

# Realizing the Promise of Healthcare Innovation in Ontario

–  
Increasing Value for the  
Patient, Health System and  
Economy

By OBIO® in Collaboration with  
CLEAR, St. Michael's Hospital and  
Innovation Cell, Massey College

*Building Authentic Trust Among  
Stakeholders to Get Things Done*

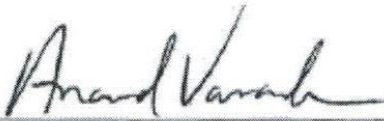
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## A Message from the Steering Committee

As Members of the Steering Committee of the OBIO Innovation Working Group, we are proud to have had a role in this important work. We deeply care about promoting healthcare innovation in Ontario to benefit patients, while contributing to health system sustainability and economic growth. While not easy to solve, we cannot afford to cast healthcare innovation adoption aside. The OBIO Innovation Adoption report identifies the gaps that exist in reaching healthcare innovation adoption in Ontario and puts forward solutions to help overcome those gaps. The report points to the need for collaboration among multiple stakeholders –including government, industry, patients, caregivers and allied health professionals – to identify common definitions, metrics and outcomes. In addition, the issue demands leadership, particularly from government and industry leaders, to ensure the dialogue turns into action. We wish to thank Neil Seeman and the team at Innovation Cell at Massey College for their commitment to this report. We also wish to thank the Centre for Excellence in Economic Analysis Research, Li Ka Shing Knowledge Institute, St. Michael's Hospital for their diligence in preparing the Ontario innovation case studies to accompany the report. Finally, we extend our appreciation to OBIO and Gail Garland for demonstrating leadership on this important issue. We hope this report sparks the dialogue and actions needed, for the benefit of Ontario's health and future.



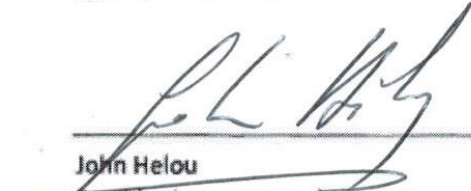
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## 1.0 Executive Summary

### Using Innovation to Address the “New Normal” in Healthcare

The **OBIO® Innovation Adoption Initiative** is a product of the Ontario Bioscience Economic Strategy Team (OBEST®), an initiative launched by OBIO® to address the challenges faced by Ontario’s human health technology and bioscience industry. Its goal is to recommend policy avenues that catalyze commercialization for the therapeutics, medical devices, diagnostics, and health information technology (health IT) sectors while strengthening the province’s capacity to deliver cost-effective care for patients and caregivers as intelligently and innovatively as practicable.

The Province of Ontario’s healthcare system faces two significant challenges: a fiscally unsustainable rise in healthcare costs, and the rise of chronic disease and related co-morbidities. Innovative health technology has proven integral to improving health outcomes but it also has significant potential to be a key component in managing healthcare costs. Consequently, in Ontario’s publicly funded health system, public policy becomes either the primary driver or the primary obstacle for delivering healthcare innovation in the province.

Currently, innovation adoption in Ontario faces certain systemic barriers and we lag behind some other technologically advanced jurisdictions in deriving the health and value benefits of some innovative health products and services.

Our research reveals that a significant barrier to adoption appears to be the inability of government and industry to overcome mutual distrust which has become institutionalized and systemic. This can be ameliorated if government and industry work to collaborate on standardized metrics that can be used to objectively measure enhanced value for patients, and the system as a whole. Other obstacles to rapid innovation adoption include: misalignment of priorities (among providers, patients, industry and government), a differing view on assessing value, aversion to risk, and upfront cost as a primary factor in decision making.

### Innovation Adoption in Healthcare

In order to facilitate adoption, the innovation must first be recognized for its value and benefit within a system; and the system itself needs to recognize that the innovation leads to increased value and benefit, and then pursue it with vigor.

Today it has become increasingly clear that healthcare innovation requires more time, risk, and upfront investment. Unfortunately it is too often met by increased barriers and uncertainty with respect to market adoption. By way of contrast, academic efforts in the United Kingdom, the United States and key E.U. countries reveal where and how product and process innovations reduce healthcare costs and/or deliver value via breakthrough treatments that may dramatically improve patient outcomes.

In a global economy, it is no longer sufficient to keep pace. Leading jurisdictions will be the ones that stay ahead of the innovation adoption curve by proactively implementing novel solutions to new and emerging challenges.

In Ontario, more timely adoption of innovation could improve health outcomes, create a more robust healthcare sector, and enhance productivity. In order to accomplish these goals there needs to be put in place a regime in which there is a full evaluation of innovation cost-effectiveness and efficacy.

### A Fundamental Barrier to Moving Forward

Extensive research and consultations by OBIO revealed a fundamental lack of trust among stakeholders, which has had a negative impact on our ability to create a productive innovation adoption system. The current state of affairs reflects ‘cordial disregard’ where stakeholders talk *at* each other rather than *with*, and there is little to no follow-up or collaborative activities undertaken.

The evidence indicates that industry-government dialogue is required to overcome the distrust and to facilitate the adoption of innovative technologies in healthcare. Therefore, a fresh dialogue between industry and the province surrounding innovation adoption pathways for therapeutics, diagnostics, devices, and health IT will require a new consensus around what “innovation” and “value” represent, and the metrics utilized for their evaluation.

There appear to be a number of trust “gaps” in the current system. For instance, government shows a lack of trust that it is receiving value for money from new innovations and a lack of trust in therapeutic/health IT/device/diagnostics pricing models. Meanwhile, industry shows a lack of trust that government understands the value for money the government is receiving.

Developing a new approach to innovation adoption protocols will require acknowledgment of the trust gaps that exist and an agreement by all parties to incorporate trust-building and partnership along the entire innovation adoption pathway. Each element or step on the pathway should be designed to strongly improve the use of high quality evidence.

Furthermore, leadership is required at the highest levels of government and industry to address and ameliorate the current trust gaps and achieve alignment on common goals for innovation adoption in Ontario.

### Case Studies of Healthcare Benefits in Ontario

The OBIO Innovation Adoption Initiative worked with the Centre for Excellence in Economic Analysis Research (CLEAR) from the Li Ka Shing Knowledge Institute at St. Michael’s Hospital in Toronto to develop case studies that evaluate the healthcare benefits for innovation adoption in Ontario. A series of six case studies were selected to represent the full spectrum of opportunities for innovation adoption in healthcare and to demonstrate the true value of innovation in terms of cost savings for the Ontario health system, and extend life, enhance the quality of care and improve patient satisfaction for Ontario patients.

Many global jurisdictions have demonstrated the growing trend to seeking innovation as a solution to improved and sustainable healthcare and are actively monitoring metrics to ensure success. Case studies that were developed specifically for Ontario also demonstrated that cost and patient benefits have been realized by other jurisdictions that have implemented the healthcare innovations profiled. While some of the case studies showcase the benefits that have been realized through industry / government collaboration for innovation adoption, there are others that demonstrate a significant opportunity lost for not adopting innovative healthcare solutions. Collaboration, while essential to innovation adoption, is not currently embedded in the Ontario health system, and needs to be formally recognized as part of the process.

## Implementing Innovation Adoption in Healthcare

A new balance must be struck among innovation, cost-effectiveness, and efficacy in order to address population health burdens imposed by the increased demographic and fiscal challenges facing the healthcare system.

There are considerable challenges to determining how best to diffuse innovation into the health system, while also ensuring proper management of healthcare expenditures. It is a practical reality that given the province's fiscal circumstances, Ontario's senior civil servants must carefully utilize cost containment as a central policy filter.

The provincial government, along with its affiliated agencies, are tasked with **identifying** potential new products, **evaluating** their value to the healthcare system and finally, determining if the technology is a good **investment** for the province.

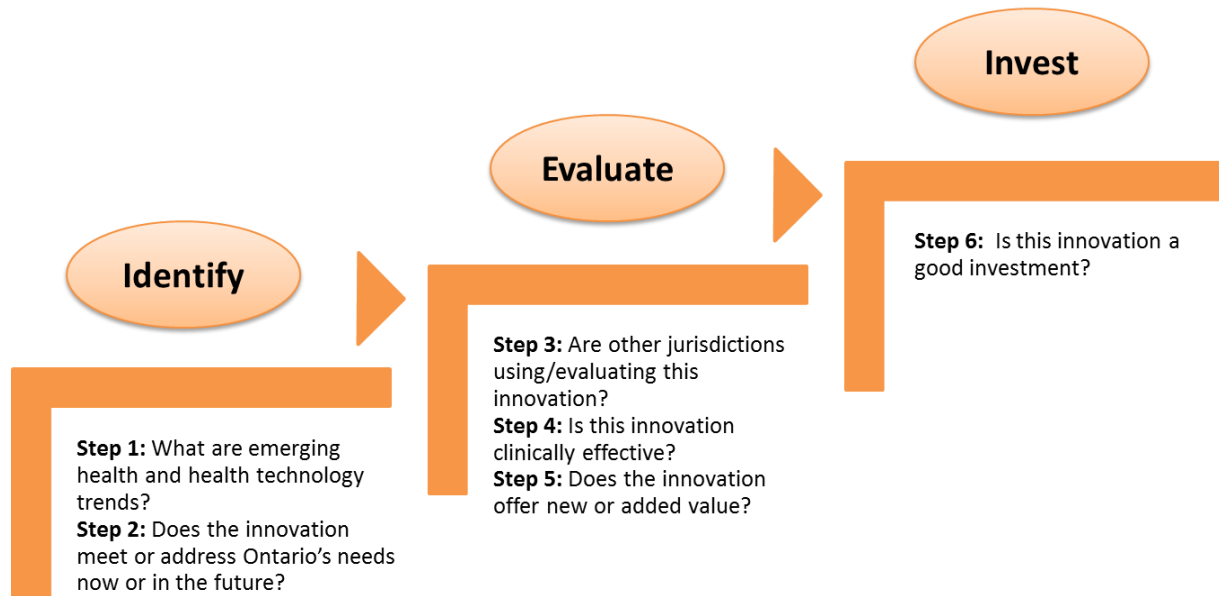
A close examination of the current adoption system identified six specific steps along the "Identify, Evaluate, Invest" pathway where stakeholders identified opportunities to increase the efficacy/efficiency of these processes and facilitate decisions regarding the adoption of new technologies in Ontario (Figure 1).

