

New Health: A vision for sustainability

July 2017



Executive summary

More than a decade ago, PwC's *Healthcast 2020* outlined what's required to create a more sustainable future for the global healthcare industry, one that is affordable to citizens and governments alike and dedicated to achieving the continuous health and satisfaction of consumers. The report described the challenges facing the industry, from increasing demand and rising costs to uneven quality and misaligned incentives.¹ At the time, some healthcare leaders were exploring solutions such as collaboration, consumerism, technology adoption, and better resource management. But today the industry is wrestling with the same challenges we highlighted in our 2005 report, including affordability, accessibility, and quality—and falling short.

Why does the healthcare industry continue to struggle? One reason is the complex global environment, marked by uncertainty and growing insularity. At a time when collaboration is needed more than ever to face global challenges—including healthcare challenges—some countries are turning inward, a trend highlighted by recent populist events. This trend not only could complicate trade, foreign relations, and domestic investment policies. It could affect the ability of the healthcare industry to innovate and address common problems.

Another reason the industry struggles is that incentives and reimbursement policies are partially out of sync with the needs and preferences of the people it serves. While consumers are increasingly focused on wellness and prevention, healthcare systems are still geared toward treating illness and disease.

There are other reasons why healthcare has been slower to change than many other industries, from regulatory constraints to a lack of price transparency. But there are signs that the industry is poised—finally—for major disruption, driven

by persistent challenges of rising costs and growing demand; the rapid advance of technology; and the rise of the consumer. Indeed, new entrants, enabled by sophisticated technology and novel business models, are already transforming pockets of the industry.



Making healthcare systems more sustainable

The purpose of this paper is to explore, at a high level, how we can make healthcare systems sustainable—how we can encourage innovation and investment in the sector to enhance wellbeing, improve health outcomes, slow the rate of cost growth, and bolster customer satisfaction. It serves as the foundation for future insights about the threats and opportunities facing the industry, and how key players can respond effectively. PwC's mission is to build trust in society and help to solve important problems. Certainly there is no more important problem facing the global community than creating sustainable healthcare systems, with adequate funding, investment, and innovation to support them.

There are many factors involved in creating more sustainable health systems, but we believe two are the most critical:

- **Delivering value to consumers**—as *they* define the term. Adopting the consumer's perspective is critical today, as consumers in many parts of the world are responsible for a greater share of total healthcare costs.
- **Developing a broader, more holistic, consumer-centred approach** that focuses on wellness and prevention, and on continuous management of health. This new model also expands the definition of health that crosses sectors and encompasses economic, social, and other aspects of individuals' lives. It is central to the emerging era that we call *New Health*.

We explore four key steps toward achieving a more sustainable future:

- **Embracing new entrants:** Established players must recognise and respond to the growing ranks of newcomers—both startups and established companies—that are leveraging technology and new business models to transform the healthcare industry.
- **Redesigning the workforce:** New workforce models are needed to make care more accessible, affordable, and capable of meeting growing demand. The workforce will expand to include social workers and others outside the medical ranks. Traditional roles will shift as organisations pursue personalised service delivery and more integrated care. Robotics and artificial intelligence (AI) will help to compensate for a looming shortage of healthcare workers.
- **Leveraging genomics and personalised medicine:** Advances in genomics are transforming the industry, enabling improvements in risk assessment, detection, treatment, and prevention, and improving the quality of patients' lives. Genomics will help to shift the industry's focus, from disease to wellness and prevention. As genomics advances, scientific, regulatory, reimbursement, and other challenges will have to be addressed.

- **Creating new care delivery models:** Technology is transforming care delivery—enabling do-it-yourself (DIY) care via mobile devices, shifting care to lower-cost settings outside of hospitals, and enabling improved care coordination. New entrants are leveraging technology and pursuing business-to-business (B2B) models to improve care delivery.

We focus on these four steps because they can help to achieve sustainability by leveraging emerging trends, and they address our primary concern of making healthcare more consumer-focused. But we recognise that these steps are by no means exhaustive. Health systems are dealing with a long list of variables that impact sustainability and the delivery of care, from resource allocation, waste, and fraud to safety and more. These challenges require greater exploration, and we will delve into them in the coming months.

The transformation of the healthcare industry has economic implications—good and bad—for stakeholders. We highlight the implications for key players:

- **Consumers**—both patients and caregivers—will be major beneficiaries of the transformation, as the industry strives to deliver on what consumers value.
- **Hospitals and health systems** may lose some patients to more convenient and cost-effective care settings. They will have to adapt accordingly, narrowing the range of services offered and providing new services that cater to consumers' desire for wellness and prevention of disease and for enhancing their quality of life.
- **Payers** will have to consider reimbursing for telehealth and other services that enhance health and reduce hospitalisation rates; consider paying for genomics-based treatments that are costlier but also more effective; integrate patient satisfaction measures in reimbursement schemes; and leverage the data they own to help consumers access affordable, high-quality care.
- **Government** must create the right regulatory and legislative environment to ensure that new entrants and new technology can thrive. Government can also help to facilitate data sharing and collection to improve population health. And it can encourage collaboration between players in the regulated and unregulated sectors of the market as well, collaborating with the private sector to achieve important healthcare goals and ease funding challenges.

Throughout the paper, we offer examples of players who are reshaping the healthcare industry. We also provide case studies that highlight the transformation underway—including a case involving a holistic, multi-sector approach

Creating sustainability

to tackling diabetes in Western Sydney, Australia that demonstrates the power of collaboration to drive positive change on a societal level.

The transformation of the healthcare industry is occurring more rapidly than many players recognise. Healthcare organisations that hope to compete in the future must understand the forces that are reshaping the industry and become active participants in the transformation.

There are many factors involved in creating more sustainable healthcare systems, but in our view, two are most critical to success: delivering value to consumers as *they* define the term, and developing a more holistic, consumer-centric approach to health and wellness.

Delivering value to consumers

In an era of rising healthcare costs, increasing demand, and dwindling resources, delivering value has taken on new importance. Like beauty, value is in the eye of the beholder, and in healthcare, the definition of value varies by stakeholder. An insurer's definition will differ from a provider's, and both will differ from the consumer's perspective on value.

