problem and opportunity as our global reputation remains strong. As we scale nationally we build in systems

to accommodate 13 different health systems (provinces and territories), around the common core principles of the Canada Health Act which becomes a major selling feature for export.

The Internet of Things connects patients to health care providers and resources

The Internet of Things (IoT) is a network of physical devices, embedded with software, sensors, transmitters and actuators, enabling real-time connectivity and data exchange with systems that support patient care. IoT in health includes mobile medical equipment, wearables, implantable devices and remote monitoring devices.

The Internet of Things will:

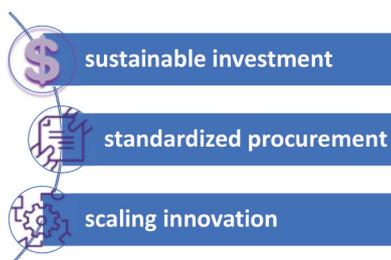
- Enable care in the home, workplace and community.
- Continuously monitor health status.
- Support patient independence and well-being.

What's holding us back?

- Negative privacy and security instances reported in the media of other industries.
- Infrastructure gaps in underserved areas of the country.

Moving Forward

Industry, government, healthcare providers, patients and consumers must work together to realize the benefits of Digital health technologies to improve the health of Canadians and foster economic growth. ITAC Health proposes three objectives to support the goal of accelerating digital health adoption in Canada:



Cloud computing enables innovation

Cloud computing (a.k.a. “the cloud”) gives innovators access to a shared pool of computing resources (e.g. networks, servers, storage, applications, and services). It enables innovators to leverage secure and reliable digital resources allowing them to focus on solutions that improve the health and well-being of patients.

Cloud computing will:

- Lower the cost of access to reliable digital services.
- Improve the privacy and security of personal health information.
- Enable innovators to scale as their business grows.

What's holding us back?

- Lack of understanding in the healthcare community marketplace.
- Infrastructure gaps in underserved areas of the country.

Sustainability in the Canadian Digital Health Market

ITAC Health members are committed to economic development in Canada. We do this by creating jobs in Canada across small, medium and large enterprises, developing products and services that broadly leverage Canadian sector expertise and innovation, and selling these products and services locally and globally.

Supporting the exchange of ideas between the public and private sector, and a strong Canadian digital health marketplace are critical factors to the success of this industry. The strength of the Digital Health industry is a key determinant of our ability to create a capability that is competitive locally, and most importantly, globally. Our investments will always be a function of the anticipated market. After all, we are not in business to lose money.

A sustainable and predictable Digital Health market is essential for the acceleration and adoption of emerging technology. Digital health investments by our clients often follow a “boom and bust” cycle. This results in uncertainty

in the Canadian market and the movement of investment capital to more certain markets.

All jurisdictions should consider making a long-term commitment (e.g. 10 years or more) to maintaining annual funding for Digital Health at a predictable level. All provinces should make commitments to measurable targets (e.g. five per cent of operating expenses, EMRAM Level 6 compliance, etc.).

The Federal Government should take a similar investment approach to providing an annual technology funding allocation to the Federal agencies, and thereby ensure that provincial investments continue to follow a reusable, scalable and common blueprint.

The health system needs: sustained funding commitments to ensure, as much as possible, continuity across political election cycles; and to bridge the provincial fragmentation that hinders technology standardization and the integration of research, teaching and care provision into emerging technology, data processes and non-clinical

Blockchain secures access to health information

Blockchain uses a secure, tamper-proof ledger to manage and store data. Blockchain technologies provide a highly secure, decentralized framework for data sharing that can accelerate innovation throughout the healthcare sector.

Blockchain will:

- Improve the accuracy and integrity of personal health information.
- Support consent management and enable patient control over their personal health information.
- Facilitate interoperability and the legitimate sharing of personal health information between healthcare providers.

What's holding us back?

- Lack of understanding in the healthcare community marketplace.
- Legacy approaches to healthcare policy.

environments as health shifts outside of our transitional hospital sector. As an industry, both public and private sector participants must exert strong pressure to liberate patient data in a safe and effective manner using common standards tools and processes to encourage patients to be equal, engaged partners in their care. We must facilitate sharing and could be leaders in this area.

