UNLEASHING THE POWER OF DIGITAL TRANSFORMATION IN HEALTHCARE

cliniconex

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INTRODUCTION

Healthcare is at a crossroads. Our society is aging, and this demographic shift will affect economic growth, patterns of work and retirement, the way that families function, the ability of governments and communities to provide adequate resources for older adults, and the prevalence of chronic disease and disability.

Countering this, the rise in digital natives in the workforce is accelerating digital adoption, impacting everything from consumer preferences to supply chains.

All these changes mean that the value of healthcare needs to be increased. The value provided to patients or residents and their families, the value provided to staff, and the value provided to healthcare organizations themselves.

If providers can improve the efficiency of providing excellent care, they improve their value. Organizations that fail to improve value, no matter their reputation today, are likely to encounter growing pressure.

So what is the solution to this multifaceted problem? **Technology**.

The question is, which organizations will lead the way in adopting technology and how quickly can others follow?

Despite considerable efforts, healthcare systems in North America still have not undergone digital transformation at the same rate as other industries. They still face barriers which are not only technical but institutional and organizational.

So while 81% of healthcare executives say the pace of digital transformation for their organization is already accelerating, many senior care organizations do not know which problems to solve with technology, or how to go about determining what to invest in.

87%

of Homes increased their technology budget in 2021.

56%

of Homes don't have a concrete technology plan, but know they need one.

This means most healthcare organizations know WHAT the problem is, they just need guidance on HOW to solve it.

CHALLENGES DRIVING INNOVATION IMPERATIVE

Critical staffing shortages

Although many blame the pandemic for the burnout of medical staff leading to resignations and early retirements, others say the pandemic only revealed a systemic problem that has existed for decades.

"As the CEO of a large national healthcare staffing company, I can tell you that our clients were experiencing the impact of the shortage well before any of us knew what COVID-19 was," says Bart Valdez, Chief Executive Officer of *Ingenovis Health*. "But to be sure, COVID-19 has taken a tough situation and made it worse. This is true for hospitals needing more help at the bedside, and it's true for physicians who need LPNs and other staffers to keep their offices running efficiently."

There's also a dearth of case managers, payments/ medical billing, in addition to nurses making it more challenging than ever for doctors to run their businesses, he says.

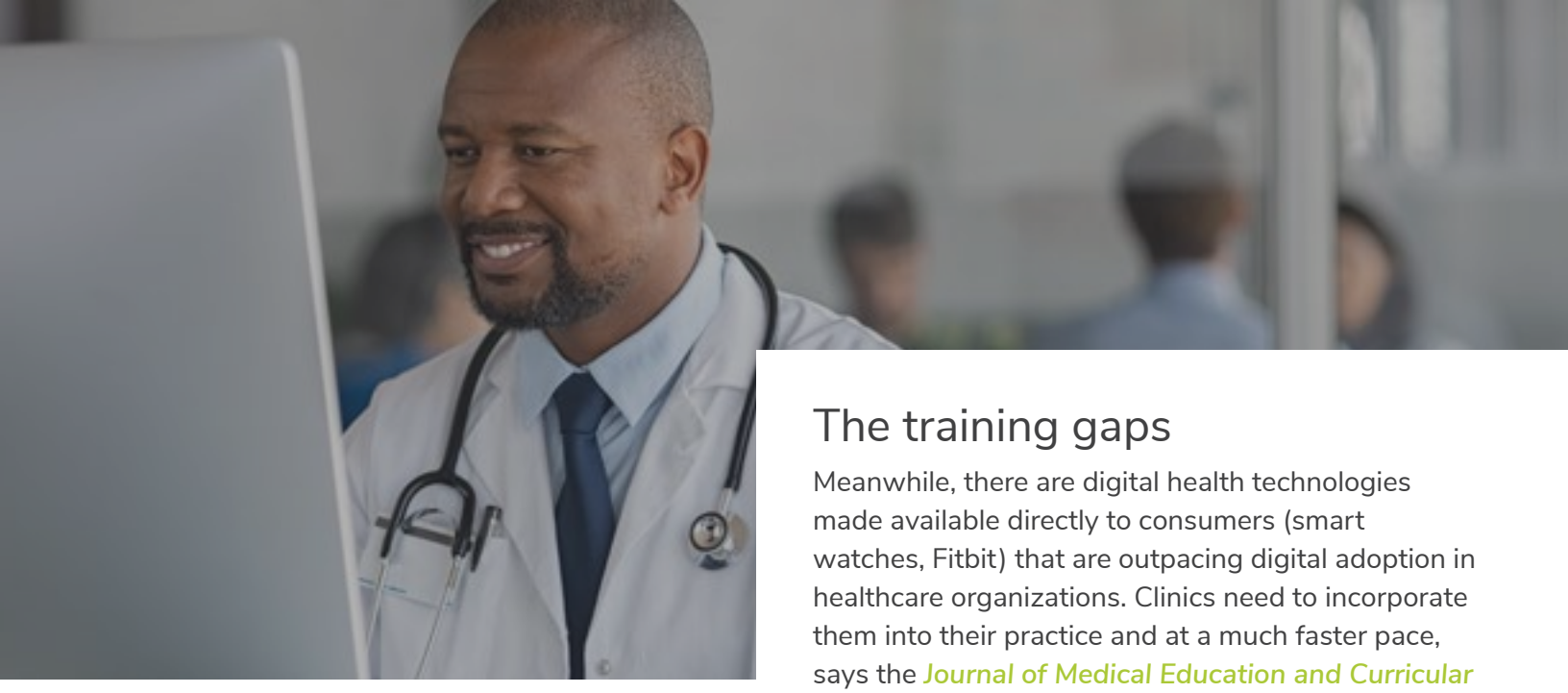
The US Healthcare Labour Market Report *by Mercer* suggests that within five years, healthcare in the United States will be 3.2 million workers short.

The report also shows that about 12% of family medicine, pediatric, and obstetrics and gynecology physicians are 65 years of age or older. By 2026, that number will grow to 21% with more than 32,000 physicians moving into retirement age.

Nurses make up the largest section of the health profession. *The American Nurses Association (ANA)*, says more jobs will be available for nurses than any other profession in the United States with more than 275,000 additional nurses needed from 2020 to 2030.

According to an Altarum analysis of U.S. Bureau of Labor Statistics data, hospital employment declined by nearly 94,000 since February 2020, including a decrease of more than 8,000 between August 2021 and September 2021.

Staff turnover caused by COVID-19 pressures has increased from 18% to 30% for some hospital departments (e.g., emergency, intensive care units and nursing), according to an *analysis* released in October by *Premier*, a group purchasing organization that works with more than 4,400 hospitals and health systems in the U.S.



Recruiting digital skills in a highly competitive market

Another staff challenge is recruiting digital natives with the skills necessary to make digital transformation a reality, a factor to be considered in a company's strategic recruitment strategy. Medical centers and hospitals that several years ago were focused on deploying EMRs and integrating them with other systems have broadened their focus to include secure remote care delivery, video connections, mobile capabilities for providers and patients, more digital services, the digitalization of more medical equipment, seamless patient experiences and more innovation overall.

