



Blurring the lines

**Convergence in Canadian
Health & Life Sciences**

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Foreword

Facing a combination of enormous business pressures, health and life sciences companies are at a critical junction. In Canada and across many other parts of the world, there is recognition that we have entered a new economic age of more moderate growth expectations while faced with an aging crisis that is threatening to bankrupt us if nothing is done to adapt. Companies across all sectors of health and life sciences are thus experiencing growing pressure on pricing. Increasingly, payers are taking a system wide perspective to health technology assessment and purchasing decisions as they continue to seek solutions to the challenge of achieving the best outcomes at the lowest cost – value rather than volume has become the focus.

Health systems around the world are recognizing that the way of the future will be a shift to team-based care models that:

- Leverage technology, based upon best available evidence;
- Focus on outcomes;
- Integrate across care settings; and,
- Deliver the right care, at the right time, in the right location

The challenge of course is enabling this transformation. In universal healthcare environments, while no one has a silver bullet solution, private pay health is becoming a more common consideration. Patients, who are better informed and more demanding, realize they can play an integral role in shaping their own health outcomes. Much of this is being enabled

by modern technology – technologies such as genomics and home health monitoring will help individuals to live healthier lives and prevent the onset of chronic disease; advances in digital technology are enabling consumers to gain a better understanding of their body and empowering them to make healthier life decisions.

These drivers of change and the challenges of the health system are presenting companies with a genuine opportunity for transformation. Most will not be able to do it alone as the increasingly multi-disciplinary operating environment requires a breadth of knowledge, access to technology and organizational capabilities that no single company or even sector of health will be able to provide alone. This will often mean partnering, including loose forms of collaboration all the way through to mergers and acquisitions. However, even when the right partners and capabilities are in place, effective execution will be the difference between success and failure. Staying abreast of technology, carefully navigating disruptive threats and optimizing supply chains will be critical to adjusting to a rapidly evolving healthcare landscape. Companies that are prepared for the convergence of health and life sciences will be better able to ensure the sustainability of their businesses.

This opportunity is significant but is going to require companies as well as many not-for-profit organizations to be agile, innovative and daring.

Kais Lakhdar & Georgina Black

We have entered a new economic age while faced with an aging crisis that is threatening to bankrupt us if nothing is done to adapt. The challenge of course is enabling the required transformation.

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Introduction

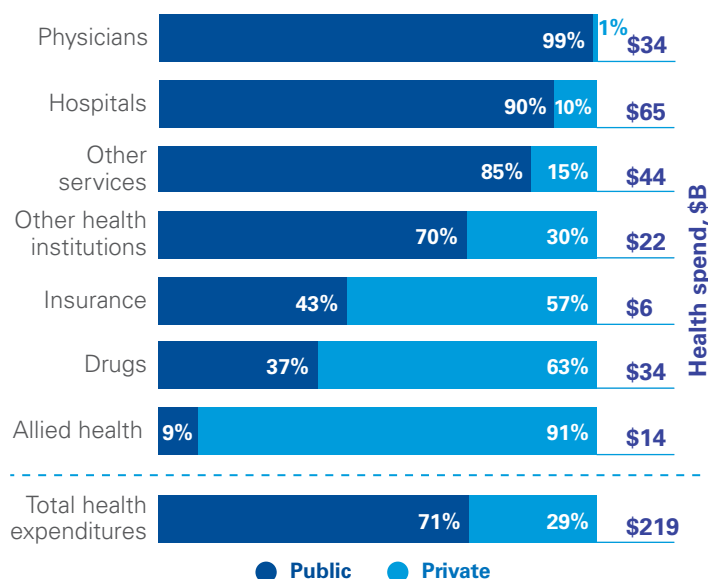
The health system of tomorrow must change. It must find a way to become better connected, smarter, and deliver more value if it is to have any chance of solving the dilemma of increasing demand for health services in a resource constrained environment.

Industry leaders agree that we must move away from a supply-driven healthcare system organized around what physicians and hospitals do, and toward a patient-centered system. The magnitude of this transformation will require an integrated whole system approach which leverages evolving technologies and capabilities from across the healthcare ecosystem. Companies across the health and life sciences industry will need to realign their goals with those of the health system as a whole and identify opportunities to work collaboratively with system stakeholders or they will risk being left behind.

Significant role of the private sector

Although healthcare in Canada is largely publically funded (71 % of total), the private sector including care providers, product and service suppliers and innovators plays an arguably even more significant role in enabling change in the health system. Figure 1 illustrates forecasted Canadian healthcare expenditures in 2015 and the significance of privately funded services such as drugs, dentistry, optical, paramedical and seniors care services that represent more than 29% of healthcare expenditures. The remaining 71 % (representing \$155B in spending) are publicly funded expenditures that are largely privately delivered healthcare services with major spending items including physician services (\$33.7B), hospital administered drugs (\$12.6B), medical devices (\$7.4B)¹, health information technology (\$5.4B)², long term care (\$24B)³ and homecare services (\$3.7B)⁴ representing more than half of those (56%) expenditures.

Figure 1: Breakdown of public and private shares of healthcare expenditures in Canada, 2015



Source: CIHI, National Health Expenditure Trends, 1975 to 2015; KPMG Analysis

¹ Industry Canada, KPMG Analysis;
² Branham Group; KPMG Analysis;
³ OECD Data – Nursing Care/LTC data;
⁴ OECD Data – Home Care data.

Sector trends in health convergence

- Pharmaceutical and medical device companies are driving sector convergence by creating combination products and investing in digital technologies to address areas of unmet need.
- Non-traditional players such as retailers and telecom companies are working with providers to enable both better quality and access to community based care as well as supporting the shift to more integrated care delivery.
- Diagnostics companies are innovating as they leverage disruptive technologies such as point of care testing and genomics and the consider the evolution of their business models.
- Seniors care companies faced with contracting public funding and a shift from institutional to home-based care settings are developing new delivery models that leverage innovative technology.

Preparing for the future

- Most organizations will identify that they don't yet possess the necessary regulatory experience, relationships, distribution channels and access to financial resources required for growth. This will drive convergence as companies partner for success in the new age.
- Preparing for convergence means responding to the drivers of change by systematically assessing current business and operating models in the context of the evolving opportunity landscape.
- Growth strategy may require redefining business models by better understanding the market, prioritizing the right opportunities and defining market entry plans.
- New business models need to be enabled by the right operating model foundation and the development of the necessary capabilities.
- New operating models may require assessing current operating models by understanding the value chain, organizational needs and operational constraints; defining a target operating model, and developing change plans.

Health convergence

Although the role of the private sector is significant, recent constraints on public funding have created pressure to deliver better outcomes while also increasing pressures on pricing. This is driving companies to seek new markets and, develop innovative partnerships and alliances including finding novel ways to work with payers and providers to better ensure value.

No longer can the health system afford to operate in silos. Companies must move away from the historic adversarial supplier model and to that of a partnership model. Traditional life sciences companies including pharmaceutical, medical device, and diagnostic health service providers, as well as non-traditional players such as retailers, technology companies, telecommunications companies and seniors housing providers are already participating in the revolution.

In this document

In this paper we explore some of the drivers that have caused health sector “convergence”, showcase recent examples of this phenomenon from a number of key health and life science sectors and outline some of the key questions companies will need to address to help ensure success in this new age.

No longer can the health system afford to operate in silos. Companies must move away from the historic adversarial supplier model and to that of a partnership model.



Drivers of change

A number of significant market forces are reshaping and redefining how healthcare is managed, delivered and experienced today and in the future.

Shifting demographics and a new era of economic growth

An uneven economic recovery continues to exert pressures on healthcare systems. This pressure, compounded by aging populations, presents many of the traditional challenges including soaring acute care costs, the burden of chronic disease, long-term care and end-of-life needs.

For the first time in history, Canada's senior population has outnumbered the youth population (ages 0 –14). By 2036, the population of those older than 65 in Canada is expected to increase to 10.4 million, more than twice the size of what it is today and approximately 25% of the overall population⁵. This increase in the senior population is leading to a dwindling work force and an increased burden on health and social services.

As more seniors require care, health systems are responding to these pressures through fiscal measures. For providers however, there is a burning platform as the system demands them to do more.

The demographic shift, combined with more moderate long term economic growth prospects, suggests this new fiscal reality is here to stay.

Transitioning to outcome-based payments

Today's healthcare payers and providers are increasingly focusing on outcomes, and aligning reimbursement approaches to more value-based pricing models. Only suppliers that can demonstrate positive patient outcomes in a cost effective way will be successful. As costs increasingly come under scrutiny, evidence-based assessments of interventions and care models are being used to make decisions and support the efficient allocation of resources. While assessments that examine clinical and economic implications and impact on patients and health services are not new to the health system, there has indeed been a trend to a longer term perspective and taking into consideration system wide impacts. In many cases this type of approach supports making more significant upfront investments to achieve cost savings over the longer term.