In our view, it's the consumer's perspective that is most important today, as consumers in many parts of the world assume a greater burden of healthcare costs, either directly—through out-of-pocket or insurance payments—or indirectly, through regional taxes. Thus delivering value *as the consumer defines it* should be the ultimate goal of healthcare systems.

Consumers define value as the extent to which they receive what matters most to them. Value is determined by factors such as the quality of the customers'/patients' experience, how treatment impacts their lifestyle, and how much consumers receive for their healthcare dollars.

PwC's research on cancer patients reinforces the need to measure what matters to them, which often is not surviving but *thriving*, despite illness.² (For example, in a memorable TED Talk, Eric Dishman, former Director of Proactive Health Research at Intel Corporation and an avid skier who struggled with cancer, noted that what he values most is 'time in snow.' He insisted that his patient chart include the goal of taking low-dose drugs with 'side effects friendly to skiing.'³)

Historically the healthcare industry hasn't focused much on satisfying consumers, on delivering value from *their* point of view—at least not to

the extent that industries like retail and hospitality have done so. That's partly because most healthcare bills have been paid by third parties, not directly by consumers, or clinicians assume—due to their greater medical expertise—they have their patients' better interest in mind. When insurance companies write the cheques, the consumer's input is seldom solicited—about treatment options, satisfaction with services, or unmet needs that new products might address.

That's changing, as consumers take more responsibility for their care, and as they're increasingly empowered by technology, from personal health apps to social media. Today, consumers can access remote providers, order genetic tests, track fitness levels, monitor symptoms, and manage chronic illness—all from their smartphones. And they can share their experiences online—and in the process, influence health systems and drive change.



Embracing a more holistic, consumer-centred approach




As empowered consumers have a greater say in healthcare decisions, we’re seeing a shift to a broader, more holistic, patient-centred approach to health and healthcare. Under this emerging model, the focus is on wellness and prevention rather than disease and illness, and on continuous rather than episodic management of health. This new model encompasses a multidimensional definition of health that crosses sectors and includes economic, social, and other aspects of individuals’ lives. It is central to the emerging era—driven by consumers and enabled by technology—that we call *New Health*.

To deliver on the vision of holistic, consumer-centred healthcare will require rethinking traditional business models and organisational structures. It will demand that healthcare organisations focus on the changing needs and values of consumers, just as retailers do.

As with other trends we discuss in this paper, not all countries or regions will move toward this vision at the same pace, and solutions will necessarily vary in different parts of the world. But we see the emergence of a global trend toward holistic, consumer-centred care, and we believe it’s essential for the sustainability of the healthcare industry (see Figure 1).

As empowered consumers have a greater say in healthcare decisions, we’re seeing a shift to a broader, more holistic, patient-centred approach to health and healthcare

Figure 1: The changing role of the consumer

 Past	 Present	 Future
<ul style="list-style-type: none">• Passive recipient of information and care; responds to ‘doctor’s orders’	<ul style="list-style-type: none">• Empowered; active participant in treatment decisions	<ul style="list-style-type: none">• Primary decision-maker• Active partner with physicians and care teams• Potentially no physicians
<ul style="list-style-type: none">• Limited access to medical information	<ul style="list-style-type: none">• Easy access to medical information (via web, social media)• Researches symptoms prior to doctor visit	<ul style="list-style-type: none">• Proactive medical information (re: potential illness) delivered automatically via AI or virtual reality
<ul style="list-style-type: none">• No access to digital health tools	<ul style="list-style-type: none">• Uses multiple digital health tools (mobile and web-based)• Orders certain tests (including genetic tests) online	<ul style="list-style-type: none">• Orders and analyses tests using smartphone• Self-care via prevention and treatment (including more home screening, and treatment via nanobots in bloodstream)

Moving toward a sustainable future: Key steps

Achieving a more sustainable future for the healthcare will require the continued evolution of four trends: embracing the ongoing flow of new entrants into the industry; redesigning the healthcare workforce; leveraging genomics and personalised medicine; and improving care delivery systems. All four trends are being driven by technology, which represents the biggest threat and the greatest opportunity for industry players as we move into the era of New Health.

Embracing new entrants

For decades the healthcare industry was relatively closed to outsiders, but today new entrants from outside the industry are emerging in force. Armed with advanced technology and new business models, they are reshaping the industry and upsetting the status quo. For incumbents, these new entrants are a force to be reckoned with.

New entrants include both startups and well-established companies that have moved into the healthcare arena, such as Google, Samsung, General Electric, and Telstra. Both large and small companies can succeed by leveraging their unique strengths. For example, larger companies can leverage customer/channel access, data, product bundling, and investment capital, whereas startups—small, nimble, and unencumbered by tradition and regulation—can drive bold disruption, either alone or in partnership with the big established names.

Leapfrogging competitors

Some new entrants will have the opportunity to leapfrog competitors by

leveraging novel healthcare solutions or new business models that upend existing processes or treatments. For instance, a genomics company that could predict the course of a disease and alter it through intervention could upend traditional therapies and potentially undermine an entire specialised area such as oncology. Or, a new entrant that bypasses traditional reimbursement channels by offering new products directly to consumers, or by developing innovative reimbursement schemes, could jump ahead of the competition.

Another way that new entrants could leapfrog competitors is via reverse innovation. For instance, a company based in a Western market might develop a product in Asia, where healthcare regulations are less strict, then introduce the product to Western markets once it has been proven. By contrast, emerging economies with less regulation, less established healthcare systems, and more urgent needs, can innovate more rapidly, enabling some of these countries to leapfrog more developed nations.⁴

Redesigning the healthcare workforce

To achieve a more sustainable future, we'll need new workforce models that make healthcare more accessible, affordable, and capable of meeting rising demand. As we embrace a broader concept of health and wellness that encompasses social, economic, and other needs of consumers, the workforce is already expanding to include home caregivers, social workers, teachers, and others outside the medical profession. In addition, the wealth

of data generated by wearables and other medical devices is driving a need for data analysts and health information managers.