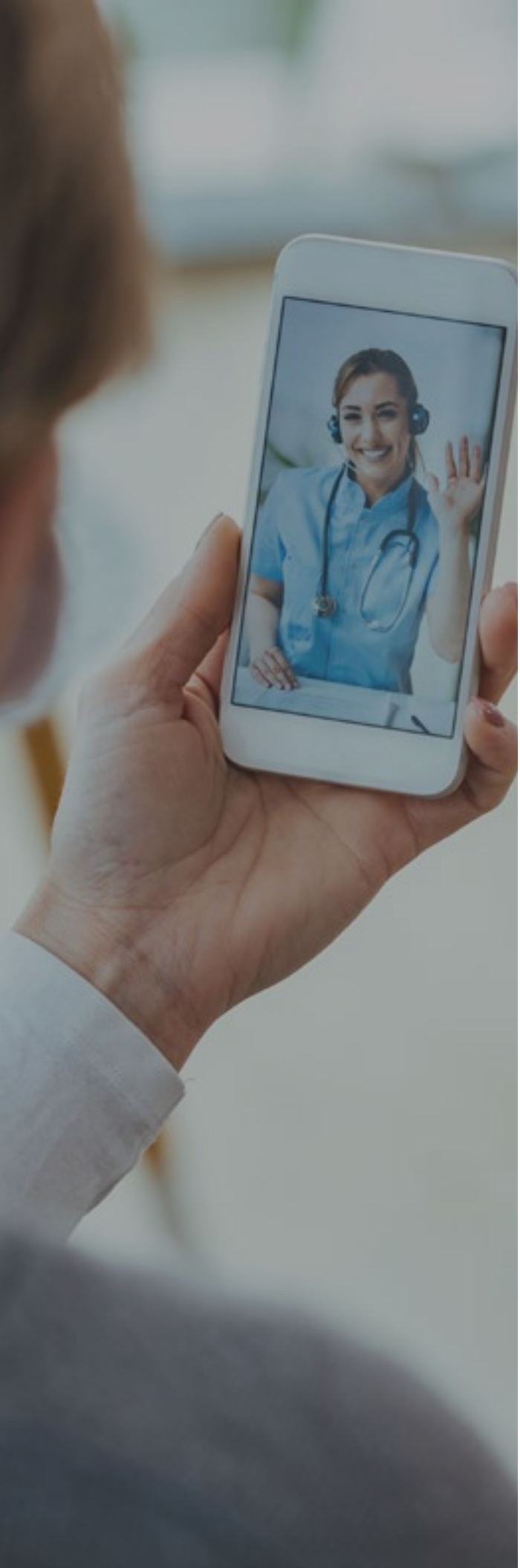
A recent report by the *Communications and Information Technology Council of Canada* (ICTC) estimates that demand for digitally-skilled people will reach 119,000 in 2022. "Various types of health tech companies require medical advisors, software engineers and full stack developers, as well as data-focused roles like machine learning engineers, data scientists and data analysts," the report says. "Meanwhile, product development teams require project managers, designers and quality assurance professionals, and biotechnology companies require applied scientists and computational scientists." The report also points out the need for interdisciplinary teams (integrating tech and health backgrounds).

The training gaps

Meanwhile, there are digital health technologies made available directly to consumers (smart watches, Fitbit) that are outpacing digital adoption in healthcare organizations. Clinics need to incorporate them into their practice and at a much faster pace, says the *Journal of Medical Education and Curricular Development in its report Integrating Digital Health into the Curriculum*.

The rapid life cycle of digital technology and its relevance to a care setting make it challenging to establish standards for education regarding digital health, says the report. "There should be an emphasis on foundational skills regarding assessment of relevance for these technologies to contextualized clinical use. For example, a clinician would not need to know all medication reminder applications available for mobile phones. They should, however, be able to assess individual patient needs, such as history of diagnosis and digital literacy, to make meaningful, actionable recommendations to patients.

Another gap is training faculty to understand and use digital health technologies; no such training currently exists. This could include data analytics, machine learning, and remote patient monitoring. "Likely, in time, there will be a standard approach, but at this moment, institutions should identify key faculty with a mindset conducive to teaching this material and enable their further training and knowledge to bring back to their health programs."



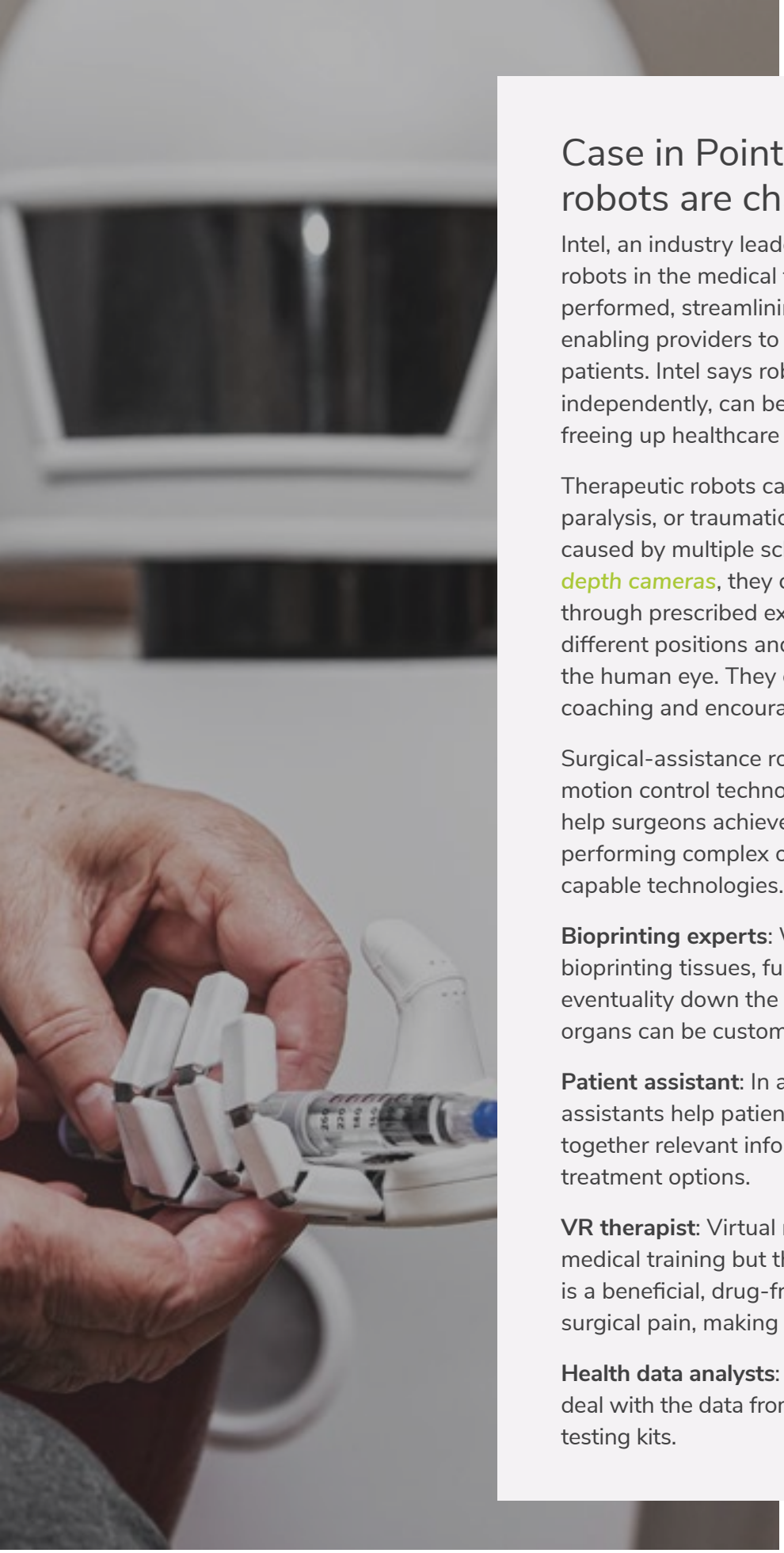
Futuristic healthcare professions

The *Medical Futuristic Institute* says there are *seven futuristic professions in healthcare* that companies need to prepare for today.

Deep learning expert: the algorithm trainer: AI is all too often trained on medical data which is fraught with biases or where developers use selected datasets not reflective of clinical environments. Whether it's for an autonomous emergency drone to find the optimal path to reach its destination or for *devising treatment plans*, a deep learning expert will be able to guide and supervise the development and deployment of effective and ethical algorithms.

Lifestyle strategist: According to some stats, the number of connected wearable devices is expected to exceed one billion in 2022. A lifestyle strategist can help people navigate through the data collected to create personalized lifestyle, diet and workout routines.

Telesurgeon: By 2025, analysts expect the global medical robots' market to reach $12.7 billion, up from $5.9 billion in 2020. With the assistance of robots, surgeons will not only be able to perform more intricate procedures but also to perform them remotely. And to fine-tune their skills, surgeons can employ technologies like augmented or virtual reality.



Case in Point: Intel explains how robots are changing the medical field

Intel, an industry leader in world-changing technology, says robots in the medical field are transforming how surgeries are performed, streamlining supply delivery and disinfection, and enabling providers to focus on engaging with and caring for patients. Intel says robots can clean and prep patient rooms independently, can be used to deliver medicine and supplies freeing up healthcare workers and clean and disinfect rooms.

