



Health and Biosciences



HB



From the discovery of insulin to the invention of the pacemaker, Canada has had a strong record of health innovation. In a time of rapid technological change and global interconnectedness, we have an opportunity to leverage our health-care system and to achieve even greater impact through our advances in the life sciences. With commitment and bold action, Canada can be a destination for investment and talent, growing our health and biosciences firms to support a more sustainable health system while advancing Canada's prosperity.



Canada needs to unlock the full potential of its innovations and accelerate the pace of commercialization to ensure a sustainable, globally competitive health ecosystem with a robust innovation economy and improved health outcomes.”

Karimah Es Sabar
Chair, Health and Biosciences
Economic Strategy Table

VISION

By 2025, Canada will double the size of the health and biosciences sector and become a top-three global hub by: leveraging and advancing innovative technologies; attracting and retaining capital, skills and talent; and ensuring a vibrant ecosystem that will unleash the full potential of the sector and lead to improved health outcomes.



AIMING FOR THE TOP THREE

Canada ranks fourth in global health and biosciences hubs, according to measures identified by the U.K. BioIndustry Association. That puts Canada behind the U.S., U.K. and Germany. To double the sector and break into the top three, we'll need strategic action to strengthen every facet of the sector.

TARGETS

Double health and biosciences
exports to
\$26B

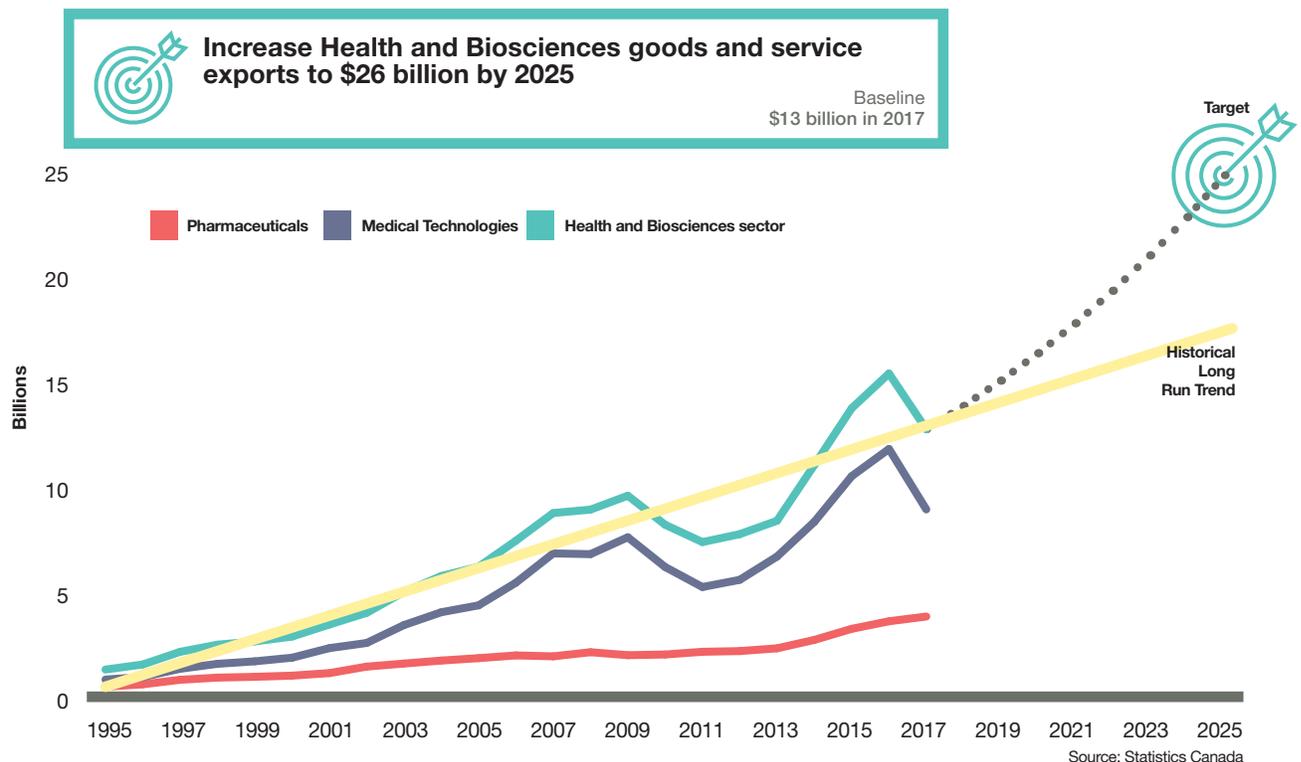
Double the number of
health and bioscience
firms to
1,800

Double the number of
health and bioscience
high-growth firms to
80

The Canadian health and biosciences sector's historical growth rate of 4% leads us to predict that business as usual will lead to annual exports of approximately \$17 billion by 2025. However, we believe that by rejecting the status quo and taking ambitious steps, we can change our trajectory and double our exports to \$26 billion by 2025, which is equivalent to a 9% annual growth rate.

The ecosystem currently consists of some 900 firms. This encompasses pharmaceutical multinational enterprises, generics firms, biopharmaceutical SMEs, contract research and manufacturing organizations and medical technology manufacturers. With bold actions that eliminate barriers and drive growth, our 2025 target is to double this number to 1,800 firms, with each creating knowledge-intensive jobs. Within this total, we have a particular focus on high-growth firms. Canada currently boasts 40 such firms, and we believe that the proposals in these pages will enable us to create twice as many. These high-growth firms will commercialize innovations, penetrate new markets and serve as regional leaders.