All six steps of the innovation adoption pathway could have a beneficial impact for all parties involved. In particular, two aspects could be particularly important: **(i) the provision of data/existing information throughout all steps of the innovation adoption pathway and (ii) the development of a transparent set of value-based metrics and processes around innovation adoption and investment.** The provision of data and determination of metrics requires both government and industry to collaborate in order to establish a full and comprehensive understanding of the overall values and benefits to innovation adoption.

The real measure of benefit for Ontario is focused primarily on two key factors that benefit all Ontarians; namely: **an aggregate cost savings to the system as a whole; and an increase in the access to therapies that extend life, enhance the quality of care and improve patient satisfaction for patients.** By assessing any new products or health technologies against these two key factors, it becomes clear what the true benefits of innovation adoption will be (or the lost opportunities for not adopting them).



Figure 1: Critical Pathway to Enabling Innovation Adoption



### Innovation Adoption: Impact on Ontarians

**Impact on the Individual Patient** – Patients and caregivers are partners in care and innovation. Their active engagement will not only enable the development and adoption of new innovations, but they will also be the key factor in determining their success. The measures of extending patient life, improving quality of life, increasing access to therapies/services, making service delivery safer, patient convenience, and patient satisfaction are all key indicators of how innovation adoption can directly impact the individual patient.

**Impact on the Health System** – The introduction of new products or processes must demonstrate an overall value, which means it must also demonstrate an overall long-term cost saving to the system, which in turn leads to sustainability. Ontario-based case studies showcasing the value of innovation in devices, therapeutic products, and health IT-systems have shown that the adoption of innovation by the health system can result in overall value for the health system.

**Impact on the Economy** – Assessment, evaluation and adoption of the best innovative products and technologies will lead to a more efficient health system that can show accountability and return-on-investment to the public. Taxpayers will receive better value and a higher return on investment. In addition, if Ontario is able to create an open and transparent mechanism for adopting new value-added innovations, then local companies will be enabled to further invest and develop priority products and systems. Local market adoption will help to retain these companies as they grow and prosper which will lead, in turn to export opportunities. In the same vein, attraction of foreign products and companies to the province will also ensure that the best products are available to Ontarians, thus improving the chances that these companies will establish a long-term presence in the province.

## Ontario Government Ministries – Contributory Role and Resulting Benefits

The Ontario Government's primary role will be to establish a clear mandate for innovation (research through adoption), and to ensure alignment of that mandate across all ministries. While innovation has always been a clear priority for government, the approach to innovation has never been well aligned from a Ministry perspective. This is because the mandate has failed to account for other ministry specific factors and at times conflicting ministry priorities. Innovation adoption needs to be clearly understood not only as an overall priority for the province, but also how it directly benefits the various ministerial mandates of government.

**The fundamental role for government must be directed from the highest levels of leadership, to first acknowledge that innovative technologies are an essential component of the Ontario health system, and second to reinforce a mandate to adopt health technologies that will improve patient outcomes, while also reducing overall costs to the health system.**

## Conclusion – Or Rather, a New Beginning

This report does not dictate an ultimate solution for innovation adoption, but rather recommends a framework to engage government and industry in finding common ground on value-based metrics and establishing a process that openly and transparently evaluates those metrics. By working in an authentic trust-based collaboration, we can decelerate the innovation adoption deficit, and work toward sustaining an environment of innovation adoption to the benefit of all Ontario for decades to come.

At the same time, shattering the barriers to innovation adoption in Ontario will require strong leadership and a determined, sustained effort from public and private partners alike.



## 2.0 Introduction – Using Innovation to Address the “New Normal” in Healthcare

Ontario, along with most other developed economies, has recognized the importance of innovation as a leading factor for growth and prosperity in the new economy. Healthcare has been one of the leading sectors globally that has driven the growing demand for innovation. In recent decades, the resulting products from healthcare innovation have already demonstrated significant improvement in the diagnosis, treatment and management of many diseases and in the increase in quality life years for all of society. Economic growth has also played a key role in ensuring ongoing commitments across political parties in Ontario to enabling and supporting health innovation in the province.

The delivery of healthcare, however, has become an increasing challenge in terms of funding and long-term sustainability. This challenge is not unique to Ontario, or Canada, but healthcare has become a universal value for developed and developing nations and ensuring the sustainable delivery of healthcare remains a top priority for all.

**The Growing Health Burden** – Public healthcare spending in Ontario is a \$49 billion annual commitment, accounting for 7% of the GDP. Over the past 15 years, Ontario’s healthcare spending grew at a pace of approximately 6.5% annually. Ontario has recognized in its own strategic plan the unprecedented challenges facing the province’s healthcare system; namely, increasing demographic and fiscal demands. Estimates around the aging population place the number of seniors living in Ontario over the next 20 years at nearly double its current level with the cost of care for a senior at 2-3 times that of an average person.

The Ontario government estimates that current healthcare expenditures are roughly 42 cents of every dollar spent on provincial programs. Projecting forward (based on cost increases over the past two decades) if no changes are made in the way healthcare is delivered, health spending is expected to rise to 70 per cent of the provincial budget within 12 years. Given these conditions, it is not surprising that the government is forced to operate in an environment of fiscal restraint.

**A Balanced Approach is Needed for Improving Health Through Innovation** – Ontario stakeholders recognize that public policy is the primary driver for healthcare innovation in the province. A proper balance of both supply-side policies (e.g. support of research and commercial development) and demand-side policies (e.g. acquisition of new technologies and solutions for better care) are required to establish a growing, virtuous cycle of innovation that can be sustained to the benefit of all players in the healthcare ecosystem.

There are at least five key challenges that healthcare innovation can address in Ontario and in Canada from provincial and federal perspectives:

- The unsustainable rise in healthcare costs
- The rise of chronic disease and related co-morbidities
- The population health status of Ontarians and Canadians

- The need for equitable access to healthcare for rural and underserved regions
- The drive for economic growth and prosperity in Ontario and in Canada

**A Collaborative Solution** – Ontario recognizes that these challenges will require the identification of new approaches to securing health science innovation within a robust Ontario innovation ecosystem. These approaches must not only demonstrate improvements in patient care, but also provide value-based health services that benefit the patients, caregivers, and the provincial system overall.

The *OBIO® Innovation Adoption Initiative* is a product of the Ontario Bioscience Economic Strategy Team (OBEST®), an initiative launched by OBIO® to address the challenges faced by Ontario’s human health technology and bioscience industry. Stakeholders from all sectors (i.e. industry, government, healthcare providers, institutions, support services, etc.) were invited to participate.

The goal of the *OBIO Innovation Adoption Initiative* is to recommend policy avenues that catalyze commercialization for the therapeutics, medical devices, diagnostics, and health information technology (health IT) sectors while strengthening the province’s capacity to deliver cost-effective care for patients and caregivers as intelligently and innovatively as practicable. The work presented in this report is based on a thorough environmental scan that includes a systematic literature review, a jurisdictional comparison and the largest semi-structured set of stakeholder interviews ever conducted in the field of healthcare innovation adoption in Canada. It also incorporates case studies illustrating how Ontario can use the adoption of new technologies – often through existing opportunities – to address and meet its impending healthcare challenges.

*This report will highlight findings from the OBIO Innovation Adoption Initiative.*

***Value — neither an abstract ideal nor a code word for cost reduction — should define the framework for performance improvement in healthcare. Rigorous, disciplined measurement and improvement of value is the best way to drive system progress. Yet value in healthcare remains largely unmeasured and misunderstood... Current cost-measurement approaches have also obscured value in healthcare and led to cost-containment efforts that are incremental, ineffective, and sometimes even counterproductive. Today, healthcare organizations measure and accumulate costs around departments, physician specialties, discrete service areas, and line items such as drugs and supplies... Costs, like outcomes, should instead be measured around the patient.***

***Michael Porter***

*What is Value in Healthcare?*

*New England Journal of Medicine, 2010.*

### 3.0 Innovation Adoption in Healthcare – What Is It and What Can It Do?

**What is Innovation Adoption?** – By definition, an innovation is something that adds value and provides a significant incremental (or more likely transformative) benefit over the current status quo (or standard of care, in the context of health). In order to facilitate adoption, the innovation must first be recognized for its value and benefit within a system; and the system itself needs to recognize that the innovation leads to increased value and benefit, and then pursue it with vigor.

In the end, adoption often comes down to understanding and communicating the overall value and benefits of innovation.

**Innovation Adoption in Healthcare** – Today it has become increasingly clear that healthcare innovation requires more time, risk, and investment upfront; which are then met by increased barriers and uncertainty to market adoption towards the end. The crux of the innovation-adoption challenge in Ontario (and in Canada) is to ensure that the right innovations get to the right people at the right time, which in turn will improve patient care, increase stability and long-term sustainability to the health system, and facilitate a cycle of economic growth in the province. Ultimately, a clear pathway for market access will result in healthier populations and greater economic productivity.

Academic efforts in the United Kingdom, the United States and key E.U. countries reveal ongoing examinations around where and how product and process innovations reduce healthcare costs and/or deliver value via breakthrough treatments that may dramatically improve patient outcomes. This includes efforts by researchers to analyze the causal and correlational factors related to innovation, cost-effectiveness, and efficacy of health systems.