The challenge of an aging population and associated economic pressures combined with advances in technology will transform healthcare for the next generation.

⁵ Population Projections for Canada (2013 to 2063), Statistics Canada

Changing customer-supplier relationship

The industry can no longer remain competitive through traditional practices that position companies as counterparties in a transactional customer-supplier relationship. Instead, companies need to work within the system as strategic partners to help redesign care pathways, improve workflows and bridge system silos all while demonstrating better patient outcomes. At the same time, payers are exerting pressure on pricing, leading to pressure on company profit margins. This shift to paying for outcomes is encouraging health and life science companies to focus research and development resources on the areas of highest unmet need. Outcome based payment models also mean companies need to ensure they better appreciate the context within which their products and services will be deployed, compelling them to better understand patients and their care pathways and offer more comprehensive treatment solutions.

Innovative business models are already emerging in which products and services are packaged with other value add services such as training, patient identification and screening, population data analysis and identification of best practices. Critical factors for success in this new environment will mean innovation, multidisciplinary capabilities and developing a deeper understanding of clients' and their operating contexts.

Changing patient expectations and behaviours

Availability of health information combined with advances in patient engagement technology are creating more informed and more demanding patients. Patients expect more from their care as they are better informed of disease states and available treatments. A significant body of literature suggests that models of care that are developed with the patient's perspective in mind and that encourage greater patient participation in care are demonstrating reduced healthcare costs, better patient outcomes, and higher quality of care, particularly for those with chronic diseases⁶. As models of care become more patient-centered and outcome focused, patients are becoming an increasingly important voice in reshaping the healthcare ecosystem. Advances in technology such as patient health information systems, wearables and other home monitoring devices are also enabling patient engagement, allowing

⁶ Health Affairs, Patient-Centered Care: What It Means And How To Get There; 2012/13





them to self-diagnose, self-navigate and self-manage their health. For many providers, this realization of patients' latent capacity for care could not have come at a more critical time as healthcare evolves from passive to proactive.

The age of digital health marketing

Companies are taking note as well. The pharmaceutical industry, which traditionally engaged more with providers than patients, is now making an even more concerted effort to reach out to patients directly via new channels such as mobile applications (apps). A review of any global life sciences company annual report illustrates that patient experience and patient engagement are both central to almost every company's strategic agenda. As of 2014, the top pharmaceutical companies had an average of 65 apps in the Apple and Google Play app stores, compared to 1 to 2 from the average health app publisher⁷. A recent survey by RockHealth reported that 80% of internet-connected adults use digital health tools. The survey identified six different categories of digital health use: searching for online health information, comparing health services online, tracking health with a mobile app, tracking health with a wearable device, using telemedicine, and using consumer-facing genetic services⁸.

Although the industry may still be in the early stages of digital adoption, consumers are already well aware and embracing digital channels as a tool for managing their health and wellness.

⁷ mHealth App Developer Economics 2014, Research 2 Guidance

⁸ RockHealth, Digital Health Consumer Adoption: 2015

Data is going to be integral in both bridging the traditional silos of care and optimizing the timing and location of that care. It will be a critical enabler of the health system's transformation.

Advanced technologies and the availability of health data

Advances in healthcare technologies including 3D printing, regenerative medicine, advanced robotics, genomics and nanotechnology are expected to transform healthcare for the next generation. The transformation will be underpinned by advances in digital innovations that will help enable more real time, decentralized, disintermediated and patient-centred care. This will be necessary if the health system is able to improve cost effectiveness, patient access and the outcomes of that care. A review of the state of technologies, such as telehealth technologies, reveals that they are already enabling care delivery near the patient, at home and in the community. This adoption of technologies is enabling less of a need for specialized professionals and allowing an increased role for general physicians and allied health professionals.

Health information to health insights

Another major trend related to emerging technologies is the proliferation of healthcare data. While health data is already creating and expected to continue to create unprecedented opportunities, the industry is in the early stages of working to understand its full potential. Much like oil, the ultimate value of the data is in its refined form, post analysis, and the insights that can be drawn from it. Data, such as information on patient behaviour, treatments and outcomes are being utilized to generate intelligence enabled by electronic health records, cloud computing, predictive analytics and ongoing advances in mobile and other digital technology. These opportunities include population health management, home health monitoring, advanced analytics and care coordination platforms to support more cost effective and efficient care delivery. Data is clearly integral in both bridging the traditional silos of care and optimizing the timing and location of that care.



Convergence in Health and Life Sciences

The aforementioned drivers of change are reshaping the healthcare ecosystem and are placing patients at the center.

Emerging challenges and opportunities are driving collaboration between industry stakeholders. In Canada, these stakeholders include healthcare providers, payers and purchasers, who are working closely to redefine healthcare funding and delivery models from fee for service to value oriented approaches. Investors recognize the opportunity as well, with 41 out of the top 100 venture capital funds active in health and life sciences related sectors⁹. Private sector players including life sciences, private health, insurance, technology, seniors housing companies and other non-traditional market participants are also responding to these dynamics with the aim of finding ways to impact health system transformation. These companies are responding through mergers, alliances and other innovative go-to-market models. These responses are leading to health sector “convergence”, where the lines between traditional sectors are becoming less distinct.

This convergence trend is evident in company diversification strategies, new business models, and partnerships emerging between different stakeholders in the healthcare ecosystem.

In the sections that follow, we explore a number of sectors of health and life sciences that are addressing the challenges of the new healthcare ecosystem by embracing healthcare convergence and developing new business models and partnerships.

The new ecosystem is bringing together a mix of traditional and non-traditional industry players all seeking opportunities to participate in the transformation of the healthcare landscape

Figure 2: Canada’s New Health & Life Sciences Ecosystem



Source: KPMG LLP, 2015

⁹ VC 100, Entrepreneur.com, KPMG analysis

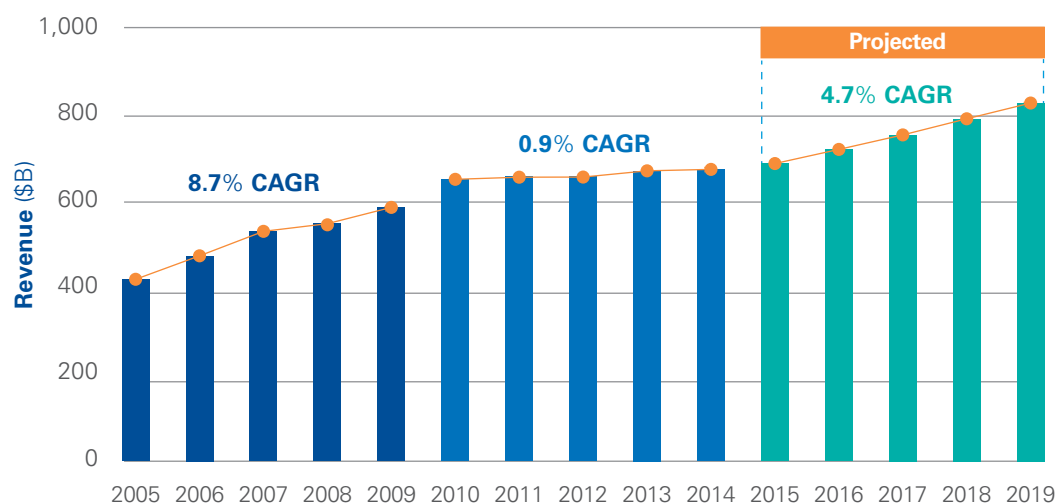
Pharmaceuticals and medical devices: Blurring the lines between traditional sector boundaries

In recent years, pharmaceutical and medical device companies have been faced with two major challenges: a tightening economic environment and reduced productivity. Because of the recent wave of patent expirations and increased competition from emerging markets, companies are experiencing slower growth in revenues.

Following the successful period of major blockbuster launches in the 2000's, over the past five years the top 30 global pharmaceutical companies have experienced significantly lower revenue growth (2010-14 CAGR of 0.9%) compared to the five years preceding (2005-09 CAGR of 8.7%) as illustrated in Figure 3.