Total Exports



■ WHAT WE NEED TO OVERCOME

Addressing processes that stifle innovation and hinder the adoption of promising innovations in the health-care system is key to advancing Canada's global competitiveness and meeting our growth targets. The following barriers stand in the way of us achieving our health and biosciences goals:

- Complex regulatory, reimbursement and procurement processes impede the adoption of innovations
- A risk-averse procurement culture prioritizes short-term focus on cost rather than broader considerations of value
- Disconnected digital health systems inhibit the collection, connection and analysis of data needed to inform innovation decision making
- Skills shortages and lack of access to executive-level talent hinder the sector's competitiveness
- Limited access to capital leads many Canadian firms to exit the market through mergers or acquisitions rather than accrue value domestically

■ WHAT WE NEED TO BECOME

Bold ambitions have to be supported by more than just good intentions. A number of structural and cultural conditions must be in place to enable the transformative growth we are seeking:

- A health policy environment that sees the health-care of Canadians and economic growth of the health and biosciences sector as mutually reinforcing
- A public health-care system that is an early adopter and is incentivized to support innovation adoption
- Agile and streamlined regulatory and procurement approaches to support access to value-based innovations
- Nationally robust, digitalized, interconnected and patient-centred health data infrastructure
- A large and vibrant life sciences capital market that invests significantly in Canadian companies
- A knowledge-intensive sector that fosters future-oriented skill development and delivers world-class research and development (R&D)

“We need to strengthen the entire ecosystem to get Canada on the trajectory to become a world leader.”

“
Economic growth and improved health outcomes are not mutually exclusive. They should go hand in hand.”

THE ACTIONS WE PROPOSE

We propose sector-wide actions that will unleash Canadian innovation and place our health and biosciences firms on a higher trajectory. Based on research, global best practices and insights from Table members and our industry peers, we propose five areas of focus to transform the life science ecosystem in Canada:



Accelerate Innovation Adoption

By employing value-based procurement across Canada's health systems and establishing a procurement innovation agency



Design Agile Regulations

By adopting international best practices, eliminating duplication across jurisdictions and decreasing review times



Harness Digital Technology

By creating a national digital health strategy featuring an interoperable digital health platform



Develop & Attract Talent

By equipping Canadians for highly skilled jobs, eliminating hiring barriers and streamlining government skills programs



Create Anchor Firms

By mobilizing late stage capital, scaling up high-potential firms, and broadening research and development tax incentives

PROPOSAL

Accelerate innovation adoption by employing value-based procurement within Canada's health systems and establishing a procurement innovation agency

A primary barrier to the adoption of innovative products and services is the traditional cost-focused bulk-buy procurement approach favoured by health systems in Canada. For the best health innovations to gain adoption in our health system, we need a systemic shift to a procurement approach that moves beyond price to value. Purchasers must be empowered to consider price alongside other critical factors such as improved patient outcomes, reduced demand for more expensive health services, increased quality of life and economic benefits. A health procurement innovation agency would help facilitate this approach by de-risking adoption of breakthrough Canadian health products and building the evidence base for translating innovative products for use within health systems.



VALUE-BASED PROCUREMENT ABROAD

EUROPEAN UNION

The EU developed the “most economically advantageous tender” (MEAT) model to maximize value to systems and patients, rather than only seeking the lowest price. The model is now being used to inform procurement practices:

- Stockholm County Council tendered for wound-care products by examining both the care delivery costs and price of products
- A regional health authority in Norway focused on purchase price along with failure rates and patient-reported pain in its procurement of IV catheters.

NETHERLANDS

The Netherlands established a foundation for value-based procurement in the form of a network of hospitals that is measuring patient outcomes, as well as a national registries platform for patient-reported outcomes. The Ministry of Health recently announced that they will procure 50% of the disease burden by value-based health-care by 2021.

WHY THIS MATTERS

Health-care procurement decisions in Canada hinder innovation adoption by emphasizing price over other measures of value such as improved outcomes and reduced demand for additional medical services. As a result, firms that have developed innovative products with a strong value proposition may find it exceedingly difficult to have their products adopted by Canadian health systems if they have higher upfront costs. Purchasing in Canada tends to be driven by minimizing cost for each silo that delivers health care rather than the value realized by delivering an outcome over an episode of care—which means hospitals view new innovative products as a cost driver rather than taking a more holistic view of potential value and impact. In contrast, value-based procurement models have the potential to simultaneously drive improvements to health quality and outcomes while supporting economic growth and accelerating Canadian-made solutions within the health system. This would also align with leading jurisdictions around the world that are rapidly transitioning to value-based health-care models.

Here at home, Ontario, Quebec and Alberta have begun a shift toward value-based procurement, but the majority of health procurement groups lack the holistic picture of the clinical environment necessary to employ this approach. Developing the frameworks to support value-based procurement will enable Canadian innovators to get their products adopted in the market and enable the Canadian health system to assess and procure valuable products.

WHAT WE RECOMMEND

Value-based procurement

We recommend the use of value-based procurement across Canada’s health systems to increase innovation uptake and foster a more efficient health-care system.

We call on the federal government to begin work immediately with the provinces and territories and with the private sector and others to develop the tools needed to support the use of value-based procurement. We recommend that the Government of Canada lead a joint federal/provincial/territorial effort to implement value-based procurement approaches for conditions that pose a high disease burden for Canadians (e.g., cancer, heart disease, chronic obstructive pulmonary disease, diabetes) by 2025.

We recommend that the federal government demonstrate leadership by adopting value-based procurement for its areas of health responsibility.

In particular, one or more federal departments with a direct role in health services should immediately develop and pilot value-based procurement models that improve care and support economic growth, with a view to spreading and scaling successes to other departments and jurisdictions by 2025. The pilot should:

- Design value-based procurement approaches and models, with a view to demonstrating how these models could be effectively applied to the federal procurement context

- Provide procurement professionals with training and education to ensure that they are well-equipped to apply value-based procurement
- Build and collect data/evidence on the effectiveness and impact of different approaches to value-based health care

Procurement innovation agency

We recommend that a new or existing health organization be given a joint health and economic mandate and established as a health procurement innovation agency.