Adoption of health innovation has been shown to improve health outcomes, create a more robust healthcare sector, and to enhance productivity. Therefore, a full evaluation of innovation, cost-effectiveness, and efficacy must be imposed in order to address population health burdens that are a result of the increased rate of chronic disease and related co-morbidities. Methods of healthcare delivery and patient care that yield suboptimal outcomes or value must also be assessed.

**How Innovation Adoption will Achieve Impact** – The entire ecosystem of healthcare delivery in the province will be impacted by the active adoption of innovation. It must be restated that Ontario, like many other innovation-based economies, has recognized the value of innovation and the importance of innovation in the health sector. However, in the age of a global economy, it is no longer sufficient to keep pace. Leading jurisdictions will be the ones that implement novel solutions to innovation adoption, while other jurisdictions will continually play catch-up by mimicking the best practices of others.

The impacts of Innovation Adoption will be prominent in the following three areas:

- Individual patients,
- The health system, and
- The economy.

### 3.1 Impact on the Individual Patient

Ensuring quality care for Ontario patients is already a shared value that has been established in law by the Ministry of Health and Long-Term Care (MoHLTC) through the Excellent Care for All Act (2010)<sup>1</sup>. This Act provides a mandate for healthcare organizations to provide a public declaration of patient values and directly engage patients to ensure quality care is being provided and that improvement plans are continually developed and implemented. Innovation adoption, however, has not yet been implemented (or, in some instances, recognized) as a key factor for ensuring excellence and quality in patient care.

**Engagement of the Patient is Essential to Delivering Quality Care** – The engagement of patients (or consumers of healthcare) is broadly cited by stakeholders as critical to the future viability of the healthcare system. There is a strong desire to push the idea of “shared care,” where patients are engaged and empowered in the management of their care. For example, models have been proposed that develop a treatment gradient whereby the primary responsibility for care begins with the patient, and then follows through to nurses, family physicians, and along the care trajectory, to specialists. This model would help diffuse the healthcare “load” and ensure resources were only engaged at the level they are needed. Although there are various models that could be proposed, the fundamental principle remains that the patient is the essential component to ensuring quality care.

**Patients are Enablers of Innovation** – There remains a tremendous opportunity for co-innovation with patients and citizens. With the engagement of the patient recognized as fundamental, the result is an incredible resource of direct engagement that is underutilized and virtually untapped. Patients and caregivers need to get better at thinking of themselves as partners in care and innovation, and realize that they are all part of the greater healthcare “team.”

The literature cites several examples of patient engagement in new technology, products and innovative process for the management and delivery of care. For example, in a recent effort to foster health IT adoption, the U.K.’s National Health Service’s (NHS) “Connecting for Health,” was funding “innovative ideas that change the way information is currently used and shared between different organisations, so that NHS staff, clinicians and patients can access information when they need to and patients can be involved in decisions about their care if they wish to be.” As a result of the program’s demonstrable success, it was subsumed at the end of March 2013 into the Health and Social Care Information Centre, and is now charged with “support[ing] the delivery of IT infrastructure, information systems and standards to ensure information flows efficiently and securely across the health and social care system, to improve patient outcomes.” Another example in the U.S. is the patient-centered “medical homes” model, which organizes primary care so that patients receive care that is coordinated by a primary care physician, supported by information technologies, delivered by a multidisciplinary team, and is in compliance with evidence-based guidelines. Even Ontario has begun to experiment with models for shared engagement with the launch of Health Links, a program that aims to improve care for seniors and others with complex conditions. This program was established to bring together healthcare providers in

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<sup>1</sup> Excellent Care for All Act, 2010; [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_10e14\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_10e14_e.htm)

a community to better and more quickly coordinate care for high-needs patients. The objective is to establish better coordination of the healthcare team across the continuum of care, resulting in better care for the patient.<sup>2</sup>

These models show that quality healthcare is not simply the engagement of the patient in their care, but the full recognition of the patient as part of the healthcare team and a key enabler of innovation.

**Patient Outcomes are the Primary Metric for Innovation Adoption Success** – Engagement of the patient will not only enable the development and adoption of new innovations, but the patient will also be the key factor in determining their success. Case studies have been developed that demonstrate specific impacts for the patient. The measures of extending patient life, improving quality of life, increasing access to therapies/services, making service delivery safer, patient convenience, and patient satisfaction are key indicators of how innovation adoption can directly impact the individual patient.

### 3.2 Impact on the Health System

The health system as a whole has become somewhat of an enigma to developed economies that have been struggling to balance the growing demand for services (i.e. from an aging population, chronic illness, long-term management of care) within an economic environment that continually demands fiscal accountability and restraint. Innovation adoption in this context has become an essential solution for achieving long-term sustainability of the health system, which would otherwise be unable to balance the growing demand for services through an imposed cap on its supply.

**Innovative Health Systems are Not Established through Cost Controls, but Through Alignment of Innovation Supply with the Demand for Health Priorities** – The challenges of managing the growing costs and demands on the healthcare system are cited repeatedly in the literature from international jurisdictions, as well as in Ontario, through our recent consultations with local stakeholders. While new innovative solutions continue to be made available (i.e. diagnostic tools, medical technology, therapeutic products, management systems), there remain obstacles to rapid adoption such as: an alignment of priorities (e.g. among providers, patients, industry and government), a differing view on assessing value, and creating an atmosphere of authentic trust among stakeholders throughout the development process, aversion to risk, and upfront cost as a primary factor in decision making.

As evidenced in the literature review, the fields of prevention and public health promotion, in sub-sectors such as healthy eating, are leading the way in addressing these obstacles head on. System benefits can only accrue across the entire health system (as opposed to silos within the health system) with greater levels of coordination and higher levels of authentic trust within and outside the health system, and between and among the various stakeholders. This is a very steep and fundamental hurdle to overcome. Fortunately, our findings have shown that there is strong cross-sectoral agreement on the

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<sup>2</sup> Ontario Ministry of Health and Long-Term Care, Health Links Program [http://www.nsmlhin.on.ca/uploadedFiles/Public\\_Community/Current\\_Initiatives/Ministry%20HHL%20BG%20Dec06-12.pdf](http://www.nsmlhin.on.ca/uploadedFiles/Public_Community/Current_Initiatives/Ministry%20HHL%20BG%20Dec06-12.pdf); A comparative analysis of this program and the Innovation Adoption Initiative has been undertaken by OBIO and has been summarized in Supplement B.

policy solution. Specifically, we found that the perceived importance of innovation and better collaboration are positively correlated to improved health systems across international jurisdictions. Direct engagement of industry and government along the innovation pathway is critical, as is patient-centered engagement, to achieving alignment on health priorities and the solutions to address them.

**Value-based Healthcare Delivery Remains an Essential Factor to Sustainability of the System** – The very definition of innovation requires that the introduction of new products or processes must demonstrate an overall value. Therefore if a solution is to demonstrate value, it must also demonstrate an overall long-term cost saving to the system, which in turn leads to sustainability. Many stakeholders have cited the need for measurements that can provide a quantitative metric of dollars spent per unit of improvement; although there is equal caution that these models need to result in a streamlining of the process and not an additional barrier to surmount. Ontario-based case studies showcasing the value of innovation in devices, diagnostics, and therapeutic products have shown that the adoption of innovation by the health system can result in overall value for the health system.<sup>3</sup>

### 3.3 Impact on the Economy

Research-based innovation has been cited as essential to growth and prosperity in national and regional economies. An environment that demands and readily adopts innovation will propagate further supply of innovative products and technology. Therefore, if Ontario seeks to build an innovative economy, it needs to also support the *adoption* of innovation.

**Innovation Must Provide a Return-on-Investment and Better Value for the Taxpayer** – Economic benefits of innovation must be demonstrated not only in improved health, but also in a net benefit to the taxpayer who ultimately pays for the government investment and adoption of innovation. Assessment, evaluation and adoption of the best innovative products and technologies will lead to a more efficient health system that can show accountability and return-on-investment to the public.

Examples of innovation delivering return-on-investment and measurable value for citizens in other jurisdictions are cited in the environmental scan; two of which have been highlighted below. The first example is one of the U.K.'s recent patient engagement efforts – a downloadable mobile application that provides the British National Formulary and the British National Children's Formulary to patients via a Blackberry or iPhone mobile device. The United Kingdom adopted a transformational approach after the 2008 global fiscal meltdown, including the ongoing negotiation of value-based pricing for devices, therapeutics, and diagnostics. It mandated that health trusts adopt metrics around innovation adoption and clinical excellence in order to receive full funding. The National Institute for Health and Clinical Excellence (NICE) routinely assesses the value of healthcare interventions using evidence-based guidance. It also makes significant efforts to engage patients and other health-system stakeholders in the innovation diffusion process. The second example, from the United States, highlights innovation in the healthcare system through the U.S. Center for Medicare and Medicaid Innovation, established to identify, develop, support, and evaluate innovative payment and service delivery models under Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). The Centre's Health Care

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<sup>3</sup> See Supplement C – Highlighted Case Study Summaries.

Innovation Challenge will award up to \$1 billion in grants to applicants who seek to implement innovative ideas for delivering better health, improved care, and lower costs to individuals enrolled in the health plans, with emphasis on those with the highest healthcare needs. The AHRQ (Agency for Healthcare Research and Quality) Health Care Innovations Exchange was created to promote the development and adoption of healthcare innovations that improve the quality of healthcare. The website provides health professionals and researchers with a platform to share, learn about, and adopt evidence-based innovations and tools that are appropriate for a variety of healthcare settings and populations.

**Ontario Seeks to Export Innovative Products, but Import and Retain Innovative Companies** – Ontario companies are also significant investors in innovation. These investments not only lead to new products, but also result in high-paying jobs, and tax revenues for the province. If Ontario is able to demonstrate an open and transparent mechanism for adopting new value-added innovations, then local companies will be enabled to further invest and develop priority products and systems. Local market adoption will help to retain these companies as they grow to export to other regions. Attraction of foreign products and companies to the region will also ensure that the best products are available to Ontarians, and the companies will establish a long-term presence in the province.