As healthcare organisations pursue integrated care, traditional roles will shift. For instance, primary care physicians of the future will be at the centre of care coordination hubs, and medical schools will have to change their curricula to train physicians in clinical advisory roles.⁵

The role of robotics

Even as healthcare needs are projected to rise with the ageing of populations worldwide, we're facing a looming global shortage of healthcare workers. The World Health Organization projects that by 2030, this shortage will exceed 14 million.⁶ Technology will play a key role in helping to fill the gap. In particular, we'll see a growing use of AI and robotics to deliver care (or assist in delivery).

Research firm Tractica projects that the market for healthcare robots will reach \$2.8 billion by 2021—up from \$1.7 billion in 2016.⁷ The power of AI and robotics is being felt across the full spectrum of healthcare, enhancing wellness, early detection and diagnosis, decision-making, treatment, end of life care, research, and training.⁸ Robots are being used in the operating theatre and in a variety of other healthcare applications, such as drawing blood, assisting people with mobility challenges, supporting autistic children, and delivering materials throughout hospitals.⁹ Assuming that the appropriate safety measures are in place, this emerging technology could have a profound influence on the quality of consumers' healthcare experiences (see Figure 2).




Research by PwC suggests that the public is ready for AI and robots in the healthcare arena. A survey of more than 12,000 people in Europe, the Middle East, and Africa found that a substantial percentage of consumers would be willing to substitute AI and robots for humans in some parts of healthcare.¹⁰ Overall, more than half of all respondents (54%) said they are ‘willing to engage with AI and robotics for their healthcare needs.’ Those in emerging economies with less established healthcare systems were more willing to embrace this new technology than people in countries with well established systems. For instance, while over one-third of United Kingdom (UK) respondents

(36%) said they were willing to have non-invasive or minimally invasive surgery performed by a robot, 73% of respondents from Nigeria indicated they were willing. We can infer that in regions where access to quality healthcare is a considerable challenge, consumers are more apt to embrace alternative modes of care.

While consumers appear ready to engage with AI and robotics, they also recognise some disadvantages of the technology. The top perceived disadvantage, cited by 47% of survey participants: they don’t trust robots with artificial intelligence to make decisions on what to do if something unexpected is found (e.g.,

during surgery or in a test). Another 38% agreed that when it comes to healthcare, people need the ‘human touch.’ This aligns with our view that technology should complement rather than replace clinical practices. We envision a healthcare future, not of humans versus machines but of humans *and* machines, a partnership that leverages the capabilities of technology while embracing the humanity and expertise of physicians and other care providers.

Figure 2: The changing workforce

 Past	 Present	 Future
<ul style="list-style-type: none"> Physicians, nurses, other medical professionals 	<ul style="list-style-type: none"> Professionals and non-professionals (caregivers, social workers, etc.) Robotic-assisted caregivers 	<ul style="list-style-type: none"> Self, assisted by AI and possibly medical professionals
<ul style="list-style-type: none"> Many specialist doctors 	<ul style="list-style-type: none"> Too few physicians in emerging markets Too few general practitioners (GPs), too many specialists in developed markets 	<ul style="list-style-type: none"> Fewer specialists, more primary care doctors Robots replace specialists for some procedures (e.g., robotic surgeons)
<ul style="list-style-type: none"> Individual care providers 	<ul style="list-style-type: none"> Care teams 	<ul style="list-style-type: none"> Integrated care teams led by primary care doctors Robots incorporated into care teams
<ul style="list-style-type: none"> Medical expertise is prioritised 	<ul style="list-style-type: none"> Technology-assisted clinicians 	<ul style="list-style-type: none"> Technology expertise and management skills are prioritised
<ul style="list-style-type: none"> Few unskilled workers 	<ul style="list-style-type: none"> More unskilled workers, assisted by technology 	<ul style="list-style-type: none"> Skilled and unskilled workforce assisted by AI and robotics

Leveraging genomics and personalised medicine

Advances in genomics science (also referred to as genomics) and personalised medicine are transforming healthcare. Genomics focuses on exploring the genetic makeup of an individual to improve diagnosis and treatment (by contrast, *genetics* focuses on individual genes). Personalised medicine includes genomics but is a broader term that encompasses any attempt to personalise health and wellness products and services for an individual.

There’s a consumer aspect of genomics science, with growing demand for companies that provide information about genetic makeup and even ancestry. But the real promise of genomics lies in its medical applications.

Genomics science is shifting the focus of the healthcare industry from illness to wellness (see Figure 3). It is helping to improve disease risk assessment, detection, treatment, and prevention as well as drug development. By

enabling earlier detection and targeted treatment, genomics science is reducing the incidence of some diseases and related mortality rates while improving the quality of life for patients.

Genomics offers other benefits: It has the potential to reduce the incidence of adverse drug reactions; increase patients’ adherence to treatment regimens; and reduce the need for high-risk invasive testing procedures. It’s also enabling advances in the diagnosis of rare diseases, bringing new hope for patients whom research has often neglected. In the long-term, genomics science could help to bend the cost curve by ensuring that the right person receives the right treatment at the right time.