The new or existing entity, potentially one or more of the pan-Canadian health organizations, would be responsible for bringing together relevant partners across Canada to tackle persistent procurement challenges. The agency should be given dedicated funding in line with international examples and approaches to supporting procurement and adoption (i.e., U.K.'s [NHS Innovation Accelerator](#)).

The agency would lead a network of partners that includes representatives from provincial and territorial health departments, pan-Canadian health organizations, health-care providers, academic institutions, the private sector and the public. The agency would change the culture of health-based procurement in Canada by identifying innovations that strongly demonstrate immediate and significant value to the health-care system and building the real-world evidence to support their procurement and adoption. Specific actions would include:

- Supporting innovation pull through pre-market engagement that enables SMEs to understand needs within health systems and participate in health-care procurement by developing solutions to fit these needs
- Building evidence for high-value innovations through technology demonstration projects, including potentially providing funding in partnership with industry and the health sector to enable testing
- Measuring outcomes, including patient-reported outcomes, and disseminating scalable insights based on real-world evidence
- Working with provincial and territorial organizations on a clear deadline for making decisions about adoption once regulatory and health technology assessments have been completed

TRACKING SUCCESS

Canada placed ninth out of 11 peer countries in the 2017 Commonwealth Fund ranking of health-care system performance. We are aiming for a top-five spot by 2025.



MISSED OPPORTUNITIES IN CANADIAN HEALTH-CARE PROCUREMENT

Intellijoint Surgical of Waterloo, Ontario, has commercialized Intellijoint HIP, which gives surgeons real-time, intraoperative measurements to precisely select and position orthopaedic implants during total hip arthroplasty. Despite improved patient outcomes that have reduced cost and post-operative complications, the company has struggled for Canadian hospitals to adopt their technology, leading to minimal sales in Canada. In contrast, hospitals abroad have been quick to adopt the new technology, recognizing the potential to improve quality and reduce the overall cost of care.



U.K. NATIONAL HEALTH SERVICE INNOVATION ACCELERATOR

This entity works in partnership with the U.K.'s Academic Health Science Networks to support the adoption and promotion of proven, value-based innovations, aligning goals with NHS national priorities and local needs. Since its inception in 2015, it has supported the scale up of dozens of innovations into use in over 1000 NHS organizations. Each of these innovations has demonstrated greater quality outcomes at lower health system costs—and many are now marketed internationally.



REGULATORY AGILITY IN PRACTICE

SUBSTANTIAL EQUIVALENCE

The U.S. Food and Drug Administration oversees a submission process called the Pre-market Notification where, in lieu of an approval process, a class of new devices may be cleared for commercial distribution if the device is demonstrated to be at least as safe and effective as (i.e., substantially equivalent to) a legally marketed device. This allows for a lighter regulatory burden.

PROPOSAL

Create a modern, agile regulatory system by adopting international best practices, eliminating duplication across jurisdictions and decreasing review times

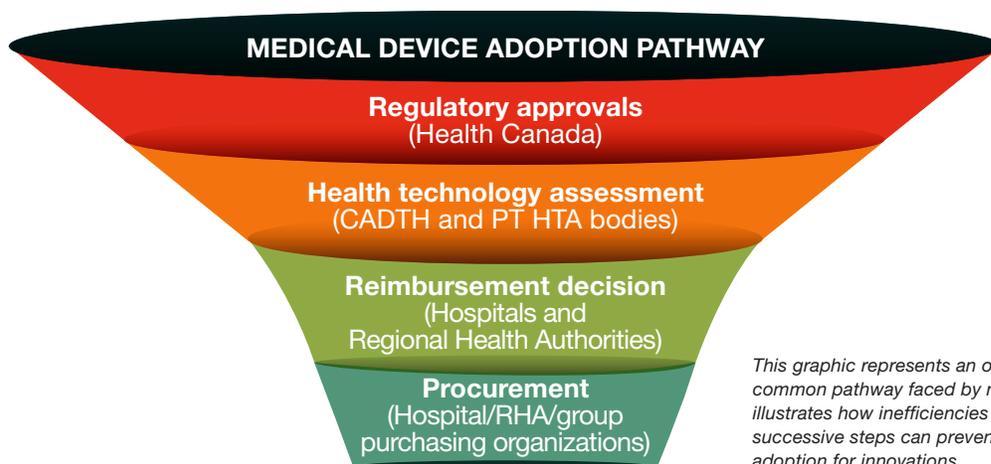
An effective regulatory environment ensures patient safety and well-being while encouraging the development and adoption of innovative new products and services. The regulatory system must be modernized, with the objective of ensuring that it serves as a catalyst for new products. A high-performing regulatory system should be predictable, efficient, consistent and transparent, so as not to present barriers to business investment, innovation and ultimately, economic growth and improved patient outcomes.

WHY THIS MATTERS

Today, Canada’s regulatory processes present significant hurdles for the rapid adoption of Canadian innovations. This may reduce patient access to leading-edge therapeutic products and harm the international competitiveness of Canadian health and biosciences firms. An agile regulatory system is the fundamental backbone to reaching our growth targets.

In a [2017 Business Council of Canada survey](#), only 13% of executives felt the Canadian regulatory environment was efficient and did not impose substantial costs to their companies. Small businesses in particular struggle with the cost burden of regulations. There is an opportunity to produce immediate gains for health and biosciences enterprises by streamlining regulatory processes and reducing red tape.

Specifically, many commentators have noted that Canada’s complex regulatory environment and fragmented procurement processes across and within Canada’s health systems pose unique challenges and adoption at scale across Canada. For instance, the [2015 Advisory Panel on Healthcare Innovation](#) highlighted concerns about “the efficiency and duplication of regulatory processes governing healthcare products and services” and noted that



This graphic represents an overview of the most common pathway faced by medical devices. It illustrates how inefficiencies at any or all of the successive steps can prevent timely marketplace adoption for innovations.

“innovators are frustrated by a multi-tiered system for regulatory approval and fragmented purchasing, forcing them to seek adoption by individual healthcare institutions and providers.” Similarly, Table members repeatedly raised the challenge and frustration with navigating the complex innovation-adoption pathway.