***Multi country-level analysis shows a positive correlation between: (a) the perceived importance of healthcare innovation to country wealth and prosperity; and (b) the perceived importance of better collaboration between government and the healthcare industry to improve health system innovation.***

*(RIWI Multi-Country Survey)*

## 4.0 The Essential Ingredient for Innovation Adoption – Authentic Trust Among Stakeholders

The goals of excellent care for all, health system sustainability, and economic prosperity will require the engagement and contributions of all stakeholders. Success will not be achieved independently by a single government or by industry. The only feasible solution for innovation adoption will be a true collaboration among them.

### 4.1 The Fundamental Barrier to Moving Forward

The evidence collected through this initiative indicates that industry-government dialogue is required to facilitate the adoption of innovative technologies in healthcare. A fresh dialogue between industry and the province surrounding innovation adoption pathways for therapeutics, diagnostics, devices, and health IT would require a new consensus around what “innovation” and “value” represent in the new



normal. Achieving clarity on interrelationships among innovation, cost-effectiveness, and efficacy, for example, might involve scenario-planning exercises among healthcare stakeholders that explore innovation pathways that must be understood more granularly; commercialization pathways that may need to be opened up; broad categories of regulatory, demographic, and epidemiological transition; and joint priorities surrounding innovation, commercialization, and procurement. In today's risk-averse innovation culture, this could re-contextualize the Ontario health ecosystem and enable the development of a shared vision of the future of healthcare.

The complexity of healthcare innovation adoption means we need to work across sector boundaries. This in turn will require trust among all sectors and all along the entire commercialization pathway. Extensive research and consultations in this area by OBIO revealed a fundamental lack of trust among stakeholders thereby preventing essential components of a productive innovation adoption system from occurring; elements such as early and frequent collaboration and transparency of interests. Rather, the current state of affairs reflects 'cordial disregard' where stakeholders talk *at* each other rather than *with*, and there is little to no follow-up or collaborative activities undertaken.<sup>4</sup>

Many of the innovation-acceleration initiatives proposed around the world are complex and will require trust. Initiatives must be undertaken that seek to break down the divide between 'MoHLTC v. Industry' in careers and allow greater professional collaboration among Ministry management and industry scientists and leaders. This will require open dialogues and mutual understandings that facilitate the development of a new approach to innovation adoption and enable the impacts outlined above to become reality.

## 4.2 Recognizing and Addressing Fundamental Trust Gaps among Stakeholders

In order to develop a new, trust-based approach to innovation adoption, it is first necessary to understand the trust 'gaps' in the existing system such that they can be addressed and overcome. Numerous areas were identified where a fundamental lack of trust among stakeholders exists.

### *Existing Trust Gaps to be Addressed*

- *Perceptions of Value for Money* – Government, we found in our research, shows a lack of trust that it is receiving value for money from new innovations; meanwhile, industry shows a lack of trust that government understands the value for money the government is receiving. Government shows a lack of trust in therapeutic/health IT/device/ diagnostics pricing models.
- *System Effectiveness* – Lack of trust in Canada's ability to deliver across-the-board results in effectiveness and efficacy given other countries' more cost-effective health systems that in some cases also deliver better outcomes in particular areas (notably, chronic disease prevention and management).

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<sup>4</sup> Reference to models of trust stems from work by Dr. Diane Finegood whereby the objective is to move from a state of 'cordial disregard' (where stakeholders engage in cordial conversation, but at the end of the day nothing happens) to a state of 'authentic trust' (where stakeholders openly share information and work together to determine common measures of value and to achieve common goals). More information on the authentic trust model is available in Supplement D.

- *Process Reform* – Lack of trust in outmoded processes that are yielding higher cost, greater inefficiency, reduced clinical effectiveness, etc. Lack of trust in system complexity around clinical trials, innovation procurement, and bureaucracy among business and government, but often for different reasons.
- *Cross-Sector Solutions to Chronic Disease Prevention and Management* – System-wide frustration on rise in sedentary lifestyles leading to chronic disease and allied co-morbidities. Therefore, we endure a lack of trust in the healthcare system's relationship with patients and its inability to encourage healthy behaviours.
- *Stimulation of Innovations to Market* – General lack of trust in policies and approaches used to stimulate healthcare innovation in Canada. Specifically, there is a lack of trust among stakeholders (government often pitted vs. industry) as to what constitutes value.
- *Technology Transfer Processes* – Lack of trust in valuation methodologies in technology transfer offices. There are deep-seated disagreements over what constitutes value or valuation.
- *Incentives for Medical Innovation* – Some health researchers asserted that patenting impedes medical care and innovation in Canada through inflated drug and medical device pricing. There is a belief that new models/incentives are necessary to place the appropriate value on innovation.
- *Physician Education* – Lack of trust in medical education's ability to adapt to 21<sup>st</sup> century patient needs. The systemic culture of the medical system is viewed as averse to commercialization and to industry.

Developing a new approach to innovation adoption protocols will require a recognition of the trust gaps that exist, and an agreement by all parties to incorporate trust-building and partnership along the entire innovation adoption pathway. This new model of trust-based partnership would facilitate a collaborative, evidence-based approach (aligned with existing 'Excellent Care for All' legislation) that would enhance the effectiveness and efficiency of each step of the pathway (i.e. the speed to adoption/non-adoption decision). Each element or step would be designed to strongly improve the quality of evidence and more thorough use of data for innovation adoption. Most importantly, it would provide a context within which all stakeholders can work collaboratively to bring about the patient, system and economic impacts of benefit for all Ontarians.

## 5.0 Ontario's Positioning for Innovation Adoption in Healthcare

The potential of health innovation to drive Ontario's economy cannot be overstated since innovation has the demonstrable capacity to improve health outcomes, create a more robust healthcare sector, and to enhance productivity. This means that a new balance must be struck among innovation, cost-effectiveness, and efficacy in order to address population health burdens imposed by the increased

***The primary barrier to healthcare innovation adoption is a lack of fundamental trust and effective communication among parties involved in innovation adoption / procurement and the representatives of industry.***

*(Overarching theme from stakeholder interviews)*

demographic and fiscal challenges facing the healthcare system. Methods of healthcare delivery and patient care that yield suboptimal outcomes or value must be assessed and new/improved measures must be adopted.

There are considerable challenges to determining how best to diffuse innovation into the health system, while also ensuring proper management of healthcare expenditures. Interviews (conducted as part of the Environmental Scan) with key stakeholders within the healthcare ecosystem (i.e. industry, government, academia, health organizations) identified several barriers to innovation adoption.<sup>5</sup> Despite these challenges, it is a practical reality that Ontario's senior civil servants must mitigate the risk of a provincial credit-rating downgrade, thus making cost containment a central policy filter. Confidential interviews conducted during the course of this work, indicate that fiscal expenditures at the MoHLTC are monitored and evaluated according to protocols at the Ontario Ministry of Finance to ensure cost-containment targets are met. This fact alone may result in additional bureaucratic hurdles for would-be applicants for resources and procurement.

## 5.1 Current Practice for Adoption of Innovation in Ontario

From ideation to commercialization, an examination of the market pathways for the four types of technologies considered for this initiative — therapeutics, medical devices, diagnostics, and health IT — makes clear that the front end of the development process remains consistent across technology type. Where the processes differ are market-related adoption activities and regulatory approval processes. For example, therapeutics approvals involve the submission of Clinical Trial Applications, followed by the submission of a New Drug Submission at the federal level as well as the Common Drug Review (CDR) process at the provincial level. According to the MoHLTC, the latter involves a multi-step process that first looks at the overall application from the perspective of clinical evidence, patient feedback and potential impact. Next, a determination takes place of the specific funding program that will offer the new drug a pathway to ongoing patient uptake. In contrast, for devices, only federal divisions need to approve new technology (e.g. Health Canada, the Therapeutics Products Directorate). The Medical Devices Bureau reviews medical device license applications but there is no provincial equivalent to these entities, thereby facilitating the speed to market and reducing regulatory burden on the developers of new medical device technologies. In further contrast to medical devices, health IT carries no top-down regulatory burden *per se*, although it can be affected by specific legal frameworks related to the products.

Beyond the regulatory approval stage, there remains a final, critical step in the adoption of new technology within the healthcare system; namely, the presentation and acceptance of these new products to and by potential end-users (for example, hospitals, research institutes, and patients). Once a product has federal approval for use in Canada, the province carries out a series of assessment protocols surrounding adoption decisions (generally centering on funding, reimbursement, and value for money). The provincial government, along with its affiliated agencies, are tasked with *identifying* potential new

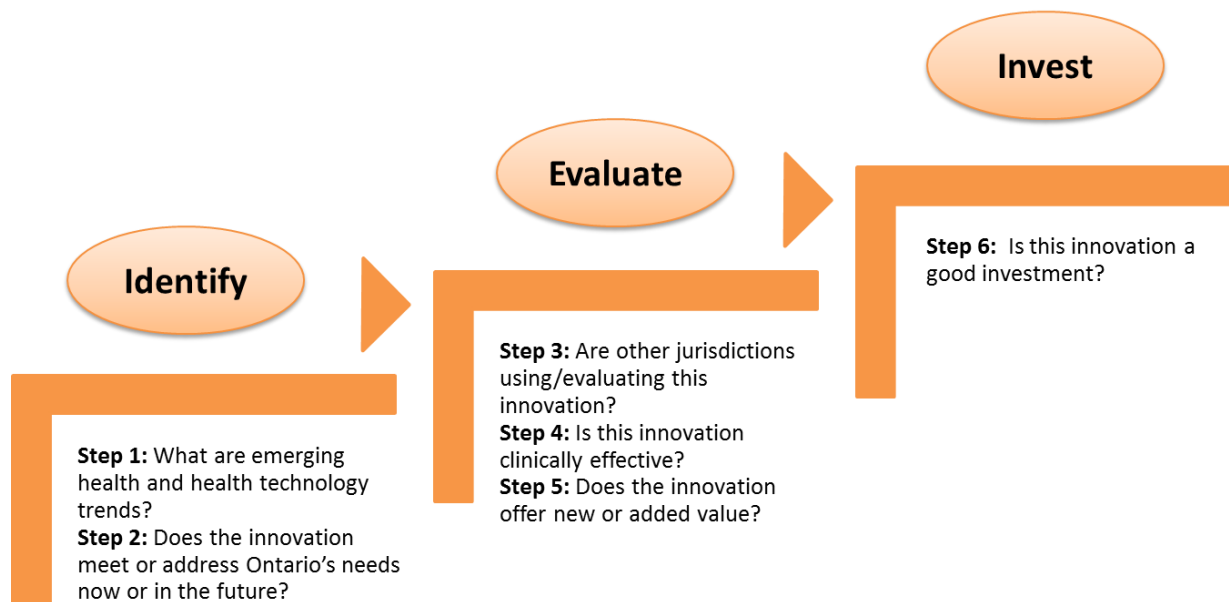
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<sup>5</sup> The barriers / challenges to innovation adoption in Ontario were defined by eight overarching themes that emerged from the stakeholder interviews.

products, *evaluating* their value to the healthcare system and finally, determining if the technology is a good *investment* for the province.