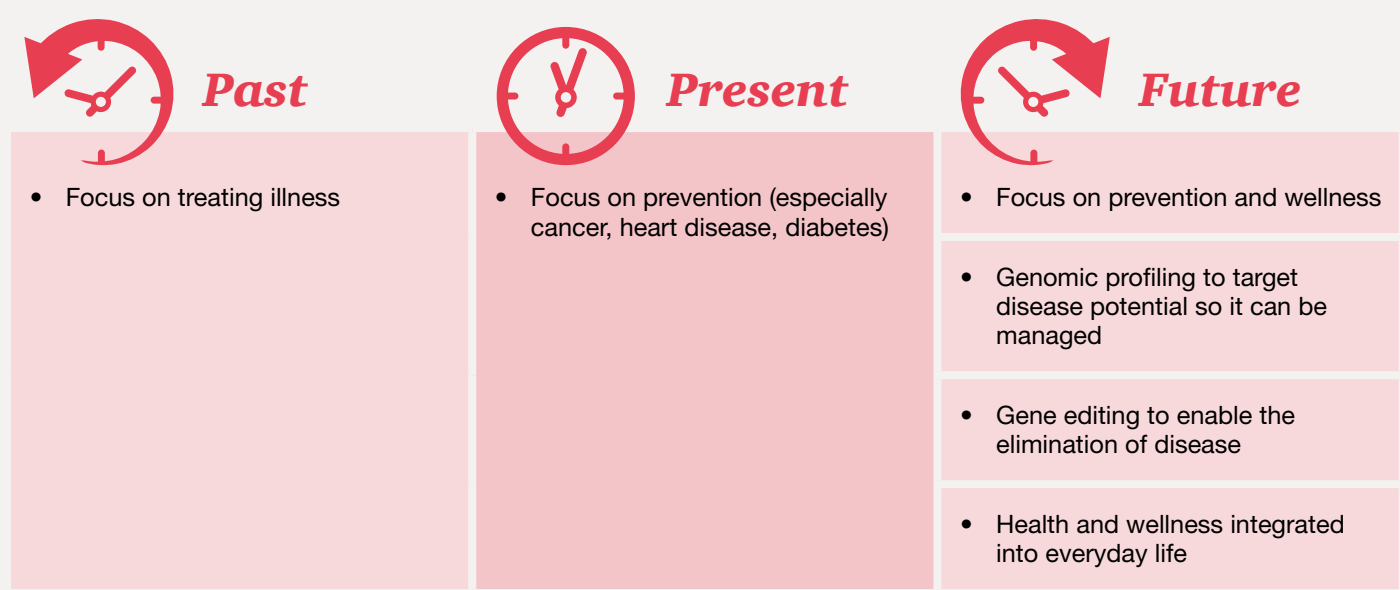
There are many current applications of genomics in healthcare. One well known example is testing for mutations of BRCA1 and 2 genes (which suppress the development of tumours) to assess the risk of developing breast cancer. Another is the highly publicised case of Nicholas Volker, a boy who underwent more than 100 surgeries and was

on the brink of death until genome sequencing identified the source of his mysterious illness.¹¹ While genomics has the potential to help detect and treat a range of diseases, oncology is a major current focus, with research and drug development targeting a variety of cancers; 73% of oncology drugs in development today are using genomic-enabled technologies.¹²

The positive outcomes achieved so far highlight the potential for genomics to transform healthcare. For instance, the five-year survival rate for patients with myelogenous leukemia is 89% following the introduction of imatinib, a targeted therapy¹³; chemotherapy use declines by 34% when women with breast cancer receive genetic testing prior to treatment,¹⁴ and the rate of heart patient hospitalisations drops by 30% when genetic information is used in dosing the blood thinner drug warfarin.¹⁵

Each year brings new advances in genomics. For instance, in 2016, the US Food and Drug Administration (FDA) approved 16 new and expanded uses of targeted cancer therapies; the first liquid biopsy diagnostic

Figure 3: The evolution of wellness and prevention



test; and the first next-generation sequencing diagnostic test. And just recently, the FDA approved for the first time a cancer drug based on a tumour's genomic biomarkers rather than where the tumour is located on the body.¹⁶ There are now 238 pharmacogenomic biomarkers recognised by the FDA for use in approved drug labeling.¹⁷

Opportunities and challenges ahead

As we move forward in the era of New Health, we will face new opportunities and challenges related to genomics. Tailored therapeutics will give the industry a platform to communicate more clearly to payers, providers, and patients that a given drug will or will not be effective for a particular individual, and this will add enormous value to the entire healthcare system. The momentum for genomics-based cancer treatments is likely to remain strong. Non-invasive cancer diagnostics, based on genomics, could enable detection of cancer in its infancy and could potentially lead to cures. In the coming years, we also expect to see a range of technological innovations related to genomics, such as new computational platforms and methods, machine learning, digital imaging, and medical decision support tools. All of these innovations will improve our understanding of disease processes, detection, treatment, and prevention.

While genomics holds much potential for the future, it also faces scientific, regulatory, reimbursement, and other challenges. Among other things, it could be difficult for innovative startups to remain financially solvent until they see widespread adoption of their genomics-based products. And scientists still have much work to do to unravel the links between genetic makeup and other factors that result in disease, such as diet and



environment, so they can create more powerful predictive models. Costs will also have to come down further before we can expect to see widespread application of genomics in the prevention, diagnosis, and treatment of disease.

Creating new care delivery models

Technology is transforming how care is delivered. It's giving consumers more power to manage their own health, driving care out of costly settings, and enabling better care coordination, which is crucial to enhancing the quality of care¹⁸ and the patient experience.

Some of the most striking examples of technology's disruptive power can be seen in the area of diagnosis and treatment. For instance, researchers in

Texas have developed AI software that can read mammograms and analyse pathology reports to diagnose breast cancer with 99% accuracy—and do so 30 times faster than a physician could.¹⁹ And at the University of Alberta, researchers have developed nanomachines that use synthetic DNA motors to detect cancer or other disease markers earlier and deliver drugs more precisely, with the potential to reduce side effects.²⁰

New entrants and traditional healthcare organisations are leveraging technology advances to develop more consumer-focused care delivery models. We're seeing more self-care solutions and models that push care out of hospitals and into homes and communities. Some new entrants are also leveraging new business models to gain a competitive edge in care delivery.

Enabling DIY care

Digital technology is enabling more self-care (see Figure 4). With the help of mobile phones and other portable devices, consumers can access doctors on demand, monitor chronic conditions, and more. Such tools empower consumers to manage their health, alone or in partnership with their care teams.