The federal government has acknowledged that work needs to be done. A significant modernization initiative is underway through Health Canada’s Regulatory Review of Drugs and Devices, and in 2018 the government committed to pursue reforms to make the Canadian regulatory system more agile, transparent and responsive, with a focus on supporting innovation and business investment. Table members felt that these federal initiatives are going in the right direction to supporting a regulatory system that better enables access to needed therapeutic products based on health-care system needs. A policy reform associated with the Patented Medicines Price Review Board is also underway. Table members acknowledged the importance of ensuring that the proposed drug pricing changes are not a barrier to growth and that industry concerns are addressed through a separate process.

In addition to federal regulatory processes, there are layers of provincial/territorial, regional and local regulations, policies and procedures that impact the adoption of innovative products. Efforts to improve these processes have an impact on export growth, as many international jurisdictions require country-of-origin regulatory and reimbursement approvals to be in

place before permitting a health product to receive approval in their jurisdiction. Modernized regulation and adoption processes in Canada’s health sector at all levels will improve the country’s competitiveness and strengthen the perception of Canada as a place for innovative businesses.

WHAT WE RECOMMEND

Regulatory modernization

We call on the federal government to accelerate and expand its efforts to increase regulatory agility.

The modernization process underway should result in increased international collaboration, reduced duplication and shortened review times, and enable Canada’s regulatory outcomes to surpass leading international jurisdictions such as Japan, the U.S., the European Union and Australia on a product basis.

Specifically, we call on the government to include the following objectives:

- Greater use of joint reviews as well as foreign reviews and decisions for approval of drugs and medical devices
- Adoption of international best practices, consistent implementation of international guidelines and converging review practices
- Collaboration with provinces, territories and the private sector to coordinate health technology assessments and streamline health product decisions on reimbursement, drug listing and procurement

- Greater transparency around the timeline and decision to adopt following regulatory and health technology assessment approval for drugs and medical devices or technologies

Council of Innovative and Competitive Health Regulations

We recommend the creation of a regulatory council to seek harmonization and reduced red tape across federal, provincial and territorial systems and facilitate easier entry of innovative products into the domestic market.

The council would immediately seek to:

- Identify international best practices with an aim to recommend specific actions to decrease health product review times
- Select pilots for end-to-end mapping of the innovation adoption pathway for drugs and devices—with an aim to examine the cumulative impact of regulations on firm competitiveness and propose action on specific regulatory barriers that are inhibiting growth in the sector
- Select pilots to assess regulatory pathways for emerging technologies with an aim to recommend actions to improve the adaptability of regulatory regimes for emerging technologies
- Select pilots to adapt regulatory pathways for health products that already have approval in peer jurisdictions with an aim to reduce overall time to market

■ PROPOSAL

Harness the potential of digital technology by creating a national digital health strategy featuring an interoperable digital health platform

Patient-centred information and digital services, artificial intelligence, big data analytics and disruptive digital technologies are upending markets and economic sectors and opening the door to new possibilities. A national strategy is needed to guide federal investments in digital health and unify provincial and territorial partners around the common goal of leveraging digital technology to improve care and advance economic growth. We propose a strategy that will provide a framework for privacy and data security, data governance and data sharing, and increase the information available to patients so they can make decisions about their own health outcomes. The key to success is adoption of a plan to implement a fully interoperable digital health platform across two or more jurisdictions to demonstrate what success looks like and pave the way for a national roll-out.

WHY THIS MATTERS

High-performing interoperable, digital systems are seen as a critical enabler of data-driven advances in health. Artificial intelligence is already being used to create patient-centric treatment plans based on a combination of data analytics and the most recent scientific studies. Digital and data transformation will increasingly play a role in finding active therapies for incurable or difficult-to-cure diseases as well as greater success in targeting specific treatments to individual patients. The result is a more personalized approach to health care through customized treatment plans, enabled by a strong digital technology ecosystem.

Canada has a number of strengths that it should leverage to seize the digital and data opportunity, including:

- A single-payer health system for hospital and physician

services that facilitates information sharing

- A high standard of care delivery with centres of excellence in different disease areas (often associated with major academic centres)
- The ability to collect patient outcome data across a range of disease types
- A diverse population that enables improvements learned here to be adapted to almost anywhere in the world

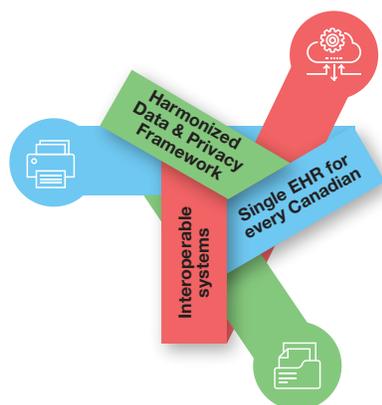
Yet, Canada faces significant challenges in implementing and using digital health systems. Variations in the implementation of digital standards, inconsistent interpretation and application of privacy frameworks and legislation, and the lack of a modern data governance framework across siloed systems pose significant barriers to unlocking and leveraging data held in jurisdictional repositories and health delivery

“People should not have more health information on their wrist than they can access walking into a clinic.”

organizations. As a result, the health system still remains largely paper-based, with doctors' offices relying on the fax machine for information sharing. In response to a [2015 Commonwealth Fund survey](#), only 19% of Canadian doctors reported being able to electronically exchange patient files.

While Canada has invested in infrastructure and developed some electronic health-record systems, three elements are still missing: an interoperable set of systems, a harmonized data and privacy framework, and a “single” accessible electronic record for every Canadian patient. A [2016 Commonwealth Fund study](#) found that not only is Canada lagging behind its peers in the adoption of digital tools but that there is considerable variation across the provinces and territories.

Digital Health Adoption Missing Elements



In addition, a critical element is the need to establish universal, next-generation internet access for all Canadians so the benefits of digital health and data can reach everyone—especially those in hard-to-reach, remote and rural communities where traditional health services are often lacking.