Therapeutic robots can help with rehabilitation after strokes, paralysis, or traumatic brain injuries or with impairments caused by multiple sclerosis and when *equipped with AI and depth cameras*, they can monitor a patient's form as they go through prescribed exercises, measuring degrees of motion in different positions and tracking progress more precisely than the human eye. They can also interact with patients to provide coaching and encouragement.

Surgical-assistance robots have become more precise as motion control technologies have advanced. "These robots help surgeons achieve new levels of speed and accuracy while performing complex operations with AI and computer-vision-capable technologies.

Bioprinting experts: While currently we are limited to bioprinting tissues, full-blown synthetic organs are an eventuality down the line. With bioprinting techniques, these organs can be custom-designed to individual patients.

Patient assistant: In a move toward compassionate care, assistants help patients navigate their health data and put together relevant information so that physicians can provide treatment options.

VR therapist: Virtual reality in healthcare not only includes medical training but therapeutic options. Studies show that VR is a beneficial, drug-free alternative, whether it's reducing post-surgical pain, making childbirth less painful or treating phobias.

Health data analysts: These analysts will help streamline and deal with the data from a patient's personal sensors and online testing kits.

Staffing shortages hurting the bottom line

In its October report, credit rating agency Moody's forecasted that pandemic-related labour shortages will continue to worsen healthcare organizations' financial performances due to wage inflation, the use of expensive contract nurse staffing firms and the expansion of worker benefits to retain employees.

Credit rating agency *Fitch Ratings*, says nonprofit hospitals—particularly lower-rated, smaller hospitals—will continue to grapple with staffing shortages even post-pandemic. Labour expenses (salaries and benefits) are the largest expense category for hospitals, according to Fitch, and between February 2020 and August 2021, average hourly hospital wages increased by 8.5%.

It's no surprise then that a survey from the American College of healthcare Executives found that personnel shortages ranked as the No. 1 concern.

8.5%

Increase in average hourly hospital wages between February 2020 and August 2021

SO WHAT IS DIGITAL TRANSFORMATION?

Digital transformation is fundamental to developing a patient-centred approach to healthcare. As well as streamlining operations to improve efficiency, digital transformation enables healthcare providers to better understand patient needs, build trust and deliver more personalized experiences. By understanding the needs and behaviours of existing and prospective patients through data insights and predictive analytics, healthcare operators can diversify their service methods and build rapport to establish customer loyalty.

This more customer-centric approach is something that people have come to expect in the retail, hospitality and banking industries. The quick pivot by companies struggling to deal with the pandemic proved that innovations such as contactless delivery of restaurant food, telehealth, and groceries ordered and delivered to the car or door, can be done quickly with rapid adoption rates.

Done properly, digital innovation in healthcare frees up staff time from repetitive tasks, allows providers to remotely monitor and provide care in all care settings, use data to make more informed decisions by providing a holistic view of the patient's challenges and needs, manage staffing needs more proactively, and provide a conduit for communications with other providers, families and caregivers. It can lead to higher job satisfaction and retention in a highly competitive market in an industry facing acute staffing shortages in all areas of care.

From a patient perspective, innovation provides for the collaboration of care and a holistic view across the healthcare spectrum, allowing them to better control and understand their health journey, include families and caregivers in the decision-making process and, most importantly, provide new options for facilitating prevention, early diagnosis of life-threatening diseases and management of chronic conditions outside of traditional healthcare settings.

Unfortunately, healthcare is considered a serious laggard in adopting new ways of doing things and is among the least advanced in terms of digitization, especially within the areas of transactions, digital spending on workers and digital capital, says the *McKinsey Digitization* Index.

On the bright side, *PwC Canada* predicts that digital health spending will more than double by 2030—going from three to eight percent of the global healthcare expenditures. And if industry investment is any indication, *Rock Health*, a venture fund dedicated to digital health, reported that the industry had another standout year in 2021, with startups raising $29.1 billion across 729 deals. Overall, investment in the market nearly doubled 2020's $14.9 billion record, the company noted in its *year-end funding report*.

The basics of digital health

At its most basic level, digital health, or digital healthcare, is described as a broad, multidisciplinary concept that provides an intersection between technology and healthcare. Digital health applies digital transformation to the healthcare field, incorporating software, hardware and services. Under its umbrella, digital health includes mobile health apps, electronic health records (EHRs), electronic medical records (EMRs), wearable devices, telehealth and telemedicine, as well as personalized medicine.

Digital health technologies use computing platforms, connectivity, software and sensors for healthcare and related uses. These technologies span a wide range of uses, from applications in general wellness to uses as medical devices. They include technologies for medical products, within a medical product, as companion diagnostics or as an adjunct to other medical products (devices, drugs and biologics). They may also be used to develop or study medical products.

Stakeholders in the digital health field include patients, practitioners, researchers, application developers and medical device manufacturers and distributors.

Steps to achieving digital transformation

Health care Information and Management Systems Society (HIMSS), a non-profit organization, says there are four key dimensions that are foundational to achieving digital transformation:

1. **Interoperability**: Interoperability is the fundamental foundation of digital transformation within health systems. An organization cannot create a person-enabled health care system that is proactive and focused on keeping people well unless they have the digital infrastructure required to enable interoperability. Interoperability allows data to move from where it is captured to where it is needed—whether to the person or the clinician or both—at any location, in real-time. This data can then be transformed, using advanced analytics, into meaningful knowledge and insights, accessible to both consumers and their provider teams, to inform the best decisions focused on keeping people well.

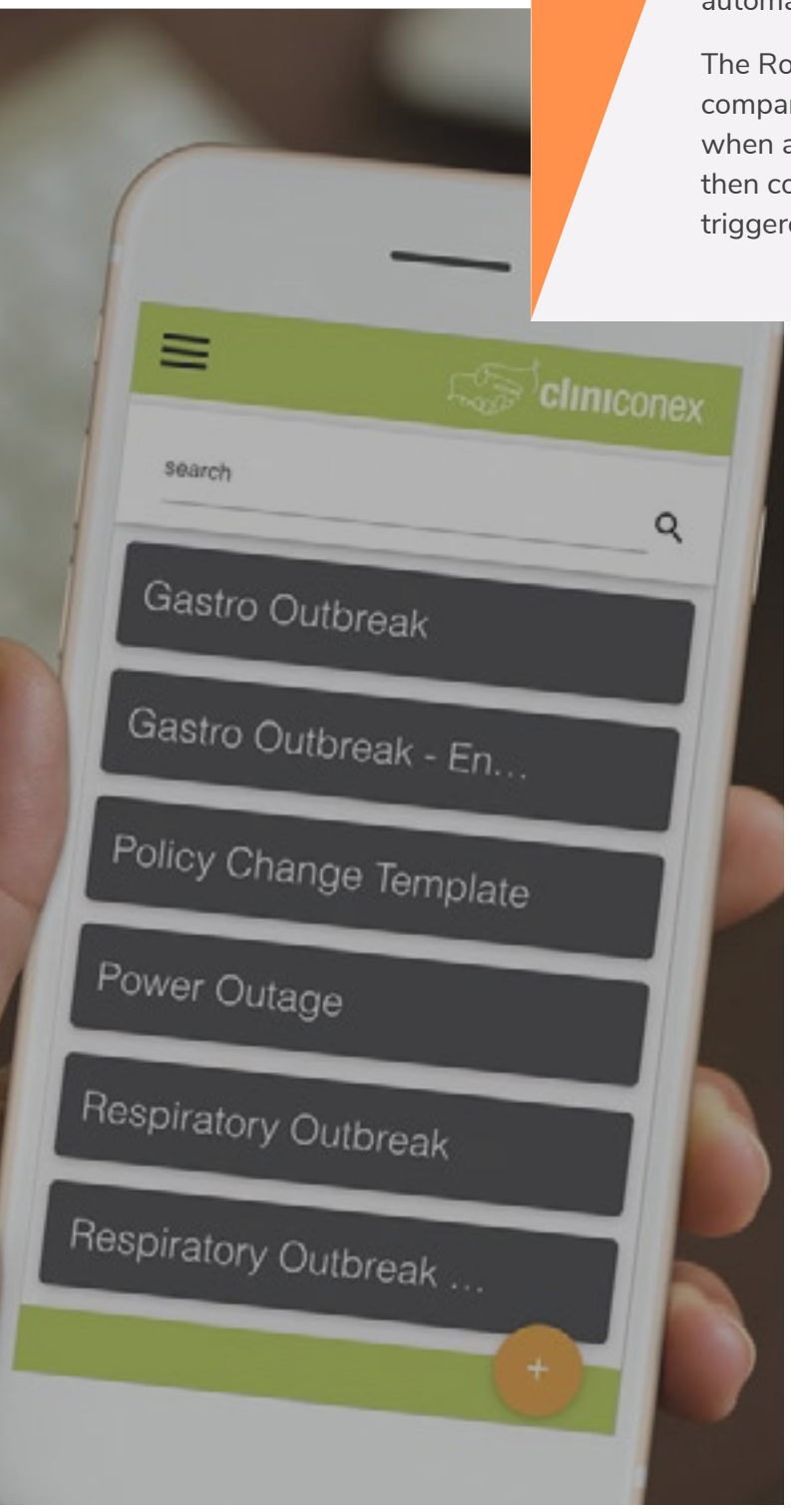
   With an interoperable system, each and every person has choices along their journey of care, informed by their personal health data and can track progress towards outcomes. Interoperability is critical to unlocking the power of digital tools to enable a patient-centric health system.