Big Pharma is expected to emerge from a period of sluggish growth over the next five years

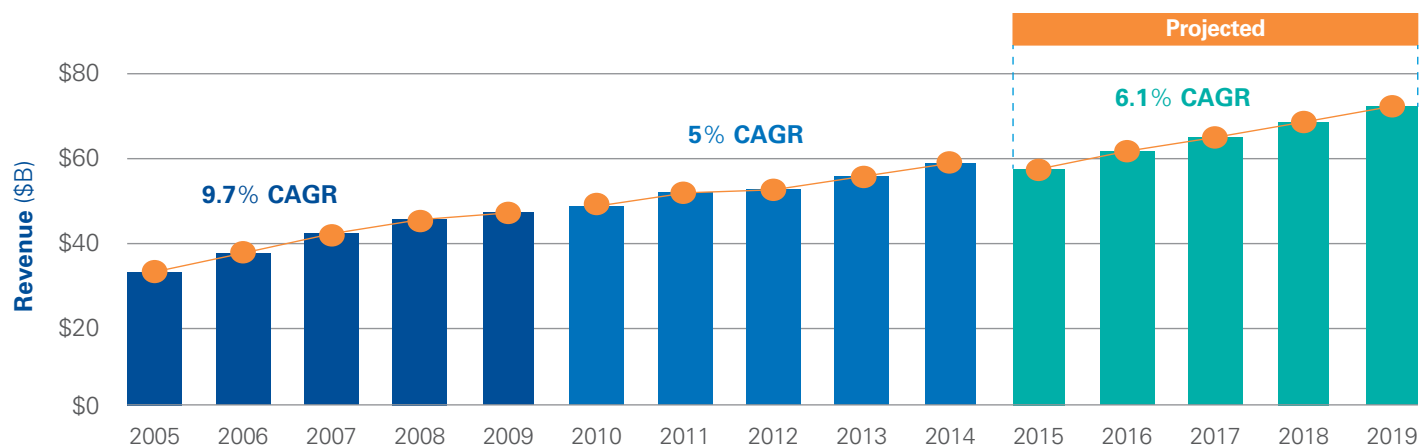
Figure 3: Revenue of top global pharmaceutical companies, 2005-2019



Source: Capital IQ, 2015

Although medical devices have outperformed pharmaceuticals over the past few years, going forward drugs are expected to keep pace driven by an increase in approvals and US prescription drug spending

Figure 4: Revenue of top global medical device companies (2005-2019)



Source: Capital IQ, 2015; Evaluate MedTech World Preview 2014-2020



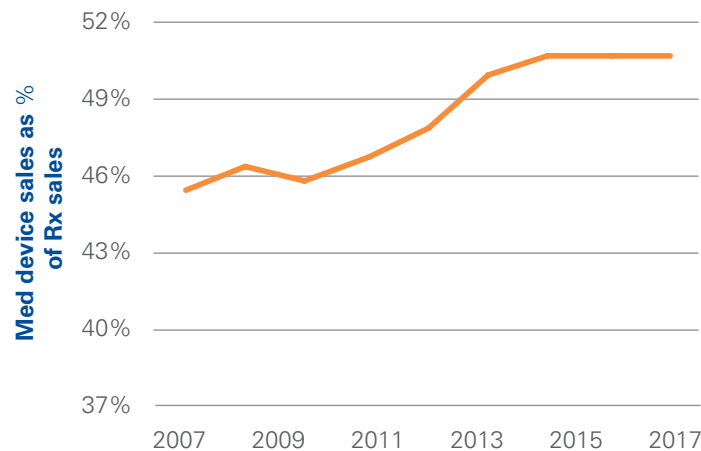
Similarly in the medical devices sector, the top 40 global medical device companies have experienced slowing growth over the past five years (2010-14 CAGR of 5%) compared to the five years preceding (2005-09 CAGR of 9.7%) as shown in Figure 4. This has been driven by economic pressures and a waning drug pipeline. One response to these challenges has been diversification into biotechnology and medical devices as companies have embraced advances in genomics and engineering and focused their innovation efforts on the most significant areas of

unmet need. In fact, EvaluatePharma reports the percentage sales from bioengineered vaccines and biologic products within the world's top 100 products represented 44% in 2014¹⁰. Another trend has been the rise of "combination" products¹¹, which are emerging as a major new growth area for the global life sciences industry. These trends have contributed to the noticeable increase in the percentage of global medical device sales as a percentage of global prescription drug sales, from less than 45% in 2007 to more than 51% in 2015 (Figure 5).

¹⁰ Evaluate Pharma, World Preview 2015, Outlook to 2020

¹¹ Definition: Combination products are products made of drug, device and/or biologics constituent parts

Figure 5: Medical device sales as a percentage share of prescription drugs (2007-2015)



Source: Capital IQ, 2015; Evaluate MedTech World Preview 2014-2020

Perhaps demonstrating a responsiveness to the changing environment, both the pharmaceutical and medical device sectors are expected to experience an uptick in growth over the next few years as companies' recent development efforts begin to come to fruition. Although pipeline productivity is expected to improve in coming years, pressure on pricing and reimbursement is expected to continue. This pressure to innovate has been driving companies to look more broadly across the healthcare ecosystem for new opportunities – pharmaceutical, medical device and other life sciences companies are increasingly partnering. These partnerships often pool financial and capability resources and focus on areas of unmet need that have long stifled the industry.

Convergence in Canada is bringing pharma, seniors health & retail health closer together

Roche Canada, Bayshore Home Health, and McKesson Canada have partnered to launch chemotherapy infusion clinics. Bayshore, an established player in the seniors care industry, is providing the clinic facilities, while global pharmaceutical company Roche is providing the therapeutics, and global distributor McKesson is administering the program. These private infusion clinics allow patients to receive cancer therapies not available under the public payer. **An example of this is Avastin a Roche drug used to treat lymphoma and breast cancer.**

Global health convergence landscape
















While co-investing in novel and emerging technologies is not new to the industry, examples of more innovative partnerships include the partnership between Abbott Laboratories and Novartis Pharma AG to develop a bioresorbable vascular scaffold (BVS), which is an innovative class of stent that delivers everolimus, a drug that works to restore blood flow for patients with coronary artery disease. Another interesting example of healthcare convergence is Proteus Digital Health, a company that is developing a new class of therapy called “digital medicines”¹². Proteus Digital Health has partnered with Otsuka Pharmaceuticals to develop this innovative digital medicine product. Otsuka’s Abilify tablet contains an ingestible sensor provided by Proteus. The sensor communicates with a wearable sensor patch and software applications to measure adherence for treatment of patients with certain mental disorders.

Globally there are many other significant examples of healthcare convergence at work in the pharmaceutical and medical device industries. This is often taking the form of significant strategic alliances and mergers and acquisitions, bringing companies together with a common thread of developing new business models to better compete.



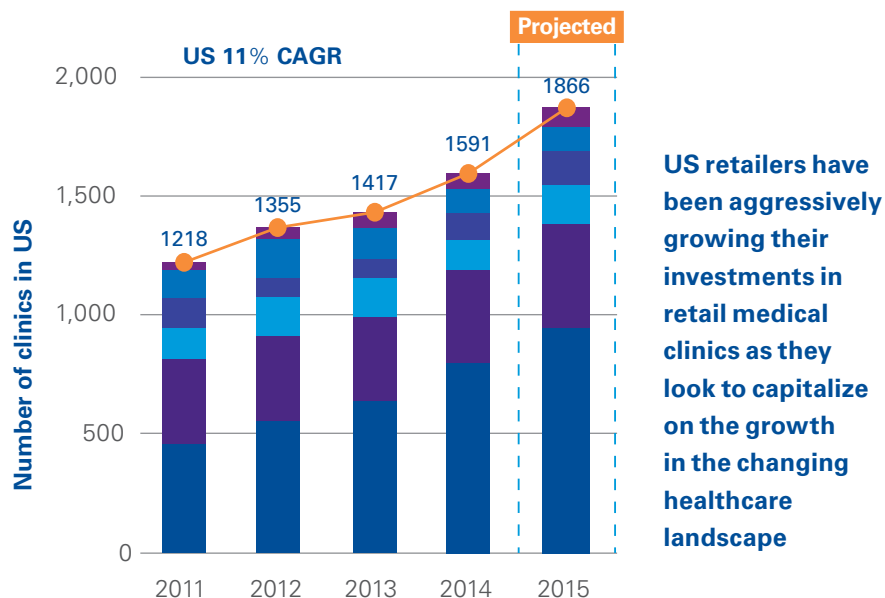
¹² Definition: Digital medicine therapy includes medicines that communicate when they’ve been taken, wearable sensors that capture physiologic response, applications that support patient self-care and physician decision making, and data analytics

Table 1. Highlighted examples of health "convergence" involving pharma and medical device companies