In short, without reliable data, the digital services that facilitate its collection, sharing and analysis, and access to quality, affordable internet, Canada will not be in a position to fully reap the benefits of digital transformation. With changes to the regulatory frameworks that block innovation, digital health

could be an important element for economic growth and Canada can move beyond having only one firm in the list of [Global Digital Health 100](#) companies.

WHAT WE RECOMMEND

Digital health strategy

To become a global leader in health digitization, we recommend that the federal government work with the provinces and territories to develop and implement a comprehensive digital health strategy.

To achieve this, the government should leverage the expertise and relationships of existing organizations such as the federally funded pan-Canadian health organizations. The strategy should operationalize six guiding principles for investments in digital health and health data:

1. Common data and agreed-on technical and formatting standards
2. A patient-centric approach that ensures health information follows the patient regardless of geographic location, provider or organization, and ensures patients retain the right to unencumbered access to their own health data
3. Interoperability across points of care, including common facilitating platforms/interfaces
4. Open architecture systems that enable rapid modification to accommodate future states
5. Private–public partnerships with well-defined roles for government and industry
6. Common privacy, data and security frameworks

We recommend that the strategy provide clear national guidance on privacy, data governance, sharing and security frameworks harmonized across federal, provincial and territorial governments to eliminate the barriers to interoperability of health-care digital systems. Serious consideration should be given to using the European Union’s General Data Protection Regulation as a starting point. In particular, the strategy should chart a clear path towards the goal of 100% of Canadians having digital access to a 360° view of their patient records. We believe that patient engagement and health outcomes will be advanced by patients having unrestricted rights to access their own health records. Moreover,

Denmark already has 100% access to electronic health records by citizens, and the Netherlands has committed to ensuring 100% patient access to their own medical records by 2020.



PRIVACY HARMONIZATION

Toronto’s Dot Health is commercializing a first-of-its-kind platform to resolve digital interoperability problems in health data. Patient privacy is fundamental to the model. The company has had to meet five separate privacy standards: PIPEDA and those of British Columbia, Alberta, Ontario and Quebec. Before Dot Health can integrate its platform with a hospital database, each hospital and health institution must complete its own privacy impact assessment, which can take up to a year.



ACCESS ATLANTIC

ACCESS Atlantic is a major digital health project being led by the Atlantic provinces and supported by federal funding through Canada Health Infoway. This initiative will support patient-centred care by modernizing the infrastructure used to manage information and empowering patients with access to their own health information. It will also embed PrescribeIT, an electronic service that sends prescriptions directly from a doctor's office to the patient's pharmacy. This project aligns with the Table's digital strategy and may serve as a launch point for the digital health pilot.

laying this foundation will provide opportunities for entrepreneurs to develop a range of innovative digital health solutions.

The Table considers the privacy of Canadians to be paramount and believes that this must be safeguarded throughout efforts to advance digital health technology adoption. Specifically, the strategy should offer a way forward that puts patient privacy first while fostering national health data interoperability and reducing red tape for firms that develop digital health technologies.

Digital health pilot
Consistent with the digital health strategy, we recommend that a pilot project be launched to implement a fully interoperable digital platform regionally across two or more jurisdictions.

This platform should enable patients to have electronic access to their personal health information. Once the pilot's foundational infrastructure is in place, it should connect with the work of the digital health supercluster. It should be specifically mandated to draw lessons learned that can inform alignment between governments on privacy, data sharing and security frameworks. The pilot should also include a plan to iteratively scale to other Canadian jurisdictions by 2025.

Digital infrastructure

We recommend that the federal government work with provinces and territories to build world-leading digital infrastructure to support the digital health strategy and enable data-driven advances in health care.

In particular, the Table calls for:

- Establishing universal, high-speed internet access to prevent a digital divide in Canada, including by improving internet access in rural, remote and Indigenous communities and providing low-cost options for those in economic need
- Creating repositories to store, retrieve and process data and better enable use of the latest advances in big data analytics, artificial intelligence and the Internet of Things

TRACKING SUCCESS

In 2017, only one of the Global Digital Health 100 Companies was Canadian. We are aiming to claim 10 spots on that list by 2025.

“
There are no big solutions to develop talent. It takes a long-term commitment that’s shared by everyone involved.”

■ PROPOSAL

Develop and attract world class talent by equipping Canadians for highly skilled jobs, eliminating hiring barriers and streamlining government skills programs

Skills and talent are vital to the sector’s growth, but there are serious shortages across all levels of the health and biosciences landscape. With rapid technological developments and exciting new research promising advances in the life sciences, we need new skills—and we need them quickly—to advance our sector. From bright young graduates to seasoned executives, the sector needs to engage top talent from home and abroad so it can compete globally over the next several years and fuel our country’s economy.

WHY THIS MATTERS

Digitization, emerging new technologies and the convergence of technologies will demand new skills of health and biosciences workers, transforming the ways medicine is delivered. Robots will do remote surgeries, diagnoses will be made by wearable devices and precision medicine will become the norm.

Health and biosciences companies consistently indicate that they suffer from skills shortages that hurt their firms. Yet job openings for life science professionals are projected to exceed the labour supply at least up to 2024. If this gap is to be closed, we need a concerted effort on all fronts: industry must collaborate to identify and articulate the current and future needs of the sector; post-secondary institutions must rapidly produce a generation of highly skilled,

innovative and career-ready graduates; and government must simplify access to skills development programs and reduce barriers to hiring foreign talent.

Canada has significant opportunities to change the way it prepares students and workers for the future. Today, there is a widening gap between the highly skilled and innovative workforce needed for Canadian firms to be global leaders and the experience and training of today’s graduates. Many international jurisdictions have experienced success with vocational schools, technical colleges and industry-focused university programs that produce graduates with the knowledge and experience to make an immediate impact. Canada must adopt this approach or risk falling behind our peer countries.