2. **Person-Enabled Health**: Person-Enabled Health focuses on the health system meeting a person's needs, values and personal health goals. It leverages digital tools to support self-management of a person's health goals, shaped by their circumstances, health needs and choices.

Case in Point: Cliniconex

Cliniconex's Automated Care Messaging sends out targeted messages to residents, families and staff in minutes via voice, text or email; logs all communications in resident's charts; syncs family contacts with a company's Electronic Health Record; and, automates day-to-day messaging with workflow rules.

The Routine Module of Automated Care Messaging also allows companies to automatically trigger notifications to families when an event is added to the resident's calendar. Families can then confirm, cancel or request a callback and workflows can be triggered based on responses.



3. **Predictive Analytics**: Technological advancements in artificial intelligence (AI) and machine learning (ML) allow health care organizations to identify needs and solutions faster and with more accuracy, using data patterns to make informed medical or business decisions quickly. The implementation of AI/ML solutions enhances preventative and patient care by leveraging large amounts of data from disparate data sources to learn about a patient population's historical diagnoses and treatment plans, which leads to better patient outcomes overall.

   Clinical predictive and prescriptive analytics will have an increasing role in the evolution of healthcare delivery from volume (fee-for-service) to value. Successful chronic-care delivery system redesign requires a focus on secondary prevention (early detection and intervention) and tertiary prevention (treating established disease to prevent deterioration), as well as closing gaps in care, managing care transitions (e.g., from hospital to home), treating behavioural health issues, facilitating self-management and, if appropriate, offering palliative care.

4. **Governance and Workforce**: Governance has become more important than ever for the future of healthcare. The rapid growth of data assets and reliance on digital health platforms present new challenges for data governance teams as growing risks and threats to security and privacy can compromise data integrity and ownership.

   Data governance is the policy infrastructure that ensures data assets are carefully managed and protected against privacy and security threats. Policy frameworks in a consumer-centric health system must also offer transparency in quality and safety outcomes informed by accurate and valid data so that health systems learn what care offers the best outcomes and under what conditions best outcomes are achieved.

Case in Point: *Cliniconex Solutions for Medical Clinics*

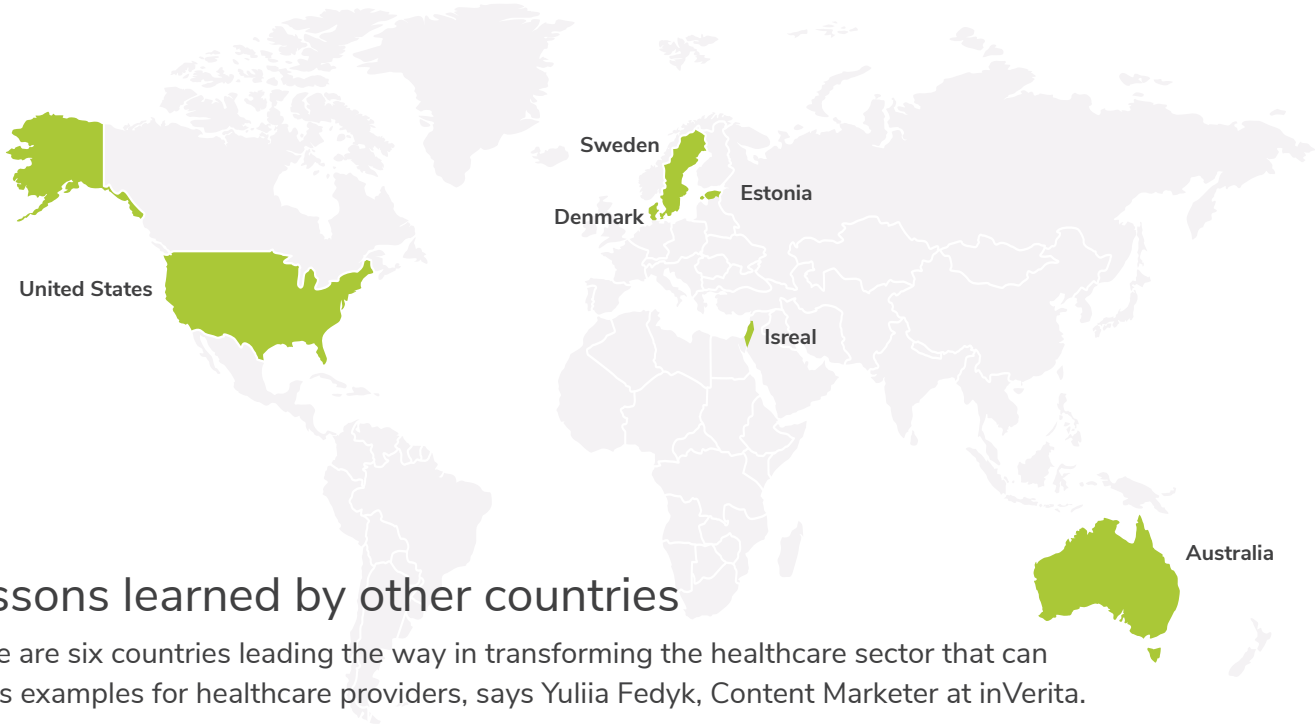
There are a variety of tasks, processes and services that can be automated at busy medical clinics to increase efficiencies and give patients more control over their medical management.

Automated appointment reminders: Patient no-show rates have always been a problem. And *with the national average standing at about 23%*, the impact this has on waitlists is understandably frustrating. Automating reminders means patients receive a reminder at a predetermined time before their appointment with all the information they need.

Create a wait list: While online scheduling and appointment reminders can cut down on no-shows and streamline your schedule, there are still no guarantees. Using an automated scheduler that allows for a waitlist means a bulk notification can be sent out when a time slot becomes available.

Automated health tips: Both general practitioners and specialists have a vested interest in the overall health and well-being of their patients whether it is specific follow-up care or general health tips. Messages can be automated based on the patient profile or health categories.

Another service offered is the *Waiting Room Concierge* (WRC) where patients can be notified of wait times via voice, text or email and notify them when their turn is approaching. It integrates with an office's Electronic Medical Record (EMR) schedule and updates automatically without any intervention needed from staff.



Lessons learned by other countries

There are six countries leading the way in transforming the healthcare sector that can act as examples for healthcare providers, says Yuliia Fedyk, Content Marketer at inVerita.

Estonia: Estonia's health care service went digital about 12 years ago with more than 99% of patient data generated by doctors and hospitals digitized. Estonians can easily access their data via a secure online portal with E-prescriptions and video consultations as standard practice.

Denmark: According to the Digital Economy and Society Index, Denmark is one of the most digitized economies and societies in the EU. The new Digital Health Strategy (2018-2022) is a paradigm shift based on the achievements of Danish healthcare digitization. The new system aims at establishing a higher level of data security, integrated care and prevention initiatives.

Sweden: Patients have been able to easily access their electronic health records, including patient's history, medicines, test results, and appointment bookings since 2018. The Swedish have access to multiple apps for healthcare systems navigation, booking physical or virtual appointments with general practitioners, tracking their medical records, and receiving treatment.

The U.S. Even before the pandemic, adoption of digital health had been steadily growing, with 42% of Americans saying they use digital health. In 2021, Philips acquired BioTelemetry Inc., a provider of remote cardiac diagnostics and monitoring. The combination of Philips' patient care management portfolio in the hospital, its advanced and secure cloud-based HealthSuite digital platform and BioTelemetry's leading cardiac diagnostics outside the hospital, will result in global leadership in healthcare management solutions for cardiac and other patients.