A close examination of the data collected during the environmental scan identified six specific steps along the “Identify, Evaluate, Invest” pathway where stakeholders identified opportunities to increase the efficacy/efficiency of these processes and facilitate decisions regarding the adoption of new technologies in Ontario (Figure 1).

Figure 1: Critical Pathway to Enabling Innovation Adoption



The figure demonstrates that at each of the three phases of the pathway, critical questions must be addressed in order to advance innovation adoption. A mutual understanding of the emerging trends and Ontario’s needs will clearly identify which innovations should be prioritized for adoption. An assessment of the clinical effectiveness and value added (leveraging other jurisdictions as a source of information) will provide a transparent evaluation of the technology. Finally, a critical review of the costs and benefits of the technology will determine if it is a good investment.

## 5.2 Value-Based Metrics for Facilitating Innovation Adoption

Evidence collected through the environment scan process was used to determine potential solutions to facilitating open collaboration among stakeholders throughout the entire innovation adoption pathway. Policy recommendations have been proposed for each step along the pathway based on the literature review, jurisdictional scan, and the stakeholder interviews. In addition, as previously introduced, innovation adoption policy recommendations are also well aligned with existing government legislation

and programs. The Ontario Health Links program is one example of how OBIO has demonstrated that this initiative is in direct alignment.<sup>6</sup>

The underlying principle for all policy recommendations is that of value-based metrics, whereby all parties (particularly industry and government) can work together to determine common measures of value. While each party may have individual interests or objectives, the six key questions identified along the pathway must be addressed to the mutual benefit of all parties if innovation is to advance.

All six steps of the innovation adoption pathway were identified as areas of importance to industry in terms of where their participation could have a beneficial impact for all parties involved. In particular, two aspects were highlighted as particularly important; these were: *(i) the provision of data/existing information throughout all steps of the innovation adoption pathway and (ii) the development of a transparent set of value-based metrics and processes around innovation adoption and investment.* The provision of data and determination of metrics requires both government and industry to collaborate in order to establish a full and comprehensive understanding of the overall values and benefits to innovation adoption.

***“There are so many different areas as a practicing clinician where you see the friction of futile or unsuccessful care – there are zillions of these areas of unmet needs. When I look at technologies, I look at how they fit into these unmet needs as the first screen and then the evidence base. The truth about most new technologies is, as they are emerging, they do not have level-1 evidence. Therefore, to a certain extent, you depend on people to take a leap of faith to generate that evidence.”***

***“If the Canadian society says [we must have evidence for technology,] then Canada will be, by definition, late adopters of every technology and will not be the place where early stage innovation is going to find it easy getting started on the commercial side.”***

*Dr. Geoffrey Gurtner – Professor of Surgery, Stanford Medical Center*

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<sup>6</sup> See comparative analysis conducted by OBIO in Supplement B.

***The findings from the Environment Scan were used to develop policy recommendations that addressed the critical gaps at each stage of the innovation adoption pathways. All recommendations are based on a model of authentic trust and require direct engagement from both industry and government.***

***Sample Policy Recommendations:***

- ***Collaborative definition of overall assessment criteria (e.g. value for money or cost per quality of life gained)***
- ***Including industry perspectives for defining key success metrics (e.g. ease of market entry, efficiency of regulatory process)***
- ***Value treatment based on outcome measurements (throughout the treatment duration, and following completion as well)***
- ***Incorporating industry data into evaluation at all stages of the innovation adoption pathway***

*(Recommendations from survey data analysis)*

## 6.0 The Case for Ontario – What We All Have to Gain

The value of innovation adoption has been cited by other jurisdictions, and challenges to readily adopting innovation in Ontario have been cited by multiple stakeholders representing the various perspectives of the provincial health system. What remains however is a clear case for how innovation adoption will directly impact healthcare in Ontario.

As previously introduced, innovation adoption has the potential to deliver improved patient outcomes, long-term benefits to the health system, and economic growth for the province. The real measure of benefit for Ontario however, is focused primarily on two key factors that benefit all Ontarians; namely: *an aggregate cost savings to the system as a whole; and a measured improvement for patients.* By assessing any new products or health technologies against these two key factors, it becomes clear to all Ontarians what the true benefits of innovation adoption will be (or the lost opportunities for not adopting them).

### 6.1 Case Studies of Healthcare Benefits in Ontario

The OBIO Innovation Adoption Initiative worked with the Centre for Excellence in Economic Analysis Research (CLEAR) from the Li Ka Shing Knowledge Institute at St. Michael's Hospital in Toronto to

develop case studies that evaluate the healthcare benefits for innovation adoption in Ontario.<sup>7</sup> A series of six initial case studies were selected to represent the full spectrum of opportunities for innovation adoption in healthcare; and to demonstrate the true value of innovation in terms of cost savings for the Ontario health system, and QALY's for Ontario patients (Figure 2).

## 6.2 Alignment with the Global Trend for Innovation Adoption

Many global jurisdictions have demonstrated the growing trend to seeking innovation as a solution to improved and sustainable healthcare; and they are actively monitoring metrics to ensure success. As an example, in 2011 the OECD showcased a study monitoring the performance of cancer care systems in member countries.<sup>8</sup> Results demonstrated that: survival was strongly associated with the investment in innovative drugs; the availability of innovative cancer drugs was a more important variable than the provision of drugs free of charge; and the clinical use of innovative cancer drugs and survival (by countries' general income level) were significantly correlated. On an individual country basis, most developed economies have continued to support investment in innovation through research and development, but many are now realizing the challenges that have resulted from policies that impede innovation adoption. As an example, Germany has been investing heavily in academic research and emerging companies since 2007, but with a strong desire to contain public healthcare costs, the country is now seen as less attractive for therapeutics companies. Positively however, Germany's policy to accelerate the reimbursement of novel medical devices has been seen as a benefit for medical device companies.

Case studies that were developed specifically for Ontario (cited above) also demonstrated that cost and measured patient benefits have been realized by other jurisdictions that have implemented the healthcare innovations profiled. While some of the case studies showcase the benefits that have been realized through industry / government collaborations for innovation adoption; there are others that demonstrate a significant opportunity lost for not adopting innovative healthcare solutions. Collaboration, while essential to innovation adoption, is not currently embedded in the Ontario health system, and needs to be formally recognized as part of the process.

## 6.3 Accountability to Ontarians

We are all accountable to delivering the best care to patients through a system that will be sustained for generations to come. Government has a direct role in working with industry, academic, and public sector partners to ensure quality care for patients and fiscal responsibility to the Ontario taxpayer. Industry (and indirectly academia) has a direct role in developing new technologies and products to deliver better care for patients. We all share the same goals of delivering the best care to the people of Ontario, and sharing our innovations and best practices with the world.











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<sup>7</sup> See Supplement C – Highlighted Case Study Summaries.







<sup>8</sup> <http://www.oecd.org/els/health-systems/48098832.pdf>






Figure 2: Case Study Summary

Innovation (Starting with most recent approval)	Priority Populations*		Alignment with Government Priorities	Early Adopters	Cost Savings for Ontario	Patient Benefits (QALYs)	Patient Benefits (Qualitative)
	Seniors	Co-morbidity					
New Oral Anti-coagulants			Access to Care	Germany Scotland	(\$15.1M) (estimated lifetime incremental cost)	Patients could have gained a total of 2,685 lifetime quality years with wider implementation	Eliminates need for close patient INR monitoring; lower number of adverse events
KRAS Testing used with approved therapeutic			Increased access to care where appropriate	Australia USA	Not quantified	For the 4,785 to 6,525 patients in 2012, KRAS + therapeutic will add 676-853 quality years of life.	Longer overall survival or spending more time in healthier states
Ultrasound Elastography			Reduce unnecessary procedures	UK France Australia	\$533K - \$1.68M (over 5 years)	N/A	Avoid unnecessary liver biopsies; non-invasive reduced hospital stay
Insertable Cardiac Monitor			Telehealth, Home care	Australia New Zealand USA Western Europe UK	\$11.95M (over 10 years)	For 2,174 patients in 2011, ICM will add 196 additional quality years of life.	Higher diagnosis accuracy; avoidance of negative clinical outcomes (falls, broken bones, etc.)
Pregabalin			Reduced narcotic dependence	Quebec USA UK	\$1.3M (If 50% of requests for EAP were accepted in 2011)	If 50% of requests for EAP were accepted in 2011, it would yield 307 QALYs for DPN and PHN patients	Effective pain management alternative and opioid abuse reduction; lack of drug interaction and lower side effects

Drug eluting stents			Reduced utilization of acute care services	Widely available	\$45M in revascularization costs (over 11 years)	For the 8,021 patients in 2012, DES will add 22 additional quality years of life.	Reduced rates of revascularization procedures
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Innovation	Priority Populations*		Alignment with Government Priorities	Early Adopters	Patient Benefits (Qualitative)
	Seniors	Co-morbidity			
HPV Vaccines for Males			HPV Vaccination Program	USA Australia Prince Edward Island	Protect boys from infection, reduce transmission, increase herd immunity, and effectively prevent HPV associated diseases.
Novadaq SPY Elite			Reduced complications & re-admissions	USA	Reduced risk of major post-operative complications
Colesevelam			Diabetes, primary care strategy & patient enrollment	Quebec USA	Management of multiple risk factors and low compliance for diabetic, pre-diabetic, and cardiovascular disease patients.