Industries	Companies	Action	Rationale
   Pharma Device	Sanofi and medtronic	Sanofi and Medtronic formed a strategic alliance focused on Diabetes in 2014	<p>This open-innovation based alliance model between two industry leaders will combine the capabilities, as well as the human and financial resources of both companies.</p> <p>The alliance has two key priorities: development of drug-device combination products, and delivery of care management services for better disease management.</p>
   Pharma Lab	LabCorp and covance	LabCorp acquired Covance for \$6.5B in 2015	This deal creates the world's largest healthcare diagnostics company. LabCorp immediately gains a major footprint in the area of drug development and becomes a leading provider to the clinical trials industry.
	OPKO health and bio-reference laboratories	OPKO Health acquired Bio-Reference Laboratories for \$1.5B in 2015	OPKO Health will leverage Bio-Reference's diagnostic franchises in women's health, cancer, and genetics as well as the national infrastructure and extensive payer network to increase the adoption of OPKO's 4Kscore test by physicians and patients. The resulting company will have a leading position in diagnostic sequencing services for rare disorders and tumor sequencing.
	23andMe and Genentech	23andMe partners with Genentech in 2015	Genentech will have access to genomic data of thousands people belonging to 23andMe's Parkinson's disease community. Genentech will utilize this data identifying new therapies for Parkinson's disease.
   Pharma Technology	Novartis and qualcomm	Novartis and Qualcomm formed a partnership for mobile-enabled clinical trials in 2015	Novartis and Qualcomm will collaborate on the Trials of the Future program. Qualcomm Life's 2net Platform will serve as a global connectivity platform for collecting and aggregating medical device data during clinical trials to improve efficiency. Novartis will combine the 2net Platform, 2net Hub and Mobile technologies with designated medical devices to automate the collection of vital home-based patient data during clinical trials.
	Novartis and google healthcare	Novartis and Google formed strategic alliance on developing "smart lens" in 2014	Novartis licensed Google's "smart lens" to develop solutions that help diabetic patients monitor their glucose levels and other indicators. Novartis is also licensing the miniature eye electronics technology to help treat other ocular conditions.
   Device Technology	Optum and alere health	Optum acquired Alere Health for \$600M in 2015	Alere Health's health management capabilities will broaden and strengthen the value Optum provides to healthcare payers, employers and states by improving outcomes and reducing cost. Alere Health's offerings in areas such as tobacco cessation and home-based obstetrical services that will enable more comprehensive population health solutions.
   Device Lab	Roche and IQuum	Roche acquired IQuum for \$450M in 2014	IQuum's unique products will allow Roche to quickly enter the point of care segment of molecular diagnostics through IQuum's Laboratory-in-a-tube System.

Source: Capital IQ, 2015

Figure 6: Growth of retailer-based medical clinics in the US and Canada, 2011-2015

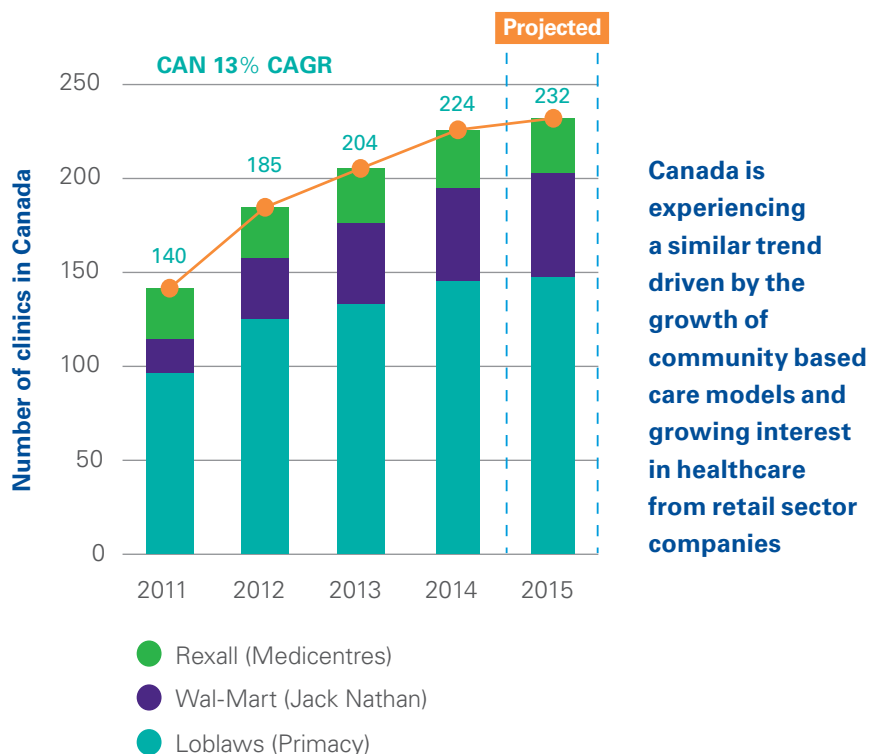


Retail health: non-traditional entrants see opportunity in community care

As traditional healthcare providers continue to experience the evolution to outcome based funding and seek more innovative models of care, there are opportunities to help develop a more integrated system that bridges the silos that currently exist across the care continuum that includes in acute, long-term, primary and community care, and wellness and prevention programs. Health systems across the developed world have prioritized evidence-based models of care, multidisciplinary teams and improved integration across care settings, and shifting care into the community and away from more costly acute care settings.

More recently, new industry players that have not traditionally operated in the healthcare space have been seeking ways to participate in this healthcare industry transformation. As payers continue shifting care resources from acute settings into community, retailers have taken note, and a trend has emerged: the proliferation of retail-based clinics. In the US, a number of major retailers have been partnering with primary care chains given their broad patient base. Over the past decade, retail clinics have increasingly been colocated within big box stores and pharmacies. These clinics are nested within major retailers such as Walmart and CVS and offer basic primary healthcare, often on a walk-in basis and have extended operating hours. This has brought a degree of much needed relief to traditional care settings as well as the benefit of increased foot traffic for retailers.

As the number of major retail clinics in the US has grown, the trend has also become clearly evident in Canada. Major retailers such as Wal-Mart and Rexall are venturing into the retail clinic space. The number of Canadian retail clinics is estimated to have grown from 140 in 2011 to 224 in 2014, representing a CAGR of 13% (Figure 6).



Source: Merchant Medicine LLC; Various media sources; KPMG analysis

The number of Canadian retail clinics has grown from 140 in 2011 to 224 in 2014, representing a CAGR of 13%

However, beyond these retail based primary care groups, hospitals and other medical groups are also offering healthcare services in the community. A variety of models or choices are now available to patients who seek services in the community. These community care models include specialized care clinics, urgent care, primary care in convenient locations and virtual care. These models of care are enabling a more flexible and decentralized health system that allows providers to expand their services more efficiently and offer care in the community that is convenient to patients while alleviating capacity pressures on traditional care settings.

The evolving role of allied health professionals

Another significant enabling trend is the shift to less specialized and less expensive human resources that reduce the burden of care on the physician and support the transition of care into the community. Health professionals such as community pharmacists are often patients' first point of contact into the healthcare system. Indeed, 43% of Canadians rely on pharmacists for health advice¹³. In provinces such as Saskatchewan, Alberta, Nova Scotia, and Manitoba, the Minor Ailments Program has enabled pharmacists to prescribe a predetermined set of medications directly to patients. Another example are Nurse Practitioner (NP) led clinics. These clinics are part of a new primary care model that is also intended to alleviate pressures on the health system by allowing broader access to primary care services by leveraging healthcare practitioners other than physicians. These clinics position NPs as the most responsible provider, working with a multi-disciplinary team to deliver often comprehensive primary care services. The potential of NPs to enhance the accessibility and quality of primary healthcare services has sparked nationwide interest¹⁴. The majority of the aforementioned retail clinics, for example, are staffed with physician assistants, nurse practitioners and pharmacists that may or may not be collocated with a physician. Governments are expected to continue to introduce reforms to enable this transition, which will be key if nurses, pharmacists and other disciplines are to play a more significant role in community-based care.