Australia: In Australia, the COVID-19 pandemic became a catalyst for acceleration within the government saying that "it delivered 10 years of reform in 10 days', introducing telehealth to the whole population under Medicare. It is estimated that 65% of public hospitals currently use EMR systems and its first virtual hospital was launched by Sydney Local Health District in 2012 and treated more than 3,500 patients in its first seven months.

Israel: In March 2018, the government launched a $275 million digital health strategy for a personalized digital database that stored information of up to nine million citizens and a $33 million grant for biotech and medicine research. Its Digital Health Strategy goal is to unify the existing database of the digital medical records Israel has been collecting for 20 years which accounts for more than 98% of the population.

SELLING THE INVESTMENT

The cost of doing nothing

According to an *OECD Report Empowering the healthcare Worker: strategies to make the most of the digital revolution*, failure to leverage digital technologies to deliver the right information and knowledge at the right time is a significant missed opportunity to improve care.

> ***For instance, 10% of patients are unnecessarily harmed during care, most frequently due to information and knowledge not reaching the right person at the right time. The health burden of this shortcoming in OECD countries is on par with that of diseases such as multiple sclerosis and some cancers. The direct financial impact is as high as 15 % of hospital expenditure, and the broader economic loss is estimated in the trillions of dollars.***

Given this backdrop, the imperative for embracing innovation has never been clearer.

While the industry continues to mature and innovate, clinicians and institutions need to consider the following when adopting new technology:

- Analyzing how work is viewed and performed to find standardized, working practices
- Breaking down silos to create cross-functional teams
- Researching and selecting the right innovations, including reviewing integration with legacy systems (this is where Interoperability is key as it is the fundamental foundation of digital transformation within health systems. Interoperability allows data to move from where it is captured to where it is needed—whether to the person or the clinician or both—at any location, in real-time. This data can then be transformed, using advanced analytics, into meaningful knowledge and insights, accessible to both consumers and their provider teams, to inform the best decisions focused on keeping people well.)
- Rethinking legal, regulatory and employee compensation frameworks
- Recruiting, retaining and providing continuous training for digitally-savvy employees
- Ensuring future technological developments are researched and planned for
- That budget is earmarked for initial implementation and future needs

The benefits of digitalization

As you can see, successful digital transformation across healthcare is not a simple matter of technical change. Digital technologies are only tools and cannot transform the health sector on their own. That requires adaptations in human attitudes and skills, as well as a shift in organizational thinking.

Stakeholders and decision-makers must realize that not only does technology remove obstacles and manual processes, but it can move business forward by opening new areas and opportunities.

ACCESS TO INFORMATION

Improves safety, effectiveness, and efficiency of care.

ENHANCED SERVICES

Encourages proactive and not reactive care.

STAFF TIME

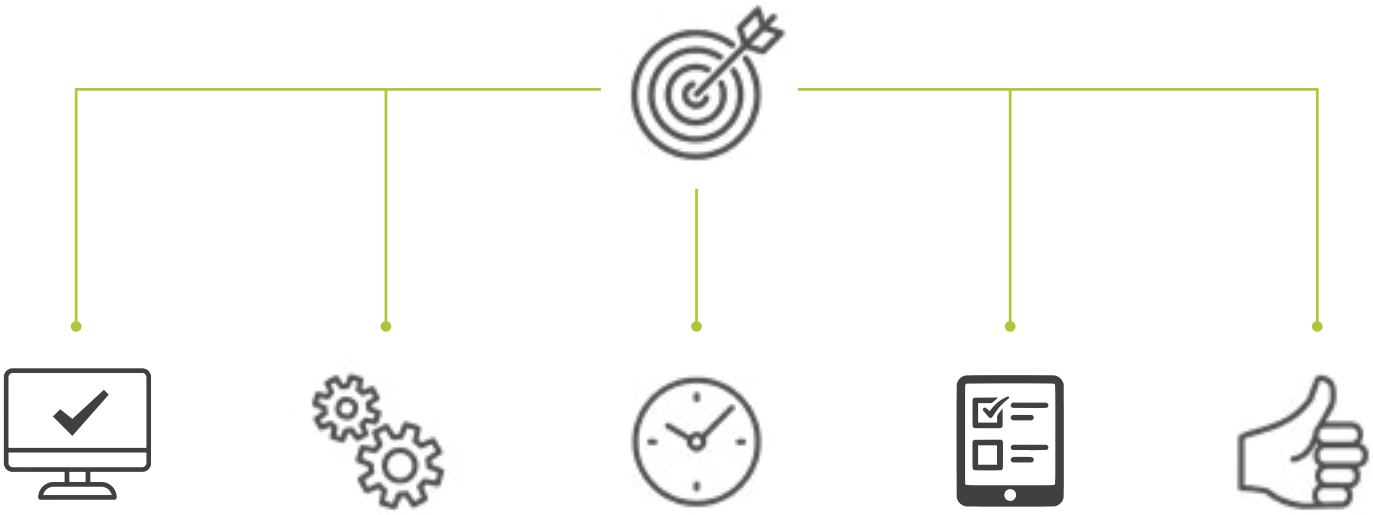
Time-consuming manual tasks are automated, returning time to direct care.

RESIDENT ENGAGEMENT

Encourages participation and collaboration in their health journey.

ROI is no longer determined by value for money spent. It needs to be calculated in hours saved and returned to care, processes removed, resident and resident family engagement – a 360 degree improvement in the care community at large. This shift in thinking can better position senior care organizations for an increasingly competitive future.

To help demonstrate efficiencies and cost savings, start by following five fundamental principles to create a best-in-class digital solution which includes: integration, automation, speed and scale, compliance and standardization, and be simple and easy to use and implement.



INTEGRATION

One set of credentials. One point of truth.

AUTOMATION

Do more with less by automating repetitive or manual tasks.

SPEED AND SCALE

Use any internet connected device to communicate in minutes.

COMPLIANCE AND STANDARDIZATION

Create and control corporate standards while adhering to regulations.

SIMPLE AND EASY TO USE

Easy to deploy, train, and use.

Preparing your organization for change

According to a recent report by Deloitte, *Top 10 healthcare Innovations: Achieving More for Less* there are six ways to prepare your organization:

1. **Build ecosystems**: identify partners to complement existing capabilities such as technology development, data capture or patient engagement.
2. **Embrace nontraditional sources of knowledge**: consider looking outside your walls and crowdsourcing fresh ideas to challenging problems.
3. **Pilot, experiment, and scale**: Given the rapid pace of change, you can benefit from embarking on small-scale pilots before entering into full-scale contracts with new technology providers.
4. **Experiment with new business models**: Traditional healthcare business models are changing and, as a result, organizations can benefit from expanding beyond traditional revenue sources. For example, growing venture capital investments or engaging in joint ventures with nontraditional partners.
5. **Focus on change management**: Organizations know they need to change but don't have the ability. This is evident in the low success rate of many transformational initiatives. Successful change requires dedicated focus and effort.
6. **Be agile**: Leading organizations should learn to anticipate and swiftly address emerging innovation. They should disrupt their own business models before someone else does.