In the future, mobile technology will give consumers even more power. Enabled by AI, today's higher-end smartphones already have some of the most sophisticated voice recognition software in the world. Leveraging AI, Big Data and analytics, a mobile app could potentially analyse an x-ray, MRI, or other sophisticated test on a smartphone, faster and more accurately than a physician. This

is democratised technology, and it threatens to shift the balance of power between consumers and providers, and to disrupt existing pricing models. It also could threaten the traditional roles of radiologists, pathologists and other medical professionals.²¹

Moving care to lower-cost settings

One of the biggest technology-driven disruptions is the transition of care

Figure 4: Using technology in care delivery




 Past	 Present	 Future
<ul style="list-style-type: none"> Large equipment—hospitals and doctors' offices 	<ul style="list-style-type: none"> Portable devices Wearables Smartphone-based Virtual technology (e.g., telemedicine) 	<ul style="list-style-type: none"> Virtual (e.g., medical holograms, telemedicine) Embedded (e.g., nanobots, sensors)
<ul style="list-style-type: none"> Physician-focused 	<ul style="list-style-type: none"> Physician- and consumer-focused 	<ul style="list-style-type: none"> Consumer-focused
<ul style="list-style-type: none"> No interconnectivity 	<ul style="list-style-type: none"> Limited connectivity 	<ul style="list-style-type: none"> Extensive connectivity Wireless Cloud-based
<ul style="list-style-type: none"> Physical 	<ul style="list-style-type: none"> Physical and virtual 	<ul style="list-style-type: none"> Emphasis on virtual
<ul style="list-style-type: none"> External 	<ul style="list-style-type: none"> Still mainly external 	<ul style="list-style-type: none"> Sensor-based, embedded (e.g., in home appliances, furniture, clothing) Internal (in vivo devices – for diagnostics and treatment)
<ul style="list-style-type: none"> Low-tech 	<ul style="list-style-type: none"> High-tech, limited integration and interoperability 	<ul style="list-style-type: none"> High-tech AI-driven Leverages Big Data, genomics, and analytics Integrated Interoperable

out of costly facilities (see Figure 5). Moving care into lower-cost settings is a major trend that was identified by PwC for 2016, as reimbursement shifts toward paying for value, not volume.²² This trend also aligns with the values of mobile consumers, who prefer ‘care anywhere’—anywhere but a hospital, that is.

Already, more than 50% of Kaiser Permanente visits are virtual, leveraging smartphones, videoconferencing, and other technology,²³ and this trend is accelerating, with many startups entering the arena. After years of promise, telemedicine is beginning to transform the industry.²⁴ The

developers of Mercy Virtual Care Center have taken the concept of telemedicine to the extreme, building a hospital with no beds or patients that’s devoted solely to virtual care.²⁵ We expect the trend toward virtual care to accelerate.

Figure 5: Shifts in care delivery

 Past	 Present	 Future
<ul style="list-style-type: none"> • Institutional care (hospitals, doctors’ offices) 	<ul style="list-style-type: none"> • Outpatient centres • Retail clinics • Home- and community-based care • Virtual care/telemedicine • Mobile apps—fitness, disease monitoring (cardiac, diabetes, etc.) • Portable devices (e.g., non-invasive blood glucose monitor) • AI-assisted test analysis • Robot-assisted surgery • House calls (via mobile app) 	<ul style="list-style-type: none"> • Home- and community-based • Virtual care/telemedicine • Virtual surgery • Surgeon-less operations • Automated test analysis using AI
<ul style="list-style-type: none"> • Fragmented, disconnected • Individual physicians working in silos 	<ul style="list-style-type: none"> • Multidisciplinary care 	<ul style="list-style-type: none"> • Integrated care • Connected care teams
<ul style="list-style-type: none"> • Episodic 		<ul style="list-style-type: none"> • Continuous
<ul style="list-style-type: none"> • Focuses solely on medical needs 	<ul style="list-style-type: none"> • Hospitality and wellness services 	<ul style="list-style-type: none"> • Addresses broader health needs (social, economic, etc.)
<ul style="list-style-type: none"> • Care based on knowledge and experience of professionals 	<ul style="list-style-type: none"> • Minimal collaboration between doctors 	<ul style="list-style-type: none"> • Data-driven, evidence-based care
<ul style="list-style-type: none"> • Care delivered solely by medical professionals 	<ul style="list-style-type: none"> • Care delivered by medical professionals and non-professionals 	<ul style="list-style-type: none"> • Self-care via prevention apps and devices (including in vivo diagnostics and treatment)
<ul style="list-style-type: none"> • Measurements based on physician/institution outcomes 	<ul style="list-style-type: none"> • Prevention playing a bigger role but measurement still focused on cost savings 	<ul style="list-style-type: none"> • Measurement based on patient outcomes

Leveraging B2B models

In this paper, we focus largely on end consumers, but it's important to note that physicians are also key healthcare customers through which products flow to end customers/patients. In our view, one reason many healthcare innovations fail is that they are targeted to consumers rather than to providers and other business customers.

Some new entrants are leveraging business-to-business models to improve care delivery. For instance, MyDoc has implemented a B2B model that's focused on care coordination (see 'MyDoc: A new business model for coordinating care' sidebar). The MyDoc story highlights the potential for delivering better care of consumers by satisfying business customers.

In our view, one reason many healthcare innovations fail is that they are targeted to consumers rather than to providers and other business customers

MyDoc: A new business model for coordinating care

When Dr. Snehal Patel moved from New York City to Singapore in 2008, he observed a fragmented healthcare ecosystem in Southeast Asia. Because the region's healthcare systems were less developed, they were unencumbered by the legacy systems that make innovation difficult in more developed markets. Patel recognised this as an opportunity to potentially leapfrog competitors. To capitalise on the opportunity and address the challenge of fragmentation, Patel and a fellow physician, Vas Metupalle, launched MyDoc, a secure care coordination platform designed to connect the pieces of the ecosystem and simplify care delivery.

MyDoc provides a single access point to a personal healthcare network consisting of doctors, pharmacies, insurers, and lab data. It gives users easy access to a range of services such as health screening, virtual consultations, e-prescriptions, wellness coaching, and tools to manage chronic conditions such as diabetes. Users can manage and track their health data and lab results on MyDoc via smartphone or their computer, securely message or chat with their doctors, order prescriptions, and more. The platform also offers payer integration as well as services for healthcare providers, such as care team management tools, peer referrals, and the ability to view lab results and DICOM images. In building the platform, the founders drew from the design of popular chat apps, so that users wouldn't have to learn a new interface.

Unlike many healthcare startups which target consumers directly, MyDoc is a B2B model. Customers include major insurance companies and blue chip corporations across Southeast Asia, which offer the platform to their policyholders and employees. Insurance companies

recognised that better care coordination could reduce costs. Corporations saw the potential to generate a higher level of user engagement and satisfaction than telehealth services could, and a higher return on their healthcare investments.