¹³ Health-Canada Baseline Natural Health Products Survey Among Consumers, 2005

¹⁴ Longwoods, The Primary Healthcare Nurse Practitioner Role in Canada



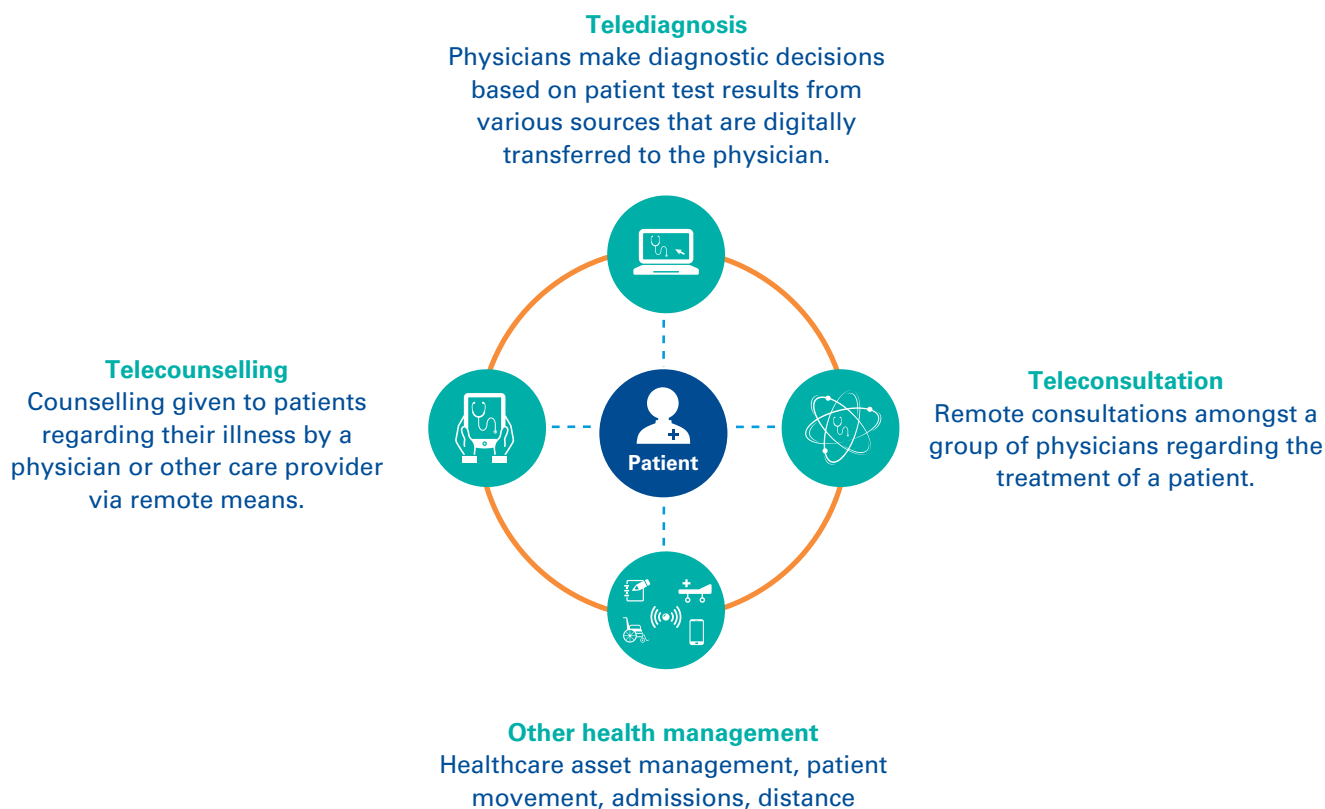


Telehealth: empowering the patient via mobile and digital technologies

In 2015, there were globally more than 3.7 billion people that were wirelessly connected and 7.5 billion mobile phones¹⁵. The propagation of wireless technology is enabling a level of virtual connectivity that was previously unimaginable. This is inspiring both telecommunication and healthcare companies to find ways to utilize mobile devices and related technologies to enhance patient care.

Video-conferencing and home monitoring devices are common examples of telehealth technologies that are already enabling virtual care at home and in the community. The field of telemedicine, which focuses on the use of technology to facilitate communication between various healthcare providers, access to offsite databases and transmitting of vital medical images for examination, has received significant attention. Many organizations in Canada have invested in telemedicine as they seek to find ways to overcome common health system challenges that are exacerbated by Canada's geography. A number of illustrative applications of telehealth technologies are outlined in Figure 7.

Figure 7: Types of telehealth solutions



Source: KPMG LLP, 2015

¹⁵ GSMA Intelligence

Many organizations in Canada have invested in tele-medicine as they seek to find ways to overcome common health system challenges that are exacerbated by Canada's geography.

Telecom providers see opportunities in health

Telecom companies in particular can offer tremendous opportunities for the healthcare industry. Although not as ubiquitous as Mobile, "Mobile Healthcare," known as "M-health," has already become widespread as it helps to address the challenge of making healthcare better, cheaper and more accessible. In recent years, telecom companies in North America and Europe have led the way with numerous exciting innovations.

Vodafone, the largest telecom company in the UK, is using communications technologies to help transform how healthcare is delivered in both developed and emerging markets. It has formed partnerships with enterprise customers, NGOs and governments to improve access and quality of care for patients. It has also entered into a number of innovative partnerships with life sciences companies. For example, in 2014 it formed a global partnership with AstraZeneca to develop new mobile and internet-based services to support patients with cardiovascular conditions during treatment through solutions such as medication adherence programs. In 2012, it started working with Baxter to provide a mobile communications system for patients with immune deficiencies that enabled long-term treatment at home.

In the US, companies such as AT&T, Verizon and Sprint are offering similar solutions to engage patients, connect health system stakeholders and improve access to services as they aim to make telehealth a part of everyday healthcare practice.

Here in Canada, although far from routine, telehealth is quietly growing. One particular industry leader, Telus Health, which was formed following the acquisition of Emergis, an e-business company with a strong presence in health claims processing and pharmacy management systems, is leading the way. Following more than \$1.5B in investment, Telus Health is currently the largest EMR provider in Canada and also provides a variety of mobile and digital solutions in the health and life sciences space. Besides being well established in the publicly funded healthcare provider system, Telus Health is also innovating in other areas of health. For example, in 2012 it partnered with Sanofi Canada to launch the STARsystem platform to educate, empower and encourage Canadians living with diabetes to more effectively manage their disease.

Going forward, many telecommunications companies will be interested in expanding the use of telehealth technology more broadly. There is growing interest in extending beyond the traditional rural opportunities to think about how companies can create stronger services within urban settings, particularly in the face of stronger incentives to move healthcare out of large hospitals and into out-patient settings.

Health and wellness has also been an area of significant interest to telecom companies. In recent years, there has been a dramatic increase in the number of health & wellness related apps. It is estimated that there are now more than 100,000 apps dedicated to mobile health. The global health and fitness mobile app market is projected to reach over \$26 billion by 2017¹⁶. One creative alliance in this area is between SoftBank, the Japanese telecom giant, and Fitbit, a popular health & wellness related wearables technology, to bring a subscription-based health activity tracker service to Japanese customers.

The next leap in health data connectivity

Although it is likely a number of years away, the inevitable evolution is to take data generated by these digital health applications and directly integrate them into personal electronic medical records. Furthermore, health information systems that are currently focused at the organizational level will need to be integrated across different settings and disciplines. This integration will require both significant investment and technological advancement but has the potential to be highly transformative from a clinical perspective. This innovation would enable an order of magnitude growth in clinical evidence, accelerating a shift to a preventative, predictive and more data driven health system.

There are obvious opportunities for telecom companies to partner with a range of hardware and software allies, both in the traditional health sector as well as in consumer electronics. The challenge for many will be solving the value chain integration puzzle. An interesting question to ponder is who might take the lead in developing the next major telehealth innovation. Will the next leader be a telecommunications, healthcare, consumer electronics or technology company?

Table 2. Examples applications of telehealth

Application	Description of value add
Remote patient monitoring	The delivery of healthcare to a patient's home that is made possible by connecting the patient and a healthcare provider through a mobile device. It involves electronic transmission of patient data to the provider at a remote location, review and interpretation and potential alteration of the patient's course of care.
Enabling community based care	Mobile technologies, such as those used to track patient positions and monitor conditions, enable patients to live at home or in care communities and reduce time in acute-care settings.
Patient medication adherence	Data is recorded at the point of drug intake and transferred to carers to help patients get the right amount of medication at the right time.
Health & wellness	Communications through mobile devices and health apps encourage behavior changes that improve disease prevention and management, as well as support activities that improve wellness such as smoking cessation and weight loss.
Data analytics	Mobile technology makes it faster and easier to collect and analyze data, in some cases in real-time. The insights can be informative in many areas including evidence-based care, personalized medicine, enhancing clinical trials and population health management approaches.

¹⁶ Research2Guidance, mHealth App Developer Economics 2014

Diagnostic laboratories: emerging technologies threaten disruption of traditional business models

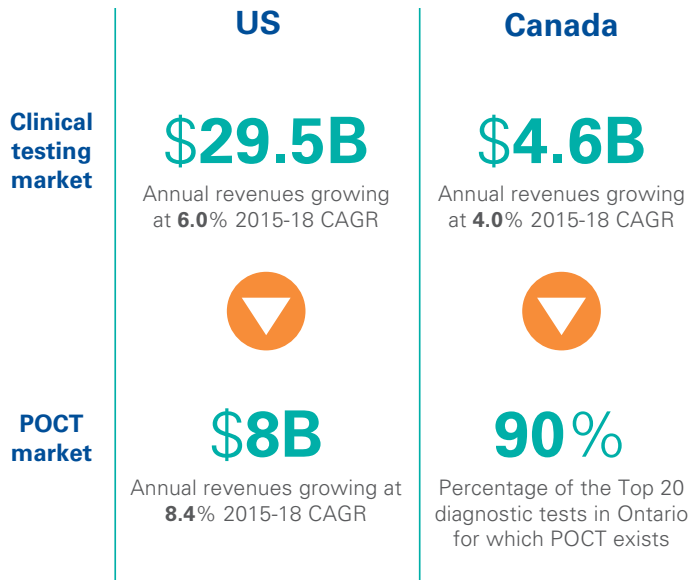
Similar to other parts of health and life sciences, the diagnostic testing industry has been impacted by similar health system financial pressures. The North American diagnostic testing market has been experiencing increasing consolidation as a result. Heightened service expectations combined with pressures to reduce cost are expected to continue and have primed the industry for transformation.