ACADEMIC/INDUSTRY PARTNERSHIP IN PRACTICE

Recognizing that many graduates with advanced health science degrees lack the training and experience to enter the private sector, Queen’s Medical School partnered with the pharmaceutical industry to develop the Graduate Diploma in Pharmaceutical Management and Healthcare Innovation. It offers a unique training experience to recent MD, PhD and PharmD graduates from across Canada to support industry needs by helping participants gain the necessary training and experience to transition to the private sector.

Coordinated effort needs to take place to better match skilled workers with unmet job needs. The Government of Canada supports a range of career development, skills and training programs, and recent developments indicate the time is ideal to streamline and simplify these programs so that employers can easily access them. Attention will also need to be paid to the requirements of businesses, particularly SMEs that require different skillsets and talents at different phases of product lifecycles.

WHAT WE RECOMMEND

Skills hub

We recommend that the Government of Canada, the health and biosciences sector, academia and provincial/territorial governments together establish an empowered and accountable hub to drive the necessary changes to skills and talent programs, and to equip Canadians for highly skilled jobs in the sector.

Key performance indicators and relevant metrics will ensure accountability and ongoing evaluation of the success of the hub's activities and programs. The hub should focus on:

- Developing a roadmap for the jobs of the future and the skills and competencies they will require
- Creating an evergreen data collection strategy, including research and industry surveys, to act as a focal point for gathering and disseminating labour market information

- Updating K-12 and post-secondary curricula to emphasize future-focused competencies
- Driving the expansion of work-integrated learning opportunities, including by promoting the development of vocational programs and the establishment of industry-focused education streams, including at the graduate level
- Promoting mid-career interchange opportunities across major sectors to strengthen the connections between industry, academia and public service
- Creating and subsidizing reskilling programs that enable technology adoption
- Promoting careers in the sector and conducting targeted outreach to underrepresented groups

As an early action, the hub would spearhead a redesigned curriculum pilot between industry and a group of up to five post-secondary institutions, based around robust work-integrated learning and the attainment of in-demand skills in the sector. The skills hub would also help ensure that STEM (science, technology, engineering and mathematics) and digital skills are emphasized more at the pre-college stage, recognizing that these competencies are foundational to building the innovative workforce of the future.

Talent repository

We recommend the creation of a digital repository of skilled workers.

This would benefit SMEs by giving them flexible and timely access to workers with various skills—on a

part-time or short-term basis—that are in limited supply. This would help them grow into successful, innovative firms. It could also facilitate opportunities for workers who wish to expand their skillsets in different company settings, tap into retired talent and create flexible work opportunities that foster greater workforce participation among underrepresented groups such as women and older workers. A sector-wide talent repository would become a one-stop shop that brings together supply and demand to better calibrate hiring processes. The digital repository could be hosted by the skills hub and harmonize the ongoing efforts of organizations such as BioTalent Canada, which hosts the PetriDish, a national bilingual bio-economy job board.

Optimize immigration

We recommend the reduction of barriers to hiring highly skilled foreign talent and enhancements to the system for foreign credential recognition.

Immigration is a valuable tool for addressing skills shortages but more needs to be done to better employ the skills of newcomers to Canada and reduce administrative barriers to hiring them. In many cases, immigrants have in-demand skills but struggle to find employment commensurate with their training. At the same time, in a globally competitive landscape, streamlined immigration processes are an essential element of acquiring top global talent. Progress has been made, including efforts through the federal government's Foreign Credential Recognition Program and initiatives to accelerate



EXECUTIVE TALENT PROGRAMS IN CANADA

ONTARIO EXPORTERS FUND

This helps SMEs cover the cost of hiring an experienced export manager.

QUEBEC TAX HOLIDAYS FOR FOREIGN EXPERTS

This helps firms recruit candidates who are highly qualified to carry out innovation projects. Eligible foreign experts or researchers are granted a reduction in Quebec income tax over 60 months.

MARS EMBEDDED EXECUTIVE FUNDS

This helps place a C-level or other senior-level executive with an Ontario-based technology venture for six months to support achieving their next growth milestone.

processing of work-permit applications through the Global Skills Strategy. Nonetheless, given the importance of the issue to accessing critical talent, these efforts must be strengthened and enhanced. For example, initiatives that assist with job placement for accompanying spouses would address a common challenge and enhance Canada's reputation as a destination for top talent.

Access to C-suite talent

We recommend the development of initiatives to improve the affordability of C-suite or other senior executive talent for SMEs.

Canadian firms are at a disadvantage in the global marketplace for C-suite talent due to our relatively low levels of compensation. A relatively small sector coupled with lower compensation and a high cost of living poses significant challenges for global talent acquisition and retention. This challenge is particularly stark for health and biosciences SMEs as they have difficulty accessing capital. Without mechanisms to increase the affordability of executive talent, businesses can't attract and retain the top global business leaders who might drive their firms to scale.

Federal skills programs

We recommend streamlining federally funded programs for skills development and training through a single body to manage outcomes and reduce duplication and overlap.

The wide range of federally-funded initiatives demonstrates the government's commitment to career and skills development, including in the health and biosciences sector. Unfortunately, the various offerings have differing processes and eligibility criteria, making them confusing to navigate. Consolidation would improve data collection and facilitate strategic interventions to improve access. This includes creating one source of information on program availability and helping ensure benefits are well known throughout the sector. As part of these efforts, programs could be revised to improve alignment with current and upcoming industry needs. Program outcomes could be assessed to ensure they are supporting skills development that truly helps the sector and align with efforts to advance the inclusion of women and other underrepresented groups in the health and biosciences sector.

“We need to reorient and incentivize companies to build to scale, not build to flip.”

PROPOSAL

Drive the creation of anchor firms by mobilizing late-stage capital, scaling-up high potential firms, and broadening research and development tax incentives

Canada’s innovative life sciences industry has the essential components to compete globally and has achieved a successful track record of fostering start-up health and biosciences firms. Yet in spite of this potential, Canada does not currently have any homegrown global anchor firms in the health and biosciences sector. This must be tackled head on. With supportive scale-up programs, we can stem the tide of foreign acquisitions within the sector and allow Canadian life sciences companies to grow into globally competitive anchor firms.