To engage physicians—a prerequisite for success—it helped that the cofounders are physicians themselves. They recognised that traditional telehealth models can be disruptive to the practice of medicine. So they set up MyDoc to minimise the disruption to physicians' practices and make optimum use of their time. "Today you have a lot of inefficiencies, with physicians called in to do things that we can automate, things that we can push to a triage level," says Patel. "With MyDoc we're telling physicians that your time is valuable. We will save you for the aspects of healthcare that absolutely require your advice and skills."

MyDoc's B2B model and focus on simplicity have yielded measurable results. Due to the app's convenience, 85% of MyDoc users follow up after health screenings, and the app is used three times more than the industry standard for telemedicine, Patel notes. "We think people come back to the app at a higher rate because we're a multi-trick pony," he says. "They don't just access the platform when they're sick. The fact that so many services are offered make it like 'healthcare in a box.'" For many users, MyDoc is their main touchpoint with the healthcare system, making it a valuable resource.

For consumers, MyDoc is delivering on the promise of easier access to more effective care. For health insurers and corporate customers, MyDoc offers another way to deliver value to consumers in the era of New Health.

Implications for key players

As we move toward a future of holistic, patient-centred healthcare, a variety of players will feel economic impacts, positive and negative. There will be winners and losers. To stay viable, players will have to adapt.

Consumers—both patients and caregivers—will be big beneficiaries of healthcare's transformation, as the industry focuses on what consumers value. New entrants also will be clear winners, with major opportunities to deliver consumer-focused products and services, as we have discussed. Hospitals and health systems, payers, and governments will also have opportunities in an era of New Health, but they will face some daunting challenges as well. Collaboration to create a more connected healthcare ecosystem of players will help to ensure success and sustainability.

A changing role for hospitals and health systems

Many hospitals and health systems are already struggling to survive as costs rise and technology enables less costly care elsewhere, from outpatient centres to the home. As technology continues to advance, hospitals could lose patients and be forced to narrow the range of traditional services they offer. There will still be a need to perform some acute care in hospitals, and to serve ageing populations, but there will be fewer hospitals needed, and some won't survive. Many hospital employees could be left without jobs and may have to undergo retraining to thrive in a changing care delivery environment.



To compete in this new environment, hospitals will have to adapt, perhaps by adding services that cater to consumers' desire for wellness and prevention. Some hospitals are acquiring healthcare startups as a

way to stay relevant and competitive, but in our view, many of these acquisitions have been reactive rather than strategic and thus may not be positioned for success. As we move towards evidence-based care,

measurements that demonstrate cost transparency and accountability will become more important to improve clinical performance and outcomes (see "Measuring what matters" sidebar).

Measuring what matters

In determining health outcomes, providers too often measure what they believe to be important rather than what patients value. That includes elderly patients in long-term care settings.

One of the biggest debates in long-term care centres on quality of life, with a concern that care homes are focused purely on medical treatment rather than on wellbeing. More than 15 years ago, the Dutch Ministry of Health and ActiZ, the Dutch association for residential and home care organisations and infant and child health clinics, began to address this concern. ActiZ created a multidimensional benchmarking system to measure what matters to the elderly customers its members serve in home care and residential care settings. The goal: to increase quality, reduce costs, and enhance transparency for all stakeholders.

As a national health employers' association, ActiZ acts on behalf of its members. The association tries to influence Dutch national health policy development, and negotiate financing with national and local agencies, regional payers, and health insurance companies. Its 400 plus members provide care for more than one million public and private customers, with around 430,000 employees.

Realising the importance of a critical mass of contributors, ActiZ gained agreement from the vast majority of its members to participate in a multi-dimensional benchmarking system. It acknowledged the need for a sophisticated system, which would be improved annually, that would enable comparisons within and between participating organisations. Over time, the organisation designed and refined a series of regular reports that consider provider performance across three dimensions:

- **The customer's and family's view of care, including reliability of care**, quality of treatment, safety, concern for mental well-being, professionalism of staff, and communication.

- **Employees' views of employer quality**, including the corporate vision and ambition, inspiring leadership, job content, pressure of work, atmosphere and fun, learning and personal development opportunities, and concern for elderly customers.
- **Operational and financial performance** – the operating margins, solvency, and current ratio, all driven by key indicators like the capital expenditure ratio, information technology costs, and human resource costs per employee.

The results give insight into performance, and they often reveal surprising links among the three dimensions and variables. For instance, there appears to be little correlation between hours of caregiving and the perceived quality of care received, suggesting that it's more important to improve the nature of care, and listening to the elderly customers' wishes, than the volume.

These and other findings are raising the average standards of perceived quality of care, employee engagement, and financial performance across all ActiZ members. A provider can also use the benchmarking data to compare units, wards, and locations within a single organisation and pinpoint high performers and units with potential for improvement.

The ActiZ benchmarking system demonstrates the value of asking the right question (e.g., "How can I serve you?") to the people they care for. This fact-based approach has made an impact in the way performance is driven and the perceived quality of care for the elderly in the Netherlands, helping the government and payers to reduce costs and giving elderly and their families better-informed choices over home and residential care providers.

Source:

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New considerations for payers

In the New Health era payers, whether private or public, will have to reconsider their approaches to reimbursement. As the benefits of wellness and prevention are proven, insurers should consider reimbursing for products or services that keep members healthy and avoid costly hospitalisation. That includes telemedicine and other services performed outside of hospitals. Payers should also weigh the benefits of reimbursing for personalised medicines that increase the cost but also the value of treatments. This will require a different mindset.

To ensure that consumers are getting value from the healthcare services they receive, payers should integrate patient satisfaction measures into their reimbursement schemes. Some health systems are using patient-reported outcomes and experience measures as part of their performance scorecards. One notable example is the US Medicare system, which links reimbursement to a measure of customer satisfaction.²⁶

In addition to updating their reimbursement models, payers can leverage the massive amount of data they own to help consumers access affordable, high-quality care, taking into consideration regional regulations and patient privacy. This new role of advocate will also serve payers' self-interest in keeping costs in check while improving care quality.

In the very long term, as wellness and prevention reduce the incidence of disease and continuing technology advances make healthcare very inexpensive, consumers will pay out of pocket for most, if not all, of their care, perhaps with some government

help. That could eliminate the need for most insurance companies, which will have to adapt to a radically changed marketplace.