Procurement Practices in the Canadian Digital Health Market

Procurement practices within Digital Health have become increasingly centralized, resulting in a smaller number of opportunities that are correspondingly much larger. In addition to this, the increasingly complex environment supporting free trade has brought with it rules that are intended to provide fair access to Canadian markets to all global firms, and also to foreign markets to Canadian firms. The rules of engagement are also becoming much tougher and Canadian jurisdictions are simply not keeping up to their contractual obligations.

In spite of these forces, procurement practices are often different in each jurisdiction, and even within jurisdictions. We are aware of cases where procurement practices are openly in conflict with commitments and where procurement opportunities are not done fairly. To be fair, it has become increasingly obvious that many public and private players have actively engaged in seeking the means to alleviate the huge cost of the current procurement practices. Perhaps this trend will itself force a re-correction, but history has demonstrated that such corrections take time, have significant costs and exert a human toll. Acting now would more effectively control the outcome without concomitant media show and would demonstrate appropriate leadership.

We need procurement structures and processes that reinforce collaboration between vendors and public sector – not just large corporations, but for all vendors. Governments should consider providing a training and certification program that would be made available to all players: policy-makers, vendors, purchasers, etc., and consider how procurement risk can be transferred to the private sector to speed up the process.

Industry is comfortable operating within one set of procurement practices. ITAC Health recommends that jurisdictions establish a common set of practices (similar in structure to ISO-9001) that

are used to audit and report on all public sector practices. Not only will this protect the commitments made under free trade to other countries, but will provide confidence to vendors of the fairness of the procurement landscape.

Innovation in the Canadian Digital Health Market

To industry, innovation is “business as usual”: vendors could not compete if they did not constantly look to improve their products and services. Vendors bring learnings from innovations from around the world to the benefit of their Canadian customers.

In our view, what is lacking is a strong relationship between industry and vendors around innovation that also meets the procurement standards and principles. We need to actively change to more of a level playing field between the public and private sectors as this could be another uniquely Canadian competitive advantage. We do not do this seriously today.

Why are public sector institutions invited to strategize and brainstorm freely amongst themselves when they compete to deliver services, and often compete for funding with the private sector, and yet private sector companies are not invited? Public and private sector organization bring different strengths to the table; both are required. The public sector generally brings strengths in clinical process innovation and risk management, while private sector generally brings risk tolerance and time vs cost analysis and scale. Innovation carries with it the risk of failure. We are concerned that all the rhetoric around innovation ignores the reality that the public sector is risk-averse, and that issuing bid requests for “innovation” will likely not be possible based on new proposed global free trade practice standards.

To be successful at innovation, both public and private sectors must strategize to develop and adopt innovative new tools and approaches to healthcare delivery, and market these innovations around the world. Jurisdictions should create a multi-lateral task force that would include broad industry representation (e.g. ITAC) to consider possible processes and techniques to enable joint contribution to innovation within the real world in which we currently operate.

Recommendations

In view of the foregoing, ITAC Health recommends that industry and government:

- 1) Take concrete measurable steps to reinforce dependencies and actions between the public and private sectors to accelerate the adoption of emerging digital technologies. Public sector discussions and decisions on this topic should have advisory panels and consultations between all stakeholders, including vendors.
- 2) Provide incentives and encourage the vendor community to share information and not hoard it for competitive use. The private sector must step up to this commitment to sharing.
- 3) Make long term commitments to annual funding of digital health. Start by requiring reporting and tracking of commitments and expenditures as a measure of investment in our collective future.
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- 5) Jointly encourage models of ICT investment, deployment and operation that bring the public and private sectors, large and small corporations, and academia together to grow the labour force and advance the skills needed to successfully implement digital health technologies.
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- 7) Invest in national privacy and security standards and practices to reduce risk and friction. Our patchwork of provincial and federal laws and policies are outdated and hinder scale and national initiatives.
- 8) Ensure that sufficient broadband capacity exists equally in all areas of the country to support the new digital economy for all Canadians.

1 Mordor intelligence LLP, Global Healthcare IT Market, 2017.

2 Ontario Centers of Excellence, <http://www.occ-ontario.org/about-us/focus-on-sectors/advanced-health-technologies>