As a result of advances in technology, diagnostic labs are now able to provide a more comprehensive menu of services. In particular, innovations related to information technology, automation, genetics and point-of-care testing are enabling major advances in laboratory practice. These technologies, although at varying stages of adoption, are enabling faster, more accurate and accessible diagnoses. The significant role of clinical testing as a facilitator of clinical decision making established diagnostic lab companies as an essential part of the evolving healthcare ecosystem. Going forward, lab companies have the potential to play an even more significant role in chronic disease and utilization management given their frequent touch points with patients and physicians.



Revenues of point-of-care testing are expected to grow faster than clinical testing revenues in the US

Figure 8: Key trends in US and Canadian clinical testing market versus POCT market, 2015



Source: IBISWorld, 2015; CIHI; KPMG Analysis

Innovation in clinical testing

For an increasing number of tests, portable and handheld “point-of-care” testing (POCT) devices can now analyze blood samples and deliver lab-quality results in minutes. Over the past twenty years, the availability of POCT has increased significantly from ten types of tests to over 110 types. Today, marketed POCT technology is available for over 90% of the top 20 lab tests and the rate at which the POCT market is growing is outpacing the rate of growth of conventional clinical testing (Figure 8). This technology could have the potential to play an even more significant role as care becomes more distributed. Although the adoption to date has been slow over concerns related to costs and accuracy, POCT technology is certainly causing many to take note and for select tests it is being increasingly adopted by hospitals in Canada and the US. In community settings, a number of pharmacies have also begun piloting POCT. Most recently, ten pharmacies in British Columbia began offering a blood POCT system called HealthTab. Pharmacists simply collect a few drops of blood from a finger prick, the sample is placed in a POCT machine, which then measures up to 21 key health markers¹⁷.

¹⁷ CTV News, Canadian pharmacies testing do-it-yourself blood test kiosks, December 2015

As technology continues to evolve, it is reasonable to anticipate more elements of the care delivery process to be packaged and marketed directly to consumers.

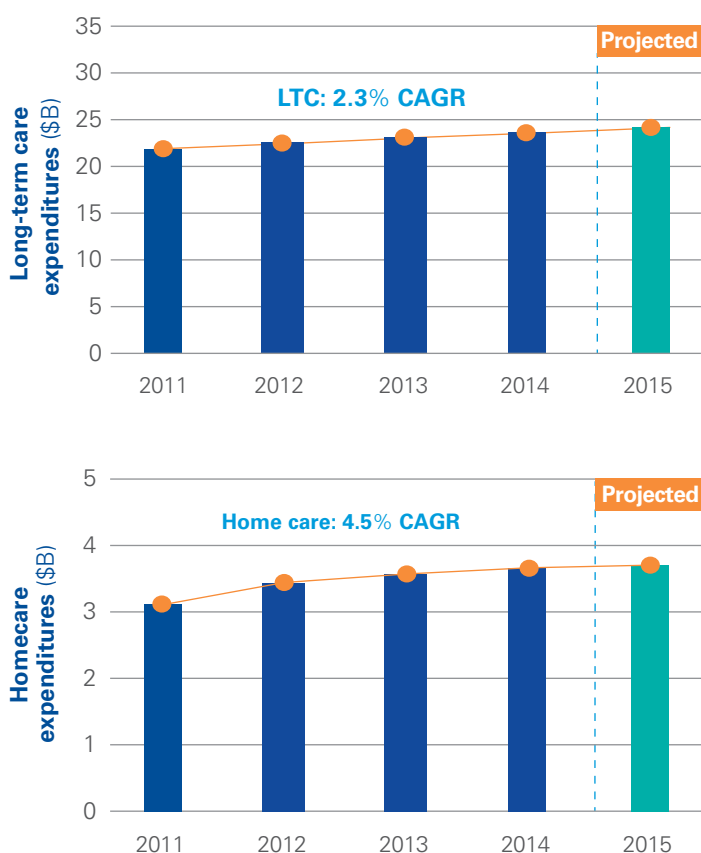
Diagnostic labs are also expanding into other new sectors of the health and life sciences industry as they seek grow revenues and benefit from existing cost efficiencies. In 2014, Laboratory Corp of American (LabCorp) acquired Covance, a contract research organization, for \$6.5 billion. This deal allows LabCorp to enter into the contract clinical trials market, while expanding its existing central lab business and leverages the global presence of Covance. The long-term patient database of LabCorp could be used to quickly recruit and fill clinical trials, providing the company an advantage over its competitors in the clinical research sector.

As technology continues to evolve, it is reasonable to anticipate more elements of the care delivery process to be packaged and marketed directly to consumers. For example, companies such as 23andMe and Theranos are already offering products in the form of testing kits sold directly to consumers at affordable prices. In 2015, Theranos was able to have Arizona law updated to allow blood tests to be ordered without a physician requisition form¹⁸. Needless to say this new business model is stirring up much discussion given the potential for these new technologies to disrupt traditional business models. As these types of technologies expand in use, issues of appropriateness, consumer education and ethical considerations will need to be addressed by funders and regulators, as well as providers.

¹⁸ New-arizona-law-and-fda-approval-gives-theranos-something-to-celebrate, USA Today, July 2015

Spending growth on home care has outpaced spending growth on long term care in Canada

Figure 9: Growth of long-term care and home care spending in Canada



Source: OECD data; KPMG analysis

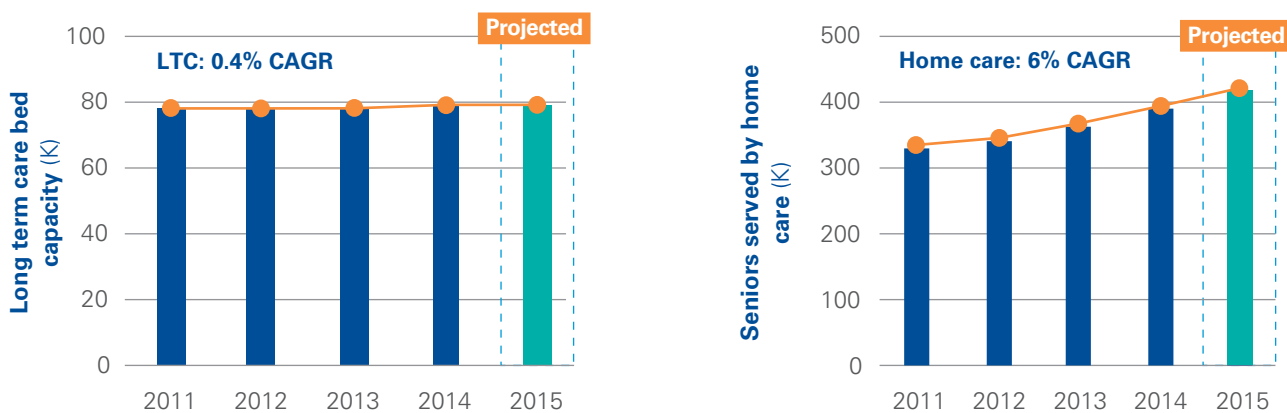


Seniors health: economic pressures drive innovation in seniors care

An aging population means more pressure on all aspects of the health system as seniors care increases the burden on payers and providers. In particular, demand for long-term care and other seniors living services is becoming untenable. Governments are responding by funding long term care more stringently and accelerating the rate of funding to homecare providers as they aim to keep seniors at home for longer. Figure 9 shows that homecare spending across Canada has been growing at a rate of 4.5% versus 2.3% for long term care spending.

In Ontario, LTC funding has been flattening, which has resulted in very limited new LTC capacity while home care services have been growing strongly as government focuses on keeping people in their homes for longer

Figure 10: Growth of long-term care and home care capacity in Ontario



Source: MOHLTC; Home care ontario; various sources; KPMG analysis

“Homecare is where we can get the best value for money and the highest quality of care for people.”