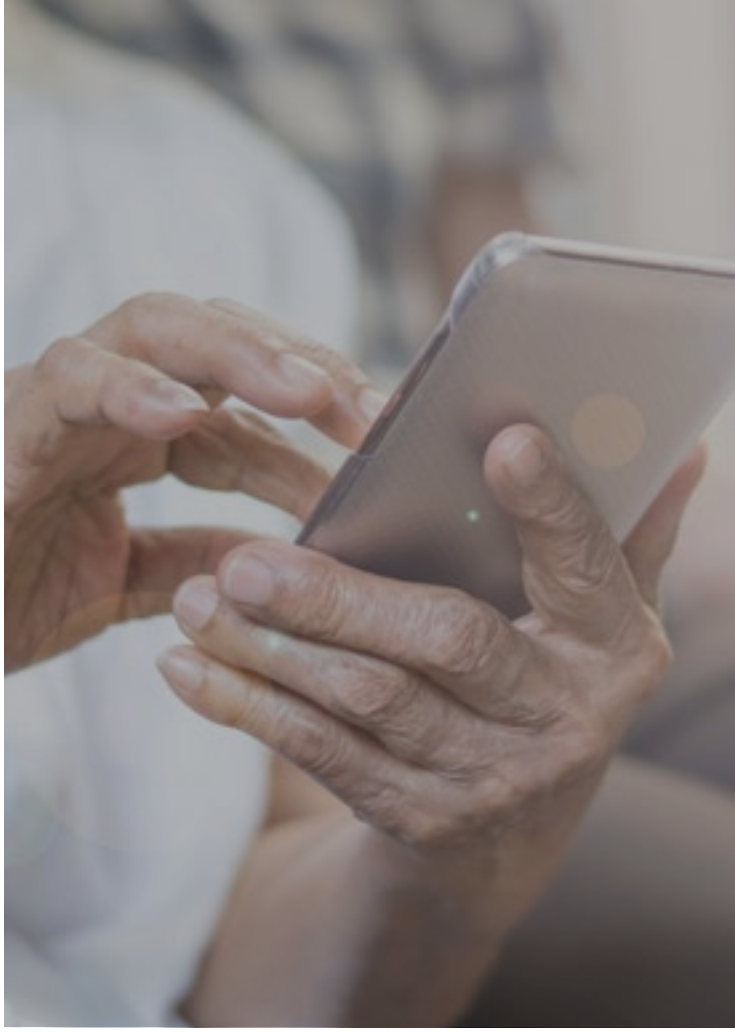
Building the business case

So we know the situation – healthcare needs to embrace technology. We know the benefits for patients and residents, their families, healthcare staff and healthcare organizations. We know leveraging existing data through integrated or interoperable systems is the key to improved value for all involved.

So where to start? Like any investment or large purchase, a business case has to be built. Technology is no different.

1. Clearly define the issue being addressed and the opportunity or goal to be achieved
2. Identify the top solutions and do a SWOT analysis
3. Look at the core benefits and determines the monetary equivalent
4. Determine the cost of investing in the software/ service
5. Find the value of the investment – look at all the factors - financial/time/personnel
6. Understand the process for implementation and identify the stakeholders needed to drive the change and adoption

All of these items also help build the ROI into your business case. True ROI can be hard to measure and even harder to guarantee. You cannot predict how the organization will grow over the time you use the software solution. It's also likely you will continue to add features, new modules or build out integrations as the organization evolves. While business leaders understand the gray area around this number, they will expect you to understand the potential ROI. Be sure to explain that these numbers are the best projection of the expected benefits and costs of the new software that you've made with educated estimates.

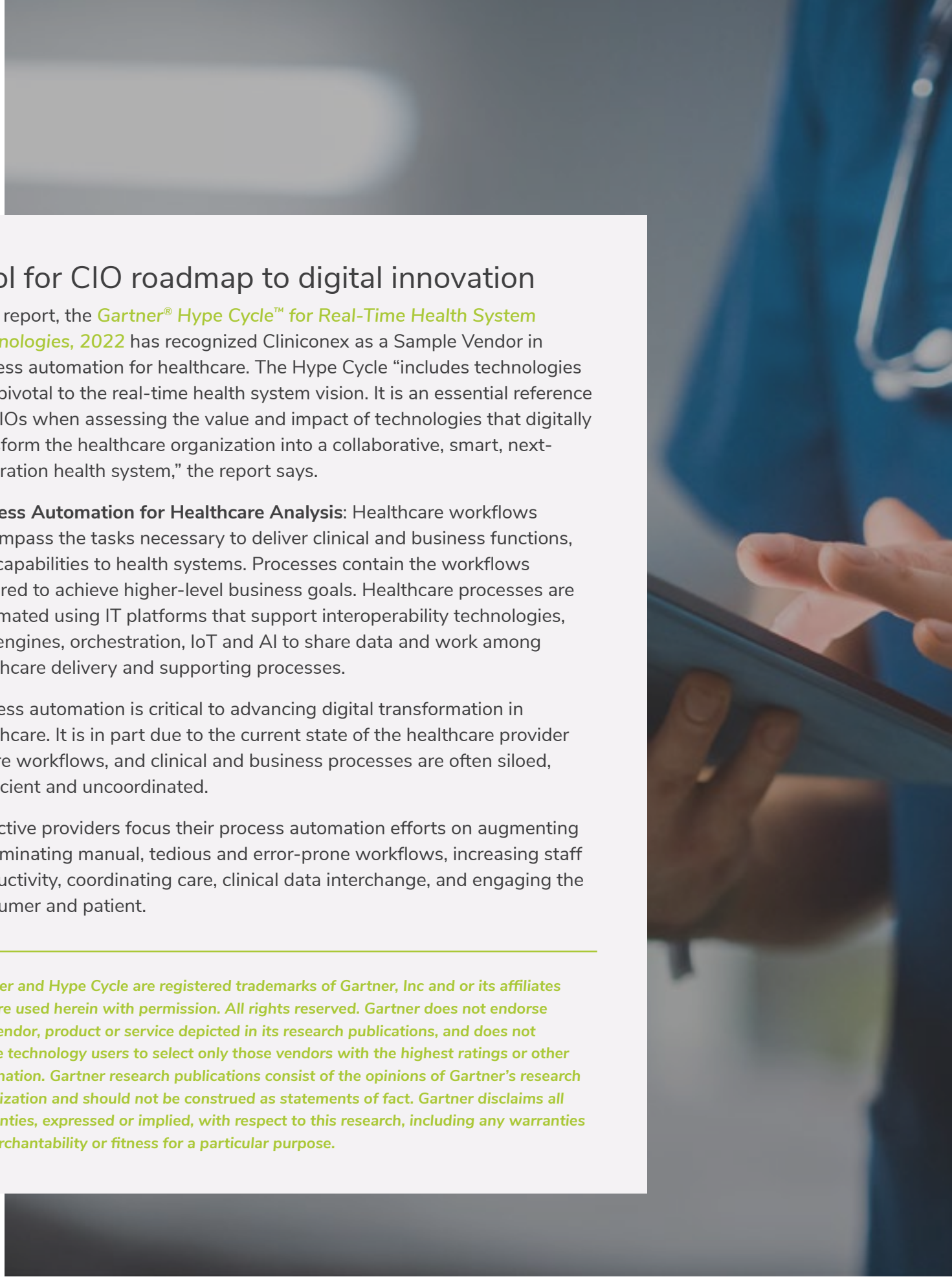


The formula for calculating ROI is:

(gain from investment – cost of investment) ÷ (cost of investment)

These steps are just suggestions to consider. The key outcome of course is building consensus among stakeholders. This includes patients, residents and their families, staff and organizational leadership.

While it may seem overwhelming, doing this work before making a purchase decision not only helps to get the necessary buy-in faster, it helps in the adoption and usage of the chosen solutions.



Tool for CIO roadmap to digital innovation

In its report, the *Gartner® Hype Cycle™ for Real-Time Health System Technologies, 2022* has recognized Cliniconex as a Sample Vendor in process automation for healthcare. The Hype Cycle "includes technologies that pivotal to the real-time health system vision. It is an essential reference for CIOs when assessing the value and impact of technologies that digitally transform the healthcare organization into a collaborative, smart, next-generation health system," the report says.

Process Automation for Healthcare Analysis: Healthcare workflows encompass the tasks necessary to deliver clinical and business functions, and capabilities to health systems. Processes contain the workflows required to achieve higher-level business goals. Healthcare processes are automated using IT platforms that support interoperability technologies, rule engines, orchestration, IoT and AI to share data and work among healthcare delivery and supporting processes.

Process automation is critical to advancing digital transformation in healthcare. It is in part due to the current state of the healthcare provider where workflows, and clinical and business processes are often siloed, inefficient and uncoordinated.

Proactive providers focus their process automation efforts on augmenting or eliminating manual, tedious and error-prone workflows, increasing staff productivity, coordinating care, clinical data interchange, and engaging the consumer and patient.

THE FINAL WORD

As outlined in this white paper, there are many challenges facing the global healthcare industry such as lack of skilled labour at all levels, slow adoption of new technology with its associated costs, ensuring interoperability and the sharing of data, reimagining the way work is done from supply chains to collaborative care teams and putting the legal, regulatory and security frameworks in place.