The role of government

In the coming years, a key challenge for government at all levels will be to remain solvent while meeting constituents' healthcare needs. To support the sustainability of healthcare systems, governments must also create the right regulatory and legislative environment to ensure that new entrants and new technology can thrive. It will always be a challenge for regulations to keep up with the dizzying pace of technology change that is driving healthcare innovation.

While technology poses challenges for governments, it also presents opportunities to be more effective by making it easier to mine and analyse data to improve public health. Leveraging Big Data and analytics, for example, government can determine which medical procedures are being overutilised, and where, and identify pockets of chronic disease so they can be addressed more effectively.

Government can also play a role in facilitating the collection and sharing of data to improve population health. The government of Australia has been developing and implementing an initiative dubbed My Health Record to create a personally controlled, electronic shared health record for every Australian. The initiative will better connect the country's national health system and give physicians access to critical information when needed (e.g., in a medical emergency).²⁷ One long-term goal is to bring patients' genomics data into the health records, which will provide physicians with even richer

information to improve the quality of care and deliver more value to consumers. Could we one day reach the point where medical records are not just national but global?

The need for collaboration

Artificial intelligence, mHealth, virtual reality, and other technology, including technology needed to implement global medical records, have been around for awhile. But to realise the potential of these technologies will require a greater focus on collaboration and breaking down silos with key players in the healthcare arena working in concert as an ecosystem.

Government can play a role in encouraging collaboration, by staying up-to-date on technology advances and creating a regulatory environment that rewards collaboration rather than restricting it. This will require governments to break down silos that prevent innovation from flowing between players in regulated and non-regulated (e.g., prevention and wellness) sectors of the healthcare industry.

Increasingly, governments are collaborating with the private sector to meet public health objectives. For example, in the UK, the National Health Service (NHS) and Google's AI company, Deepmind, have partnered with the Royal Free Hospital in London to help initially with the early detection of acute kidney injuries. This collaboration has now expanded to cover other preventable conditions. This is being done through a unique public-private sector collaboration (through technology, data and AI engines) focused on clinical outcomes with the patient as the focus rather than the hospital or the health system²⁸—a key issue that must be

addressed when implementing any initiative involving electronic health records. Another compelling example of collaboration is the Western Sydney Diabetes initiative, which has brought together government agencies and private partners to address a critical healthcare challenge (see sidebar, ‘Tackling diabetes in Western Sydney’). We expect to see more such collaborations in the future, as governments and private stakeholders grapple with the challenge of creating sustainable healthcare systems.

Addressing funding challenges

Funding of healthcare is another issue that governments must help to address, despite their own financial constraints. Adequate funding is needed to develop the technology and innovations that eventually will drive down the cost of care and boost quality and customer satisfaction. The challenge is to determine who will pay—especially for healthcare innovations that don’t have a clear short-term return on investment.

Novel funding arrangements, such as the pursuit of social benefit bonds by the Western Sydney Diabetes initiative, could be one way of sharing the risks and rewards between government and private players. For governments facing budget shortfalls, public-private partnerships may be another solution to funding challenges.



Increasing the odds of success

Seven guidelines that will improve the likelihood of succeeding in the era of New Health.

1. Identify and deliver on what consumers value most. Use patient-reported outcomes to measure success.
2. Shift your focus from illness and treatment of disease to wellness and prevention.
3. Rethink your business model and product portfolio. Determine how to make products and services more consumer-focused, and how to address broader aspects of health (economic, social, etc.).
4. Consider how to leverage technology to deliver more convenient and affordable quality care to consumers.
5. Collaborate. New entrants and established players, private and public organisations, even competitors can benefit by partnering to deliver consumer-centred healthcare.
6. Reconfigure the workforce. Consider how human resources can be better deployed to achieve the vision of holistic healthcare, and how AI and robotics can complement human labour or replace it where appropriate.
7. Explore new funding and reimbursement models to help drive innovation, such as social benefits bonds. Consider public-private partnerships as a way to pool resources.

Tackling diabetes in Western Sydney: A holistic approach

Diabetes is a serious problem in Australia, and Western Sydney in the state of New South Wales (NSW), is a recognised 'hot spot' for the disease. More than half the population of Western Sydney is overweight and at risk of developing type 2 diabetes. The impact on the state's health system is enormous; based on an analysis of hospital data, PwC estimates that diabetes costs NSW AUD\$126 m annually, accounting for 16% of all inpatient resources. If the problem is not addressed, within a decade the Western Sydney hotspot will create an unsustainable economic and societal burden on the state's health system.

Western Sydney has economically challenged communities, and in some areas, healthy foods aren't readily available. These so-called 'food deserts' are part of an overall environment that makes it difficult for residents to engage in a healthy lifestyle and puts them at risk of type 2 diabetes.

'Beating Diabetes Together'

The Western Sydney Diabetes (WSD) initiative was launched in 2012 to address the challenge. The initiative is a collaboration of approximately 50 partners, including public agencies across health, education, social care, infrastructure, and local councils; two preeminent universities; food companies; and non-government organisations, including Diabetes New South Wales (NSW) and the Australian Capital Territory (ACT). The goals of the initiative are to prevent type 2 diabetes by addressing the root causes of the problem, and to slow the progression of diabetes. Working with at-risk populations and those who already have the disease represents an ideal opportunity to reorient the health system to prevention and earlier intervention.

The WSD initiative recognises that diabetes care is multidisciplinary and occurs in a variety of settings, and that effective prevention and care require a partnership approach that extends beyond the boundaries of the healthcare industry. Hence the programme motto: 'Beating Diabetes Together.' The plan to beat diabetes calls for leveraging existing successful interventions, bringing new capabilities, innovations, and technology to bear on the problem, and creating new outcomes-oriented funding mechanisms to finance the solution.

Framework for action

To achieve optimal results, the WSD programme is targeting interventions in four core domains: Primary Prevention; Screening and Lifestyle Coaching; Enhanced Community Management, and Specialised Hospital-based care reaching

out to the community. Multiple sectors are involved in addressing these areas.