\*  = High;  = Medium;  = low

***This is what Ontario's demographics look like:***

- ***Ontario's population is growing rapidly, with seniors (65+) accounting for 54% of all population growth between 2013 and 2030***
- ***Seniors are the most expensive segment of the population, with a current per capita health expenditure of \$12,690 with a 2.9% CAGR.***
  - ***It is 3.4x more expensive to care for a senior than an adult***
  - ***It is 5.2x more expensive to care for a senior than a youth***

***This is the case for doing nothing:***

- ***Even with no cost inflation, healthcare expenditures are projected to rise to \$72.4B in 2030, growth of 43% (versus \$153.6B if current inflation levels persist)***
- ***While each senior and youth in Ontario is supported by 2.3 working-aged adults today, that number will shrink to just 1.6 working aged adults by 2030, representing a 1.5x increase in the number of seniors and youth each working-aged adult supports."***

*(Source: Beaconsfield Group)*

## 7.0 Working Together – A Collaborative Approach to Innovation Adoption

This initiative has recognized that despite the value and benefits of innovation adoption in healthcare, the successful implementation of a solution will never occur through a single party or group working independently to impose a solution on others. All stakeholders have a vested interest in adopting the best innovative solutions for healthcare, but the only way to move forward is through collaboration and working together.

### 7.1 A New Authentic Trust Model as the Foundation for Building Collaboration and Partnership

With the identification of “authentic trust” as an underlying impediment to innovation adoption, a new model of multi-stakeholder engagement and open communication is required. In order to address the

issues of trust, future collaboration and partnership will need to focus on continuous engagement of industry and government at all stages of the innovation adoption pathway. More importantly, a better / common understanding of priorities and terms such as: 'value' and 'innovation' will enable more open communication and dialogue. In addition, shared data and metrics will facilitate the alignment of all stakeholders to achieve common goals.

Trust provides powerful opportunities for unity around health system goals, such as a deepened and common understanding of other sectors, partnership-enabling behaviors, safe space for communication, opportunities for sharing assets (resources, reach, and influence), and clarity of roles, responsibilities, accountabilities, and commitments. Meanwhile, a lack of trust can make it virtually impossible to reach system-wide goals. Dr. Finegood's pioneering work on authentic trust, in the context of disease prevention and management, provided a constructive scholarly impetus for guiding the development of authentic trust-based policies that could help to accelerate innovation adoption in Ontario and in Canada. If trust is the missing link, then policies that aim to align the objectives of industry and government across the innovation adoption lifecycle could be crucial to achieving health system sustainability as well as industry growth via innovation.

The proposed "Trust Model" includes several recommendations for strategies and tools to facilitate information sharing in an open and transparent manner, with collaboration and partnership among government and industry stakeholders working toward the common goal of improving patient outcomes and overall efficacy and efficiency of healthcare delivery.

## 7.2 Industry in Ontario – Contributory Role and Resulting Benefits

Industry will play a key role in alleviating some of the demands arising along the "Identify, Evaluate, Invest" pathway. In a survey conducted by OBIO of leading healthcare technology companies, industry identified a number of areas where they could see themselves assisting government and facilitating the process. As previously mentioned, all steps along the critical pathway to innovation adoption were identified as areas of importance for industry; and their participation and contributions at each stage of this pathway would be deemed to be of benefit for all parties. The two key contributory roles that industry identified were: (i) the provision of data/existing information throughout all steps of the innovation adoption pathway and (ii) the development of a transparent set of value-based metrics and processes around innovation adoption and investment.

One, open-ended response to a survey question summarizes well the overall participant views reflected in the survey. "[We need to] work in a constructive and trustful environment where credible data can be presented, collected, shared and discussed with the underlying mindset that we are all part of the same eco-system." It should be noted that industry representatives were very clear that they did not see their participation as a means to increasing positive decisions regarding the adoption of their new technologies. Rather, they saw it as an opportunity to develop a more efficient and transparent approach to technology assessment, regardless of the final investment decision.

The benefits to industry are best articulated in the dual perspectives of the emerging small- and medium-sized enterprises (SME's) in Ontario, and the multinational enterprises (MNE's) that directly

engage in the Ontario economy. Both are integral to sustaining and expanding the innovation economy in the province.

SME's in Ontario will focus development activities to align directly with provincial health priorities. With many companies, early activities stemming from health innovations spun-off from academic investments throughout the province, there is already an initial alignment of provincial research priorities with early stage companies. The acceptance of an innovation adoption mandate for the province will allow these companies to continue to work on the development of health technologies that are aligned with provincial health priorities (at all stages of development). A collaborative model of trust will further engage Ontario SME's in the identification of health trends as well as the current and future needs for health technology in the province. This collaboration will lead to stronger ties with Ontario companies, giving local companies an indirect advantage given that their commercial activities will be better aligned with provincial health requirements. The trend of companies shifting and often relocating to larger markets can also be stemmed with a strong mandate to support the development and adoption of health technologies in the province. While foreign markets remain a priority for local SME's, there will be an increased ability to anchor companies in the province through the development and adoption phases. With the adoption of new technologies, companies can continue to focus on introduction of the novel products into foreign markets, and the ongoing export activities that define the successful innovation-based companies we wish to grow in the province.

MNE's engaged in Ontario will also better align with the health priorities identified by government. More importantly however, they will be able to work directly with government to demonstrate a business case for their innovative products and solutions, which should only be adopted if there is a clear benefit to the patient, the health system, and the Ontario economy as a whole. The result of an innovation adoption mandate will be an open and transparent process for industry to engage and provide solutions that address the health priorities, fiscal restraints, and socio-economic benefits outlined by the province. Innovations that address these issues will be adopted, and products or technologies that fail to meet these requirements will not. In effect, Ontario will have established a market driven economy that will benefit MNE's with novel technology products, which in-turn bring benefits back to Ontario.

### 7.3 Ontario Government Ministries – Contributory Role and Resulting Benefits

The Ontario Government's primary role will be to establish a clear mandate for innovation (research through adoption), and to ensure alignment of that mandate across all ministries. While innovation has always been a clear priority for government, the approach to innovation has never been well aligned from a cross-ministries perspective, because the mandate has failed to account for other ministry specific factors and at times conflicting ministry priorities. Innovation adoption needs to be clearly understood not only as an overall priority for the province, but how it directly benefits the various ministerial mandates of government.

The fundamental role for government must be directed from the highest levels of leadership, to first acknowledge that innovative technologies are an essential component of the Ontario health system, and

second to reinforce a mandate (already established in legislation through the Excellent Care for All act) for adopting health technologies that will improve patient outcomes, while also reducing overall costs to the health system.

All Ministries must, in their own context, be able to define the value of innovation and the benefits from its adoption. While the full role and benefits of an innovation adoption mandate for each of the Ministries will require ongoing development and evaluation, the ultimate benefit comes from the alignment of the innovation agenda across all ministries of government. Investments in education, training, research and commercialization will align with economic development and employment strategies. Priorities defined by MoHLTC will be aligned with research investment and commercial activities by Ontario companies (and employment). Most importantly, the agenda for fiscal management and long-term economic prosperity will be aligned with the agenda for improved health and system sustainability in the province.

#### 7.4 Ontarians – The Ultimate Beneficiaries of a Fully Integrated Innovation Economy

Working together in a model that facilitates authentic trust between government and industry will enable all parties to benefit from innovation adoption. However, it will be the patients, caregivers, skilled labourers and, ultimately, all Ontarians who will be the beneficiaries of innovation adoption and a fully integrated innovation-based economy. Ontarians should expect that innovation will lead to: improved health and better quality of life; a health system with access to the best technologies and healthcare solutions available; the retention of highly skilled individuals with high-paying jobs in the province; and a growing economy from successful companies bringing commercial revenues to Ontario.

## 8.0 Conclusion – Or Rather, a New Beginning

The *OBIO Innovation Adoption Initiative* has established a new foundation – ‘authentic trust’ – for industry and government to move forward together to build a new collaborative relationship targeting the shared goals of sustainable healthcare and economic prosperity for the province. This report does not dictate an ultimate solution for innovation adoption, but rather provides a framework to engage government and industry in finding common ground on value-based metrics and to establish a process to openly share data that is relevant to those metrics. By working in an authentic trust-based collaboration, we will decelerate the innovation adoption deficit, and thereby work to sustain an environment of innovation adoption to the benefit of all Ontario for decades to come.

***With austerity affecting health systems worldwide—and placing many jurisdictions' innovation ecosystems at risk—Ontario can position itself as an "oasis of innovation." There is a compelling business opportunity for Ontario's bioscience firms, government agencies and universities to commercialize and export ground-breaking innovations that drive health system performance, especially as health systems worldwide strive to both cut costs and improve patient health. In highly valuable commercial, academic and patient care disciplines, Ontario has the people, as well as the innovative technologies and processes, to lead the way in consulting, stakeholder collaboration, innovation education and commercialization, and more.***

***Sanjay Khanna***

*Khanna Research, 2013.*



## Supplemental Material

## Supplement A – Innovation Cell Contributions Brief

OBIO's Innovation Adoption Initiative aims to tap the huge potential of health innovation in driving Ontario's economy through its inevitable capacity to improve patient health outcomes and to create a more robust healthcare system. Under this initiative, OBIO commissioned the Health Strategy Innovation Cell at Massey College, University of Toronto (Innovation Cell), to develop a granular picture of how innovations in the health sciences get to market in Ontario and Canada, and to compare Ontario's market with those of other leading jurisdictions. Furthermore, the Innovation Cell collected data on individual awareness on the importance of healthcare innovation.