It requires interconnected systems, embracing how AI can enhance diagnostics and looking at how robotics can liberate care teams from repetitive tasks so that they can focus on providing patient-centric care. For patients, it means giving them more control over their health journey and allowing them to receive care when, where and how they need it whether they live in remote communities or want care delivered to their homes or within a care setting.

While there are many challenges facing the industry as outlined in this report there is no better time to embrace digital innovation to reset the healthcare system and its workforce than now.

The benefits of digital transformation in healthcare for everyone impacted far outweigh the seemingly complex road ahead for healthcare organizations. As with any technology innovation, it requires an iterative process where you use case studies to demonstrate the value of the technology in consultation with the people that actually use it. It requires a strong leader to champion the effort and painstaking review of existing processes and policies to determine what currently works and what doesn't.

This effort all leads to a common end which is to create a healthcare system that puts:

- Patients at the centre of care empowering them to take more control and understanding of their health journey
- Allows health organizations to improve care, be more efficient and reduce costs
- Enhances the recruitment, loyalty and retention of staff in this highly competitive field
- Reduces the financial burden carried by governments to deliver health care services

The advancements and innovations are not about the technology itself, but rather the promise that those technologies hold.

ADDITIONAL RESOURCES

The Terminology Explained

One of the complexities of understanding the digital transformation taking place in healthcare is understanding the different terminology being used. Below are some of the most common terms.

What is digital health?

Digital health, or digital healthcare, is a broad multi-disciplined concept. It applies digital transformation to the healthcare field, incorporating software, hardware and services. Under its umbrella, it includes mobile health apps, electronic health records (EHR) electronic medical records (EMR), wearable devices, telehealth and telemedicine, as well as personalized medicine.

What is the difference between digital health and digital transformation?

Digital transformation is the incorporation of computer-based technologies into an organization's products, processes and strategies. Organizations, such as those in healthcare, undertake digital transformation to better engage and serve their staff and customers and be more competitive. Transformation requires an examination and change to all facets of an organization from supply chains and workflows to employee skill sets, to customer/patient interactions.

What is a personal health record (PHR)?

A personal health record, or PHR, is an electronic application through which patients can maintain and manage their health information (and that of others for whom they are authorized) in a private, secure and confidential environment.

What is an electronic medical record (EMR)?

The EMR refers to everything you would typically find in a paper chart, such as medical history, diagnoses, medications, immunization dates, and allergies. It enables physicians to record patient histories, display test results, write prescriptions, enter orders, receive clinical reminders, use decision-support tools, and print patient instructions and educational materials.

What is an electronic health record (EHR)?

An electronic (digital) collection of medical information about a person that is stored on a computer. It includes information about a patient's health history, such as diagnoses, medications, tests, allergies, immunizations and treatment plans. Key capabilities of an EHR system include core healthcare information, results management, order management, decision support, communications, patient support and reporting.

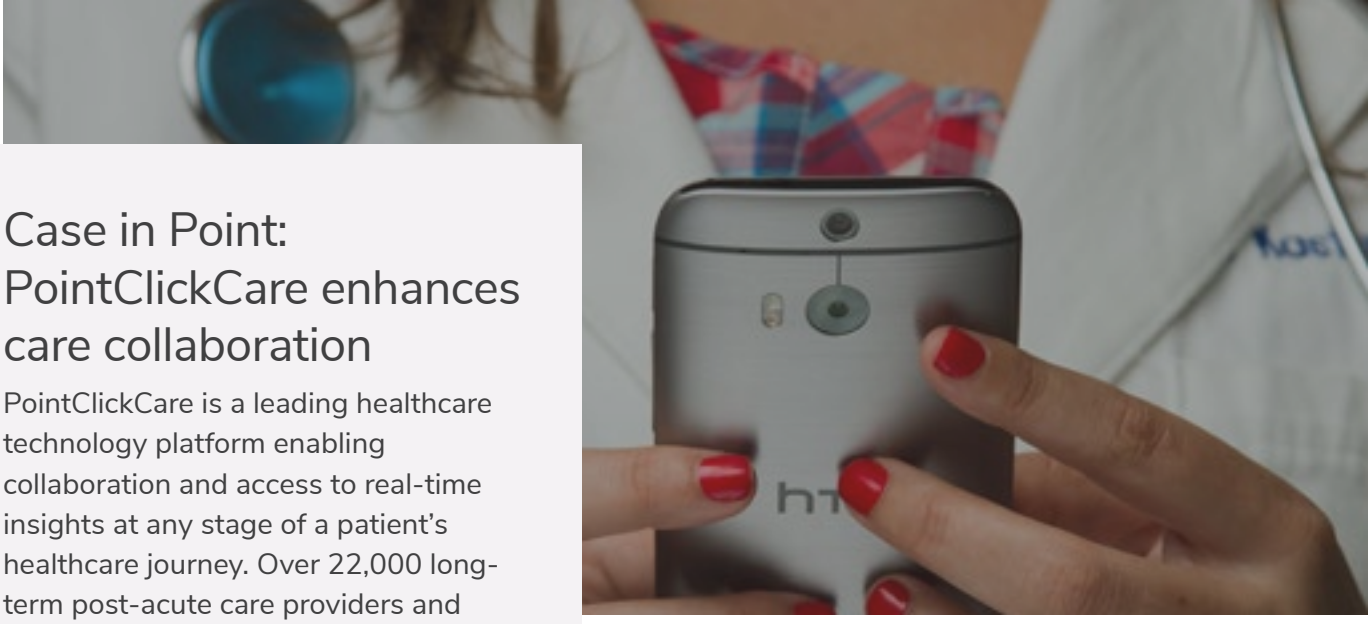
What is telehealth? How is it different from telemedicine?

Telehealth is defined as the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media and terrestrial and wireless communications.

Telehealth refers to a broader scope of remote healthcare services than telemedicine. While telemedicine refers specifically to remote clinical services, telehealth can refer to remote non-clinical services, such as provider training, administrative meetings and continuing medical education, as well as clinical services.

What is a health information exchange (HIE)?

Electronic exchange of clinical information allows doctors, nurses, pharmacists, other healthcare providers and patients to access and securely share a patient's vital medical information electronically—improving the speed, quality, safety, coordination and cost of patient care.



Case in Point: PointClickCare enhances care collaboration

PointClickCare is a leading healthcare technology platform enabling collaboration and access to real-time insights at any stage of a patient's healthcare journey. Over 22,000 long-term post-acute care providers and 1,600 hospitals use PointClickCare.

One of its solutions, PointClickCare POC, enables users to document clinical care activities at or near the point of resident care. With POC, care teams can create timely, accurate and complete documentation to maximize RUG scores (tied to Medicare reimbursement) while increasing the amount of time spent with residents and reducing time required for routine administrative tasks.

By eliminating manual, paper-based tracking methods, staff gain additional time to care for residents. Care workers can quickly access the most relevant and timely information to proactively address resident needs, and information captured while with the resident is instantly available to other care team members.

What is Interoperable healthcare Information Technology (Health IT) systems?

Health IT refers to the ability to operate a secure system that allows instant access to and sharing of health data and information among authorized stakeholders, and only authorized stakeholders, no matter where they are located.

What are wearables?

Wearables are a network of patient-worn smart devices (electronic skin patches, ECG monitors) with sensors, actuators and software connected to the cloud that enable the collection, analysis and transmitting of personal health data in real-time. They can be worn as accessories, embedded into clothing, implanted in a person's body or even tattooed on the skin. The devices are hands-free gadgets with practical uses, powered by microprocessors and enhanced with the ability to send and receive data via the internet.

It is widely used in healthcare to enable monitoring of a patient, therapy delivery and more. In 2021, the wearable medical devices market was estimated at $16.2 billion and is expected to reach $30.1 billion by 2026.

Interest in wearables shows a steady increase. According to the *Rock Health Digital Health Consumer Adoption Report*, 54 % of Americans used digital wearables to track at least one health parameter (e.g. heart rate, body temperature) in 2020, compared to 42 % in 2019.

How does blockchain technology apply?

According to the *International Journal of Intelligent Networks* a blockchain network is used in the healthcare system to preserve and exchange patient data through hospitals, diagnostic laboratories, pharmacy firms and physicians.

For healthcare, it acts as a public digital ledger that records transactions on many computers so that no record involved can be altered retroactively. Blockchain is verified and linked to the preceding 'block,' forming a long chain. As any transaction is registered and checked publicly, Blockchain provides accountability. When entered, no one can modify all the information written in the Blockchain. It serves to demonstrate that the data is actual and unchanged.