WHY THIS MATTERS

Access to capital and industry expertise from specialized venture capital (VC) and private equity funds is an essential prerequisite for entrepreneurs and life sciences companies to maximize their business and growth potential at all stages of development, from start-up through later stage development and commercialisation. However, the vast majority of Canadian life science venture capital funds are concentrated on early-stage financing rounds. Canada also suffers from the lack of a robust Canadian stock-exchange on which life science companies can raise growth capital by becoming publicly traded in Canada. The lack of local access to later-stage

growth capital presents a missing link in the life science innovation ecosystem and creates negative feedback loops that stifle innovation and growth potential.

Consolidation through mergers and acquisitions is a global reality within health and biosciences, and it is not about to change. Scaling up Canadian firms would help stem their acquisition by foreign entities, instead allowing scaled-up Canadian firms to become the anchors that acquire firms within Canada. This shift in the sector would be a game changer, as anchor firms attract, recruit and develop talented managers who often become entrepreneurs of spinoff biotech start-ups. They also acquire small and mid-sized

Since 2001, in Quebec alone, a total of 11 life sciences companies with market values in excess of \$250 million have been acquired by foreign entities—mostly from the U.S.—for an aggregate value of \$15.2 billion.



SPOTLIGHT ON THE U.S.

The top four U.S. biotech companies are Amgen, Celgene, Gilead and Biogen:

- They have a collective valuation of \$378 billion (larger than the collective valuation of Canada’s Big Six banks)
- They each employ an average of 10,000 people
- They generate strong economic growth by each investing an average of \$4 billion per year (20% of their annual revenues) in private sector R&D

life sciences companies so they can fill their innovation pipeline with new assets and technologies, thereby building their own capacity while providing a strong source of funding for the domestic innovation ecosystem. Jobs, innovation, intellectual property and other benefits would remain in the country.



SPOTLIGHT ON QUEBEC

Quebec's Biomed Propulsion Program provides financial support for Quebec life sciences companies with strong growth potential to help them commercialize the results of their research while encouraging private investors to actively contribute.



SPOTLIGHT ON DENMARK

Denmark reserves 20% of its health-care budget for investment in information, communication and medical technologies, including medical devices. The goal is to create an environment that helps companies thrive and produce the best value-for-money technologies. They are home to numerous global health-care anchor firms, including Novo Nordisk, Coloplast and Leo Pharma.

WHAT WE RECOMMEND

Late-stage capital

The relative lack of Canadian late-stage funds results in earlier exits to foreign investors, ultimately resulting in fewer self-sustaining Canadian anchor companies. We must stem the loss of potential multi-billion-dollar firms due to insufficient access to local sources of VC and private equity funding. The Venture Capital Catalyst

Initiative (VCCI), available through the Business Development Bank of Canada (BDC), has become an important vehicle to secure early-stage VC funding for high-growth firms, but its mandate must be expanded.

We recommend the creation within the VCCI of a dedicated envelope that would support and invest in the creation and development of later-stage venture and private equity capital funds that are specifically focused on life sciences.

ISED and VCCI should encourage large Canadian institutional and pension funds to invest as limited partners in these dedicated later-stage venture capital and private equity funds and also to more actively co-invest with these Canadian-based funds on larger rounds of financing of more advanced Canadian companies (in particular when being targeted for acquisition by foreign multinationals).

Own the Podium

We recommend the Government of Canada enhance its existing support for firm scale-up by identifying high-potential health and biosciences firms, keeping them based in Canada and giving them opportunities to grow into anchor firms for the sector.

ISED's Accelerated Growth Service initiative provides a strong foundation upon which to build an "Own the Podium" approach. When a Canadian high-potential firm is targeted for acquisition by a foreign entity, the program should include mechanisms for the government to provide strategic financial support to Canadian late-stage capital

funds to help them successfully compete against foreign multinational companies and financial investors in such acquisition processes. Metrics for evaluating which firms would qualify for concentrated support could include:

- Three-year compound annual growth rate
- Number of international and/or domestic partnerships
- Demonstrated pipeline of innovations in development
- Amount of revenue
- Amount or number of VC-private equity investments

Toronto Stock Exchange listings

We recommend the Government of Canada work with securities administrators to develop policies and mechanisms that reduce barriers and increase incentives for Canadian life sciences firms to pursue dual listing on the TSX and U.S. exchanges.

Access to U.S. public markets, especially the NASDAQ, is recognized worldwide to be a key factor for growth, providing a wide range of new and deeper sources of capital. Often, Canadian firms focus only on listing in the U.S., as listing on both U.S. and Canadian stock exchanges demands time and resources and introduces complexity. Barriers must be reduced so Canadian firms can more easily list on the TSX—leading to new capital opportunities, increased public investor familiarity with life sciences companies in Canada and improved domestic and international visibility of Canadian firms. This would foster greater

liquidity, enhanced Canadian retail investment and analyst coverage for publicly-traded Canadian life sciences firms.

SR&ED review

We recommend a review of Canada's Scientific Research & Experimental Development Tax Incentives (SR&ED) to allow full SR&ED access for eligible Canadian-based companies regardless of whether such companies are controlled by Canadian investors or traded in public or private markets.

SR&ED is globally recognized as a highly effective lever for promoting private sector R&D activity as well as early-stage VC investment and company growth in the life sciences industry. However, current eligibility criteria, including a narrow interpretation of R&D, make the benefits inaccessible to many health and bioscience companies that are based in Canada. For example, Canadian-based companies that have greater than 50% ownership by non-Canadian investors or are listed on a public stock exchange are ineligible for the SR&ED reimbursable credit.