**Environmental Scan** – The OBIO Innovation Adoption Initiative strived to identify novel avenues for adopting bioscience and human health technology innovation in Ontario amid a time of low-economic growth. To this aim, the Innovation Cell's environmental scan combined three strategies, carried out in parallel, in order to examine existing market pathways, map the current legislative and regulatory environments, as well as identify government objectives to which industry can contribute or align with their innovative solutions: 1) A literature scan, 2) Government and industry stakeholder interviews and 3) A jurisdictional scan.

**Literature Scan** – The in-depth, widespread literature search collected prioritized information on technology adoption and health-system effectiveness, capital access, commercial pathways as well as Canadian and other country innovation models, in order to highlight opportunities for innovation adoption in Ontario. Out of approximately 500 published articles from peer-reviewed and grey journals, academic databases, government-sponsored papers, independent papers, or online materials, generated from the initial search, over 50 papers were selected to help compile the environmental scan.

**Stakeholder Interviews** – The Innovation Cell interviewed 46 key stakeholders involved across healthcare as well as across different stages of the commercialization life cycle including: industry, government, hospitals, academia, medical research, and not-for-profit organizations. The semi-structured interviews were designed to tease out the various challenges facing these stakeholders in the current economic, regulatory, institutional, and business environments. This impressive work is the largest set of semi-structured interviews ever conducted in healthcare innovation in Canada to date.

**Jurisdictional Scan** – The cross-jurisdictional analysis assessed how different jurisdictions from Ontario's, including those of Australia, U.S., South Korea and some countries in Europe, address the lack of innovation in healthcare during a period of austerity. In general, other jurisdictions have focused largely on reducing the supply side, for example, cost cutting or funding model reform. Ontario is undergoing dramatic health-system reform as well, with strong emphases on value for money, higher-quality outcomes, and new hospital-financing approaches. That being said, adoption of promising technologies may be missed according to stringent criteria, including cost and clinical effectiveness, relative to existing, well-established products. Thus, the province consulted experts in other jurisdictions globally for ideas to overcome the healthcare innovation deficit. Ontario already has a good head start with OHTAC (Ontario Health Technology Advisory Committee), HTX (Health Technology Exchange) and EXCITE (MaRS Excellence in Clinical Innovation and Technology Evaluation).

Using the information gathered from the literature review, stakeholder interviews and jurisdictional analysis, the environmental scan outlines market pathways for the three different life science technology types: therapeutics, medical devices and health IT. However, these pathways for innovation adoption are challenged by current health-system hurdles, including the unsustainably rising healthcare costs and growing prevalence of chronic disease. Furthermore, it became evident during the Innovation Cell research that there exists a severe lack of trust among key stakeholders. The report outlines target areas to which industry can contribute and enhance process efficiency. Integral to this is improving industry-government dialogue throughout the entire commercialization pathway and building authentic trust, which would benefit Ontario by “co-creating” health innovative technologies of value to the patient, health system and economy.

**RIWI on Healthcare Innovation** – The objective of the RIWI survey was in part to measure the perception and level of awareness of the average, everyday citizen, in regards to the importance of healthcare innovation as a contributing factor for their nation’s wealth and prosperity. Nine countries, including Canada, were selected for review with further analysis comparing Ontarians’ responses to those from other provinces and countries. The countries were chosen by the Innovation Adoption Steering Committee based on their existing active support or investment into healthcare innovation at a political level.

At a multi country-level, RIWI’s analysis shows two co-linear positive correlations: 1) The perceived importance of healthcare innovation to country wealth and prosperity and 2) The perceived importance of better collaboration between government and the healthcare industry to improve health-system innovation. There was no correlation between Canadian or Ontarian perceived importance of healthcare innovation versus other variables, including better collaboration between government and industry, investment in higher education, and more direct government support. These results suggest Ontarians and other Canadians are not publicly aware of the value healthcare innovation would have for them, their families and peers, the healthcare system and overall economic prosperity of Ontario.

The Innovation Cell compilation of work demonstrates how to get industry’s innovative solutions onto market as well as areas for improvement and challenges to be addressed in order to make commercialization a more efficient process for the benefit of Ontario. One of the largest areas for development is authentic trust between government and industry. There is a dire need for enhanced trust between these parties to co-create mutually beneficial healthcare solutions for the success of Ontario. Their work also shows that Ontarians do not really know of or see healthcare innovation as playing an important role in Ontario.

## Supplement B – The Health Links Program, MoHLTC

Ontario is improving care for seniors and others with *complex* conditions through Health Links.<sup>9</sup> This innovative approach brings together healthcare providers in a community to better and more quickly coordinate care for high-needs patients. When different healthcare providers work as a team to care for a patient, they can better coordinate the full patient journey, or continuum of care, through the health system, leading to better care for patients.

**Policy Proposals for Innovation Adoption and Alignment with Ontario’s Health Links Program** – OBIO’s approach to innovation adoption aligns well with the Health Links initiative; it seeks a new framework for collaboration and strategic dialogue to ensure continuity of care. It also involves all stakeholders early on in the decision-making process in order to ensure that biosciences innovations are adopted and diffused into the health system to support patients and caregivers.

	Health Links	Innovation Adoption
<b>Collaboration</b>	Health Links encourages the idea of collaboration and coordination amongst healthcare providers to support patients at all levels of the health system.	Trust-building policy proposals to facilitate innovation adoption (along the pyramid) establish the need for transparent and collaborative dialogue with all stakeholders every step of the commercialization pathway.
<b>Involving all Stakeholders</b>	Involves all stakeholders (family care providers, specialists, hospitals, long-term care, home care and other community supports) in patient care.	All stakeholders (ex. government, industry, consultants, etc.) will be brought together to participate along each step of the pyramid.
<b>Patient Involvement</b>	Health Links will work closely with patients, so that healthcare providers can formulate an individualized plan, and ensure the plan is being followed.	Policy Proposals, along with Steering Committee input, infer that it will be important to engage the public in filling gaps in trust.
<b>Information/Resource Sharing</b>	Health Links will facilitate information sharing and improved coordination amongst stakeholders, which will allow patients to receive faster care and spend less time waiting.	A policy proposal suggests an open-source secure website where stakeholders can participate safely as a mechanism of information/resource sharing.
<b>Outcomes Measurements</b>	Health Links will measure results and develop plans to improve access to family care, reduce avoidable emergency room visits, reduce hospital re-admissions, etc.	A policy proposal recommends annual reporting on certain indicators, none of which are currently measured in Ontario. Many of these indicators relate to improving continuity of patient care and family supports via smarter, more targeted, and fluid innovation adoption.

<sup>9</sup> <http://news.ontario.ca/MOHLTC/en/2012/12/improving-care-for-high-needs-patients.html>

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<b>Complex Issues Requiring a Level of Trust</b>	Health Links aims to manage patients with <i>complex</i> chronic disease using a comprehensive, integrated, easy to navigate, and collaborative approach across the entire healthcare system.	Similarly, the complexity of healthcare innovation adoption means we need to work across all sectors (devices, therapeutics, health IT, and diagnostics) as well as government.
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## Supplement C – Highlighted Case Study Summaries

The OBIO Innovation Adoption Initiative worked with the Centre for excellence in Economic Analysis Research (CLEAR) from the Li Ka Shing Knowledge Institute at St. Michael’s Hospital in Toronto to develop case studies that evaluate the healthcare benefits for innovation adoption in Ontario. CLEAR conducts economic evaluations of health care interventions with the goal of improving efficiencies of the health care system. Some services include developing economic evaluation models, conducting patient-level cost-effectiveness analyses, and improving research grants to provide economic evidence.

A series of six case studies and three mini-cases were selected to represent the full spectrum of opportunities for innovation adoption in healthcare and to demonstrate the true value of innovation in terms of cost savings for the Ontario health system, and QALY’s for Ontario patients. In addition, the case studies will illustrate an example of lost opportunity/benefit or a success story for early adoption and demonstrate the need for collaboration between government and industry.