How is artificial intelligence (AI) used?

Forsee Medical says machine learning is one of the most common forms of artificial intelligence in healthcare. It is a broad technique at the core of many approaches to AI and healthcare technology and there are many versions of it. "Machine learning, simply put, is a type of *artificial intelligence* when computers are programmed to learn information without human intervention."

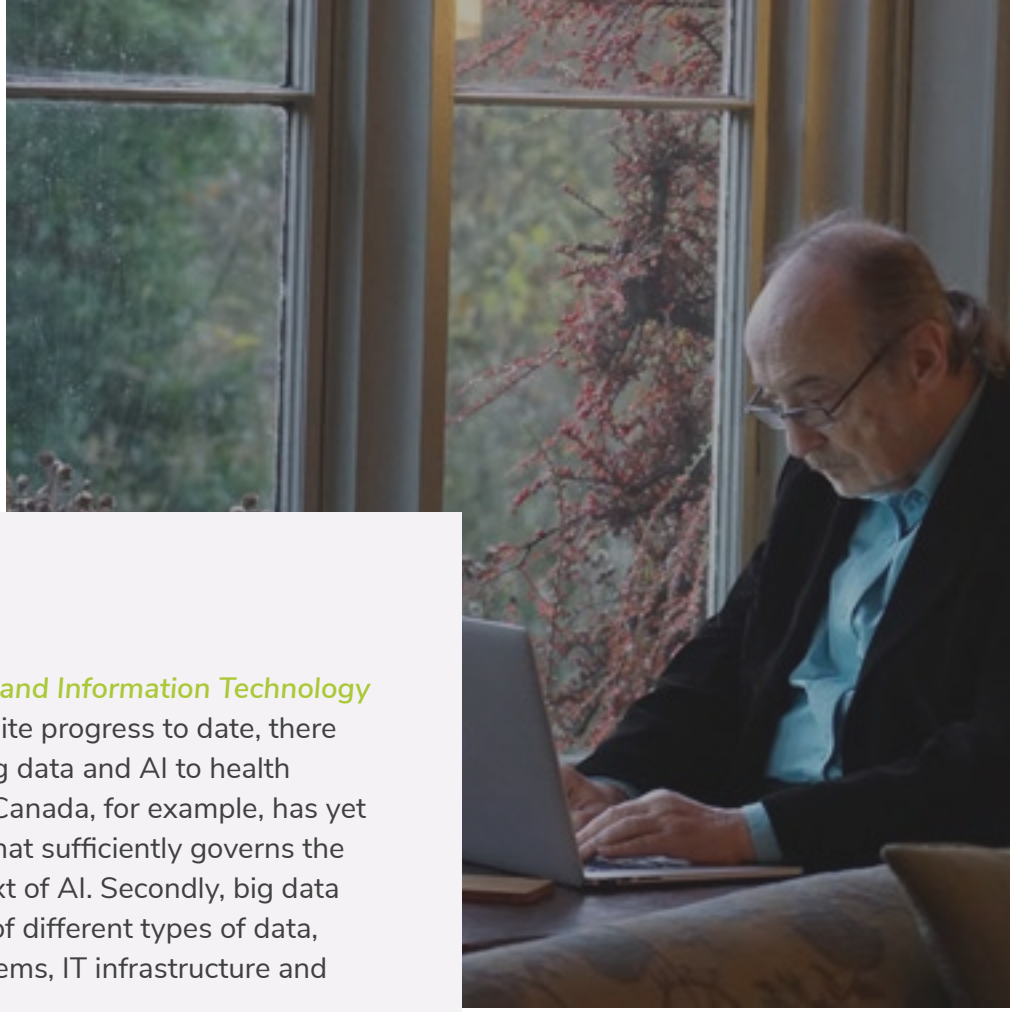
Computers are provided data and then the computers "learn" from that data. The data actually "teaches" the computer by revealing its complex patterns and underlying algorithms leading to knowledge about the data, new insights and potential for new discoveries. The larger the sample of data the "machine" is provided, the more precise the machine's output becomes.

The most common healthcare use cases for machine learning are automating medical billing, clinical decision support and the development of clinical care guidelines. There are many notable high-level examples.

Case in Point: Machine learning speeds up diagnosis

At MD Anderson, researchers have developed the first medical machine learning algorithm to predict acute toxicities in patients receiving radiation therapy for head and neck cancers.

In radiology, deep learning in healthcare identifies complex patterns automatically and helps radiologists make intelligent decisions by reviewing images such as conventional radiographs, CT, MRI, PET images and radiology reports based on the insights that are generated. The performance of machine learning-based automatic detection and diagnosis systems has shown to be equivalent to that of an experienced radiologist.



Privacy issues with AI

A recent report by the Communications and Information Technology Council of Canada (ICTC) says that despite progress to date, there remain several challenges in applying big data and AI to health research and health system innovation. Canada, for example, has yet to establish modern privacy legislation that sufficiently governs the use of personal information in the context of AI. Secondly, big data and AI require access to large amounts of different types of data, which is hampered by siloed health systems, IT infrastructure and health data.

Interviewees referenced silos between the provincial, territorial and federal health jurisdictions; local health networks or other local health systems; and public and private sector data sources. Even within health jurisdictions, individual-level data sharing is challenging. "It is often difficult for researchers to get access to high-quality individual-level data for secondary purposes (e.g., testing new hypotheses and building statistical and machine learning models).

> ***"Personal health information (PHI) is one of the most sensitive types of personal data, and there are strict privacy laws pertaining to health information in almost all the provinces and territories. One significant challenge with PHI relates to the "reuse" or "secondary use" of PHI.***

Privacy legislation generally requires that patients provide prior and informed consent for their data to be used, with consent being limited to specific, clearly defined purposes. Using PHI for secondary purposes, therefore, requires additional consent. While there are some exceptions to this rule, exceptions vary by jurisdiction and research institution.

SAMPLE BUSINESS CASE

Project Name	
Desired Implementation Date	
Business Owner	
Busying Team & Roles	

EXECUTIVE SUMMARY

(Provide an overview problem you are trying to solve with new software, urgency of the problem, and any requirements making a solution mandatory. Maximum 1,000 words.)

SAMPLE BUSINESS CASE cont'd

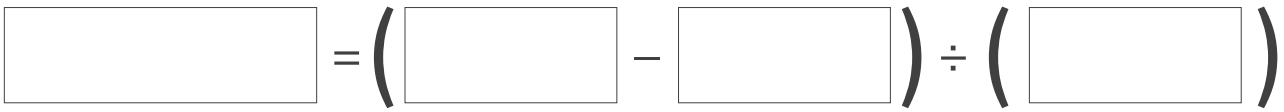
Software solution: (Describe how you plan to use software to solve business problems and/or achieve your goals that you can't do now and differentiate between mandatory requirements and nice-to-have requirements for the tool.)

Software benefits: (Highlight the expected business benefits and tangible gains as opposed to technical benefits. Example: resource time gained, money saved, improved processes, auditing, etc.)

Project timeline: (Outline major milestones such as the project kickoff meeting, the go-live date, and dates for training, as well as the minor milestones like a cadence for team meetings, status reports, and demos.)

Implementation cost and ROI: (Describe the solution price such as software licenses, as well as implementation costs like new hardware, onboarding and training services.)

ROI = (gain from investment – cost of investment) ÷ (cost of investment)



Final recommendation: (Specify which software solution you have short listed, and provide detailed rationale, especially if the lowest cost is not the winner).

APPENDIX

	[SOLUTION 1]	[SOLUTION 2]	[SOLUTION 3]	[SOLUTION 4]
[Mandatory Requirements]	✓ or ✗	✓ or ✗	✓ or ✗	✓ or ✗
[Mandatory Requirements]	✓ or ✗	✓ or ✗	✓ or ✗	✓ or ✗
[Mandatory Requirements]	✓ or ✗	✓ or ✗	✓ or ✗	✓ or ✗
[Optional Requirements]	✓ or ✗	✓ or ✗	✓ or ✗	✓ or ✗
[Optional Requirements]	✓ or ✗	✓ or ✗	✓ or ✗	✓ or ✗
[Optional Requirements]	✓ or ✗	✓ or ✗	✓ or ✗	✓ or ✗