The current system cuts off R&D support at the exact instant when Canadian firms are demonstrating the greatest growth potential by going public or attracting foreign direct investment. It also removes a highly effective lever for retaining R&D activities in Canada once a Canadian SME becomes publicly traded or controlled by foreign investors and further accentuates gravitational forces to move head offices and R&D activities outside of Canada. Expanding

SR&ED benefits would provide a greater incentive for health and biosciences firms to fast-track technology development, expand their innovation pipelines and grow into anchors that will strengthen the Canadian innovation ecosystem. Canada should make every effort to relax eligibility for SR&ED instead of seeking to restrict its availability.

Technology in-licensing

We recommend that the Government of Canada provide support for in-licensing of domestic technologies by creating a fund that would provide matching investment to any Canadian firm willing to grant an in-licence for further development of a Canadian-invented discovery.

Venture investment in the health and biosciences sector has a higher inherent risk relative to other industrial sectors given substantially longer times for certain products to reach the market, increasing regulatory complexity and global pricing pressures. As a result, investors have tended to prioritize lower-risk investments with earlier exit opportunities, typically businesses developing a single asset. This approach imposes constraints on the longer-term development, risk diversification and scale-up potential of SMEs, and on their ability to access growth capital. Instead, Canadian life sciences firms should be encouraged to in-license Canadian technologies (sourced from early-stage assets developed by academia and Canadian SMEs) in order to provide



SPOTLIGHT ON AUSTRALIA

The Australian research and development tax incentive aims to boost competitiveness and improve productivity across the economy by providing refundable tax offsets on R&D activities undertaken in Australia. Corporations that are incorporated under an Australian law or that are incorporated under a foreign law but are an Australian resident for income tax purposes are eligible for the R&D tax incentives. There are no eligibility restrictions based on the level of Australian ownership of the corporation or on whether the corporation is privately held or publicly traded.

further diversification and enhance their scale up potential as well as to promote commercialization of Canadian-invented discoveries.

TRACKING SUCCESS

By 2025, we are aiming for doubling of the total annual amount of equity capital invested in the Canadian health and biosciences sector from \$1 billion to \$2 billion.

The Canadian health and biosciences brand

Canada's universal health-care system is a source of national pride, and the Canadian health and biosciences sector is a key source of high-paying, quality jobs, employing more than 91,000 people directly and some 2.1 million within the broader health system. Health and biosciences is also a significant contributor to Canada's economy. The industry contributed \$7.8 billion to Canada's GDP in 2016 and has tremendous growth potential. Areas poised for growth include digital health, which is due to be a \$233-billion global market by 2020, and precision medicine, which is set to be an \$88-billion market by 2023. Our Canadian health and bioscience companies are well aware of the brimming opportunities in the sector, and have world-class solutions.

All over the country, Canadians are leveraging cutting-edge technologies to bring about the health solutions of tomorrow. Our researchers, inventors and entrepreneurs are following our strong tradition of innovation and developing breakthrough products—but we don't do enough to shine a spotlight on our successes.

Here at home, the public needs to be more aware of the brilliant innovations being developed right here in Canada. Our public health systems need to have the confidence to back Canadian innovations, as well as the capacity to reach out to our innovators for Canadian-based solutions to issues related to services delivery and care. We need to let our homegrown talent shine and grow, knowing that once we give them the scope to expand in Canada, they can then succeed globally.

Further afield, attracting skilled talent from around the world would be expedited if we did more to ensure that Canada is rightfully recognized abroad as an economic powerhouse and a place to contribute to health solutions with global impact. **We recommend that industry collaborate with federal, provincial and territorial governments to raise the profile of the health and biosciences sector among the Canadian public, governments and institutional investors, as well as the global marketplace.**

■ CONCLUSION

The health and well-being of Canadians is at the core of our society, and Canada has a proud tradition of innovation in health products and service delivery. Health spending represents a sizeable proportion of our gross domestic product, and there has never been a better time to leverage this investment to produce greater health outcomes and economic prosperity.

By seizing the moment, we can better enable Canadian-based innovations and companies to grow within Canada as a jumping-off point to global leadership, focused on value-based products that aim to improve patient care and outcomes. Our collective commitment to streamline regulations, enable cutting-edge technologies to reach the marketplace, advance digital health technology and grow firms to scale will transform the health and biosciences ecosystem to the benefit of all Canadians. Bringing this to fruition won't happen overnight: focused and ongoing dialogue will be required between Health Canada, ISED, the private sector, the health-care community and provincial and territorial governments. We recommend that this Table be maintained as an ongoing mechanism to facilitate that dialogue.

HEALTH AND BIOSCIENCES KEY PERFORMANCE INDICATORS FOR 2025

Proposed target

Background

Canada placed ninth of 11 peer countries in the 2017 Commonwealth Fund ranking of health-care system performance. We are aiming for a top-five spot by 2025.

The Commonwealth Fund is a private U.S.-based research foundation. Rankings are based on the fund's detailed international surveys of patients and doctors as well as data from the World Health Organization and the Organisation for Economic Co-operation and Development (OECD). The 2017 list was topped by the U.K., Australia and the Netherlands. The next set of rankings will be released in 2020.

In 2017, only one of the Global Digital Health 100 companies was Canadian. We are aiming to claim 10 spots on that list by 2025.

The Global Digital Health 100 is an international benchmark of innovation in the health-care technology industry compiled from a combination of nominations and industry research by the Journal of mHealth. The lone Canadian firm on the 2017 list was Toronto-based mobile app, Dash MD.

By 2025, we are aiming for a doubling of the total annual amount of equity capital invested in the Canadian health and biosciences sector from \$1 billion to \$2 billion.

According to Thomson Reuters, \$1 billion of venture capital equity was invested in the sector in 2017. Doubling this investment would reflect a vibrant life sciences capital market and an indication of Canada's success as a global destination for health and biosciences venture capital.

HEALTH AND BIOSCIENCES TABLE MEMBERS

Chair

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Members

Armen Bakirtzian, Intellijoint Surgical Inc.

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