Primary Prevention The prevention programme will target the key drivers of diabetes: reduced physical activity, consumption of unhealthy food, and lack of a socially inclusive environment. A variety of initiatives are addressing prevention. These include healthy eating initiatives, such as a community-based cooking programme, kitchen gardens in primary schools, a peer educational programme for high schoolers, and community gardens targeting social housing areas. Prevention initiatives also include programmes to boost physical activity, such as walking groups promoted through GP practices and the Heart Foundation, and residential planning to create more recreational open space and opportunities for walking, cycling, and other forms of exercise, and for building connections within the community.

Screening and Lifestyle Coaching Widespread hospital and community activities will identify those who have pre-diabetes, so they can receive the support they need to become fitter and lose weight, thus reducing their odds of progressing to diabetes.

Enhanced management

Type 2 diabetes is best managed by GP and allied health providers in the community, leaving hospitals to manage more complex cases. Specialist diabetes teams are case conferencing patients with practice GPs and training practice nurses to better manage the disease. Enhanced management is focused on delivering better care to patients in the community and more integrated care with hospitals. This is achieved through components such as community eye and foot services, a web-based information portal called HealthPathways, and a two-way GP/specialist telephone support system. There are also plans in place to utilise a mobile application for consumers. The app would complement clinical care by providing education and support for patients on a daily basis, to encourage self-management of their condition.

Specialised consultation

This programme focuses on changing in-hospital and outpatient diabetes services and better connecting them with community care, such as outpatient clinics, diabetes education services, and general practitioners in the community, to strengthen the integrated model of care for diabetes that the WSD initiative is pursuing.

Economic impact

PwC modelled the economic impact of 15 primary prevention initiatives within the WSD programme over the 14-year period 2017 to 2030, recognising the need for a longer-term perspective on prevention and the extent of the paradigm shift required. In total, the initiatives target 270,500 people, including 44,000 adults at high risk of diabetes, 6,000 adults in the 50% of the population that’s healthy, and 220,500 children.

PwC projects that the initiatives will prevent 10,000 people from developing type 2 diabetes. The total benefits of the initiatives are projected to reach roughly AUD\$702.26 m, and the total costs to run the initiatives are estimated at AUD\$124.7 m, for a total net benefit of AUD\$577.99 m. That total net benefit includes AUD\$262.07 m in healthcare costs avoided; AUD\$272.68 m in government subsidies (pension, benefits) and direct non-healthcare costs (caregivers, home support) avoided; and AUD\$43.25 m in lost productivity in sick days (absenteeism) avoided (see Figure a). An additional AUD\$1.3 m on top of the total net benefit will be saved as a result of the initiatives that target children, by preventing the lifetime costs that would have been incurred if they had become diabetic.

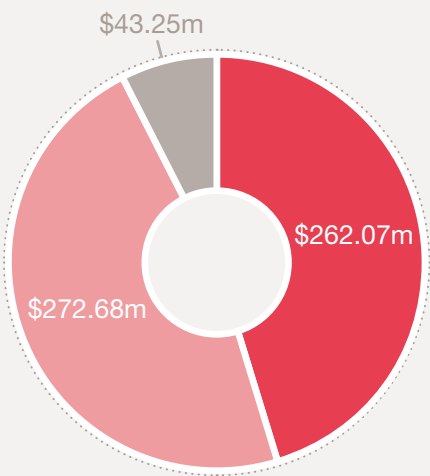
Some components of the WSD programme have already been funded and are being implemented. But it will require additional funds to fully scale the initiative and reap the projected rewards. This is particularly challenging, given that existing funding models are more geared towards the management of diabetes with funds split between primary care (from the federal government) and acute care (from the state government).

The WSD collaborators are pursuing novel funding strategies, all with an outcomes focus. Options being pursued include creating social benefit bonds whereby private investors would invest in the bonds, and the government would pay off the bonds with a premium for achieving programme objectives. Another option that may be pursued is a pay-for-performance contract with government directly (both state and federal levels of government). The WSD programme is exploring investment options into prevention-oriented activities with relevant partners where these activities align with related areas of focus (e.g. retail services to promote healthy food

Figure a: Estimated cost/benefit of WSD programme (in AUD dollars):

Cost/benefit summary	Benefit to 2030
Total benefits/costs avoided	\$702.26m
Total costs to run initiatives	(\$124.27)m
Total net benefit	\$577.99m

Breakdown of whole of care cost savings (in AUD dollars)



- Healthcare costs (Inpatient, Emergency, Outpatient, Primary Care)
- Government subsidies (pension, benefits) and direct non healthcare costs (carers, home support)
- Lost productivity in sick days (absenteeism)

choices). These approaches reflect the WSD programme’s commitment to the principle of sharing risk and return, with payments made depending on outcomes achieved.

The WSD programme is a prime example of a holistic approach to improving population health that involves a variety of sectors and stakeholders. We expect to see more such examples emerge as communities worldwide struggle with sustainability in the emerging era of New Health.

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Dr. Snehal Patel, MD
CEO & Co-Founder
MyDoc

Prof. Glen F. Maberly
Director
Western Sydney Diabetes

Other contributors:

José Alarcón
Partner
PwC Mexico

Michael Burkhardt
Partner
PwC Germany

Dr. Zubin Daruwalla
Director
PwC Singapore

Vaughn Kauffman
Principal
PwC US

Frank Lemmon
Principal
PwC US

David McKeering
Partner
PwC Singapore

Dr. Rana Mehta
Partner
PwC India

Robbert-Jan Poerstamper
Partner
PwC Netherlands

Richard Royle
Partner
PwC Australia

Nathan Schlesinger
Partner
PwC Australia

Simon Sun
Partner
Strategy& China

Dr. Tim Wilson
Partner
PwC Middle East

Contacts

Contact us for more information:

United Kingdom

Patrick Figgis
Global leader, Health
+44 (0) 207 804 7718
patrick.figgis@pwc.com

United States

Kelly Barnes
Asia Pacific, Americas Leader,
Health Industries
Global Health Industries
Consulting Leader
+1 214 754 5172
kelly.a.barnes@pwc.com

United Kingdom

Dean Arnold
Europe, Middle East, Africa Consulting,
Health Industries leader
+44 (0) 207 213 8270
dean.c.arnold@pwc.com

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