Case Title	Summary/Key Messages
<b>New Oral Anticoagulants</b>	<ul style="list-style-type: none"> <li>• This case demonstrates the value of innovation through highlighting its effects on patient experience. In 2012, with wider implementation of apixaban in Ontario, the MoHLTC would incur \$24,182,676 in drug cost, but could have saved \$9,103,328 in adverse event and monitoring costs; and patients suffering from atrial fibrillation could have gained 2,685 QALYs and 358 fewer adverse events.</li> <li>• Apixaban received public funding in Scotland in February 2013 and in Germany in April 2013. Apixaban was also recommended for public funding in the UK in January 2013 and in Canada in February 2013, but currently it is not funded in Ontario.</li> </ul>
<b>KRAS Testing used with approved therapeutic</b>	<ul style="list-style-type: none"> <li>• An example of how, through collaboration, industry and government can successfully work together to develop a funding and accessibility model which allows for a level of cost-containment for the health care payer, entry to market of innovative products for industry partners, and evidence-based treatment options being reimbursed for patients in Ontario.</li> <li>• Collaboration between government and industry could work to optimize the adoption process of new technologies. In the example of KRAS, the evaluation of the test occurred after the evaluation of the drugs, whose usage was dependent upon the test results. Industry and government working together on metrics to facilitate evaluation of genetic testing could lead to smoother adoption processes.</li> <li>• For the 4,785 to 6,525 patients in 2012, KRAS + therapeutic will add 676-853 quality years of life.</li> </ul>
<b>Ultrasound Elastography</b>	<ul style="list-style-type: none"> <li>• A case where a new, innovative diagnostic tool, which is non-invasive and provides better patient outcomes, could also result in significant cost savings to the Ontario health system by avoiding unnecessary, costly procedures.</li> <li>• When compared to liver biopsy, the use of transient elastography could save the health care system approximately \$533K to \$1.68M from 2007 to 2011.</li> <li>• Although the approval of the use of UE technologies occurred in 2008, the use of both TE and VT has been more widely adopted in other countries than in Canada.</li> </ul>
<b>Insertable Cardiac Monitor</b>	<ul style="list-style-type: none"> <li>• From 2002 to 2011, the MoHLTC may have correctly diagnosed 12,137 more patients and potentially saved \$33.5M in hospitalization costs with the use of ICM.</li> <li>• For 2,174 patients in 2011, ICM will add 196 additional quality years of life.</li> </ul>

	<ul style="list-style-type: none"> <li>• The use of ICM can lead to significant benefits to patients in terms of the avoidance of unnecessary tests and negative clinical outcomes such as falls, broken bones, loss of independence, and even premature death.</li> <li>• Australia and New Zealand received reimbursement approval in 2004. With similar approval year, Canada shows a lower utilization rate of insertable cardiac monitor than in other jurisdictions (United States, UK, Australia, and New Zealand).</li> </ul>
<b>Pregabalin (Lyrica)</b>	<ul style="list-style-type: none"> <li>• This case study illustrates an example where an innovative new medication that initially was not recommended to be funded, was approved under special conditions and highlights the opportunity for a collaborative approach between government and industry to expand access to care and to positively impact the Narcotic strategy, given the opioid sparing effects demonstrated with Lyrica.</li> <li>• In 2011, if half of the EAP's requests for the use of pregabalin were accepted, this innovation could have resulted up to \$1.13 million savings for MoHLTC and 279 QALYs gained for patients with DPN, and up to \$174,755 savings for MoHLTC and 28 QALYs gained for patients with PHN, when compared to the use of gabapentin. Through sensitivity analysis, it was seen that as the number of patients receiving pregabalin increased, the number of QALYs gained in both DPN and PHN patients also increased, as well as an increased overall cost-savings to the health care payer.</li> </ul>
<b>Drug Eluting Stents</b>	<ul style="list-style-type: none"> <li>• An example of successful collaboration between government, industry, and researchers, which led to research being conducted to encourage adoption of innovative technologies in an appropriate, cost-effective fashion and to provide value to the Ontario healthcare system.</li> <li>• Having DES available in Ontario, MoHLTC has saved almost \$45 million in revascularization costs from 2002 to 2012. For the 8,021 patients in 2012, DES will add 22 additional quality years of life.</li> </ul>
<b>Mini Case – HPV Vaccine for Males</b>	<ul style="list-style-type: none"> <li>• This case highlights the impact that HPV vaccination in males could play in decreasing the rates of anogenital warts and HPV associated cancers while being a more equitable prevention strategy for the province of Ontario.</li> <li>• Comprehensive vaccination programs for males have been adopted in other jurisdictions (such as USA, Australia, and Prince Edward Island) and have lead to successful results. In addition, although there have been numerous recommendations made by scientific bodies (ex. NACI, PIDAC) as well as advocacy groups (FMWC, CCAC, SOGC) to expand publically funded HPV vaccinations to boys, currently in Ontario, the HPV immunization program is still confined to females.</li> </ul>
<b>Mini Case – SPY Elite Imaging System</b>	<ul style="list-style-type: none"> <li>• Thought leaders in other jurisdictions are adopting new innovations because they see the value the technology provides in terms of clinical benefits for patients and the cost savings to the health care system.</li> <li>• Although SPY Elite was approved in Canada first, its use has been more widely adopted in USA</li> </ul>
<b>Mini Case - Colesevelam (Lodalis)</b>	<ul style="list-style-type: none"> <li>• The benefit of colesevelam is apparent in patients with cardiovascular disease as well as diabetic and pre-diabetic patients. Colesevelam may help to reduce the provincial expenditure on high users of the healthcare system through its combined cholesterol and blood glucose lowering properties and improved tolerability. Colesevelam provides comparable benefits of two solutions in one agent.</li> <li>• Colesevelam has been used in clinical practice for over 10 years in USA. In October 2012, Quebec became the only province to approve public funding for colesevelam.</li> </ul>

## Supplement D – Authentic Trust Model

**Creating a Culture of Trust to Accelerate Innovation Adoption in Ontario** – OBIO commissioned the Health Strategy Innovation Cell at Massey College, University of Toronto (Innovation Cell) to develop a granular picture of how innovations in the health sciences get to market in Ontario and Canada, and the accompanying challenges. Over a twelve-week period, Innovation Cell conducted a literature scan and the largest semi-structured set of interviews of Canadian health system players in the field of healthcare innovation adoption. They interviewed key stakeholders from industry, government, hospitals, academia, medical research and not-for-profit organizations. The literature scan includes research from more than fifty peer-reviewed journal articles on technology adoption, capital access, commercial pathways, Canadian and other country models, and related thought leadership.

Through their research, Innovation Cell noted there exists a severe lack of trust among key stakeholders in the healthcare ecosystem. The trust gap is a significant barrier that must be overcome in order to foster innovation adoption in Ontario. Pricing, regulation, innovation procurement, health technology assessment, and series of claims and counterclaims surrounding notions of value and cost, all involve multiple-stakeholder engagement and trust.

Trust building may have a role in increasing innovation adoption consistent with the “Authentic Trust Model” formulated on evidence from chronic disease management in Canada. Dr. Diane T. Finegood, President & CEO, Michael Smith Foundation for Health Research, Victoria, British Columbia, adapted the notion of authentic trust to address the complexity of cross-sectoral chronic disease management.<sup>10,11</sup> Authentic trust suits an increasingly complex health system environment<sup>12</sup> because, put simply, it reduces complexity. In October 2011, Finegood presented lessons learned from her “Building Trust Initiative.”<sup>13</sup> In the presentation, she outlined the need for regulation that levels the playing field when competition is undesirable. That being said, building trust between sectors is easier than within sectors, which are driven by competition. Finegood explains further that complex problems cannot be solved using a reductionist paradigm. Instead, decision, action, and authority benefit from being distributed, individuals benefit from support, and networks and teams need to be established.

Finegood's pioneering work on authentic trust, in the context of disease prevention and management, provided a constructive scholarly impetus for guiding the development of authentic trust-based policies that could help to accelerate innovation adoption in Ontario and in Canada. If trust is the missing link, then policies that aim to align the objectives of industry and government across the innovation adoption lifecycle could be crucial to achieving health system sustainability as well as industry growth via innovation. Due to the complexity of healthcare innovation adoption, the authentic trust model suggests

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<sup>10</sup> Finegood DT, TD Merth, H Rutter. Implications of the foresight obesity system map for solutions to childhood obesity, *Obesity*, (2010) 18, S13 – S16

<sup>11</sup> Bauman A, DT Finegood, V Matsudo. International perspectives on the physical inactivity crisis—Structural solutions over evidence generation? *Preventive Medicine* (October 2009), 49 (4), pg. 309-312

<sup>12</sup> Dougherty D and DD Dunne. Organizing ecologies of complex innovation, *Organization Science*, ISSN 1047-7039, 2011, Volume 22, Issue 5, pp. 1214 – 1223

<sup>13</sup> Finegood, Diane T., “Working Across Sectors to Address Wellness,” *Action on Wellness*, October 11 to 13, 2011, Banff, Alberta



we need to work across sector boundaries. This in turn will require trust between all sectors along the entire commercialization pathway, including early and frequent collaboration and transparency of interests.

Extensive research and consultations in this area by Innovation Cell revealed at present, a fundamental lack of trust among stakeholders thereby preventing productive innovation adoption in Ontario and Canada. The current state of affairs reflects ‘cordial disregard’ where stakeholders talk *at* each other rather than *with*, and there is little to no follow-up or collaborative activities undertaken. A lack of trust can make it virtually impossible to reach system-wide goals.

Meanwhile, trust provides powerful opportunities for unity around health system goals, such as deepened and common understanding of other sectors, partnership-enabling behaviours, safe space for communication, opportunities for sharing assets (resources, reach, and influence), and clarity of roles, responsibilities, accountabilities, and commitments.

Developing a new approach to innovation adoption protocols will require a recognition of the trust gaps that exist, and an agreement by all parties to incorporate authentic trust-building and partnership along the entire commercialization pathway. This new model of trust-based partnership would facilitate a collaborative, evidence-based approach (aligned with the existing ‘Excellent Care for All’ legislation) that would enhance the effectiveness and efficiency of each step of the pathway. Each element or step would be designed to strongly improve the quality of evidence and hasten the decision as to whether the innovation will continue on the adoption pathway or not.

Most importantly, the proposed “Trust Model” includes several recommendations for strategies and tools to facilitate information sharing in an open and transparent manner. Improving dialogue and building trust between health system silos throughout the entire commercialization pathway would benefit Ontario by “co-creating” health innovations across devices, therapeutics, diagnostics and IT for adoption and diffusion into the health system. By working together, we can minimize missed opportunities and ensure adoption of valuable innovations to improve patient outcomes, overall efficacy and efficiency of the healthcare system, and economic prosperity in Ontario.



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OBIO is a private sector, membership-based organization committed to building a vibrant life science sector in Ontario. OBIO is engaged in policy and government relations activities to enable the successful development and commercialization in Ontario of life science technology through investment, strategic alliances, stakeholder engagement and industry promotion. The Ontario Bioscience Economic Strategy Team (OBEST®) was created by OBIO as a call to action to address innovation adoption and other challenges facing Ontario's human health technology and bioscience industry.

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