Hon. Deb Matthews

Minister of Health and Long Term Care, March 20, 2012

In fact, in Ontario where key policy reports including the Seniors Strategy and the Drummond Report have advocated for expanded Homecare services, Homecare has been outpacing long term care funding even more significantly (Figure 10). This shift has been driven by a combination of technology and cost efficiency that has the potential to offer significant savings compared to traditional hospital based care (Figure 11).

Opportunities in seniors care

By 2036, the population of those older than 65 in Canada is expected to increase to 10.4 million growing at six times the rate of the under 65 years of age population. This shift in seniors care is creating opportunities for both seniors' housing and technology providers. Those who can respond effectively have the opportunity to capitalize on a huge opportunity; the North American seniors' care services industry is estimated to be worth more than \$350 billion a year¹⁹.

¹⁹ Long-Term Care Services in the United States: 2013, US Department of Health and Human Services; KPMG Analysis

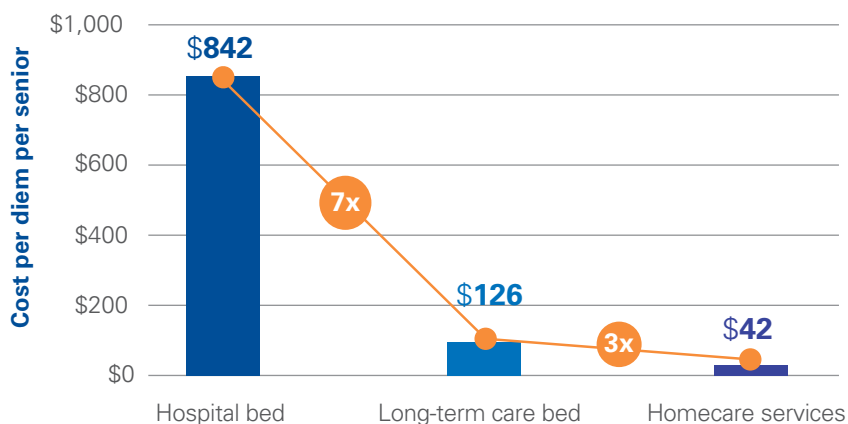
Convergence in Seniors Housing is blurring the lines between traditional seniors housing and care settings

A key enabler of innovation in seniors' care is advanced technology such as mobility enhancers, wearables, home monitoring and other telehealth technology. These technologies will allow the industry to enhance the mobility and independence of seniors as they are allowed to spend more time in their homes and in the community. This will serve to alleviate pressures on acute care, enhance broader service delivery and overall system productivity.

An interesting example of healthcare convergence in the seniors care sector is the "campus of care" model. A campus of care is a planned community that provides a range of seniors housing options and services within a single community. For example, the campus might include four units and/or buildings – one unit each for servicing a retirement living, supported living, assisted living, and continuing care needs. These campuses are often collocated with wellness clinics with access to a physician, labs and other allied services.

Although there are some issues of comparability, the cost of care in hospitals and long-term care facilities are significantly more expensive than in community-based care

Figure 11: Average cost of care comparison between hospital, LTC beds and homecare



Source: CMHC, Seniors' Housing Report, 2014

An example of this is Schlegel Villages, a Canadian long term care and retirement facility with a strong presence in Ontario managing 15 locations that service 2500 seniors. These senior campuses have a full range of services including Full Service Retirement Suites, Assisted Care, Memory Care, Apartments and Long Term Care. By offering complete services in a community setting for seniors, the need for hospital care is likely to be reduced, leading to increased revenues for the operators of senior campuses, improved quality of life for seniors, and lower cost for the healthcare system.

Preparing for the future

Companies that are to be successful will need to address a broad spectrum of business issues, from strategy to operations, from information technology to organizational excellence and culture change.

However, before defining a strategy, companies will first need to understand what impact this convergence trend is likely to have on their industry and what specific challenges are going to need to be addressed.

Responding to the aforementioned challenges will mean developing a clear understanding of the market, proposed business and operating models and a clear strategic plan for execution. Strategy development should be framed in the context of a defined financial ambition for growth. By setting tangible targets the business should identify and prioritize the future goals and financial targets that management believes are achievable. In the context of such significant market transformation, developing and executing a successful strategy requires a comprehensive assessment of a company's business and operating models.

“Innovation in diagnostics, therapeutics and digital technology will drive convergence and must be coupled with adoption and adaptation of new business models”

Mark Britnell

KPMG Global Chair for Health and author of the book, “In Search of the Perfect Health System



Responding to the challenges of healthcare convergence

Look beyond traditional boundaries

— **Market evolution via mergers and acquisitions (M&A):** As financial pressures continue and the lines between sectors continue to blur, we are likely to see more M&A as companies reinvent their focus and build more comprehensive value propositions tied to delivering outcomes for the health system over the longer term. This may mean leveraging cash generating businesses to invest in innovation, enhancing value-add of offerings and driving the reorientation of the business.

— **New era in regulatory affairs:** As technologies and therapies become more sophisticated, they will continue to cross traditional sector and regulatory approval borders, companies and regulators will increasingly have to contend with more complex regulatory approval processes. This will require companies to implement changes to enable compliance to new regulations.

— **Managing patient data:** Privacy and personally identifiable information have so far stood in the way of organizations being able to gather, share, analyze and act on data. Furthermore, with the accumulation of vast volumes of, in some cases, real-time data and the potential sharing of this information, risk and accountability become central. Engaging patients will be a key enabler of change and those who know their patients and their data best will be at a major advantage.

Shift from volume to value

— **Need for more focused interventions:** As payers continue to push for outcomes, therapies will need to be more targeted. Advances in genetics and pharmacogenomics, will allow products to be paired with companion diagnostics and ensure that only patients that are responsive are being offered those treatments.

— **Move to outcome-based reimbursement:** As payers push companies to take on more financial risk tied to delivering outcomes, innovators and service providers will need to increase their understanding of health system dynamics. This will require much earlier payer and provider conversations during the development process.

— **Evaluating full-life-cycle benefits:** Although health technology assessment is not a new phenomenon, companies are increasingly expected to demonstrate the benefits of products over the long term and at a system level. Driven by a combination of fiscal pressures and a more multidisciplinary environment, this will often mean pulling together coalitions of decision makers who typically do not make joint decisions. Examples have already begun to emerge in Canada, including the Pan-Canadian Drug Pricing Alliance as well as the increasing prevalence of group purchasing and shared service organizations that employ multi-disciplinary evaluation committees.

Develop internal capabilities

— **Collaboration to develop new-age capabilities:** Collaborative arrangements between stakeholders that are aiming to improve outcomes will bring technology, provider and innovator organizations much closer. No single organization will be able to survive without bringing in external capabilities through either acquisitions, partnerships or hiring.

— **Embracing real-world evidence and analytics:** As health systems accumulate data and market participants learn how to share that data, there will be an increased emphasis on data driven decision making as care plans and treatments become more personalized and care becomes more proactive. Better collaboration and data sharing will help enable this change as we gradually move into a new era of predictive, preventative and wellness oriented healthcare.

— **Flexible supply chains:** As pricing pressures continue and the operating landscape becomes more complex, companies that do not realign their operations and suppliers to ensure they are able to deliver and remain cost effective will no longer be able to compete. Supply chain agility will be key as the industry changes. Those who are not flexible may find themselves gradually cut out of the value chain.

Is our business model able to drive growth in this changing landscape?

Business model “growth strategy”

For most, healthcare convergence means that the current business model will need to change. Companies developing a strategy in response to healthcare convergence should consider addressing the following key questions.

1 Understand the market

- What are the right target markets and the industry dynamics in each market?
- What propositions should we offer?

Companies that ask these questions will need to consider what role they would like to play in the health system’s transformation. Will they be a provider of data and information, a facilitator of value chain integration and collaboration, a provider of therapeutic solutions, an enabler of supply chain rationalization or remote care or a combination of these options that lead to a unique value proposition? Each will require a different set of competitive advantages and financial resources.

There are many new potential markets to consider, including:

- Health data management and analytics;
- Care coordination;
- Personalized medicine;
- Wellness Management;
- Home healthcare;
- Remote monitoring and
- Technology enabled outcome based funding

All are examples of areas of opportunity that are drawing interest from a diverse set of market participants.

Another important angle is geographic focus. While operating models and financial resources may constrain the universe of opportunities, the evolution of the global macro-economic context, location of talent pools and enabling technology means that companies must consider their geographic intentions even more deliberately.

2 Prioritize the right opportunities

- Where are the best opportunities for growth?
- What are the best go-to-market approaches?

Every organization will have a different set of criteria and priorities. These opportunities will often be dictated by available resources, risk appetite and areas of value creation across the market segments of interest. Given the significant potential shifts in value creation expected across the healthcare ecosystem and changing competitive landscape, this may be based on capabilities that do not yet exist and hence will require upfront investment. Improving the understanding of target customers will also help shed light on opportunities for better serving current customers as well as opportunities for expansion into new channels.

3 Define a market entry plan

- Do we need a partner to create and deliver customer value and who should it be?
- What coalitions of customers do we need to create in order to develop 'full life cycle' value cases for purchase decisions?
- How do the economics create value across the selected channels, partners and clients?

While every sector of health and life sciences will continue to have unique sector challenges, the increasingly distributed, patient centered, preventative and outcome-oriented health system means developing effective partnerships will be critical. Partnerships will depend on which lever of health system change a company has chosen to focus on and the internal gaps that exist.

For example, genetics and diagnostic service providers will have a critical role in enabling more targeted interventions and more personalized care. Technology providers as well as medical device companies will play a key role in driving

the shift towards more virtualized and preventative care models, as well as enabling more integrated and coordinated care. Those planning to drive efficiencies for the customer and provide better value may consider moving into either upstream or downstream sectors of the value chain which will largely be driven through mergers and acquisitions.

Irrespective of the specific market in question, the challenges of the health system are driving a need to develop a greater ability to articulate "full life cycle" product value cases. Currently, many purchase decisions are still made based on single purchase orders, without reference to the system level economic and health benefit implications. Companies need to do a better job of articulating why their product – in many cases a convergent product with multiple attributes – has economic and health benefits beyond that focal application. In articulating the full life cycle of benefits, companies need to engage stakeholders in a way that clearly demonstrates the benefits are relevant for decision makers, rather than simply offering theoretical arguments about systemic benefits.



Operating model "execution"

Companies able to identify and develop innovative business models will be better positioned for success. However, developing the appropriate business processes, capabilities and infrastructure that enable these business models is arguably even more critical and is no simple feat. This makes operating model transformation an ever more important lever in responding to the demands of the new healthcare ecosystem.

Collaboration with new partners will bring with it other significant challenges including ensuring the appropriate organizational capabilities are in place - effective partnering will need to be considered as a core competency. Organizational structures that were developed to meet the needs of the historical customer-supplier relationship will need to be deliberately reshaped to meet the needs of the new environment. In this new era, few companies have systematically planned for the human capital they need or have taken the action required to build that talent base over time. Driven by ongoing economic pressures, rationalization and restructurings will continue reshaping companies' ability to compete. These structures will need to be revisited and assessed in the context of convergence and will mean that capabilities related to mergers and acquisitions, change management and broader organizational transformation will also be critical.

Although these operating model issues are significant and will seem overwhelming, they can be considered through a systematic assessment of the key value levers in the business and will include addressing a number of key questions.



1 Understand the value chain, organizational needs and operational constraints

- What is the value chain and what business processes are required to support execution?
- What is the organizational structure in place?
- What currently inhibits or propels the strategy?

Understanding current operations and their underlying internal business processes will be key to delivering the required value propositions. Doing so will require a critical assessment of whether the business has room for efficiencies to drive bottom-line improvements to support growth and identifying potential areas of operating model innovation.

2 Define a target operating model

- What should the future organization look like?
- What are competitors doing differently?
- What improvement options will enable the desired financial outcomes?

Defining a target operating model is focused on identifying the core business processes and the organizational structure required to enable the selected strategy. Based on the selected markets of focus, it is critical to understand the impact of business model options and to identify cost take-out and business process innovation opportunities. Determining the optimal structure often involves looking outside the organization, combining an entity's best attributes with those of its peers as well as comparators in different industries to bring in fresh ideas. Translating the overarching objectives and drivers for change into clear design principles will help to underpin practical changes.

3 Develop a change plan

- What is the track record in absorbing changes?
- Are there organizational constraints in place which will prevent certain changes?

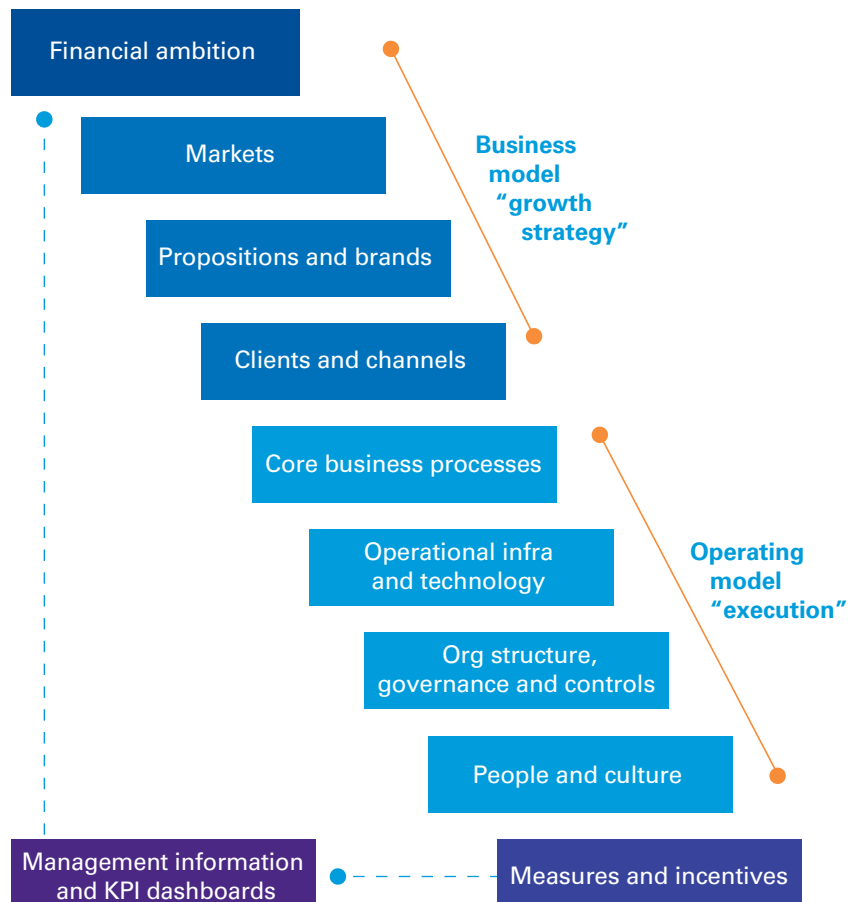
Similar to target operating models, developing a clear understanding of people, culture and organizational constraints assists in identifying the company's appetite for change as well as key cultural levers and risks related to the desired change. Developing a communication strategy to identify the specific stakeholder needs is essential. Evaluating the track record in delivering transformational change and developing a change plan will further help drive accountability and establish the resource and development needs required for success.

Overall, companies that understand themselves as well as the evolving healthcare convergence landscape will be better positioned to help identify the most attractive market opportunities. Companies must then ensure that the right capabilities are in place to develop and execute strategies that will enable them to capitalize on those opportunities.

Convergence is an established phenomenon around many developed markets, and even more importantly it is happening in Canada. Waiting is no longer an option. Companies that act today will be better positioned to survive and thrive tomorrow.

Strategy through execution approach

A well-designed strategy links the implications of the business model to downstream operating model decisions. Thinking about the interrelationships within the business in the early stages of strategy formation helps companies lay the groundwork for effective strategies and allows companies to adapt to a rapidly changing healthcare ecosystem.



Source: KPMG LLP, 2015

KPMG management consulting

KPMG's Canadian Life Sciences practice is dedicated to assisting businesses of all sizes from biotechnology start-ups to large multinational pharmaceutical, medical device and health technology companies. We take an enterprise-wide view to business transformation by assisting clients from strategy through to execution, KPMG's proprietary methodologies connect business model design (strategy) and operating model implementation (execution). Further, KPMG holds a differentiated position in the marketplace offering clients a wide range of implementation services through our deal advisory and risk consulting capabilities. The collaborative professional experience of these practices is more than the sum of the parts. Together, they establish a platform to support transformation with deep industry experience and strong and differentiated proprietary methodologies and tools. The end result is a client engagement where strategy, business model, and operations are all in sync.

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Acknowledgements

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Mark has a pioneering and global vision of the future of healthcare in both the developed and developing worlds. Mark has a unique level of knowledge and insight, and management experience at every level of the system. He has advised Governments and business leaders and has worked in public and private sector organizations.

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Mark is proven healthcare leader with over past 25 years of health management experience, leading successful healthcare organizations, including having served as President and CEO, Toronto Rehabilitation Institute, CEO, Health Services Restructuring Commission, and President and CEO, Humber Memorial Hospital.



Contact us

Our team is passionate about improving healthcare for Canadians. At KPMG we help health and life sciences companies thrive in the ever changing landscape. We challenge the status quo, bringing fresh ideas, developing new models of business, reimbursement and patient care.

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